Sources and Science

A Guide to Experts at the Pacific Northwest Research Station

USDA United States Department of Agriculture

Forest Service

PNW Pacific Northwest Research Station

A Message From the Station Director

The Pacific Northwest Research Station provides land managers, researchers, policymakers, journalists, and citizens with objective and credible information on environmental and natural resource issues. Our staff of research scientists and professionals works to fulfill the Station's mission of generating and communicating knowledge to help people understand and make informed choices about natural resources and the environment.

We invite you to use this guide to learn more about the work we do and to, ultimately, better understand the environment and your role in it.

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Station Director

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How to Use *Sources and Science*

For over 80 years, the Pacific Northwest Research Station's scientists have been called upon as experts for objective and credible information on environmental and natural resource issues. More than 80 scientists currently conduct research for the Station. Many of them are profiled in this guide.

This guide is divided into four broad categories representing scientists' areas of expertise: forests and plants, fire and air, wildlife and aquatics, and economics and social research. A glossary and two indexes—by scientist and subject—also are provided to help you understand and locate the information you need.

About PNW Research Station

- Established in 1925
- One of seven research facilities of the U.S. Department of Agriculture, Forest Service
- Headquarters in Portland, Oregon
- Eleven laboratories and centers in Alaska, Oregon, and Washington
- Eleven active experimental areas (watersheds, ranges, and forests)
- About 500 employees

How to Contact Us

Our public affairs specialists can help put you in touch with the right expert.

Sherri Richardson Dodge
Phone: (503) 808-2137; Email: srichardsondodge@fs.fed.us

Yasmeen Sands
Phone: (206) 450-0319; Email: ysands@fs.fed.us

Visit us on the Web at **www.fs.fed.us/pnw/**

Ask Him About

Silviculture, ecosystem restoration, ecology, climate change

Background

Ph.D., physiological ecology and silviculture, University of California, Berkeley; member, Society of American Foresters, California Forest Soils Council

Paul Anderson

Supervisory research forester; Corvallis, Oregon

For Paul Anderson, now is a great time to be involved in silvicultural research in the Pacific Northwest. The diversity of the region's ecosystems, along with growing awareness of both the ecology of our forests and society's expectations of them, means that opportunities to develop ecologically sound forest management techniques abound.

Anderson is a supervisory research forester and leader of the Biology and Culture of Forest Plants team who conducts research on silviculture and physiology. In one study, he found that leaving behind buffers, relatively narrow tracts of trees and plants alongside a stream, helped to guard against warming of stream temperatures following thinning. In other studies, Anderson is exploring alternative silvicultural treatments—such as thinning or planting—to enhance biological diversity, habitat quality, and wood production in regenerating Douglas-fir forests.

In the future, Anderson will continue to combine knowledge of plant biology and community ecology to help develop management tools that produce forests capable of meeting society's needs.

Ask Him About

Wood utilization, integrated resource management, GIS application, science communication

Background

Ph.D., wood and fiber science, University of Washington; member, Forest Products Society; Chair, International Union of Forest Research Organizations, Division 5 Research Group on Sustainable Production of Forest Products

Jamie Barbour

Forest products technologist; Portland, Oregon

Having grown up in southern New Jersey in a suburb of Philadelphia, Jamie Barbour remembers how spending his summers in his parents' cabin in the Warton State Forest whetted his interest in natural systems and how living a dual existence in both urban and rural worlds exposed him to the dynamics of a changing landscape and the subsequent natural resource issues that emerge.

Now Barbour is a forest products technologist and manager of the Focused Science Delivery Program—a program whose mission it is to make existing scientific information meaningful to policymakers, land and forest managers, and the public—and he carries with him an awareness of this dynamic in his work.

Barbour's research examines resource management, wood utilization, and mapping systems. His work is aimed at better understanding the interactions of wood characteristics and economics. This knowledge improves managers' ability to decide when use of timber sales is an appropriate way to achieve nontimber objectives in forest management. Barbour also has worked on developing techniques to conduct research on integrated resource management. This has helped provide tools, methods, and procedures that assist managers in evaluating the tradeoffs among various resource objectives.

In the future, Barbour plans to develop techniques to make existing science meaningful and useful to those who set forest policy, those who implement forest policy, and those who seek to influence forest policies.

Ask Her About

Statistical methods, forest inventories, hardwood forests, forest planning, state forest practice regulations, classification of forest structure types

Background

Ph.D., wildland resource science, University of California, Berkeley; member, Society of American Foresters, Institute for Operations Research and Management Science

Tara Barrett

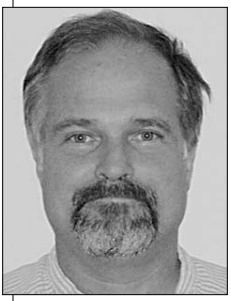
Research forester; Anchorage, Alaska

If there is one lesson Tara Barrett learned from growing up in a sailing family, it is that one does best when one adapts to a constantly changing environment. She has found this to be especially true in forest research, where policy, technology, and, often, the trees themselves are in a seemingly constant state of flux.

Barrett is a research forester and biometrician who applies both her expertise in inventory methods and her knowledge of forestry to assess and monitor the region's ecosystems.

