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Northwest Research Experimental Forests: A Hundred Years in the Making

BY THERESA (TERRIE) B. JAIN

Over the past 100 years, experimental forests and ranges (forests) have supported research that produced long-term knowledge about our forests and ranges, and their resources. These forests are living laboratories and are rare assets that serve as places to conduct forest research to meet society's natural resource needs.

The original intent of Forest Service experimental forests and ranges (over 80 throughout the United States) when first established in the early 1900s was to provide a place where scientists could conduct long-term research in a "realistic setting" and to deliver science-based information to managers that could address current and unforeseen future management problems. These forests are also ideal locations for recording decade and even century-long environmental data such as daily weather, annual snowfall, stream flow, and vegetation growth to identify long-term trends in climate and subsequent changes in forest and range ecosystems. Forest Service experimental forests were designed to have ongoing partnerships where scientists and managers work together to develop novel management techniques and strategies to conduct landscape-level field experiments where conditions are manipulated for research purposes.

PHOTO COURTESY OF OSU RESEARCH FORESTS

STEM academy students participate in a field trip at OSU's McDonald Forest. STEM is an acronym for the fields of science, technology, engineering, and math, and engages K-12 youth in programs designed to increase college attendance and participation in STEM fields.

In addition to the Forest Service, other entities also manage experimental forests. For example, universities use their experimental forests not only for research, but also to engage their students in all facets of forest ecology and management. Regardless of whether an experimental forest is administered by a federal, state, university, or private entity, the common threads among all these special places are the ability to study and demonstrate lessons learned through scientific investigation. Perhaps more importantly, it is also where scientists, managers, and the public can learn about northwest forest and range environments.

In the Northwest, there are 12 experimental forests, the Caribou-Poker Creeks Research Watershed in Alaska, and Starkey in Oregon, which is both a forest and range. Forest Service Research and Development is responsible for research and facilities on 11 experimental forests and Caribou-Poker Creeks in partnership

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Northwest Research Experimental Forests

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with several Forest Service ranger districts. Priest River and Deception Creek in Idaho are administered by the Rocky Mountain Research Station. The Pacific Northwest Research Station is responsible for Starkey, H.J. Andrews, Cascade Head, Pringle Falls, and South Umpqua in Oregon; Entiat and Wind River in Washington; and Bonanza, Maybeso, and Héen Latinee in Alaska. Universities are responsible for the University of Idaho Experimental Forest, University of Washington Pack Forest, and the Oregon State University McDonald-Dunn Research Forest and associated properties. Unique to the state of Washington is the Olympic State Experimental Forest that integrates science and management.

Emulating the ecosystem

Each forest mirrors the ecosystem, disturbance regime, and management history inherent to the forests where they occur. For example, Priest River Experimental Forest in northern Idaho has five major potential vegetation types common throughout the northern Rocky Mountain mixed-conifer forests. Deception Creek Experimental Forest located in the Coeur d'Alene Mountains of Idaho, prior to blister rust, exemplified the historical western white pine-dominated forests. Bonanza Creek Experimental Forest and Caribou-Poker Creeks Research Watershed represent Interior Alaska boreal forests and Maybeso and Héen Latinee highlight Alaska's coastal forests. Starkey, Pringle Falls, and Entiat are located within the ponderosa pine and dry mixed-conifer forests. The South Umpqua, H.J. Andrews, and Cascade Head reflect the moist to wet mixed-conifer pacific forests. This approach allows research on an experimental forest to link to the broader landscape to ensure that any science information coming from an experimental forest is relevant and applicable to the larger landscape where they occur and to provide an opportunity to link science to the citizens of the United States.

Similar to experimental forests administered by the Forest Service, university forests also represent the larger landscape, but they also provide opportunities for students to engage in forest management and research. For example, the University of Idaho produces hands-on forestry experiences to their students by placing them on logging crews or a prescribed fire crew. They also administer thinning, harvesting, and vegetation management contracts giving them "real world" experience prior to graduation. Oregon State University faculty inte-

PHOTO COURTESY OF USDA FOREST SERVICE

Scientists quantify canopy opening using fisheye photographs.

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Next Issue: Managing Riparian Forests

grates outdoor class activities on the McDonald and Dunn Forest and associated properties due to its proximity to campus (15 minutes) and students also obtain hands-on experience. In addition to research and teaching, these are working forests with direct economic benefits through forest management that support the forests and all management activities.

Partnerships and innovation abound

Experimental forests and ranges provide opportunities for partnerships between managers and scientists leading to rewarding outcomes. For example, a silviculture scientist develops and evaluates alternative management techniques and concepts that are not currently implemented on other lands, thus making innovation an important research element. Innovation requires scientists and managers responsible for implementing such studies to be open to different ideas, incorporate new perspectives, and identify alternative methods, which might lead to adding alternative contract language, implementing complex marking guides, or introducing new harvesting techniques.

