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Old Growth Forest Science, Policy, and Management in the Pacific Northwest Region

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Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify on old growth management in the Pacific Northwest. I am Linda Goodman, Regional Forester for the Pacific Northwest Region for the USDA Forest Service. I would like to share with you our perspective on science and management of old growth forests in dry, wet, and mixed forest types across the Pacific Northwest.

General Characteristics

Old growth forests have high ecological, social, and economic values and mean many things to people. While they are often perceived as an icon of stability, old growth forests have not remained undisturbed for centuries by nature. Today's old growth forests developed and are continuing to develop along multiple pathways with many low-severity and some high-severity disturbances along the way. Scientists are learning that, as a result of the multiple pathways and different timeframes forests take towards becoming old growth, heterogeneity exists in old growth ecosystems.

What is an old growth forest? This is a simple question without a simple answer for there is no single, widely accepted definition of old growth. The term "old growth" did not originate as a scientific term but came first from foresters in the early days of logging and later from others who sometimes replace the term with the more dramatic, but even less precise "ancient forests". There are many strong opinions from different scientific disciplines and policy perspectives on the appropriate definition(s) of old growth, including from forest ecology, wildlife ecology, recreation, spirituality, economics, and sociology. In 1989 a general definition for the Pacific Northwest was developed by Tom Spies (Research Forester, Pacific Northwest Research Station) and Jerry Franklin (Professor of Ecosystem Analysis, College of Forest Resources, University of Washington). The definition reads, in part: "Old growth forests are ecosystems distinguished by old trees and related structural attributes…that may include tree size, accumulation of large dead woody material, number of canopy layers, species composition, and ecosystem function." Most scientists would now include vertical and horizontal diversity in tree canopies as important attributes of old growth forests.

The common features of many old growth forests are old trees and structural complexity. We have learned that old growth forests are diverse, varying in structure, function, and role of

disturbance. In the wetter provinces[1], old growth is characterized by dense multi-layered forests; in drier provinces, by relatively open crown canopies and understories. Many scientists believe that the diversity of forest types within the Pacific Northwest and elsewhere necessitate multiple definitions of old growth, and that these definitions should reflect the inherent patterns and dynamics of the forest landscape mosaic of an area. Just as there are many different types of forests for the diverse array of climates, soils, and topography, there are many different types of old-growth forests.[2] For example, old growth forests east of the Cascades and in the Klamath Province of southern Oregon historically ranged from open, patchy stands, maintained by frequent low-severity fire, to a mosaic of dense and open stands maintained by mixed severity fire. In these areas, old growth structure and composition were varied and were shaped by a complex disturbance regime of fire, insects, and disease.

Tree (or stand) age or tree size are not by themselves adequate descriptors of either the structure or function of old growth forests, yet these two attributes are commonly used descriptors by the media and public. Others use the absence of clearly visible human activity as a necessary criterion for old growth, but there is no consensus on this in the scientific community nor any real basis in experience or fact.

Current Science

Science has made great strides in refining our understanding of the ecological roles of older forests and the structure associated with those forests, which are important in the understanding of what old-growth is in healthy, dynamic forest ecosystems. The ecological functions of old growth include unique wildlife habitat, high levels of carbon storage and cycling of nutrients, and capture, storage, and release of clean water into streams and rivers. The Forest Service, drawing on its research expertise, is exploring management strategies to accelerate the development of multi-storied, complex structure (old-growth) in forests of the Pacific Northwest where it has been lost through previous logging or fire suppression and where, through that loss, forest ecosystem function and resiliency are diminished or impaired.

