Managing Mature and Old-Growth Forests

A Position of the Oregon Society of American Foresters

The Oregon Society of American Foresters (OSAF) recognizes the unique characteristics and values that mature and old-growth forests provide for society. Definitions for old growth vary and none are exact. From a forest ecology perspective, there is no age where a forest becomes mature or defined as old growth; however, these forests can more accurately be described as a mid to late seral stage which includes features like large snags and downed logs, vertical and horizontal diversity and species diversity within each forest layer (floor, mid story and canopy). It is important to note that not all forest land reaches these conditions because of natural disturbance (e.g., wildfire, windstorms) or the quality of the site limits growth. Importantly, as living ecosystems, trees and other vegetation in these forests will change over time and mortality will occur. Sometimes changes can be significant, thereby impacting unique habitat and other desirable features and functions. ***OSAF supports policies that effectively reflect the diverse and dynamic nature of forest ecosystems, such as a targeted mix (e.g., percentages) of younger and older forests across the landscape rather than artificially fixed in specific locations.***

A common misconception is that actively managing old growth is inappropriate or incompatible with other values. This perception is reinforced by policies and proposals to designate specific locations where management is greatly or totally restricted. However, ***even where non-timber values are primary drivers of management decisions, OSAF believes that active management of mature and old-growth forests may be needed to promote and sustain ecological values over time.*** This need can be especially important for forests in drier, fire-prone landscapes (e.g., central, eastern and portions of southwest Oregon) where climate change and related disturbances have an outsized impact on the ecosystem. Although, as climate change continues to threaten the permanence of older trees across the state, it is clear wet forests on the west side of the cascade crest may benefit from some management practices as well. Active management may include prescribed burning, tree thinning and planting. Treatments may be needed periodically but these intervals can vary from years to decades in different ecosystems. Active management can protect mature and old-growth forests by keeping large trees vigorous when facing forthcoming disturbances such as climate change, wildfire, drought and insects and disease infestations.

A “one-size-fits-all” approach to mature and old-growth forest management does not address the range of unique and dynamic forest conditions in Oregon both now and in the future. Research and management experience show that professionally prescribed, site-specific plans are most effective in achieving and maintaining desirable forest conditions. These plans should carefully consider local ecological conditions and objectives, social concerns and policy constraints of the owners or managers. ***OSAF supports appropriate management practices, planned by experienced forestry professionals for specific forest sites with consideration of the broader landscape, to help achieve and maintain desired conditions and values of mature and old-growth forests for current and future generations of Oregonians.***

Issues

Concerns about mature and old-growth forests raise many issues and challenges which highlight important differences in perceptions, values and philosophies. These issues take on added complexity with the range of vital questions that have not been consistently addressed, including:

1) the definition of an old-growth forest;
2) the specific, desired uses and values of these forests; and
3) the detailed objectives and allowances for their management.

Disagreements about these forests have stemmed from widely varying perceptions and preferences, including:

1) the idea that nearly all pre-European settlement forests in Oregon were old growth;
2) the idea that these forests and their benefits will persist indefinitely if left unmanaged;
3) the values are only obtained from old-growth forests; and
4) contrasting views about the approach or philosophy for managing mature and old-growth forests, e.g., from no-touch "preservation" to strategic active management with incidental economic returns and even, light touch non-commercial treatments.

Current examples of old-growth management issues include policy directives or advocacy that limit the size of trees to be harvested irrespective of their age or species (e.g., no tree greater than 21 inches can be harvested) and age limits (e.g., 120 years), at or above which no trees can be removed. Such approaches greatly oversimplify the features of old-growth forests, do not address their dynamics as living ecosystems, and increasingly restrict management that could help maintain the health and benefits of these forests over the long term. All forests are dynamic and it is important to recognize that they all contain components that grow, compete for resources and eventually die.

Background

The definition of an old-growth forest is not exact (Helms 2004) and it can vary with forest type (dominant species). Old-growth forests often have trees of various sizes, patchiness, large snags and downed wood. However, no one single attribute, be it appearance, tree age, tree size, canopy structure (foliage layers) or species composition, can consistently define old growth. The area or size of an old-growth forest is also important because small areas may not be effective habitat for some old-growth dependent wildlife species. Nevertheless. these components, however small, may be vital refugia and add desirable ecological diversity to the greater landscape. They may also provide aesthetic and educational benefits.

The term "late-successional[1]" is an ecological descriptor of old-growth forests that relates to the time after a disturbance (e.g., wildfire) that initiates the development of a new forest. Ecological definitions are useful in that they reflect key forest processes (e.g., succession and disturbance) and resulting forest structure and habitat. However, old growth also is valued for its intrinsic features that can invoke awe, inspiration and spiritual fulfillment. This is reflected in common descriptors of these forests, such as cathedral, heritage, or ancient. Such labels can suggest some images that may not be accurate for all forest types. Lodgepole pine and aspen, for example, are not long-lived species and thus their forests may contain old-growth attributes that are far different from old-growth species with longer life spans (Spies 2004). A forest type and site-specific understanding of a particular forest and its associated values is more useful than an inexact label.

