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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-

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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.

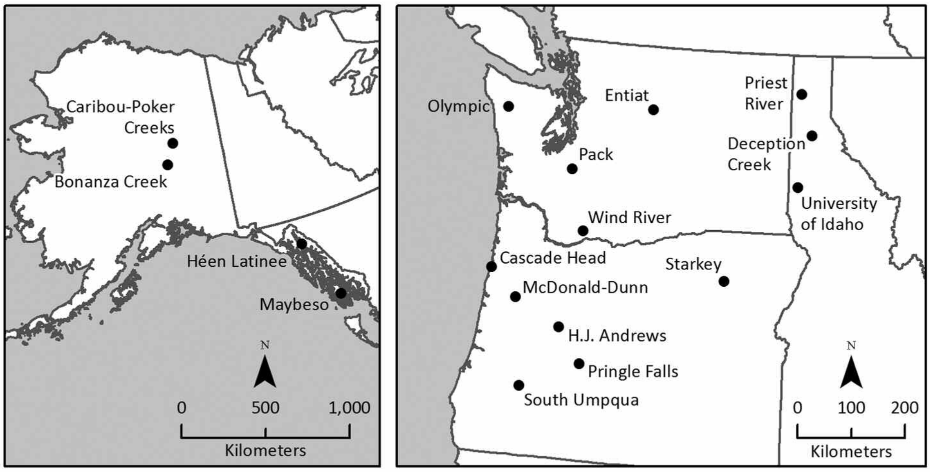
The reward comes from the mutual learning gained by both disciplines. In many cases, the challenges lead to original, yet practical management concepts and techniques that offer management relevant to science applications. It is in these partnerships that create opportunities such as on Starkey Experimental Forest and Range where over 70 partners including Oregon Fish and Wildlife, universities, Forest Service districts, and non-government 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,

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



SOURCE: BENJAMIN BRIGHT

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.

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. ◆

Theresa (Terrie) B. Jain is a research forester for the Rocky Mountain Research Station in Moscow, Idaho. An SAF Fellow, she can be reached at 208-883-2331 or tjain@fs.fed.us.

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Bridging Science and Management at the H.J. Andrews Experimental Forest

BY SHERRI L. JOHNSON, CHERYL FRIESEN, AND MARK SCHULZE

Sherri L. Johnson

First established in 1948 as a US Forest Service Experimental Forest, the H.J. Andrews is a 16,000-acre research forest in the western Cascade Mountains. It is collaboratively managed by US Forest Service PNW Research Station, Oregon State University, and Willamette National Forest. Over 50% of the Andrews Forest is mature and old-growth Douglas-fir forests, intermixed with plantations and ridgeline meadow complexes. Steep hillslopes are heavily dissected by rocky, cold, and clear streams. These forests are among the tallest and most productive in the world, with tree heights up to 300 ft (90 m). Early studies at the Andrews Forest focused on silvicultural and hydrologic responses to regeneration harvest in small watersheds. This research provided a foundation for future basic and applied studies involving vegetation succession, hydrology, ecosystem functions, terrestrial and aquatic nutrient dynamics, and forest-stream interactions. Since 1980 the Andrews Forest has also been a Long-Term Ecological Research (LTER) site with funding through the National Science Foundation. Data from the current and historical studies are publically available online (http://andrews forest.oregonstate.edu/lter/data.cfm). Real time streaming climate and hydrologic data and phenocamera images from numerous locations within the forest are also available (http://andrewsforest.oregonstate.edu/lter/about/weather/hja.cfm).

Long-term research and short-term experiments informative for both researchers and managers

For over 65 years, the Andrews Forest has provided a platform for researchers and managers to explore challenging questions related to natural resource management. The resulting strong research-management collaborations have made significant contributions to efforts such as the Northwest Forest Plan. The importance of using the best available science to support management decisions has only increased over the years. When scientists and managers work together to explore research findings, new questions and new ways of managing resources are developed and everyone's understanding of complex issues is expanded.

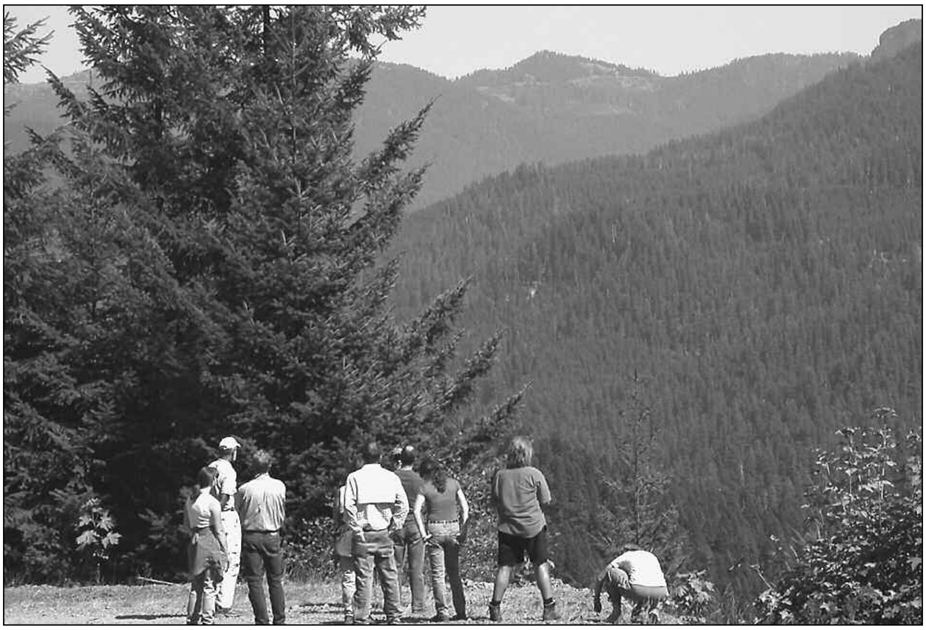

PHOTO COURTESY OF SHERRI L. JOHNSON

Discussions between researchers and managers at an overlook at the H.J. Andrews Experimental Forest. Over 85 researchers are associated with the Andrews in addition to up to two dozen graduate students each year.

A hallmark of the scientists at the Andrews Forest is their ability to conduct long-term research. Investigations over long time scales have proven invaluable in increasing our understanding of dynamics at population, community, and ecosystem levels, particularly in systems with decadal or even century-long processes. Often, research is conducted for only a few years before the project is completed and data analyzed. However, in some

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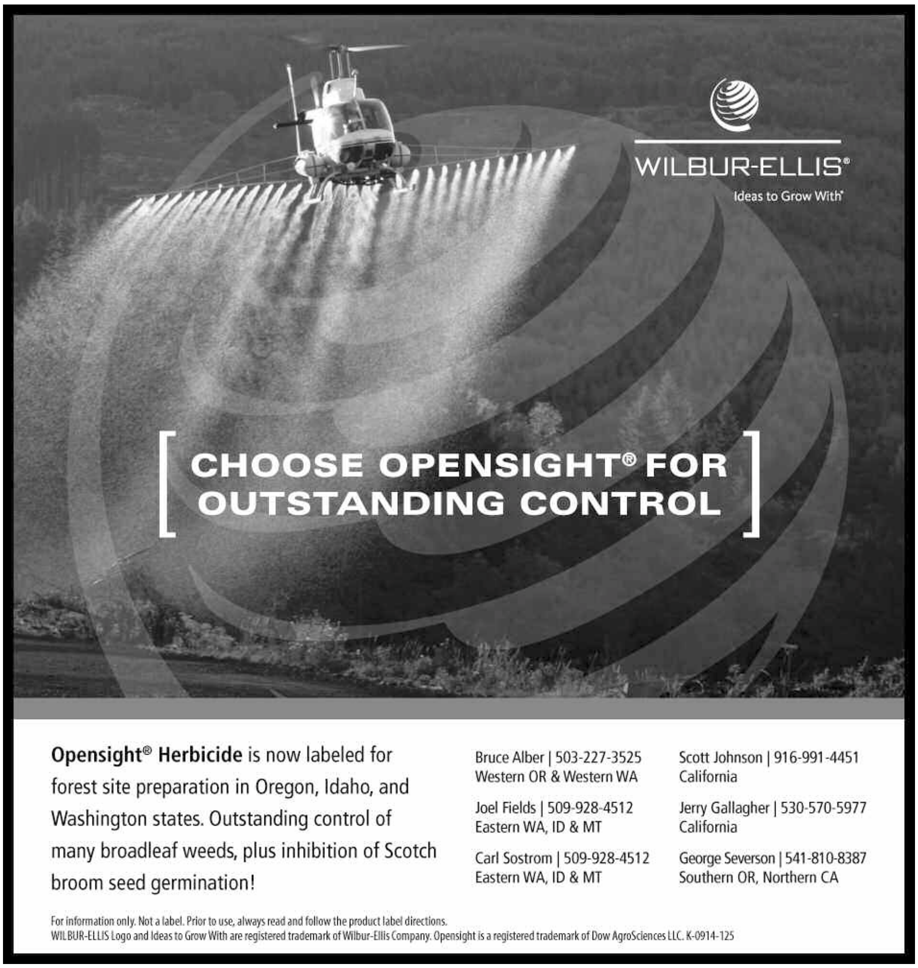
cases, the story can change with continued observations; multiple studies have shown shifts in findings over time that may be contrary to initial results. Research and monitoring with decades of observations have yielded surprises, such as changes in vegetation community dynamics or streamflow during forest succession, or shifts in trends of discharge and nutrient export over time. Long-term studies can also capture infrequent or extreme events that might not occur during shorter time scales. The long-term data then provide a site specific baseline that can be used to determine magnitude of change or to compare ecosystem responses following disturbances.