Research has demonstrated that, historically, the amount of old growth forest across the Pacific Northwest region ebbed and flowed, with natural disturbances creating a patchwork of forest ages across landscapes. By 2004, ten years after the approval of the Northwest Forest Plan[3], the total area of late-successional and old growth forest (often referred to as “older forest”) in the

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[1] The Northwest Forest Plan (NWFP) area has 12 distinct provinces, classified by their differences in climate, vegetation, geology, and landforms. One especially important difference is the fire regime, or characteristic combination of fire frequency, intensity, seasonal timing, and fire size in an ecosystem. Provinces are considered to be dry and fire-prone are the Washington and Oregon Eastern Cascades, Oregon and California Klamath, and the California Cascades.

[2] See, for example, PNW-GTR-720, January 2008, First-Decade Results of the Northwest Forest Plan and Supplemental Materials, as well as Kaufman et al. 2008. Defining Old Growth for the Fire Adapted Forests of the Western United States, Ecology and Society 12(2): 15.

[3] In April, 1994 the Secretaries of Agriculture and Interior issued a Record of Decision (ROD) for the Northwest Forest Plan (NWFP). The ROD affects the management and administration of 22.1 million acres of Federal land within 19 national forests in western Oregon, western Washington, and northern California administered by the Forest Service and Bureau of Land Management. The NWFP created 10 million acres of reserves where development of late successional or riparian habitat is the primary objective.

Northwest Forest Plan area ranged from about 3 million acres to 8 million acres, depending on the definition of late successional and old-growth forest. Monitoring during this time has shown that the rate of increase of acres of older forest is somewhat higher than expected. Between 1994 to 2003, gains well outpaced losses from all causes, including limited stand- replacing harvest and wildfire. Overall losses from wildfire are in line with what was projected, but the rates of loss have been highly variable among different locations, with the highest rates of loss occurring in the dry provinces. Increased densities of fuels and development of ladder fuels increase the probability of high-severity fire and the loss of late successional forest. Increasingly widespread and prolonged outbreaks of insects and disease that, in turn, can lead to higher and more widespread mortality and the cascading effects of increased fire severity have the potential to further lower the overall amount of older forests and trees. Monitoring suggests that rates of fuel treatments and restoration of structure and disturbance regimes in fire-dependent older forest types have been considerably less than is needed to reduce potential for losses of these forests to severe disturbance.[4] As a consequence the old growth forests and landscapes of the dry provinces are among the most threatened and degraded coniferous forest ecosystems within the Northwest Forest Plan area.

Climate Change

Changes in climate increase the uncertainty associated with forest development and associated management. Climate and weather have changed periodically during the development of our old forests. They will continue to change at uncertain rates into the future (thereby constituting a disturbance in their own right). Climate also interacts with other disturbance factors that shape the development of forests. Within the Pacific Northwest, the natural disturbance agents potentially affected by climate include insects, disease, windthrow, and fire. These disturbances often occur sequentially or in combination. For example, when regional droughts affect tree vigor across entire watersheds and contiguous blocks of host trees are available, beetle populations can build and attack trees across whole landscapes or regions. The resulting increase in dry fuels increases the probability of fire. As a result of warming trends, it is possible that insect and disease outbreaks could become quite large, as we already are seeing in Colorado, British Columbia and elsewhere.

Management Implications

The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. The National Forest Management Act (NFMA) establishes the goals of maintaining species diversity and ecological productivity on National Forest System lands. Ensuring a diversity in forest ages and stand structures across landscapes and the region supports this goal and mission. Old growth has an important role in that mixture, in ecosystem dynamics and in providing unique wildlife habitat. In many cases active management is needed to restore old growth or reduce the risk of loss of old growth to high severity fire. We believe that, on the east side of the Cascades, it will be necessary to treat stands to manage fire and insects to re-establish and maintain a diversity of

[4] See PNW-GTR-720, January 2008, First-Decade Results of the Northwest Forest Plan and Supplemental Materials.

forest age and stand structures. On the west side, thinning and other such treatments are necessary to accelerate and/or continue the development of desired future structural conditions in dense, uniform young forests.