As a dynamic ecosystem with many natural influences, old-growth forests are constantly changing and all have a finite life span, even in the absence of human influences. In northwest Oregon, the amount of old

[1] Succession is the natural, gradual supplanting of one plant community type over another, with a "late-successional" community often considered as part of a final, long-term stage before a catastrophic event (e.g., wildfire) repeats the process, initiating "secondary" succession.

growth prior to European settlement has been estimated to vary from about 30 to 70 percent over time and with shifts in location (Teensma et al. 1991, Wimberly et al. 2000, Wells and Anzinger 2001, USDA Forest Service 2003).

In 2012, the US Forest Service estimated the acreage of mature and old-growth forests in the Northwest Forest Plan Area in Oregon at 4.9 million acres. (USDA Forest Service 2015). Considerable acreage of mature and old-growth forests also exist in central and eastern Oregon forests. All forests, including old growth, will eventually succumb to natural disturbances (e.g., wildfires, windstorms, insect infestations) and then regenerate over time. Although old-growth forests can be protected from some disturbances, indefinite protection from natural influences is impossible and thus maintenance of the key values of old-growth requires planning for the next cycle, extent and location of old-growth forests. From an ecological perspective, old-growth (as well as early- and mid-successional forests) would not remain in fixed locations but would instead shift in the landscape over time and space.

Historically, large trees in old-growth forests had great commercial value and their harvest supported the development of many Oregon communities. Although large trees are still valuable and prized for lumber and some specialized uses, most mills now manufacture products from younger and smaller trees. Old-growth forests now are recognized for much broader values, including unique or rare wildlife habitat, complexity in forest landscapes, scenic recreation experiences, genetic reservoirs, natural heritage and carbon storage. Importantly, the diverse values of older forests, including economic benefits, are not necessarily incompatible with each other. Some state forest lands in the region, for example, are being actively managed to create habitat features of older forests for fish and wildlife diversity while also generating mandated economic benefits to local communities. This approach has not satisfied all interests however and significant pressure on both sides persists. Continued discord has resulted in efforts to pass new legislation, regulation changes and ballot measures for both greater and reduced restrictions on harvest of older forests across the state. However, a mix of forest ownerships managed for a range of forest conditions (young to old) produce a forest landscape with high overall ecological complexity and socioeconomic value.

Forests with older trees can be found in different ownerships, each managed with unique objectives and legal requirements. Specific mandates even exist for old-growth management on public lands. Older and mature forests may not contain every feature of a fully developed old-growth forest, but many of them contain key elements such as large live and dead trees that provide the features important for wildlife habitat. Private landowners have significant leeway in setting their own management objectives and related actions, although Oregon law requires some snags and downed logs to be left in harvest areas. In general, as long as applicable regulations are met, private landowners in Oregon may harvest older and larger trees on their property, some of which may meet an ecological definition of old growth.

Management strategies to promote or maintain old-growth forests depend on the specific ecological goals and the environment in which the forest occurs. Mature and old-growth forests often can benefit from active management to emulate natural processes, including those altered by human needs or activities. This is particularly true in dry, fire-prone forest types in eastern, central, and southwestern Oregon, forests historically dependent on Native American burning (e.g., oak in western interior valley foothills), as well as in forest plantations with limited ecological diversity. There may even be instances where substantial commercial tree harvesting is appropriate, particularly if some down wood and large live and dead trees are left on site. Another example is when restoration of an oak savannah or woodland is the objective. Conifers often encroach on these unique ecosystems and turn into mature stands dominated by conifers. To restore the unique oak habitat, the larger conifer trees would be removed. With a blend of ecological, social and economic objectives, active management strategies such as long rotations with legacy wood retention can promote key old-growth features while also providing forest products.

Importantly, thinning smaller or younger trees in old-growth stands has been shown to improve tree health and vigor of older trees by reducing the competition (Stone et al. 1999, Latham and Tappeiner 2002, McDowell et al. 2003). This activity improves resistance to insect attacks and reduces the risk of stand replacing wildfire. This practice can extend the life of existing old-growth trees and forests while other younger forests develop into an old-growth condition. Thinning in mature forests may hasten old-growth

structural development (Bailey and Tappeiner 1998; Acker et al. 1998; Newton and Cole 2015). Large trees and old-growth character have also been achieved over time in younger forests after heavy thinning (Newton and Cole 1987). Where stand-replacing wildfire has consumed old-growth forests, such as on federal lands in the 2020 Labor Day fires, active restoration (eg. replanting) can help ensure the timely progression towards old-growth conditions given time. Without reforestation and vegetation management, restoration of conifer forests in some areas may take several decades longer to achieve mature forest characteristics, particularly in areas of severe wildfire and plant competition.

Conclusions

Oregon's forest owners and managers have a broad range of goals that lead to a broad range of management approaches that can promote diverse old and young forests with high ecological and social values. The overall pattern and distribution of forests is an important consideration in sustaining a broad range of values from our forests, and in providing for old-growth features and functions as forests change over time and space.