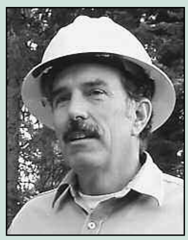
Nevertheless, short-term studies and experiments at the Andrews Forest also have a role in quantifying specific details and processes that are relevant to both managers and researchers. Two examples of short-term research that were quickly incorporated by forest managers: A recent graduate student evaluated the processes involved in road and stream interactions. Her research provided very useful information on how roads routed water and functioned to augment or dampen high flows (see sidebar by Dave Kretzing). Another project involved experiments to quantify and manipulate factors influencing stream temperature. Because stream temperature is a major water quality parameter for monitoring effects of forest harvest, discussions between researchers and managers focused on how much effect shading could have on temperatures. The researcher artificially shaded a small stream and observed rapid decreases in stream temperature over short distances. An unexpected finding during this study was the dramatic dampening of temperatures as the stream transitioned from surface flow over bedrock into hyporheic gravels. As soon as the researcher's paper was published, managers quickly incorporated the research findings into planning documents.

PHOTO COURTESY OF RHONDA MAZZA

A researcher studies water quality at a stream gaging station at the H.J. Andrews Experimental Forest.



Research Shapes Management



Norm Michaels, Forest Silviculturist, US Forest Service, Retired

The information obtained by the Andrews research community has helped me to better manage the forests with which I was associated. There are several areas that have been particularly useful to me, including wood decay dynamics, climate in mountainous areas, and fire occurrence west of the Cascade crest.

Research-management collaborations have enabled efficient implementation of scientific findings into management practices; in some cases this has occurred after targeted joint research projects on a specific management issue, while in others, findings from basic research have been implemented directly as soon as management implications were understood. For example, research into wood ecology at the Andrews Forest was quickly incorporated into prescriptions for woody material management post-harvest. Prior to the study, guidelines for harvest required that the majority of woody debris be removed from harvest units and piled on landings or burned, at great effort and expense. Research documented the benefits of leaving wood to decompose on site. Retained material rapidly recycles nutrients back into the system. It also provides shade to seedlings and a moisture reserve that can reduce impacts from drought. The down wood also provides travelways for small mammals and amphibians moving across the landscape. This small change in practices saved money and also benefited the ecological resiliency of the forest system. A similar story unfolded around retention of green trees within harvest units. Research on patch dynamics showed that recolonization of harvested areas by key fauna and flora, including old-growth indicator lichens and microrhyzal mats, could be augmented by leaving a few green trees within the units when harvesting. Federal and state managers quickly incorporated this practice into harvest plans.

Stimulating collaborations between managers and researchers

The H.J. Andrews Experimental Forest and Willamette National Forest have had the unique luxury of a person who works at the interface between research and management. The Science Liaison works to increase communication and facilitate discussions of needed research on forest management issues. The Science Liaison also helps disseminate new research findings and organizes workshops so that up-to-date science can be quickly incorporated into management.

Social science has suggested that the preferred method for dissemination of science findings and identification of new questions is through direct interaction among researchers and managers in the field or other informal settings. Information and new findings can be shared quickly through frequent interactions, improving accessibility and use of directly relevant science. Researchers and managers affiliated with the Andrews Forest recognize this and organize and host numerous field discussions on a variety of topics and issues. Experimental forests can serve as a hotbed of research, stimulating synergies and learning among researchers and managers, as well as being great places to bring together the sometimes separate worlds of science and management. ◆

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The Value of Science in Forest Management: Connecting Road and Stream Research

Dave Kretzing, Hydrologist, U.S. Forest Service, Retired

As a hydrologist working for the McKenzie River Ranger District, the home unit for the H.J. Andrews Experimental Forest, I enjoyed the opportunity for frequent interaction with the folks involved with ongoing forest research. Many of the study results were directly applicable to my work in watershed management. I found the research into the interactions between road and stream networks by Beverley Wemple to be particularly useful. It formally identified and documented interactions between roads and streams of which many of us applied practitioners had only an intuitive understanding. It provided us with the ability to identify problems with existing roads and develop mitigations, and to improve the design and location of new roads so they did not create additional impacts. Having peer-reviewed results supporting these efforts was invaluable in implementing these recommendations and supporting the environmental analyses for them.

Above and beyond the directly applicable research on forest hydrology, exposure to a broad range of other studies expanded my understanding of the many other processes that compose a forest. For example, studies of the role of disturbance processes such as fire, floods, and landslides as they operated on a forest landscape allowed me to view the forest as a much more dynamic place, varying greatly across different landscapes and over time.

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A Different Kind of Experimental Forest

BY TEODORA MINKOVA AND CATHY CHAUVIN

PHOTO COURTESY OF ALLEN ESTEP, DNR

A canopy gap created by a fallen old-growth tree. DNR researchers (in the background) are studying how to better emulate such gaps in managed stands.

Teodora Minkova

Cathy Chauvin

On the western Olympic Peninsula in Washington state, the Washington State Department of Natural Resources (DNR) has created a different kind of experimental forest: a commercial forest that is managed under an experimental approach with a core objective of learning. Learning will be applied to management directly in the forest through a structured process of adaptive management, and the knowledge gained will be shared regionally and beyond. Such knowledge should help others facing a similar challenge of sustainably managing forests for multiple objectives.

Many needs, but only one forest

DNR manages over 270,000 acres of state trust lands in the Olympic Experimental State Forest (OESF) where abundant rain and a mild maritime climate translate to lush, fast-growing coastal forests. DNR has a fiduciary responsibility to manage these lands to provide revenue for trust beneficiaries such as counties and universities. Yet these lands also provide habitat for a wide range of wildlife species including the federally protected northern spotted owl and marbled murrelet, both of which depend on late seral-stage forests. Streams in the OESF support robust populations of salmon at a time when many Northwest salmon runs are faltering.

To balance these objectives, DNR uses an experimental management approach called "integrated management." Under this approach, DNR manages the entire land base for both revenue production and ecological values instead of dividing it into large zones to be managed primarily for one objective or the other.

The integrated management approach is based on a working hypothesis that DNR can provide habitat for late seral-stage species by creating and maintaining structural complexity (such as snags, down wood, and multiple canopy layers) within forest stands, and by distributing such stands across the land base in an ecologically functional way. One of the primary ways DNR achieves structural complexity is through specialized harvest methods. In variable density thinning harvests, DNR thins stands to a variety of densities and creates canopy openings (gaps) to differentiate the stand. In variable retention harvest, a type of stand-replacement harvest, DNR retains snags, down wood, leave trees, and other structural features (biological legacies) to enrich the structure of the regenerating stand. Harvested areas are interspersed with areas that are lightly managed (such as riparian forests and wetlands) or unmanaged (such as old-growth forests) to create a complex mosaic of forest structure and seral stages across the landscape.

Based largely on the work of scientists Jerry Franklin of the University of Washington, Andrew Carey and Connie Harrington of the US Forest Service's Pacific Northwest (PNW) Research Station, and others, the integrated management approach has both promise and uncertainties. Uncertainties

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include the response of forests and fish and wildlife species to management activities and the economic and operational feasibility of the approach itself.

Learning from forest operations and experiments

Since the OESF is a commercial forest, some learning comes from monitoring forest operations. In a study called "Status and Trends Monitoring of Riparian and Aquatic Habitat," DNR is sampling nine indicators of salmonid habitat (such as in-stream large wood and water temperature) across 50 managed stream basins to assess whether riparian conservation objectives are being achieved across the landscape. This extensive, long-term project will also help DNR better understand the ecological relationships between upland, riparian, and aquatic areas.

PHOTO COURTESY OF ELLIS CROPPER, DNR

DNR researchers measure stream gradient in the OESF as part of the Status and Trends Monitoring of Aquatic and Riparian Habitat project.

DNR also conducts operation-scale research to find better ways to meet specific objectives, such as how to better emulate naturally created canopy gaps in variable density thinning harvests. For this project, DNR assessed forest response to canopy gaps created by foresters 10 years ago. Next, DNR will characterize the shape, size, and distribution of naturally created gaps observed in mature and old-growth forests. In the final phase, DNR will use this information to implement gaps in variable density thinning harvests in the OESF, and will track tree recruitment, understory vegetation response, branching and crown response, and snag and down wood creation. Though still in the initial stages, this study should help foresters write more targeted, ecologically informed silvicultural prescriptions.

Learning through cooperative studies

DNR conducts most of the research and monitoring projects in the OESF in collaboration with research partners such as the University of Washington's Olympic Natural Resources Center (ONRC) and the PNW Research Station. DNR supplies the forest management questions, data, logistics, and professional staff. Partners bring scientific expertise and research ideas.

Other projects are initiated and led by external research organizations with DNR providing support and the use of land. For example, several silvicultural research cooperatives, including Oregon State University's Hardwood Silvicultural Cooperative and the University of Washington's Stand Management Cooperative have research sites in the OESF. The OESF also includes one of four replicates of the Long-Term Ecosystem Productivity Study (the other three replicates are in Oregon). Led by the PNW Research Station, this 200-year study examines the effects of silvicultural treatments on productivity by measuring vegetation response and conducting soil analysis. Of particular concern is the effect of limiting the time forests spend in early and late seral stages, a common practice in commercial forestry.

Applying learning to management

A continued challenge and arguably the most important goal in the OESF is to apply the knowledge gained through research and monitoring to future management in a process of continual improvement called adaptive management. Adaptive management enables DNR to realize the full benefit of a commercial forest managed with an objective of learning.

An important first step in this process is to identify the highest priority management uncertainties on which to focus limited research resources. Other critical steps are ensuring scientific credibility of research and monitoring projects, communicating with stakeholders, providing timely scientific results to land managers, and sustaining the attention of decision makers.

The value and relevance of the OESF, today and beyond

Few research forests offer the capability to conduct research at an operational scale in a commercial forest. "The OESF," says Bernard Bormann, Director of ONRC, "provides us an opportunity to look at forest dynamics on a large spatial scale to determine if there is evidence supporting a shift in management from the static land-use policies dominating management today to a more integrated approach."

The need for solutions to meeting multiple objectives will continue to grow as human populations increase, public demands change, and the number of forested acres decreases due to development, making the OESF relevant today and into the future.

