Large-scale experiment on the rural Olympic Peninsula to test innovations in forest management

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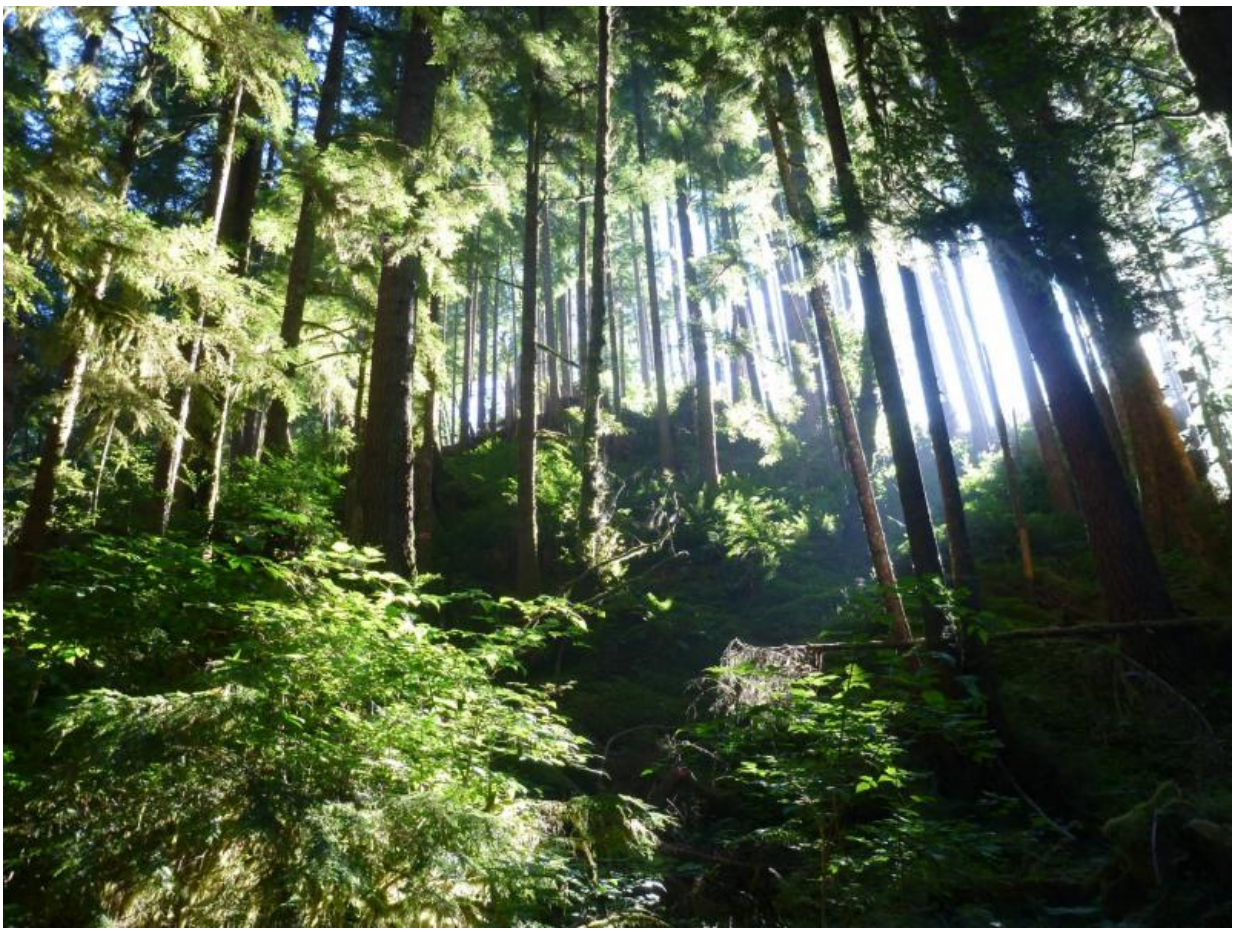

A young section of forest within the Olympic Experimental State Forest. Credit: WA DNR

Forest ecosystems are accustomed to change. Long before humans started intervening, disturbances such as fire, wind storms and diseases wracked segments of the landscape, killing off swathes of trees and providing spaces for regrowth of the forest.

Historically, plants and animals have adapted to the patterns of natural disturbance. Today, forest conditions are largely constrained by logging practices and conservation strategies for endangered species, but scientists are more fully recognizing the ecological and community benefits of letting a forest behave in more natural patterns that occur over time and across landscapes.

Scientists at the University of Washington and the state Department of Natural Resources intend to test a management approach that mimics natural disturbance patterns and processes across a large portion of the Olympic Peninsula, an area known for having the most rainfall in the lower 48 states, high tree-growth rates and old-growth forests, part of which remain today.

