Testimony prepared for the United States Senate Committee on Energy and Natural Resources on S. 1784, the Oregon and California Land Grant Act of 2013 at the Committee's hearing on February 6, 2014

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I speak today for myself and Dr. Norm Johnson. These comments represent our own views and not those of our respective institutions.

Our testimony today concerns our work with Senator Wyden to integrate ecological forestry principles into S.1784 direction for management of the BLM O&C lands in Western Oregon.[1] Specifically, we address how utilizing ecological forestry principles in managing these lands could provide ecological benefits and a sustained yield of timber harvest and revenue.

Consideration of Ecological Forestry in S. 1784

Ecological Forestry--A Philosophy of Forest Management

"Ecological Forestry" is an approach to managing forests utilizing principles from natural forest development, including the role of natural disturbances, in the initiation, development, and maintenance of forest stands and landscape mosaics (Seymour and Hunter 1999, Franklin et al. 2007, Franklin and Johnson 2012). Ecological Forestry is based, therefore, on application of our best current ecological understanding of forest ecosystems in managing these ecosystems to achieve integrated environmental, economic, and cultural outcomes.[2] S.1784 embraces this philosophy of forest management, incorporating the latest ecological science in the process, as we describe below.

Recognition of Moist Forests and Dry Forests

A distinction between Moist and Dry Forests is essential in setting policies for O&C lands because of their contrasting disturbance regimes and responses to management. This distinction is especially critical in developing policies and practices intended to protect old-growth forests and trees. S.1784 recognizes this critical distinction between Moist and Dry Forests within the range of the Northern Spotted Owl and provides distinctive policy direction for each throughout its forest management stipulations.

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[1] The BLM in western Oregon administers a collection of land ownerships resulting from various Congressional actions. They include the Oregon and California Railroad Lands, Coos Bay Wagon Roads Public Domain, and other lands. The legislation addresses the Oregon and California Railroad Lands, and Coos Bay Wagon Roads that we will call ,. "BLM O&C lands" in this testimony. They cover approximately two million acres of forest in western Oregon, with Moist Forests occupying approximately two-thirds of that area and Dry Forests the remainder.

[2] For a more in-depth description of ecological forestry see Franklin and Johnson (2012) at http://fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/JOF%20Article%20with%20Case%20Studies_2.pdf and previous testimony by Franklin and Johnson on the O&C lands at http://fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/Johnson_June%202013.pdf

Conservation of old forests and trees requires fundamentally different management approaches on Dry and Moist Forest sites because of contrasts in their disturbance regimes and the impacts of past management on current forest conditions. For example, existing intact old-growth forests on Moist Forest sites have undergone limited changes as a result of >100 years of fire suppression; active management to restore conditions within such stands is not only unnecessary but would adversely affect them. Setting aside existing older Moist Forests is, therefore, an appropriate conservation approach.

Dry Forest sites, on the other hand, have undergone dramatic changes from European pre-settlement conditions as a result of many human activities, including elimination of fire. Consequently, Dry Forests have undergone significant changes and many are currently dense, fuel-loaded stands dominated by fire- and drought-intolerant species. These forests and the old trees that they contain are, consequently, at significant risk of stand-replacement wildfire as well as highly susceptible to drought and insect attack. Hence, policies need to permit active management of such forests (including those with older trees) to create more resilient conditions.

S. 1784 recognizes this need to provide for different policies for Moist and Dry Forests while providing the first statutory protection for old forests and trees on federal forest lands. All old-growth and the vast majority of mature forests are reserved on Moist Forest sites as well as all older trees that are present in younger forests subject to timber harvest. All older trees are reserved in Dry Forests but active management is permitted around them to improve their longevity. Active management of Dry Forests is also permitted (but not required) to improve the ability of Dry Forests to tolerate fire, drought, and insect epidemics, which is also an initial step in improving their ability to accommodate climate change.

Ecological forestry in Moist Forests

In addition to conserving older forests, S.1784 includes two other key components of ecological forestry for Moist Forests: 1) thinning in some younger forests to accelerate structural development and 2) creating structurally-rich openings in some younger, mostly previously-harvested stands to create early successional conditions and regenerate Douglas-fir and other tree species.

Thinnings in younger stands in Moist Forests, mostly plantations that developed after previous harvests, have been the source of most recent timber harvests from O&C lands. Under S.1784, thinning these stands can continue to occur across the landscape and they would be an important source of harvest volume over the next 20 years. Unfortunately much of the thinning during the past two decades has contributed little to enhancement of ecological values even on land allocations where that was the primary intent under the Northwest Forest Plan. Language in S.1784 will dramatically improve the quality of future thinning by requiring the use of recent scientific findings to improve the ecological content of thinning, such as creation of spatially heterogeneous outcomes.

Thinning opportunities will substantially decline after 15-20 years, as the program progresses through younger stands, with a resulting sharp reduction in thinning harvests (Tuchman and Davis 2013). Additional problems with the thinning program is that it produces only modest revenue, requires extensive road systems, and contributes little to the array of habitats needed to sustain regional forest biodiversity.