Researchers interested in pursuing studies in the OESF may learn more at www.dnr.wa.gov/programs-and-services/forest-resources/olympic-experimental-state-forest. ◆

Teodora Minkova manages the research and monitoring program for the OESF. She is based in DNR's main office in Olympia, Wash., and can be reached at 360-902-1175 or teodora.minkova@dnr.wa.gov. Cathy Chauvin is a writer/editor for DNR's forestland planning team in Olympia and can be reached at 360-902-1385 or cathy.chauvin@ dnr.wa.gov.

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Research and Forestry Education are Priorities at UI Experimental Forest

BY ROBERT F. KEEFE

The University of Idaho Experimental Forest (UIEF) is managed by the College of Natural Resources as a working forest with active annual forest inventory, harvesting, thinning, prescribed burning, vegetation management, and reforestation programs. The four primary management units are located on Moscow Mountain totaling over 8,000 acres and within 30 minutes of campus. Several smaller properties around the state are used frequently for outreach and extension activities. Additionally, the 1,650-acre Herald and Donna Nokes Experimental Forest in McCall has been gifted to the college in a life estate and research and teaching at that property is increasing.

Our model is to have research and management activities on these properties planned and implemented by faculty and students in ways that are integrated directly with forestry classes, student employment opportunities, and student club activities. Research, education, and outreach programs are guided by management practices and research priorities identified by industry, small private, state, and federal stakeholders in Idaho and throughout the Pacific Northwest where our forestry students will work after graduation.

Education

To maximize educational opportunities in forestry on the experimental forest, a mixture of student-run and contracted activities are implemented, which gives students hands-on experience preparing for professional careers. The UIEF has a student logging crew that has been active for over 40 years. Students on the logging crew get familiar with operating saws and heavy equipment and gain a primary understanding of forest product scaling and merchandizing.

At a higher level, students in the FOR 430 Forest Operations class mark timber stand boundaries, estimate logging costs for units prior to harvest, and perform estate-level harvest planning. Students in the FOR 436 Cable Systems class layout, rig, and operate cable systems on the forest. Students in FOR 431 design new forest roads and schedule maintenance on the existing road network. FOR 427 Prescribed Burning Lab students implement site preparation, fuel reduction, and restoration treatments; these student-led prescribed fire activities are known nationally for their real-world training. Similarly, students grow our annual seedling crop at the state-of-the-art Frank Pitkin Nursery facility, and silviculture students in FOR 424 annually prepare stand descriptions and prescriptions for individual stands.

It is critical for professional development that forestry students develop the skills needed to work with contractors at a higher level, such as overseeing contract administration and compliance, working directly with loggers and silvicultural contractors, and participating in site visits by Idaho Department of Lands to review regulatory compliance with the Idaho Forest Practices Act and Best Management Practices to protect water quality. By integrating students into administrative activities, practical preparation is maximized that corresponds directly to life as a professional forester after graduation.

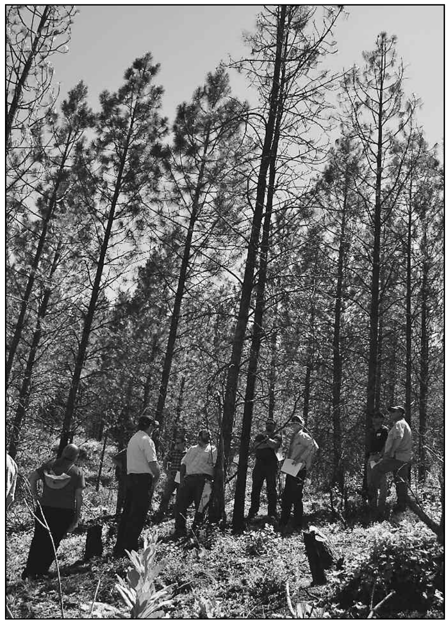

PHOTO COURTESY OF UIEF

In June 2015, Idaho Lands Resource Coordinating Council members viewed the effects of burning in one of three stands that received mastication treatments as part of a Joint Fire Sciences Program Grant.

This model has been highly successful: recent graduates are employed throughout the Pacific Northwest and are able to hit the ground running when hired. Most forestry students now do 3-4 summer internships with various employers during their degree program. Temporary employment positions are used on the UIEF to help fill gaps in student development on a student-by-student basis. For example, if a student has worked in inventory but not in operational harvest layout as they approach graduation, then we work to give them those experiences to help complete their skillsets and resumes as they apply for career positions.

Research

In 2014, Idaho passed a new stream shade law affecting harvesting near Class I streams. The experimental forest worked closely with Idaho Department of Lands and Idaho Department of Environmental Quality (IDEQ) to develop a demonstration area at the Matthew M. McGovern Memorial Tree

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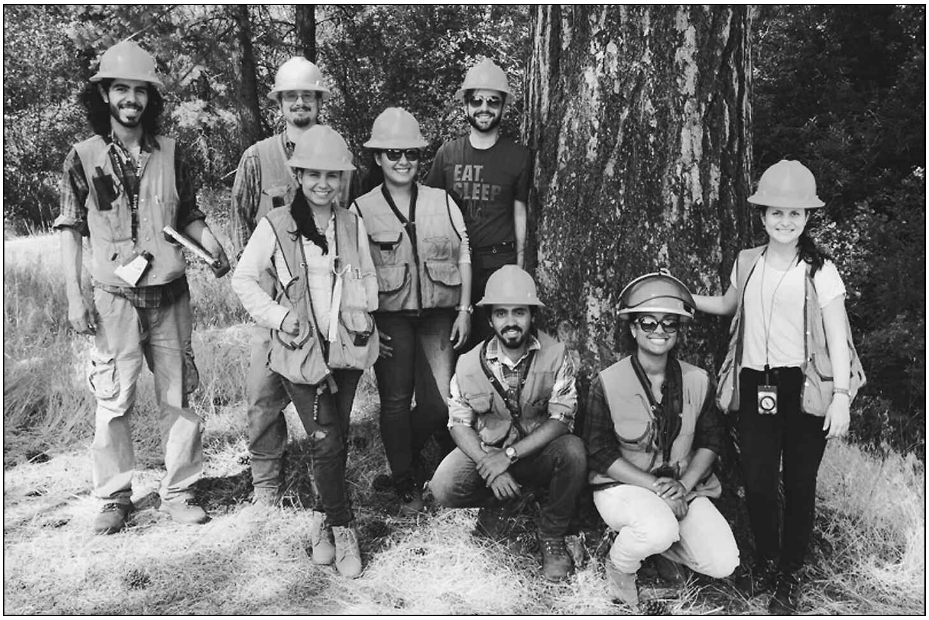

PHOTO COURTESY OF UIEF

UIEF summer interns from the Brazilian Scientific Upward Mobility Program after marking a stand at the Roger Guernsey Outdoor Classroom in July 2015.

Farm in Coeur d'Alene, Idaho, with participation and support from both agencies. The demonstration area shows options for implementing the new law under common silvicultural systems used by different landowners. The demonstration site was also used to help develop the measurement protocols for a statewide monitoring study funded by IDEQ to evaluate the new law.

Important industry research is evident in an exciting new $825,000 grant funded by the National Institute of Health and Centers for Disease Control (NIH/CDC) evaluating use of multi-transmitter GPS systems to improve logging safety. In this work, we are assessing use of digital geofences to define safe working areas, and studying equipment and ground worker movements that lead to accidents. We are using GPS transmitters to track the movements of logging equipment components and ground workers in real time, in both real logging operations and designed experiments. Logging equipment is equipped with new software that allows all operators to see the locations of one another during harvesting. This research will help identify the human factors that lead to accidents. The technology used in this experiment is also being evaluated for use in improving firefighter safety, and results are being shared with major equipment producers to facilitate technology transfer.

A great example of partnering on research important for federal land managers is a recent Joint Fire Science Program grant characterizing fire behavior in masticated fuel beds. This work includes a study design typical for the UI Experimental Forest: treatments are fully replicated at the stand level in three young (20-25 year-old) plantations. In this experiment, ponderosa pine plantations were treated with two different mastication processes (bulky vs. fine chips), two levels of fuel moisture, and two levels of fuel drying duration (1 or 2 years). This study has important implications for fuel treatments in the Wildland Urban Interface. In July, we hosted members of the Idaho Lands Resource Coordinating Council, a group that makes decisions on funding different kinds of fuel treatment projects, so they could see preliminary results firsthand.

Outreach

Outreach activities such as the Working Forests Field Day that will take place on September 26 complete a cycle of feedback between forestry stakeholders, faculty, and students that helps foster development of new research ideas and teaching and outreach priorities. This is critical as we work continuously to improve both our forestry program and the management of our college's forests. We are indebted to our stakeholders for the guidance and input they provide in return on how best to improve our management, what new techniques are of interest, and what new questions have come up.

College leadership

Having the opportunity to work on improving our forest's operations under the guidance of Dean Kurt S. Pregitzer has been among the most rewarding experiences in my professional career. We all have mentors in professional forestry and mentoring is also critical for success in academic life. In Dean Pregitzer, our college has been fortunate to have one who is a true leader in both areas.

The Dean's knowledge and understanding of applied forest ecology and on-the-ground forestry, and his fiscal acumen have guided the thoughtful synthesis of new experimentation, silvicultural investments, and quantitative forest planning that has been achieved over the last five years. We look forward to the future as both the experimental forest and the UI forestry students who manage it continue to grow better each year. ◆

Robert F. Keefe is forest manager and assistant professor of Forest Operations in the Department of Forest, Rangeland, and Fire Sciences, University of Idaho in Moscow. He can be reached at 208-310-0269 or robk@uidaho.edu. He is a member of the Inland Empire SAF.