Current research supports the view that to achieve conservation outcomes it is best to avoid "one-size- fits- all" approaches as much as possible. Using different definitions of late successional and old-growth will result in different silvicultural approaches taking into account the differences in the role of fire, insects and disease for the different forest types. In managing old growth forests, it also is important to consider multiple spatial scales including trees, stands, landscapes, and regions. This is why we develop site- specific integrated management prescriptions at the stand and landscape level. The classic conservation approach of dividing the landscape into reserves and production areas may not work well in dynamic landscapes--new approaches need to be tested and applied using adaptive management principles.

Because dry old-growth forests (such as ponderosa pine) likely developed as a result of frequent low intensity fires that created relatively open forests with scattered large trees and patches of regeneration across the landscape, re-establishing the structure of these forests and the natural role of fire will require a combination of mechanical removal of trees and the use of prescribed fire on a site-by-site basis. Many such projects have been implemented in the dry forest on the east side of the Cascade Mountains, for instance near Black Butte Ranch in Oregon, with demonstrable success. In more moist forests (such as mixed conifer), fire has also been a predominant force historically, but the fire regime is more variable and includes some infrequent, large, intense fires, but with significant patchiness, leading to a more complex mosaic of forest on the landscape. Management might make use of strategically placed area treatments (SPLAT) to reduce fuels and protect important older forest stands in mixed types. This strategy has been implemented at the Sagehen Experimental Forest and is part of an amendment to the Sierra Nevada Forest Plan. The wetter old growth forests typically developed following infrequent stand replacement disturbances that were sometimes caused by fire, but in coastal areas, could also be caused by extreme wind. Such disturbances killed most or all of the canopy trees and created large patches of diverse young forest that required centuries to become structurally complex old growth. In the Coast Range of Oregon, active management projects, such as the Five Rivers Landscape Management Project, are testing alternative approaches to accelerating the development of old-growth characteristics through thinnings, dead wood management, and riparian rehabilitation.

Management treatments to accelerate the development of complex structure can be undertaken in any of the forest types and are most effective in younger, uniform stands including both natural stands and plantations, or dense older forests where fire suppression has allowed dense understories to accumulate, increasing the risk of high severity fire. It should be noted that many of the habitat values of old growth forests can occur in younger forests where some structural complexity (e.g. large old live and dead trees, shrubs, canopy openings etc.) occurs. Management might be appropriate at many ages to achieve a goal of re-establishing the dynamic mosaic of forest ages across the landscape, especially in light of changes in management of private forest lands. This highlights the need to evaluate older forests in the context of landscape-level planning and longer time frames. Our forest planning process provides the best

vehicle for accomplishing this assessment. By contrast, broad 'one-size-fits-all' legislative prescriptions are less useful.

Conclusion

Multiple definitions of old growth are appropriate for the diversity of forest types within the Pacific Northwest. Old growth definitions and management strategies should be refined to reflect the inherent patterns and dynamics of the forest landscape mosaic of an area.

To re-establish a diversity of forest age and stand structures in some locations it will be necessary to treat stands on the east side of the Cascades to manage fire and insects. On the west side of the Cascades, treatments will be needed in some locations to accelerate and/or continue the development of desired future structural conditions in dense, uniform young forests.

The most threatened and degraded coniferous forest ecosystems within the Pacific Northwest are the old growth forests and landscapes in dry provinces. Conserving the ecological diversity of these forests is a major challenge. Increasing the amount of active management through use of mechanical treatments and prescribed fire is critical to restoring and protecting these important landscapes. On the westside of the Cascades, thinning tree plantations and other silvicultural practices can help to restore ecological diversity in young forests and accelerate the development of old growth characteristics.

We are committed to using all the tools at our disposal to ensure that landscapes include older forests that are sustainable through time and able to weather the multitude of changes that are predicted to occur in the future. We are also committed to using these tools to produce the myriad ecological and economic values the public demands from the National Forests.

I will be happy to answer any questions the Subcommittee Members may have