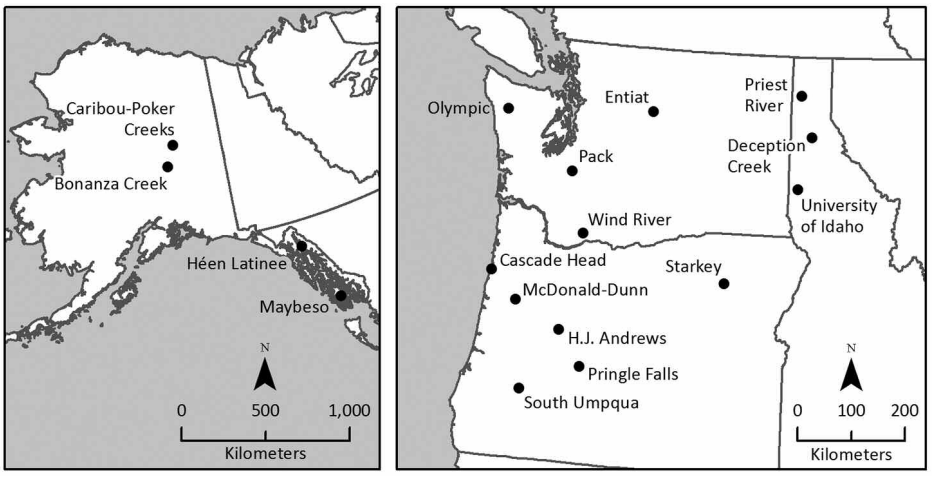
The reward comes from the mutual learning gained by both disciplines. In many cases, the challenges lead to original, yet practical management concepts and techniques that offer management relevant to science applications. It is in these partnerships that create opportunities such as on Starkey Experimental Forest and Range where over 70 partners including Oregon Fish and Wildlife, universities, Forest Service districts, and nongovernment organizations work together to develop the largest long-term dataset on elk, deer, cattle biology, movement, nutrition, and population dynamics.

Connecting research with others

Delivering relevant and timely science information in both the field and formal settings is paramount to a scientist's success—and experimental forests were established to enable scientists the opportunities to distribute the science to people who need it.

During field visits, scientists demonstrate their research results, and forest managers responsible for treatment implementation discuss their experiences and describe the nuances involved with study implementation. Visitors from a variety of professional disciplines and varying education backgrounds and ages can participate in open discussions to gain a common understanding and listen to different perspectives. Above all, people can see and "feel" the research, they can participate in research studies side-by-side with scientists as citizen scientists, and managers and practitioners can personally evaluate science outcomes. These opportunities allow people to connect with their environment and it makes science accessible in an informal setting.

Experimental forests in Oregon, Washington, northern Idaho, and Alaska



SOURCE: BENJAMIN BRIGHT

Long-term records established

Experimental forests and ranges provide a protected place to conduct long-term research and produce long-term databases. For example, from 1912 to 2012 at Priest River Experimental Forest,

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A Century of Innovation and Service

The USDA Forest Service Research and Development is celebrating its 100th anniversary of Forest Service research, which is so vital to its mission. This issue of the *Western Forester* highlights a few of the many contributions experimental forests have made to the region over the years.

PHOTO COURTESY OF USDA FOREST SERVICE

Field tours and demonstrations were conducted on the Priest River Experimental Forest in celebration of 100 years of research.

long-term weather records have shown: 1) an increase in minimum daily temperatures; 2) a decrease in annual snow accumulation; 3) a decrease in total number of days of snow cover; 4) earlier peak streamflow in the spring; and 5) reduced frost frequency.

The H.J. Andrews and Bonanza Creek Experimental Forests belong to the Long-Term Ecological Research Network created by the National Science Foundation in 1980 to provide the science and research platform to produce long-term data sets to document and analyze environmental change. This long-term research documents rare disturbance events that cannot be captured during shorter periods and yields surprises such as changes in streamflow during forest succession or changes in nutrient export over time. For example, 38 years of data collected on the Bonanza Experimental Forest has indicated that the combination of successional state, herbivory, and climate is affecting understory vegetation processes and patterns in mid- to late-successional forests.

Research, recreation, and other values do mix

In addition to scientific investigation, experimental forests are used by people for resource extraction ranging from removing timber products to collecting mushrooms and picking huckleberries and blueberries. Many visitors come to experimental forests and ranges to view wildlife, old-growth forests, and experience a "sense of place." Recreation such as bike riding and hiking is common on experimental forests. On the Starkey Experimental Forest and Range, hunting is both a form of research and recreation where scientists have investigated hunter-elk interactions to further understand elk movement patterns during hunting seasons. The Washington State Department of Natural Resources manages the Olympic Experimental State Forest where a commercial forest is managed using an experimental approach called integrated management where the goal is to balance revenue production and ecological values instead of applying one objective. Integrating multiple objectives lead to learning and adaptive management that makes this forest unique from other experimental forests.

PHOTO COURTESY OF USDA FOREST SERVICE

Bob Marshall (of Wilderness fame) quantifies fire severity at the Priest River Experimental Forest.

Much of what we know is dependent upon research conducted on experimental forests. Our knowledge about old growth originated from the H.J. Andrews and Wind River Experimental Forests. The science of fire behavior that we use today in fire suppression originated from Harry T. Gisborne's research conducted in the 1930s at Priest River Experimental Forest in northern Idaho. The ecology of ponderosa pine forests studied at Pringle Falls Experimental Forest in Oregon, and the ecology and management of western white pine forests gained from studies conducted at Deception Creek Experimental Forest in northern Idaho provide the science-based knowledge we use today in forest management. Our knowledge on elk biology and their environment would not exist without the long-term research using controlled experiments on Starkey in eastern Oregon.

The past, present, and future science produced on experimental forests provide the opportunity for generations of scientists, managers, and public to study and learn about the forests and ranges that are valued by the citizens of the United States. ◆

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