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Long-term Research in Interior Alaska Tracks Consequences of our Changing Climate

BY JAMIE HOLLINGSWORTH

The Bonanza Creek Experimental Forest (BCEF) and Caribou-Poker Creeks Research Watershed (CPCRW) are the only designated forest research areas in the northern boreal forest zone of the United States. Bonanza Creek, located about 12 miles (20 km) southwest of Fairbanks, Alaska, was established in 1963 and encompassed approximately 8,487 acres (3,360 ha) of upland boreal forest. In 1969, the forest was enlarged to 12,486 acres (5,053 ha) to include representative floodplain forests and wetlands associated with the Tanana River. Bonanza Creek lies within the Tanana Valley State Forest, a unit managed by the Alaska Department of Natural Resources Division of Forestry. It is leased to the USDA Forest Service's Pacific Northwest Research Station for the exclusive purpose of conducting research in forestry.

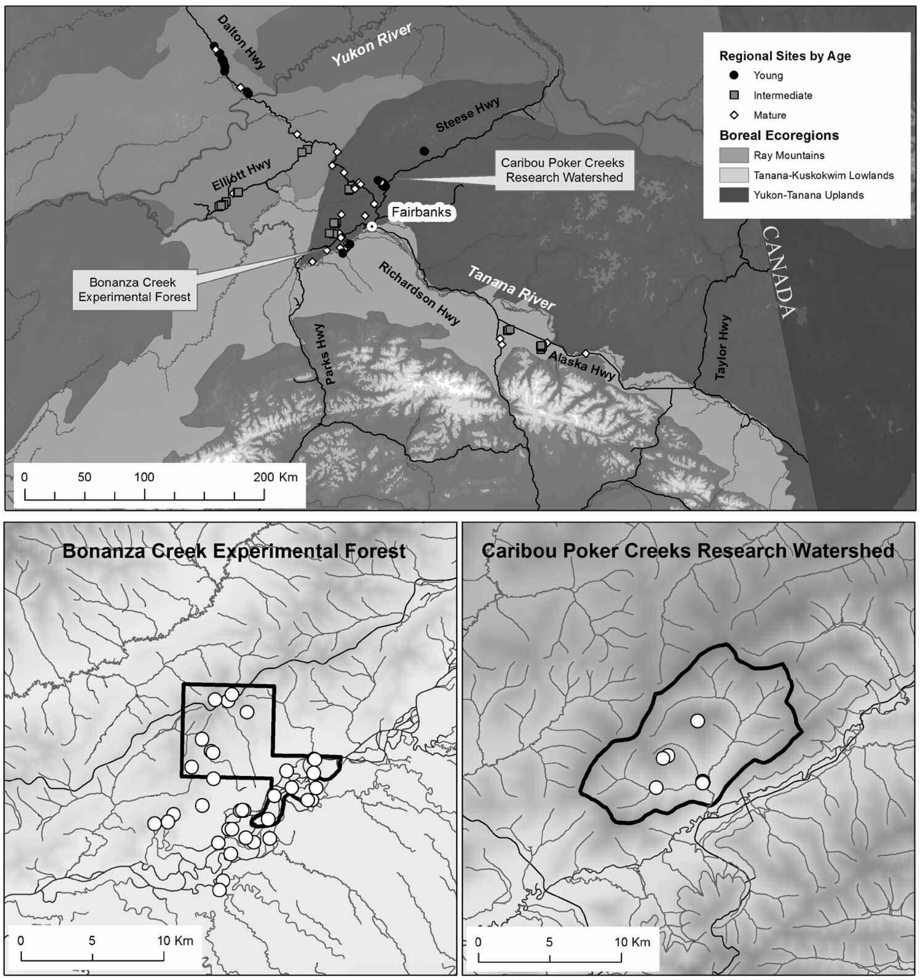
Caribou-Poker Creeks is a 25,700 acres (10,400 ha) upland research site located 28 miles (45 km) north of Fairbanks in the boreal forest of the Yukon-Tanana Uplands. Its research is focused on understanding the watershed dynamics associated with discontinuous-permafrost. In 1969, a cooperative agreement signed by the Interagency Technical Committee for Alaska and the Alaska Department of Natural Resources designated the basin as the Caribou-Poker Creeks Research Watershed. In 1996, the University of Alaska Fairbanks assumed management of the watershed.

LTER

In 1987, Leslie Viereck of the USDA Forest Service and Keith Van Cleve of the University of Alaska Fairbanks wrote the first Bonanza Creek (BNZ) proposal submitted to the National Science Foundation as part of the Long-Term Ecological Research (LTER) initiative.

Initially, BNZ LTER research was designed to study floodplain and upland succession following disturbance. It was hypothesized that succession in floodplains (following fluvial disturbance) and uplands (following fire) results in a predictable development of hardwood and then coniferous stands, with black spruce stands becoming the climax species until disturbance reset the successional trajectory.

Since initial establishment, research associated with BNZ LTER has indicated that boreal forest succession following disturbance in both interior Alaskan floodplain and upland forests is more complicated than initially defined by the original models put forward by Viereck and colleagues in the 1970s. For example, research was published in 1995 emphasizing the importance of geomorphology and fire in controlling successional process in floodplain ecosystems. Other research along a 12,000-year-old geologic chronosequence of fluvial deposits in the central Alaska Range showed that while primary succession continues toward a white spruce/balsam poplar forest, there can be a convergence toward a frequently burned aspen/white spruce/ericoid community type. A recent synthesis done of the long-term vegetation data collection at the floodplain sites suggests a complex interaction between successional processes, community dynamics (in particular herbivory), and potentially directional change in cli-



SOURCE: JAMIE HOLLINGSWORTH

Figure 1. The top half of the figure shows locations of new regional sites across three ecoregions. The bottom two maps indicate the locations of the original LTER site locations within the Experimental Forest and Research Watershed.

mate is driving understory vegetation patterns in mid- and late-succession.

Research completed on initial successional pathways post-fire has suggested that the influence of pre-fire composition, site characteristics such as moisture, and fire severity are tightly linked to changes in post-fire trajectory. Finally, stand reconstruction and modeling of a large forest stand northeast of Fairbanks suggests that self-replacement has been the most frequent successional pathway over the last century, most likely due to site characteristics (solar insolation and altitude), not time since last fire. Collectively, these studies indicate that interactions between the timing and severity of disturbance, herbivory, pre-disturbance plant composition, and site characteristics strongly interact to allow for shifts in both community composition and successional trajectories.

Regional expansion

Following the reevaluation of the original models guiding boreal forest research in interior Alaska, the BNZ LTER program began a regional expansion of study sites in 2012 with the latest LTER renewal proposal submitted in 2010. The major focus of the renewal proposal is to better understand regional effects of climate change, and in particular, climate-disturbance interactions including fire, permafrost thaw, and insect/pathogen outbreaks. This regionalization resulted in a shift away from the monitoring scheme initially defined in a spatially limited area several decades ago. However, throughout the process, scientists have been extremely cognizant of the importance in maintaining the integrity of the long-term monitoring record initially established.

BNZ LTER is currently emphasizing regional dynamics and changing successional trajectories from a more spatially extensive perspective as opposed to only stand-level dynamics. To meet this challenge, measurements have been expanded to a more regional set of sites chosen to specifically address variations in site conditions driving divergence of successional pathways. This regional site network will focus on black spruce, which is the most extensive forest type in interior Alaska and is experiencing radical disturbance-driven changes in successional dynamics. Twelve of the BNZ LTER sites that were previously established are included as part of the BNZ LTER 90 regional sites. This allows for maintaining valuable long-term records while also expanding into site conditions that are common in boreal Alaska, but not available within the limited scope of BCEF or CPCRW.

Three major ecoregions in interior Alaska are accessible by road or river and encompass more than 6,200 sq. miles (1,600,000 sq. km). These ecoregions are the Ray Mountains, ~12.7 million acres (5.2 million ha); the Yukon-Tanana Uplands, ~25.3 million acres (10.2 million ha); and the Tanana-Kuskokwim lowlands, ~ 1.6 million acres (0.6 million ha)—each with distinct fire history, permafrost distribution, and geologic history. The regional site network encompasses sites of various times since fire disturbance, site moisture conditions, and ecoregion.

Implications for managers

Experimental forests and the research associated with them are critical for land managers. In boreal Alaska, land managers are faced with management decisions related to fire safety, wildlife habitat, and biomass production. BNZ LTER is answering questions that directly relate to these issues. For example, we know the degree of warming and drying after fire on sites with permafrost will affect both tree recruitment and growth rates in those areas. Another example is a PNW Research Station General Technical Report produced by LTER researchers that provides a dichotomous key for determining potential successional trajectory at a given site immediately post-fire.

As with all long-term data, the value is in the length of the record. Bonanza Creek Experimental Forest and Caribou-Poker Creeks Research Watershed have vegetation, animal population, and climate datasets that date back to the 1950s. These data are available to managers and can be used in climate and fire prediction models, stand composites for fire, habitat loss and gain, and biomass estimates. ◆

Jamie Hollingsworth is Bonanza Creek LTER Site manager, University of Alaska Fairbanks in Fairbanks, Alaska. He can be reached at 907-474-7470 or jhollingsworth@alaska.edu.

Bibliography Available

For additional information on the research cited in this article, please visit the Bonanza Creek LTER online bibliography at www.lter.uaf.edu/pubs/bibliography_search_master.cfm.

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One-Hundred Years of Forestry Research: A Legacy of the Priest River and Deception Creek Experimental Forests

BY RUSSELL T. GRAHAM

When Raphael Zon, head of the Forest Service's Office of Silvics, recommended the establishment of experiment stations in 1906, tree cultivation and planting were identified as key information needs by the newly created Forest Service. The Priest River Forest Reserve near the Canadian border in northern Idaho was one of several forest reserves that President Cleveland established across the western USA in 1897. John Leiberg, a dendrologist assigned by the General Land Office to review the Reserve in 1897 described it as a "magnificent forest…of western white pine and tamarack." Leiberg's description no doubt influenced Raphael Zon's choice to establish the region's experiment station just north of Priest River, Idaho, within the Reserve. In August of 1911, Raphael Zon, Donald H. Brewster (first station director), and others brought along the basic supplies needed to establish the Priest River Experiment Station. By September 1, 1911, the station was established and meteorological instruments, still recording since that time, were installed on September 4, 1911.

