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September 4, 2001

Dear Members of the Regional Interagency Executive Committee:

We are environmental scientists with long experience in the Pacific Northwest and expertise that includes conservation biology, disturbance ecology, geomorphology, zoology, ecosystem science, and the ecology of lichens, fungi, invertebrates, and mollusks. The purpose of this letter is to request that you exercise the adaptive management provisions of the Northwest Forest Plan to protect all remaining late successional/old-growth forests [1] (LSOG) on federal lands in the region covered by the plan. In making this request we echo a central recommendation of the National Research Council's Committee on Environmental Issues in Pacific Northwest Forest Management (NRC 2000):

> Forest Management in the Pacific Northwest should include the conservation and protection of most or all of the remaining late-successional and old-growth forests.... The remaining late-successional and old-growth forests could form the cores of regional forests managed for truly and indefinitely sustainable production of timber, fish, clean water, recreation, and numerous other amenities of forested ecosystems.

We believe the science is clear: when habitats have been sharply reduced, the probability of maintaining viable populations of organisms that depend on those habitats increases directly with the amount of remaining habitat protected. Moreover, the increasing recognition of thresholds in species viability implies the relationship is nonlinear: relatively small changes in protection can translate to large effects on viability (Kareiva and Wennergren 1995). The extent to which old-growth forests have been lost in the Pacific Northwest is well documented. The Committee on Environmental Issues in Pacific Northwest Forest Management estimates that when Euro-Americans arrived in the mid-1800s, "...as much as 80% of the forests in western Oregon and Washington were older than 80 years and about two-thirds were older than 200 years" (NRC 2000). By the 1990's, researchers estimated only 13% to 18% of forested area in western Oregon and Washington was in old-growth, a reduction of over 75% (NRC 2000). Federal lands are the last repositories of the unique ecological wealth represented by these old forests.

From the standpoint of conservation ecology there are a variety of reasons for protecting all remaining LSOG, of which five in particular stand out:

- Many species that occupy stable habitats—of which old forests are a prime example—have poor dispersal capabilities, hence risk isolation, genetic deterioration, and ultimate extinction when suitable habitat is spread too widely (Kareiva and Wennergren 1995). Studies and modeling over the last few years

suggest that many LSOG associates in the PNW may be limited more by dispersal than by the abundance of habitat per se, including species of lichens, bryophytes, mollusks, fungi, and invertebrates (Boughton 2001, Sillett et al. 2000). This implies that every remaining piece of suitable habitat becomes an important focus for eventual colonization of the surrounding landscape. Potential problems with dispersal are exacerbated in the Pacific Northwest because young forests presently dominating the matrix do not have the structural complexity and legacies characteristic of naturally disturbed forests (e.g. Tappeiner et al. 1997), resulting in a much starker contrast between old and young forests than occurred historically. Of particular concern are low levels of coarse woody debris (important for some fungi, including many truffle-formers), hardwoods (important for some lichens and many species of Lepidoptera), and dense young conifers (detrimental to lichens). Harvesting practices that maintain biological legacies show promise as lifeboats for at least some of the species of concern, but not enough is known about that potential to accept "new forestry" as a substitute for protection.

- Species, species assemblages, and the genetic structure of populations may vary at relatively fine scales for small organisms (which account for by far the largest share of diversity), raising the possibility that each remaining older forest is to some degree unique in its biological structure. For instance, many mollusk species are restricted to one region, or even one river drainage (Frest and Johannes 1993). Recent research shows that, when compared within a locale that is reasonably uniform environmentally, old-growth virtually always differs from younger forests with respect to the soil and litter arthropod community. However, different locales within a given province (i.e., within the Cascades, Coast Range, or SW Oregon) are generally distinct from one another, and the different provinces are strikingly so (Madson 1997).

- Once thought to have relatively poor habitat value, small fragments of older forest are now known to be significant biological reservoirs. Amaranthus et al. (1994) found that 3.5- ha fragments of mature forest harbored 13 species of truffle-forming mycorrhizal fungi not found in surrounding plantations. Studying forest-floor arthropods, Work (2000) found an edge effect extending 100 m into older forest, after which a distinctive old forest community occurred. It follows that fragments larger than 3-4 ha have conservation value for arthropods as well as fungi.

- Regarding stream protection, old-growth differs from younger forests in two respects: they reduce the likelihood of debris flows and, if flows do occur, those from older forests are more likely to be beneficial to streams because of inclusion of large wood and limited runout lengths.