Silvicultural treatments that create significant but structurally enriched openings in the Moist Forests are necessary to provide high-quality early successional habitat. The early successional stage, which occurs between creation of an opening and re-establishment of a closed stand of trees, is the most biologically diverse condition that occurs on Moist Forest sites. There are many habitat specialists (e.g., birds and butterflies) that depend on early successional habitats and even more species, such as elk and deer, for which it provides critical resources. Openings need to be large and persistent enough to allow for full development of the shrub- and herb-dominated communities and regeneration of the sun-loving Douglas-fir. Both natural and artificial tree regeneration can be used. The openings also need a significant legacy of scattered trees, snags, and logs (Figure 1). Private landowners cannot be expected to provide this kind of habitat and so the only place where society can predictably provide for high-quality early successional habitat is on federal lands--just as in the case of old-growth forests!

Figure 1. Simulation example of a variable retention harvesting in a 55-year-old stand on BLM O&C lands in the Oregon Coast Range as proposed in Senator Wyden's legislation. Approximately 1/3 of the pre-harvest stand has been retained in unharvested forest patches and as individual and small clusters of trees, snags, and logs scattered through the logged portion of the harvest unit. (Graphics by Laura Hardin, Oregon State University)

To contribute to the goal of providing structurally-rich openings, S.1784 calls for variable retention harvesting, a highly flexible harvesting approach modeled on natural forest disturbances. Extensive ecological research has shown that natural forest disturbances typically kill many trees but leave behind large quantities and varieties of biological legacies from the pre-disturbance stand, including snags and logs. These legacies are profoundly important in providing for continuity in biota, habitat, and forest function between forest generations in contrast to the discontinuity created by clearcutting.

Variable retention is a harvesting method that emerged over 35 years ago and has exploded into world-wide use in the last 25 years. It has been extensively tested and shown to produce ecologically favorable outcomes (Lindenmayer, et al. 2012; Gustafsson, et al. 2012). Variable retention is a highly flexible approach that can be adapted to an immense variety of conditions and management objectives.

We favor the use of "aggregated retention" in which most of the retention is in the form of intact forest patches, including areas that buffer streams and other aquatic features. This type of retention works best in achieving the very complex goal of both sustaining most forest-related biota and processes (within the aggregates) while also providing sufficient openings to provide habitat for species dependent upon openings, including elk, deer, and Douglas-fir.

These structurally rich openings are not clearcuts.[3] Labeling such structurally-rich openings as "clearcuts" flies in the face of scientific terminology and concepts (Lindenmayer, et al 2012; Gustafsson, et al. 2012). In fact, variable retention as proposed in S.1784 can achieve the complex goal of both sustaining most forest-related biota and processes while also providing sufficient openings to provide habitat for most species that depend upon early successional conditions, including song birds, butterflies, and elk and deer.

In addition, variable retention harvests in Moist Forests as described here can provide a sustained-yield of timber harvest through time. In fact, they provide the foundation of sustained yield in S.1784. Without them, any significant sustained yield from the O&C lands is not possible.

Despite the evidence we have presented on the broad scientific basis for variable retention harvests some may still see them as risky or experimental. Thus, it is important to estimate the extent of these harvests. Under S.1784, variable retention harvests for a decade are limited to 8-12% of Moist Forest allocated to sustained yield management. Given the proportion of the O&C lands in these areas, we estimate that implementation of S.1784 would result in variable retention harvest being applied to approximately *two percent* of the O&C lands in the first decade.

The landbase available for variable retention harvest includes some stands 80 to 120 years old. By our estimates, these stands make up less than 10 percent of the landbase; over 90 percent of the landbase for variable retention harvest comes from stands that developed after a previous harvest.

[3] For a visual comparison of clearcutting and variable retention harvest, see http://fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/Smith_combined.pdf

Ecological forestry in Dry Forests

The general management approach to Dry Forest landscapes under S.1784 primarily utilizes partial cutting to reduce risks from fire, drought, and insects in the majority of forest stands, while retaining approximately one-third of the forest landscape in large dense forest patches to provide habitat for dense-forest dependent species, like Northern Spotted Owls. Silvicultural prescriptions in the treated stands are focused on retaining and enhancing the survival of all older trees (by eliminating neighboring competitors and fuels) and, in the remainder of the stand, reducing tree density, increasing average tree size, and shifting composition to more fire- and drought-tolerant species, such as pines.

Protection of aquatic systems

S. 1784 uses scientifically-credible methodologies to design riparian buffers, while still achieving the aquatic ecosystem goals of the Aquatic Conservation Strategy (ACS) of the Northwest Forest Plan and other ecological goals for these those forests. This design of riparian buffers is embedded in the continuance of the other components of the ACS, including recognition of key watersheds and requirements for watershed analysis.

Interim buffers (aka Riparian Reserves) of two-site potential tree heights on fish-bearing streams and one-site potential tree height on non-fish bearing streams occupy almost 40% percent of Matrix under the Northwest Forest Plan (NWFP). These interim buffers were identified as part of the NWFP in 1994, with the expectation that subsequently they would be revised during implementation of the NWFP. With rare exception, the interim buffers have not been revised (Thomas et al. 2007).