The Priest River Experimental Forest (PREF) now encompasses 6,400 acres with elevations ranging from 2,200 to 5,900 feet distributed across two west facing watersheds that give rise to north and south facing slopes dominating the topography. The ash-cap soils of the forest support primarily moist mixed-conifer forests containing ponderosa, western white, and lodgepole pines along with Douglas-fir, grand fir, western hemlock, Engelmann spruce, and western redcedar associates. At the highest elevations of the forest, white bark pine grows often intermixed with open bunch grass glades and multiple century-old western redcedars occupy riparian areas along the two major streams on the forest and along the adjoining Priest River. The forest provides habitat for deer, elk, black bears, the occasional grizzly, bull and cut-throat trout, and a wide variety songbirds, woodpeckers, an occasional northern goshawk, and a couple of grouse species.

PHOTO COURTESY OF USDA FOREST SERVICE

The control weather station (still operating) and George Jemison atop the 150-foot western larch tree where weather instruments were maintained at the Priest River Experimental Forest in 1932.

With people such as Julius Larson, Irving Haig, Ken Davis, Bob Marshall, Harry Gisborne, Chuck Wellner, Dick Bingham, Al Stage, Ray Hoff, Harold Haupt, Gerry Rehfeldt, Al Harvey, and many others continually conducting forestry research since 1911, PREF has been associated with over 700 publications. One of the first ponderosa pine racial variation tests was planted at PREF in 1911, and studies at PREF contributed to blister rust resistance of western white pines, seed transfer guidelines for western conifers, coarse woody debris dynamics, and the adaptation of conifers to climate change. Methods of cutting studies were started in 1914 and have been re-measured for 100 years that contributed to the understanding of forest establishment and growth. In particular, yield tables for the western white pine type originated at PREF and the long-term forest measurements of PREF were used to validate the Forest Vegetation Simulator (FVS, stand growth model) currently used worldwide.

Because of PREF's proximity to the area where the large wildfires of 1910 burned, in 1916 personnel at PREF were directed to begin studies to identify factors that affect fire spread and how the rate of spread is influenced by weather and site conditions. As a result, work at PREF was the genesis of fire danger, behavior, and control research that still continues today. Weather has been observed at PREF for over 100 years and snow accumulation and stream flow for over 75 years, providing valuable information about climate and its effects on water yield and forest development. With the exception of two natural areas and several other reserved areas, most of the forest is open for vegetative manipulation studies that have produced a long history of relevant silvicultural research on topics including thinning, cleaning, weeding, planting, regeneration methods, regular and irregular selection systems, and even-aged systems. Currently numerous combinations of forest floor and canopy treatments are being tested to see how they would modify wildfire behavior if a fire was to occur.

The McSweeney-McNary Act (1928) laid the groundwork for a nationwide system of forest experiment stations and experimental forests. That authority, supported by funds from New Deal programs in the 1930s, enabled the Forest Service, Washington Office to approve and fund the Deception Creek Experimental Forest (DCEF) located just east of Coeur d'Alene, Idaho. DCEF is positioned in one of the most productive forests of the Rocky Mountains. When the forest was established in 1933, large, old western white pines were important for producing lumber, matches, and toothpicks, and DCEF being dominated by such forests allowed researchers to focus on the ecology and silviculture of western white pine and its associated species. The forest includes the entire Deception Creek drainage, a tributary of the North Fork of the Coeur d'Alene River. DCEF encompasses 3,521 acres with elevations ranging from 2,790 to 4,600 feet. Flowing west to east, Deception Creek dissects the forest, giving rise to predominantly north- and south-facing slopes with angles ranging from 35 to 80 percent. Western white pine, grand fir, and western hemlock species now dominate the forest with occasional ponderosa and lodgepole pines.

When established, large and old western white pine trees dominated all slopes on DCEF and all possible silvicultural methods and systems were tested and demonstrated on the forest to grow and tend western white pine. Blister rust control, harvesting systems, road construction, prescribed fire, thinning, planting, and direct seeding and their economics were all tested at DCEF. Currently, western white pine still dominates the forest except blister rust has killed most of the remnant white pines that often exceed 200 feet in height with diameters over 36 inches. Such stands once dominated the 290-acre natural area located on a northern aspect in the center of the forest and now only a few such trees survived. Currently irregular selection silvicultural systems are being tested over a large portion of the forest, partial cleanings and weedings are being tested, and a major study is testing silvicultural methods (mass selection) that can be used to increase the natural resistance of western white pine to blister rust.

When a forester passes a Smokey Bear sign showing the fire danger, uses FVS, plants a blister rust resistant pine, uses a Ken Davis forestry text book, visits a wilderness area, or describes the importance of coarse woody debris to forest productivity, they can thank the people and the research conducted on the Priest River and Deception Creek Experimental Forests in northern Idaho. ◆

Russell T. Graham is a research forester with the Rocky Mountain Research Station in Moscow, Idaho. An SAF Fellow, he can be reached at 208-883-2325 or rtgraham@ fs.fed.us.

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The Starkey Experimental Forest and Range: A Nexus of Science and Management

BY MARY M. ROWLAND AND
MICHAEL J. WISDOM

Mary M. Rowland

Michael J. Wisdom

This year marks the 75th anniversary of the establishment of the Starkey Experimental Forest and Range (SEFR) in northeastern Oregon. Myriad research projects have ensued focusing on forest and rangeland management in the ponderosa pine-bunchgrass forests of the Blue Mountains. Starkey is unique in its designation as the only Experimental Forest and Range in the extensive EFR network administered by the Forest Service. This duality has led to a diverse mix of integrated studies serving land managers across much of the Intermountain West. Livestock and wildlife research, too, is a hallmark of Starkey, with long-term studies of cattle grazing and wildlife species ranging from pileated woodpeckers to mule deer and elk. The creation of the Starkey Project in 1987 strengthened this legacy. Innovative technologies of the Starkey Project include the ungulate-proof fence enclosing 25,000 acres and an automated telemetry system that has generated more than 16 million locations of mule deer, elk, and cattle, with several million more locations of all-terrain vehicles (ATVs) and hunters. The telemetry locations have been made available to a wide range of university and agency scientists for analysis and publication. These features combine to make Starkey a one-of-a-kind setting for conducting experiments and management-driven research on a wide range of natural resource issues.

Here we highlight the strong science-management bridge at the SEFR using three case examples: intensive timber management, roads and wildlife, and riparian restoration.

Intensive timber management

Forest habitats for elk can change dramatically in response to timber management. Although these potential effects have been widely debated, they were seldom investigated experimentally until the early 1990s at Starkey. Approximately 7 million board feet of timber was harvested and 24 miles of road constructed in a 3,600-acre study area (Syrup Creek) over a 2-year period. Elk did not appear to react to log truck hauling during the sale when roads were closed to the public. The average daily weight gain by elk varied across years in relation to variation in weather, but not in response to timber harvest or habitat changes. However, the increased visibility and road access associated with timber harvest made elk more vulnerable to hunter harvest, especially when hunters were allowed motorized access following the timber sale rather than foot-only travel. This key finding is now given careful attention as part of timber harvest and access planning on public lands.

Fast forward to 2015. Stands in the Syrup Creek study area have regenerated with understory conifer densities exceeding 2,500 stems/ac in some sites. A suite of new studies is planned as a demonstration of "accelerated forest restoration." Objectives include reducing fuel loading and fire risk; providing commercial timber harvest opportunities compatible with restoration; increasing forest resistance and resiliency to insect pest outbreaks; increasing early-successional conditions beneficial to wildlife; and providing forest management employment opportunities compatible with traditional economies. Research of novel pre-commercial thinning and fuels management prescriptions will include measuring responses such as wildlife, hydrology, nutrient cycling, tree growth, and fuel loading-fire hazard mitigation.

Roads and wildlife

One high-profile area of research at Starkey is evaluating effects of roads on wildlife, especially deer and elk. Roads are a ubiquitous and necessary feature of public lands, providing access for timber harvest, prescribed fire, wildland fire fighting, and recreation. But road construction and the traffic associated with roads can be problematic. Using the largest data set ever amassed to evaluate elk-road relations, researchers found that elk avoided areas near roads open to motorized traffic up to a mile away. Traffic rates matter, too—the speed and distance that elk moved increased as traffic rates increased. Surprisingly, mule deer showed little response, though past studies had assumed deer were elk equivalents when it came to road effects. The Forest Service has used this research, along with studies of ATV use at the SEFR, in developing national policies for roadless areas and off-highway vehicles. Given ongoing development and revision of travel management plans for many federal land management units, Starkey roads research continues to be highly relevant and supportive of guidelines related to road networks on public lands.

Riparian restoration

A multi-faceted restoration project began in 2012 along 7 miles of Meadow Creek within the SEFR. This research investigates riparian vegetation recovery for endangered salmonids in relation to browsing by wild and domestic ungulates. Results will provide a comprehensive set of best management practices for in-stream and forest riparian restoration

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The intensive timber harvest in Syrup Creek, shown here two years post-harvest, resulted in large reductions in forest cover, which in turn affected vulnerability of elk to hunter harvest (left). Twenty years later a dense understory of conifers prevails and fuel loads are high (right).

practices and ungulate management to support salmon and steelhead recovery. More than $1.2 million, primarily from the Bonneville Power Administration and National Forest System, has been spent to date on placing in-stream structures, constructing fencing, and planting more than 40,000 shrubs and conifers in the riparian corridor. Long-term monitoring and research is now underway to document how fish and other resources respond to the treatments.

One unique feature of this project is its exploration of how varying levels of cattle, elk, and mule deer herbivory—made possible through replicated treatment exclosures—affect the plantings and thus the ultimate recovery of fish habitat. Early results show that deer and elk browsing in the absence of cattle (which will begin grazing in 2016) substantially reduced the height and survival of planted shrubs. Moreover, the addition of woody debris and boulders has resulted in substantial increases in both pool habitats needed for summer survival of juvenile salmonids and numbers of juveniles using pools at Meadow Creek. Scientists are also studying responses of other resources, such as native pollinators, small mammals, and stream temperatures to the restoration plantings and ungulate herbivory.