- Natural disturbances are likely to destroy some of the remaining old-growth and mature habitat before younger forests have aged sufficiently to provide suitable replacement habitat, a risk significantly increased by the combined effects of changing climate (which could result in more wildfires), and the increased vulnerability of older forests when embedded within a matrix of fire-prone young forests. The more saved now, the greater the buffering against such losses.

It is impossible to state precisely what is at stake biologically and ecologically, because as Jack Thomas succinctly pointed out, these forests are not only more complex than we think, they are more complex than we can think. But there is little question that "(m)uch of the biological diversity of the Pacific Northwest is associated with late-successional and old-growth forests" (NRC 2000). Although scientists have been aware of the unique biological richness associated with older forests for at least 40 years, the vast majority of species are small, cryptic, and difficult to study; therefore much remains to be learned about habitat requirements, genetic diversity, dispersal capabilities, and many other factors that underpin species viability. There are significant unanswered questions about the degree to which a reserve system designed spatially to accommodate vertebrate dispersal meets the needs of small organisms. We know at least some of the organisms in question, such as nitrogen fixing lichens and truffle forming fungi, perform vital functions within ecosystems. The experience with Pacific yew has taught us that some may have as yet undiscovered properties that directly and significantly benefit humans.

We view this action as falling naturally within the adaptive management provisions of the Northwest Forest Plan. For many biologists, saving all remaining old-growth and mature forests was always the best option from a conservation standpoint (e.g. USDA et al. 1993, Fig. II-7). However, the scientists who developed the Plan had a clear mandate to balance conservation with economic and social concerns, and in our opinion did a remarkable job of accomplishing that. Several things have changed, however, which taken together argue strongly that this is the appropriate time to extend protection to all remaining older forests. As we pointed out above, more is known about the habitat preferences and dispersal capabilities of lichens, fungi, and mollusks, resulting in greater certainty that some are intimately tied to older forest habitats and likely to disperse poorly through the matrix. Moreover, in the past 10 years human-induced climate change has gone from a contentious hypothesis to near scientific certainty, with unknown but in all likelihood stressful future impacts on ecosystems. Humans have set forces in motion that are beyond our control, and the chances are high that some of the older forest now set aside will be lost. Protecting all that remains buys some insurance.

Finally, the social and economic scene has changed significantly since the Plan was formulated. Recent polls show a substantial majority of both urban and rural residents in the Pacific Northwest support protection of remaining old-growth. Economically, the Pacific Northwest has broadened its economic base and wood products have diminished in importance. By 1996, wood products industries accounted for only 1.9% of all jobs in Oregon and Washington. New job creation in the region has far outpaced job losses in the timber industry, and all but two of the 38 counties in the spotted owl region of Oregon and Washington had higher total employment in 1996 than in 1990 (Niemi et al. 1999). As Niemi et al. state, "the sky did not fall." By necessity, the timber industry has become less dependent on federal logs. In 1998, the latest data we were able to access, only 1 of 71 sawmills in western Oregon depended on federal timber for more than 2/3 of their supply, 3 depended on federal timber for 1/3 to 2/3 of their supply, and 40 processed no federal timber (ODF 2000). As of 1996 in western Washington, 75% of sawmills processed no federal timber, and only one mill depends on federal timber for more than 1/3 of its supply (WDNR 1996).

Despite the drop in overall dependence on federal timber, a number of mills still depend on federal timber for 1/3 or less of their supply (42 in western Oregon

and Washington in 1998). We suggest at least part of any shortfall resulting from LSOG protection could be made up by thinning younger stands, including those in LSR's. Done correctly, thinning younger stands can produce logs while at the same time enhancing ecological and conservation values by reducing susceptibility to fire and other disturbances, improving habitat for lichens, and structurally diversifying stands. In dry forest types we understand some judicious underthinning of older forests, removing only trees that have established since fire exclusion, may be warranted to reduce fire hazard. For any thinning in LSR's, or to reduce fire hazard in dry forests, we encourage you to consult with silvicultural and biological scientists familiar with the issues when formulating general guidelines.

In summary, we believe the science is clear: saving all remaining LSOG significantly enhances the probability of LSOG-dependent species persisting through this period of extreme habitat bottleneck. Moreover, the social and economic scene in the Pacific Northwest has changed sufficiently during the 1990's to make this an acceptable and, judging from polls,even popular decision. We hope you will give it serious consideration.

Sincerely,

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