Recently developed science and analytic tools have opened the way to possible refinement of those buffer sizes. Applying these tools and science to streams in BLM Matrix, Reeves et al. (2013) concluded that alternatives exist to the current implementation of the ACS that reshape and reduce the buffer area needed to meet the goals of the ACS. One alternative has fixed widths and one has variable widths based on stream segment features. Both alternatives utilize "tree tipping" to ensure that thinning within buffers does not negatively affect wood delivery to the stream.[4] In both approaches most of the NWFP riparian buffer will be retained, placed where it will make the most significant contribution to aquatic ecosystem protection. Also, both options limit harvest to younger stands (stands generally less than or equal to 80 years of age). S.1784 allows the use of both alternatives, with scientific review guiding the development of variable width buffers.

Taking a landscape approach

Both Dry and Moist Forest strategies require landscape level planning and implementation to be successful in achieving their ecological and economic objectives. S.1784 recognizes this need by calling for landscape assessments and plans for both Moist Forests and Dry Forests that will guide the actions for each decade.

[4] See Reeves, et al. (2013) for detail on the analysis and alternatives beyond that covered here.

In Dry Forest landscapes a comprehensive assessment is needed to identify the locations of the denser forest patches for Northern Spotted Owls and other species before restoration treatments are implemented. One way to accomplish this quickly could be by creating an inter-agency, inter-disciplinary team of forest and wildlife scientists and managers, including participants from the US Fish and Wildlife Service, and providing them with resources and an appropriate time line for completion.

In Moist Forest landscapes, a comprehensive assessment is needed to identify the potential locations for variable retention harvest and thinning activities that would meet the goals of the legislation, including support of the Northern Spotted Owl recovery plan. This important and challenging work could best be accomplished over a relatively short time period by an inter-agency, inter-disciplinary team of forest and wildlife scientists and managers, including the important contributions from the US Fish and Wildlife Service and NOAA Fisheries.

A first estimate of resulting harvest levels

Last fall, Dr. Johnson worked with the BLM to estimate the harvest levels that would result from full application of S.1784 to the BLM O&C lands. This work included recognition of the many land allocations and management strategies recognized in S.1784--a daunting task![5] He could not have made these estimates without the sustained and creative support of BLM professionals for which he is very thankful.

Under full implementation of S.1784, Dr. Johnson concluded that harvest on BLM forests in western Oregon could equal or exceed 300 million board feet per year for the next 20 years. That harvest would come from a mixture of variable retention harvests and thinning on Moist Forests and partial cutting on Dry Forests, with Moist Forests providing over three-quarters of the total harvest.

The ecological forestry strategies embedded in S.1784 will enable a sustainable harvest into the distant future. However, Dr. Johnson did not attempt detailed estimates of that level beyond the first 20 years.

Embracing adaptive management

Ecological forestry provides a broad conceptual basis for adaptive management based on principles derived from natural forest ecosystems. ***Ecological forestry is most certainly not a specific silvicultural system or prescription but, rather, a commitment to manage using our best current knowledge about forest ecosystems and how they work.*** Insuring that there is the opportunity to practices to evolve as new knowledge becomes available must be an essential part of any program.

Strong commitments to an adaptive management approach are important in moving away from stasis and into the kind of complex, integrated management proposed in S.1784. The legislation contains five-year reviews by regulatory agencies and 10-year reviews by scientists and managers but does not include a commitment to an adaptive management approach within which these reviews can be utilized. The strategy and tactics of adaptive management can and should be

[5] The language on roads in S.1784 is difficult to understand in some places. This work assumes that any of these difficulties will be smoothed, allowing harvest to occur where it has been designated in the legislation.

added to the legislation. That would include both provisions for monitoring and the ability to modify prescriptions for management based on the results of the monitoring results and periodic reviews. It would also make explicit that silvicultural approaches would evolve as our understanding of these forest ecosystems, their responses to ecologically-based management, and effects of environmental changes become apparent. One major focal point for scientific research should be an expanded understanding of early successional ecosystems and their role in sustaining regional biological diversity. The portion of the O&C lands co-managed by the Secretary and Oregon State University as special management and research areas under the legislation could provide a focal point for this research and monitoring.

Personal reflections

Collectively, we have been at work as foresters for over 100 years. Much of that time has been focused on charting the course for our federal forests that would better incorporate and sustain the multiple values that we all have for them. We took on this work to explore management options for federal lands, in part because we sensed a general perception in society and among decision makers that there are only two alternatives for management of federal forests--either clearcuts and even-aged management or preserves, perhaps after an initial period of thinning remaining plantations. In fact, there are many alternatives to these two extremes, although there are places where each has application.

S. 1784 utilizes ecological forestry to develop and present a "third path" for management of federal lands--one firmly based on science and directed toward achieving integrated environmental, economic, and cultural goals. We are pleased to have contributed to its development.

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