Other Starkey research

• A seminal study on livestock grazing systems highlighted the negative impacts of season-long grazing on forage resources and led to the adoption of deferred rotation systems for cattle still in use on National Forests today.

• Research about how pileated woodpeckers rely on snags and down wood led to modifications in Forest Service woodcutting permits and logging regulations.

• Continuous long-term monitoring of spruce budworm and other insect pests at the SEFR contributes data to inform forest pest management strategies for the Blue Mountains.

• A study of how various fuels reduction techniques affect mule deer and elk showed that bull and cow elk responded differently, and that use of the treatments varied by season. Moreover, deer showed little response to the treatments. Thus, a mosaic of treated and untreated habitats provides better long-term foraging opportunities for elk than thinning or burning a large proportion of a landscape, but mule deer are unlikely to benefit (*Western Forester March/April/May 2013*).

Research at Starkey will continue to adapt to meet the evolving needs of managed forests and rangelands in the future. What will grazing allotment plans look like with earlier senescence of grasses in a warming climate? How can we effectively manage fuels while maintaining wildlife habitat? How will the rapid increase of exotic grasses impact forested rangelands of the Blue Mountains? The one certainty is that Starkey research will continue to be in the mix, delivering science to local, regional, and national stakeholders as it has since 1940. ◆

Mary M. Rowland and Michael J. Wisdom are research wildlife biologists, U.S. Forest Service, Pacific Northwest Research Station, in La Grande, Ore. Mary can be reached at 541-962-6582 or mrowland@fs.fed.us and Mike can be reached at 541-962-6532 or mwisdom@fs.fed.us.

Partners Value the Scientific Approach

Starkey research has garnered the support of dozens of partners over the years. One of those is Backcountry Hunters and Anglers, whose Oregon Outreach Coordinator Brian Jennings asserted: “Starkey has not ignored controversy in its research. Indeed, ongoing research on motorized and non-motorized access to our public lands, road densities, and the response of elk to these human activities has stirred up a hornet’s nest in some circles. Backcountry Hunters and Anglers appreciate Starkey’s science-based approach to the management of our national forests and we strongly support its continuing efforts. Research is never perfect, but the bottom line is Starkey is adding value to our public lands by providing a roadmap for their best use by all groups.”

OFRI Hires Director of Forest Products

Longtime Portland public relations and marketing professional Timm Locke has joined the Oregon Forest Resources Institute to lead efforts in growing domestic and international demand for Pacific Northwest wood products.

As director of forest products, Locke is heading up OFRI's new statewide Forest Products Promotion and Education Program, funded by a nearly $250,000 Wood Innovation Grant from the U.S. Department of Agriculture. The program aims to create and strengthen demand for traditional and innovative Pacific Northwest wood products among professionals who design, specify, and construct commercial buildings.

Locke brings extensive experience promoting wood products to the new position. He has worked as a product publicity manager for the Western Wood Products Association and was a principal and public relations director at KnollGroup in Portland before starting his own Portland-based public relations and marketing agency, Pipeline PR + Marketing, in 2002. His client base included building-products firms Contact Industries, Patrick Lumber, and Warm Springs Composite Products.

At OFRI, Locke will promote Pacific Northwest wood products in partnership with state agencies, universities, trade associations and firms representing architects, engineers, developers and builders. His work will include touting the environmental advantages of building with wood and promoting innovative wood products such as cross-laminated timber.

"Throughout my 25-year career, I've focused on wood products," Locke says. "I believe they are a superior environmental choice wherever they're functionally appropriate and I'm excited to spread the word among professionals who create our built environment."

Locke's position at OFRI is funded through the USDA's Wood Innovation Grant program, aimed at expanding and accelerating wood energy and wood product markets. In May, OFRI was among eight recipients in Oregon and Washington awarded a total of $1.5 million in USDA grant funding. ◆

About the Oregon Forest Resources Institute

The Oregon Legislature created the Oregon Forest Resources Institute in 1991 to advance public understanding of the state's forest resources and to encourage environmentally sound forest management through training and other educational programs for forest landowners. OFRI is funded by a dedicated harvest tax on forest products producers.

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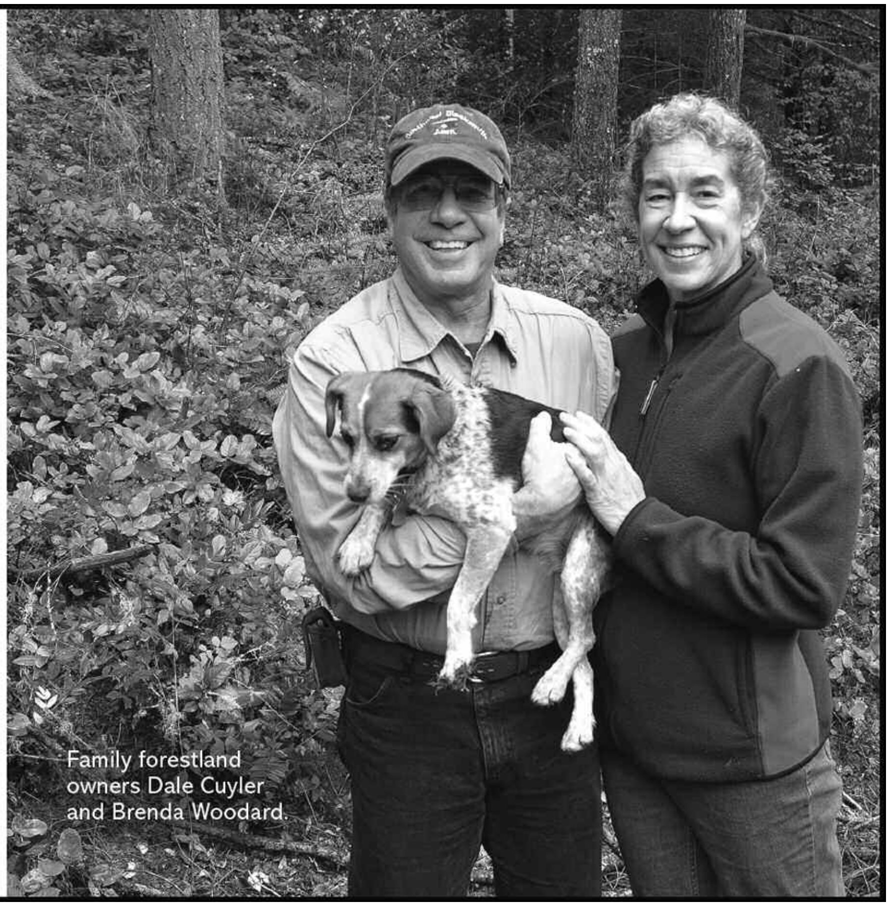

Family forestland owners Dale Cuyler and Brenda Woodard.

Calendar of Events

Inland Empire SAF annual meeting, Sept. 18, Coeur d'Alene Casino, Worley, ID. Contact: Lynn Kaney, lkaney@concept-cable.com.

NCASI West Coast Regional Meeting, Sept. 21-23, Vancouver, WA. Contact: Karen Phelps, 541-752-8801, kphelps@ncasi.org, www.regonline.com/2015ncasiwcrm.

Wetlands Delineation, Sept. 22-23, Kirkland, WA. Contact: NWETC.

Forest Watershed Symposium, Sept. 23, Vancouver, WA. Contact: Karen Phelps, 541-752-8801, kphelps@ncasi.org.

Wetlands Permitting, Sept. 24, Kirkland, WA. Contact: NWETC.

CESCL: Erosion and Sediment Control Lead Training, Sept. 29-30, Bellevue, WA. Contact: NWETC.

Using Herbicides for Site Prep and Release on Forested Lands, Oct. 7, Vancouver, WA. Contact: WFCA.

PNW Reforestation Council meeting, Oct. 8, Vancouver, WA. Contact: WFCA.

OFIC annual meeting, Oct. 11-13, Sunriver Resort, Sunriver, OR. Contact: OFIC, ofic@ofic.com.

Pacific Salmonids: Ecology, Oct. 19-20, Bellevue, WA. Contact: NWETC.

Plum Creek Distinguished Lecture Series, Oct. 23, University of Montana, Missoula, MT. Contact: Leana Schelvan, 406-243-6693, leana.schelvan@umontana.edu, http://www.cfc.umt.edu/plumcreek/default.php.

SAF Job Fair, Oct. 27, Oregon State University, Corvallis, OR. Contact: Kaitlyn Hickam, hickamk@onid.oregonstate.edu, http://undergrad.forestry.oregonstate.edu/student-services/osu-student-chapter-society-american-foresters-saf-job-fair.

Forestry Access, Easements, and Forest Management Legal Issues, Oct. 28, Coeur d'Alene, ID. Contact: WFCA.

2015 SAF National Convention, Nov. 3-7, Baton Rouge, LA. Contact: 866-897-8720, membership@safnet.org, www.xcdsystem.com/saf/site14/.

ArcGIS 10: Geoprocessing-Advanced Techniques for Environmental Applications, Nov. 16-18 in Seattle, WA. Contact: NWETC.

Field Technology and Natural Resources Conference, Nov. 18-19, Portland, OR. Contact: WFCA.

Habitat Site Restoration, Dec. 1-2, Anchorage, AK. Contact: NWETC.

Log Trade Trends: A Global Perspective, Dec. 2-3, World Forestry Center, Portland, OR. Contact: Amanda Mattern, 503-226-4562, amanda@western-forestry.org, http://logtradetrends.world-forestry.org/.

Scaling for Non-Scalers, Dec. 7, Wilsonville, OR. Contact: WFCA.

Forest Inventory and Analysis Science Symposium, Dec. 8-10, Portland, OR. Contact: Sharon Stanton, sharonmstanton@fs.fed.us, http://fia.fs.fed.us/symposium/.

