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Study focuses on 'gaps' in forest

By David Stauth
OSU News Service

Forestry researchers from three universities have begun a major exploration of a key concept in "new forestry": the role that "gaps" in the forest canopy play in the long-term health and diversity of forest ecosystems.

The three-year, $600,000 research effort is one of the largest of its type ever conducted. It is supported by the National Science Foundation and will involve researchers from Oregon State University, the University of Washington, Yale University and the Pacific Northwest Research Station.

The work will pick up its pace in the next few weeks, researchers say, as hundreds of trees are cut to create artificial gaps, or small patch cuts, in both young and old-growth Douglas fir forests of the Pacific Northwest.

The primary research sites are the H.J. Andrews Experimental Forest near Blue River and the Wind River Experimental Forest in southwest Washington.

"There's evidence that natural gaps or openings in a forest are one place in which the forest regenerates itself," said forest ecologist Thomas Spies. "Forest gaps are sort of a biological hot spot, in which light reaches the forest floor, woody debris gathers, many species of plants flourish and soil nutrients are enhanced."

However, the full significance of these gaps and the ecological mechanisms at work are poorly understood, Spies said. The project will analyze the level of biological activity in the above-ground vegetation and the below-ground root system, he said.

Spies is an assistant professor in the Department of Forest Science at Oregon State and a research ecologist with the U.S. Forest Service. He is one of the principal investigators on the project, along with Jerry Franklin at the University of Washington and Kristina Vogt, an internationally known root ecologist from Yale University.

Forests "are a shifting mosaic of gaps" that often form when trees are blown down or killed by insects or disease, in areas which may range in size from a couple of trees to several acres, Spies said. The sites eventually fill in with new vegetation, trees may grow back and the whole process continues in other places in the forest.

This research should help provide a significant amount of information on the operation of these forest ecosystems, Spies said, and the special significance of forest gaps. Among the questions to be addressed are:

- How do vegetation and trees, especially Douglas fir, regenerate themselves naturally in small openings?
- Are small gap cuts viable alternatives to clear cutting on Douglas fir sites?
- Can some of the diversity and other characteristics of old-growth forests be simulated in younger stands by special techniques of forest management?
- What are the effects of this type of disturbance on forest soils, root systems, fertility, long-term productivity and other factors?

Before any artificial gaps were created by cutting or removing trees, Spies said, the sites were carefully analyzed for soil nutrients and moisture, types and amounts of vegetation, root interactions and other features. Those same ecosystem characteristics will be compared when the sites become gaps later in the project.

The areas under study in Oregon are old-growth systems, Spies said, and the Washington sites are a combination of old-growth and younger tree stands. Tree cutting to create gaps has already begun in Oregon.

The research also has implications for producing and maintaining spotted owl habitat, Spies said. The U.S. Fish and Wildlife Service has shown interest in the study because it might help provide an understanding of the dynamics and development of forests that are favored by the owl.