They recently released their proposal for the experiment that will compare different types, intensities and patterns of disturbance and regrowth—in the form of harvesting, planting and managing competing vegetation—within 16 watersheds on the western Olympic Peninsula. It will be the largest, most ambitious study in Washington using this experimental approach.

The project will also look at how forest management can truly sustain rural communities that depend on the forest. This approach of considering community well-being in resource management is growing widely, and the experiment will try to achieve a balance of providing for both people and the ecosystem they are a part of.

"This is so central to the entire management of the Olympic Peninsula

right now," said Bernard Bormann, director of the UW's Olympic Natural Resources Center near Forks, Washington, and one of the lead authors of the study proposal.

The entire replicated experiment will take place within the Olympic Experimental State Forest, 270,000 acres of state lands designated in the early 1990s with the intent to study how to integrate revenue production from timber harvests with ecological values such as habitat conservation. About 8 percent of the experimental forest will be part of the new study. Sixteen watersheds of up to 2,500 acres each will be used as experimental units—really as microcosms of the entire forest.

A stream within the experimental forest on the Olympic Peninsula. This is representative of the streams in the watersheds selected for this experiment. Credit: WA DNR

Each of the experimental watersheds includes a stream network with fish as well as potentially unstable slopes and blocks of younger and older forest. Selecting ecologically similar watersheds will allow researchers to compare treatment effects and distinguish them from natural variability.

The Olympic Experimental State Forest has unique advantages to conduct this type of study. First, the large land base allows for landscape-level experimentation. The actively managed, working forest lets researchers test various harvesting techniques as part of the DNR's existing timber sale program. Finally, the state forest's core objective of learning and adaptive management allows the scientific findings to be easily applied to improve how the land is managed.

The DNR has a fiduciary responsibility to manage the state forestland to provide revenue from timber harvests for trust beneficiaries such as counties, universities and K-12 schools. The agency has also committed to provide habitat for protected species such as the northern spotted owl, the marbled murrelet and salmon. In addition, the DNR provides jobs and other local community benefits. The implementation of the study through the agency's timber sale program is not expected to negatively affect those commitments.

The agency is already trying to balance these objectives through an approach called integrated management. This new experiment will evaluate this approach as well as other options to see the extent to which both ecological and community benefits can be integrated. Defining sustainable management more broadly to include people as part of the

ecosystem is new for this forest and as a result, scientists hope the project receives broad support.

"We expect that with this project we will reduce a number of management uncertainties and answer questions about balancing the two main objectives of revenue production and habitat conservation," said Teodora Minkova, research and monitoring manager for the Olympic Experimental State Forest and co-author of the proposal.

The experiment will test four different intensities and spatial patterns of forest management that try to achieve beneficial results for the forest and surrounding communities. The most ambitious track, referred to as the "accelerated approach," introduces innovative ways to harvest trees in the forest, while fostering a productive ecosystem for fish and other critters.

For example, more intense forest thinning will be combined with techniques to improve trees' ability to withstand strong wind. This will allow for extracting timber without increasing the risk of wind damage to the remaining trees. Another idea is to intersperse red alder trees with conifers, leaving the evergreen trees to grow old and tall, while harvesting fast-growing alder more frequently.

Young western hemlock trees grow back in a thinned forest. Credit: WA DNR

Introducing more hardwood species like alder into the conifer-dominated peninsula forests could also benefit salmon and other animals, Bormann explained. Hardwood plants and trees drop lots of leaves, branches and flower parts into streams, which provide the main fuel for the food chain that nourishes young salmon before they head out to sea. Elk and other mammals also feed on alders and other shrubs that proliferate when the conifers in a forest are reduced.

"We think we can greatly improve the diversity in the forest as well as

the food supply, and we want to test if certain management strategies can produce larger juvenile salmon," Bormann said.

The experiment also considers logistics and mechanics related to timber harvesting and will test innovative approaches to reduce costs and environmental impacts. Often derelict forest roads must be repaired to be able to transport logs—costing an estimated $100,000 per mile—and a proposed alternative might save money by laying down wooden mats on top of the gravel roads as a temporary, reusable drivable surface.

Another innovative option is to deploy Scandinavian cable systems from roads to more efficiently thin dense forest patches.

The study plan will go through scientific review this summer and the scientists hope to begin the first 10-year leg of their experiment in 2018. Results will begin coming in shortly afterward, particularly the economic and operational feasibility comparisons, Minkova said.

"The DNR intends to use the study findings more broadly across all state lands in Washington and we expect the new information will be useful to other land managers in the Pacific Northwest," she said.

Provided by University of Washington