WSSAF/OSAF Leadership Conference, Feb. 5-6, DuPont, WA. Contact: John Walkowiak, 253-320-5064, jewalkowiak@harbornet.com.

Inland Empire/Montana SAF Leadership Academy, Feb. 26-27, Lubrecht Forest Lodge, Greenough, MT. Contact: Gary Ellingson, nwmanagemt@nmi2.com.

IESAF annual meeting, joint with Idaho Forest Owners Assoc., Mar. 28-29, University Inn, Moscow, ID. Contact: Bill Love, loblollylove@hotmail.com.

Society for Ecological Restoration Northwest Regional Conference, April 4-8, Red Lion Inn Jantzen Beach, Portland, OR. Contact: Rolf Gersonde, rolf.gersonde@seattle.gov, http://restoration2016.org/.

Montana SAF annual meeting, joint with Montana Forest Owners Association, Apr. 15-16, Red Lion Colonial Inn, Helena, MT. Contact: Gary Ellingson, nwmanagemt@nmi2.com.

Oregon SAF annual meeting, Apr. 26-29, Mill Casino, Coos Bay, OR. Contact: Shaun Harkins, 541-267-1855, shaun.harkins@plumcreek.com.

Washington State SAF annual meeting, May 12-14, La Conner, WA. Contact: Paul Wagner, pwagner@atterbury.com.

Contact Information

NWETC: Northwest Environmental Training Center, 1445 NW Mall St., Suite 4, Issaquah, WA 98027, 425-270-3274, https://nwetc.org.

WFCA: Western Forestry and Conservation Association, 4033 SW Canyon Rd., Portland, OR 97221, 503-226-4562, richard@westernforestry.org, www.westernforestry.org.

Send calendar items to the editor at rasor@safnwo.org.

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OSU Research Forests—An Example of a Working Forest

BY STEPHEN FITZGERALD

The OSU Research Forest is comprised of nine separate land parcels totaling nearly 15,000 acres of forestland and a small amount of Willamette Valley river bottomland. The largest tracts are the McDonald and Dunn Forests located just outside of Corvallis, Ore., that together comprise the bulk of the research forests at about 11,000 acres. Table 1 displays all forest tracts, size, location, and when acquired.

The acquisition of forestlands dates back to 1926 when the first parcel of land was purchased with contributions from individuals and the Oregon Agricultural College (precursor to Oregon State University). In 1927 Mrs. Mary McDonald, an early college benefactress and wealthy businesswoman whose late husband had built up large holdings of timberland in northern California and southern Oregon, began donating land in southern Oregon (which the school subsequently sold) to provide funds for the continued acquisition of nearby forestlands, which would become the McDonald Forest. She had a specific goal for the donations she made to the School of Forestry: with no children of her own, she wanted to help the youth of the future learn more about the resources she was most interested in—agriculture and forestry. It was important to then-Dean George Peavy that forestry students had a place to learn and obtain hands-on experience. That legacy continues today.

The research forests are financially self-sufficient. That is, the forest does not receive any outside funding for managing these lands. Funding comes from revenue generated by sustainable timber harvests (more on that later). Management costs (staff salaries, reforestation, precommercial thinning, road maintenance, recreation, etc.) total about $1 million per year.

PHOTO COURTESY OF OSU RESEARCH FORESTS

How long will a wood utility pole last? The utility pole decay study on OSU Research Forests has been studying this since 1923.

Teaching and research

The research forest is used heavily for teaching and short- and long-term research projects. Because the research forest is close to Oregon State (15 minutes), the forest is used regularly by College of Forestry faculty for myriad classes and field labs such as forest ecology, silviculture, mensuration, and field school. The forest is also used by faculty from other colleges at Oregon State University, providing additional hands-on experiences to a range of students.

The forests are also used for ongoing research purposes. The utility pole decay study, started in 1923, is one of the earliest studies that is ongoing. A frequently asked question by recreationists as they hike through the utility pole farm is, "What are those posts sticking out of the ground for?" Other older studies include a ponderosa pine race (genetics) study and a long-term mature forest study that is evaluating ways to take younger Douglas-fir forests and speed up and enhance mature forest conditions for a variety of values.

All past research and teaching sites are being catalogued into a comprehensive database. The database will be spatial, but also includes study plans, study locations, and research products (publications, journal articles, etc.) so

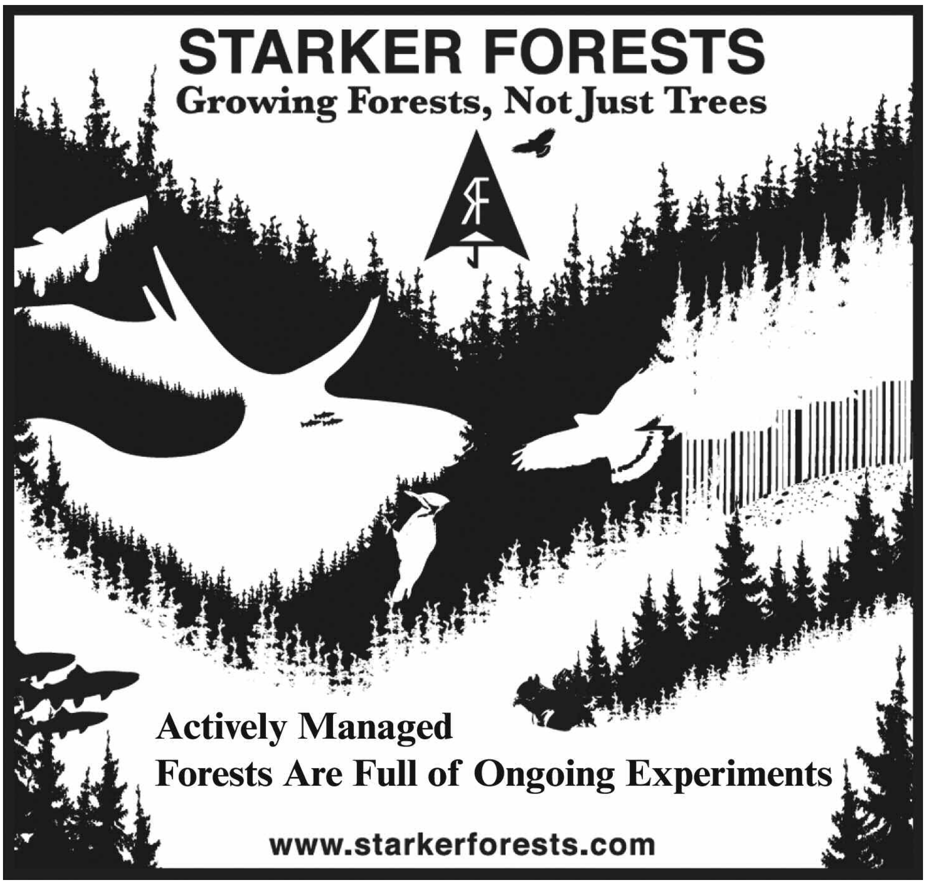


Table 1. OSU Research Forests—Forest Tracts

Tract	Acres	Acquired	Location
McDonald	6,200	1926-62	Willamette Valley fringe, Corvallis, OR
Dunn	5,000	1947	Willamette Valley fringe, Corvallis, OR
Cameron	258	1995	Willamette Valley fringe, Corvallis, OR
Spaulding	160	1921	Coast Range foothills, Philomath, OR
Marchel	71	1994	River bottom, ag land, Corvallis/ Albany, OR
Ram's Dell	97	1990s	West Cascades foothills, Molalla, OR
Blodgett	2,440	1928	North Coast Range nw of Vernonia, OR
Oberteuffer	113	1995	Northern Blue Mountains, Elgin, OR
Matteson	181	2015	Coast Range foothills near Hagg Lake, Gaston, OR

future researchers might be able to use these sites again. To date over 463 research studies and teaching dating back to the 1920s has been catalogued. Although many of these studies are no longer active, having a comprehensive database that can inform new research projects on the research forests is extremely valuable.

Recreation and outreach activities

The forests are heavily used by the recreating public. Because of their proximity to Corvallis and other communities, the McDonald and Dunn Forests receive well over 115,000 user-visits a year based on a 2009 survey. This number of recreators has increased significantly since then. It is not uncommon to see people walking, hiking, running, mountain biking, and riding horses anytime during the day and on weekends. The forests include about 24 miles of official trails and about 28 miles of unauthorized trails (illegal) of which some are being redesigned and converted to official trails.

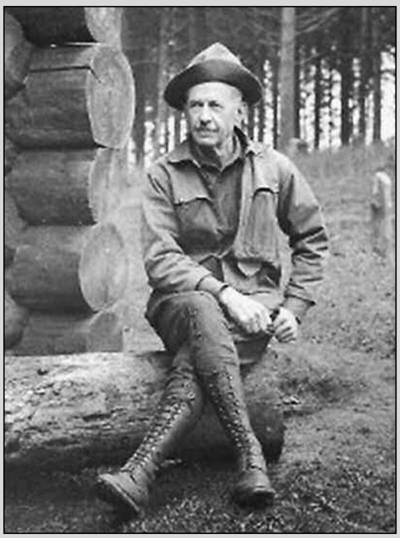
A fee is not charged for recreation because fees open the door to potential lawsuits in the event that someone is injured while recreating on the forests. It was decided that any income potential was not worth the risk. However, programs have been established to garner extra funds to support our recreation program including accepting donations for memorial benches, initiating a member-based FOREST CONNECTIONS program, and sharing of proceeds from large organized recreational events (running and mountain biking races) that occur on the forest every year.

A primary goal of the research forests is to engage the public, youth, decision-makers, and others in forest and forestry education. The public is passively engaged in self-learning utilizing interpretive signage (on various topics) along roads and trails. Active engagement occurs by hosting organized educational events such as STEM Academy and Get Outdoors Day. The forests are also used by OSU Extension programs and many Extension foresters participate in the management of some of our satellite forests.