Misunderstandings and disagreements about the social and ecological roles and management of old-growth forests can be reduced by addressing key objectives and related considerations, including careful attention to local conditions and concerns. Like the management of other forests, decisions about old-growth forests will benefit from current knowledge and experience-based, site-specific management plans prepared by professional foresters and other specialists. These plans should carefully account for unique site and landscape conditions, detailed objectives, important legal mandates and social concerns.

Selected References

Acker, S.A., T.E. Sabin, L.M. Ganio, and W.A. McKee. 1998. Development of old-growth structure and timber volume growth trends in maturing Douglas-fir stands. Forest Ecology and Management 104:265-280.

Bailey, J.D., and J.C. Tappeiner. 1998. Effects of thinning on structural development in 40- to 100-year-old Douglasfir stands in western Oregon. Forest Ecology and Management 108: 99-113.

Franklin, J.F., K. Cromack, Jr., W. Denison, A. McKee, C. Maser, J. Sedell, F. Swanson, and G. Juday. 1981. Ecological characteristics of old-growth Douglas-fir forests. General Technical Report PNW-118. USDA Forest Service Pacific Northwest Forest and Range Experiment Station, Portland, OR. 48 p.

Helms, J.A. 2004. Old-growth: what is it? Journal of Forestry 102(3):8-12.

Kimmins, H. 1992. Balancing act: Environmental issues in forestry. Univ. British Columbia Press, Vancouver, BC.

Kohm, K.A. and J.F. Franklin, eds. 1997. Creating a forestry for the 21st century. Island Press, Washington, D.C.

Latham, P., and J. Tappeiner. 2002. Response of old-growth conifers to reduction in stand density in western Oregon forests. Tree Physiology 22:137-146.

Maguire, C.C. and C.L. Chambers, eds. 2005. College of Forestry Integrated Research Project: Ecological and socioeconomic responses to alternative silvicultural treatments. Research Contrib. 46, Forest Research Lab., Oregon State Univ., Corvallis.

McDowell, N., J.R. Brooks, S.A. Fitzgerald, and B.J. Bond. 2003. Carbon isotope discrimination and growth response of old *Pinus ponderosa* to stand density reductions. Plant, Cell Environment 26:631-644.

Newton, M., and E.C. Cole. 2015. Overstory development in Douglas-fir-dominant forests thinned to enhance lateseral features. Forest Science 61(4): 809-816.

Newton, M., and E.C. Cole. 1987. A sustained-yield scheme for old-growth Douglas-fir. Western Journal of Applied Forestry 2(1):22-25.

Oregon Society of American Foresters. 2013. Active Management to Achieve and Maintain Healthy Forests. Available at: http://www.forestry.org/media/docs/or/Policy/2013_Active_Mgmt_Healthy_Forests.pdf

Puettmann, K.J., C.C. Messier and K.D. Coates. 2009. A Critique of Silviculture: Managing for Complexity. Island Press, Washington, DC.

Shatford, J.P.A., J.D. Bailey and J.C Tappeiner. 2009. Understory tree development with repeated stand density treatments in coastal Douglas-fir forests of Oregon. Western Journal of Applied Forestry 24(1):11-16.

Spies, T.A. 2004. Ecological concepts and diversity of old-growth forests. Journal of Forestry 102(3):14-20.

Spies, T.A. and S.L. Duncan, eds. 2009. Old Growth in a New World: A Pacific Northwest Icon Reexamined. Island Press, Washington, DC.

Stone, J.E., T.E. Kolb, and W.W. Covington. 1999. Effects of restoration thinning on presettlement *Pinus ponderosa* in Northern Arizona. Restoration Ecology 7:172-182.

Teensma, P.A., J.T. Rienstra, and M.A. Yeiter. 1991. Preliminary reconstruction and analysis of change in forest stand age classes of the Oregon coast range from 1850 to 1940. Technical Note T/N OR-9. USDI Bureau of Land Management, Portland, OR. 9 p.

USDA Forest Service. 2009. Old growth revisited: Integrating social, economic, and ecological perspectives. Issue 110, Science Findings. PNW Research Station, Portland, OR. Available at: http://www.fs.fed.us/pnw/sciencef/scifi110.pdf

USDA Forest Service. 2015. Northwest Forest Plan-The First 20 Years (1994-2013) Status and Trends of late-Successional and Old-Growth Forests. PNW Research Station, Portland, OR. Available at: https://www.fs.usda.gov/treesearch/pubs/50060

Wells, G. and D. Anzinger. 2001. Lewis and Clark Meet Oregon's Forests: Lessons from Dynamic Nature. Oregon Forest Resources Institute, Portland, OR.

Wimberly, M.C., T.A. Spies, C.J. Long, and C. Whitlock. 2000. Simulating historical variability in the amount of old forests in the Oregon Coast Range. Conservation Biology 14:167-180.

This position statement was adopted by the Oregon SAF Executive Committee on February 11, 2021.
"*The statement will expire February 11, 2027, unless after thorough review it is renewed by the Committee.*"