With the high volume of people recreating on the forest, it is a challenge to manage people. Because we actively harvest timber, trails and roads are often temporarily closed to recreators, which can create conflicts as it disrupts their recreational experience. Illegal activities from party fires and building of illegal trails also occur. Despite these recreational management issues, we want people to recreate on the forest. We want them to get exercise and experience the forest, we want them to see active timber harvests and other management activities, and we want to actively engage them in understanding how important forests are and that working forests provide a host of important tangible and intangible values.

OSU Research Forests Original Mission

"Create biologically diverse and sustainable teaching, demonstration and research forests with a management emphasis."



George Peavy, Dean from 1913-1941.

Sustainable timber harvests and economics

The sustainable harvest on the forests is estimated at about 6.5 million board feet per year. We are one of the few university research forests that actively harvest timber to generate annual revenues. As forest director, I have been given a financial mandate to provide approximately $1 million in revenue to the Dean of the College of Forestry to fund teaching and research initiatives within the college. Of course, this mandate is subject to timber markets and accomplishing it within our sustainable harvest level. However, this financial goal is not always attainable. For example, during the recent economic downturn little to no timber was harvested from 2008 to 2010, thus financial reserves were relied upon to fund basic forest management activities. In prior years when timber markets were good, harvesting above our sustainable harvest level took place and those extra funds were placed in reserve to help carry us through lean years.

The OSU Research Forests are a local economic engine. Direct and indirect jobs are provided through timber management, harvesting, and recreational activities. Direct jobs include staff and student workers, mill workers (from the wood delivered to local mills), and through the many contractors hired for

(CONTINUED ON PAGE 23)

Policy Scoreboard

Editor's Note: To keep SAF members informed of state society policy activities, Policy Scoreboard is a regular feature in the Western Forester. *The intent is to provide a brief explanation of the policy activity—you are encouraged to follow up with the listed contact person for detailed information.*

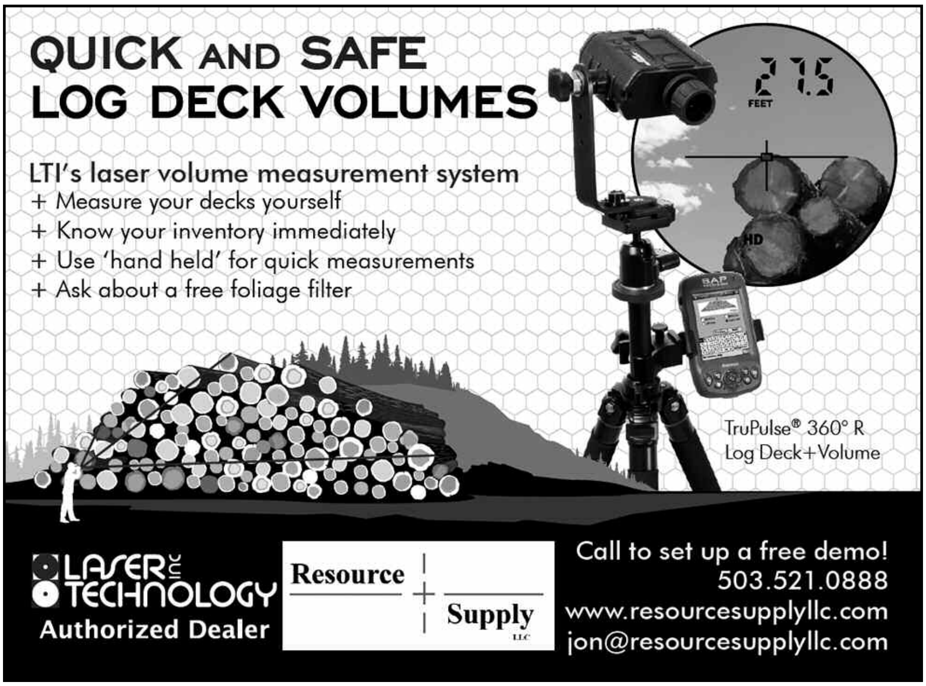
OSAF Adopts Updated Position Statement on Riparian Forests. On July 14 the Oregon SAF Executive Committee approved an updated version of its position statement on "Managing Riparian Forests" (see www.forestry.org/oregon/policy/position/). The timing is notable in that the updated position was sent to the Oregon Board of Forestry prior to its meeting on July 23, where it had been expected to make some key decisions about new rules for riparian forests along small and medium fish-bearing streams. Although the Board opted to defer those decisions, the OSAF cover letter to the Board and position statement made important points about the need and value of active management of riparian forests, as well as the lack of evidence that greater restrictions in other states are cost effective in providing desirable resource conditions. The updated position statement is expected to be similarly useful as OSAF weighs in on current issues on federal lands (see below), as will the forthcoming update of another key position ("Managing Mature and Old-growth Forests") that expires late this year. OSAF members are encouraged to use its position statements to articulate a professional perspective on forestry issues to decision makers and the interested public. Contact: Paul Adams, OSAF Policy chair, adamspaulw@gmail.com.

OSAF Submits Comments to BLM and USFS on New Management Plans. Although not completed at this writing, OSAF planned to submit comments in August to the BLM on the Draft EIS of its updated Resource Management Plans (RMPs) for the western Oregon O&C Lands. OSAF will stress the need for and value of active and flexible management to achieve diverse resource objectives versus fixed land allocations where management is greatly and indefinitely restricted. Also, given the clear mandates of the O&C Act and related community and forestry infrastructure benefits, the new plans must make commercial timber harvest a top priority; resulting forest products have exceptionally positive environmental characteristics and should be recognized as a vital asset in national timber supplies.

In May OSAF submitted responses to the US Forest Service (USFS) about its process for updating management plans for National Forests (NFs) that have followed the Northwest Forest Plan (NWFP) since 1994. The USFS asked for comments about: 1) key concerns in revising the plans; 2) how science should be used; and 3) how the public should be engaged. The OSAF response stressed the importance of: a) historic laws for NFs; b) full analysis of NWFP results, including litigation and community health; c) the high productivity of many NFs and their role in supplying green products; d) the high compatibility of active management with ecosystem services and values; e) management for forest resilience; and f) a dynamic approach to management versus inflexible land allocations. On the use of science, OSAF stressed the need for: a) technical knowledge and local professional experience; b) more socio-economic and applied research; c) improved standards for reviewing and applying science; and d) avoiding bias and micromanagement by groups that lack on-the-ground management experience. On public involvement, OSAF emphasized: a) routinely highlighting the multiple-use mandate for NFs; b) considering citizens who do not submit comments; and c) input from natural resources professionals independent of their employer interests. Contact: Paul Adams, OSAF Policy chair, adamspaulw@gmail.com.

WSSAF update. The last issue of the *Western Forester* included a draft of the WSSAF Position Statement on management for federal forests in Washington—with a request for individual members to comment. One member did—thank you Ray Weinmann. A few minor changes were made and the full membership will vote on its adoption this fall.

At least two current federal house bills (HR 2647 and S 1691) are addressing management of federal forests and the SAF National Office organized two telephone conference calls to solicit member input. For an issue so important I was hoping for a more robust response from WSSAF. Contact: WSSAF Policy Chair Harry Bell, harry@greencrow.com. ◆



OSU Research Forests

(CONTINUED FROM PAGE 21)

logging, planting, spraying, precommercial thinning, cruising, road construction and maintenance, and other work. Indirect job creation is supported by purchases of recreation gear, supplies, and fuel from local stores and businesses. Depending on which published forest sector job multipliers are used and factoring in variable harvest levels from year to year, I have estimated that the research forests support 45-70 direct and indirect jobs annually.

The future

We are currently in the process of updating our forest management plan and forest inventory. Having these in place will be important as we seek forest certification in the future. The research forests play an integral part of forestry education at the College of Forestry by allowing students to get physically immersed in the forest and add to their hands-on experience, which is increasingly important as forest management issues become more complex.

The original purpose of the research forests were to create biologically diverse forests with a management emphasis—and this is still true today. The OSU Research Forests provide real-world examples of working forests and all the values they provide to our students, faculty, public, and local communities. ◆

Stephen Fitzgerald, an active OSAF member and Fellow, is forest director, OSU College of Forestry, Research Forests, based in Corvallis. He can be reached at 541-737-3562 or stephen.fitzgerald@oregonstate.edu.

Field Technology Conference Scheduled for November

The Western Forestry and Conservation Association (WFCA) announced that registration for the fifth annual Field Technology Conference (FTC) is open. FTC 2015 is hosted by WFCA, Pacific Northwest Aquatic Monitoring Partnership (PNAMP), and StreamNet. The conference will be held November 18-19, 2015, at the Holiday Inn Portland Airport in Portland, Ore.

The conference offers attendees an insightful look at trends in field data collection hardware (smartphones, handheld/tablet computers, GPS receivers, laser rangefinders, and other data collection instruments), remote sensing (UAVs, photogrammetry, lidar) and mapping software (data collection, data processing, map building), along with outdoor demonstrations and a field trip.

"This will be our fifth conference. With the addition of the fisheries track and participation from the US government GPS authorities, we should have a significant attendance increase this year," said moderator/co-organizer Eric Gakstatter. "We continue to attract speakers with strong expertise in their disciplines to present their work and thought leadership."

The conference offers three tracks: 1) common field technology with talks on field data collection technology used across all disciplines; 2) forestry with presentations on forestry-specific technology topics; and 3) fisheries will cover fisheries-specific technology presentations. In addition to the three technical tracks, outdoor technology demonstrations and a fisheries field trip to a local slough for a live demonstration of field data collection technology (space limited) will be offered.

On the second day, presentations from the Civil GPS Interface Service Committee (CGSIC) will be included. CGSIC is the only forum in which civilians have the opportunity to interact directly with US GPS authorities.

To register or learn more about the conference agenda, visit: http://westernforestry.org/.

Exhibiting opportunities are available. For additional information, contact Richard Zabel, richard@westernforestry.org, 503-226-4562. ◆

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Questions? Call Jon Aschenbach or Tyler Gakstatter at 503-521-0888

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