In one study, Barrett estimated the number of trees susceptible to infection by sudden oak death in California. Using a sample-based inventory, she found that some 289 million trees of several oak species are susceptible to the devastating fungal disease in the state's 5 million acres of quarantined forests.

In another study, she developed a modeling system to project how different restrictions on clearcut size affect the pattern of vegetation across a landscape over a century. She found that when the "green-up" period—which refers to the length of time it takes for a clearcut forest to regenerate to the point that forest adjacent to it is allowed to be harvested—is 5 years long, two-thirds of the adjacent forest could be harvested in 10 years, and 90 percent of it in 15 years. This finding suggests that state regulations on clearcut adjacency have very little effect on retaining older-forest structures within landscapes, because in as few as 15 years, 90 percent of forests adjacent to clearcuts could, themselves, be harvested.



Ask Him About

Long-term ecosystem productivity; effects of pioneer plants on soil productivity; mineral weathering; nitrogen fixation; effects of fire and management on soils, biodiversity, and productivity; integrating research and management; adaptive management; options forestry

Background

Ph.D., forest physiology, Oregon State University

Bernard Bormann

Research forest ecologist; Corvallis, Oregon

Bernard Bormann is a firm believer in the importance of science-based evidence to natural resource decisionmaking. As a research forest ecologist and leader of the Sustainable Ecosystem Productivity team, his work provides this evidence and promotes the long-term productivity of the region's ecosystems.

Bormann is conducting research on the effects of the Biscuit Fire, which burned nearly 500,000 acres in southwest Oregon in 2002. He and his colleagues are in the unique position to examine postfire effects because half of the plots they had established as part of a regional, large-scale study on long-term ecosystem productivity were burned by the fire. Findings from his research will suggest more effective postfire management strategies.

Bormann also promotes active adaptive management, whereby managers generate reliable evidence during the management process by using some of the tools of science. With help from managers, Bormann pioneered a new active adaptive management approach called options forestry, which emphasizes learning as an objective and encourages managers to conduct rigorous experimental treatments to address the uncertainty surrounding particular management practices.

In the future, Bormann will continue examining effects of wildfire on forest ecosystems and developing concepts of adaptive management. He also will be using a remote sensing technology known as LIDAR to evaluate the effects of management on landscapes.

Ask Him About

Marketing of Alaska forest products, engineered wood products, demand for Alaska forest products, management of forestry operations, wood supply analysis and planning

Background

Ph.D., natural resources business and economics, University of Maine; member, Forest Products Society, Canadian Institute of Forestry; Registered Professional Forester, New Brunswick and British Columbia

Allen Brackley

Research forester; Sitka, Alaska

To Allen Brackley, Alaska's timber is more than a renewable resource that can provide high-quality products for domestic and global consumers. It also can provide jobs and be a contributor to community development in the state.

Brackley is a research forester and team leader of the Alaska Wood Utilization Research and Development Center. He is involved in a wide range of projects focusing on wood processing, production, and marketing—essential components of industrial and community development efforts. Through his work, he is defining new markets for Alaska's forest products and analyzing the demand for them.

In past projects, Brackley developed models used to determine sustainable yields and allowable harvest levels on large tracts of forest land. He also developed databases and software programs that generate maps and reports required by land managers for long- and short-term harvest planning. These efforts have resulted in more efficient operational management systems.

In the future, Brackley, who has worked in the wood products industry for more than 30 years, will continue to explore and develop information that will benefit Alaska's communities and its forests.

Ask Him About

Forest fungi, fungal diversity, community structure of fungi, response of fungi to disturbance

Background

Ph.D., forest mycology, Oregon State University; member, Mycological Society of America

Michael Castellano

Research forester; Corvallis, Oregon

Michael Castellano studies fungi, which are easy to overlook in a forest, but hard to live without. Fungi are, after all, fundamental to the health and productivity of the region's forests.

Castellano is a research forester whose emphasis is on macrofungi—those that are visible to the naked eye—in particular, better understanding their ecology, biology, and diversity. His research is providing critical information on the structure of fungal communities within forests, how they function, and how they aid in the recovery of forest ecosystems. His work also is assessing the diversity and population viability of the region's forest fungi. Collectively, this knowledge will help managers and researchers better predict the effects that forest management practices and other types of disturbances, like fire, might have on fungal populations.

Castellano has published some of his findings on fungal monitoring methods in two handbooks. These publications were instrumental to the identification of the fungal species listed by the Northwest Forest Plan, helping researchers determine where the species were across the landscape and survey and monitor for them.

In the future, Castellano will study the response of selected fungal species to different disturbance events. He also intends to develop efficient and inexpensive methods to track fungal populations.

Ask Him About

Soils, soil carbon cycling, yellow-cedar decline, land-water linkages

Background

M.S., soil science, Oregon State University; member, Soil Science Society of America, Society of Wetland Scientists, American Geophysical Union

David D'Amore

Research soil scientist; Juneau, Alaska

In the Pacific Northwest, soil is as critical to the basic ecological processes of the region as it is ubiquitous. David D'Amore, a research soil scientist, studies this vital substrate and its relationship to the health of the region's ecosystems.

D'Amore is enhancing understanding of the cycling and movement of elements and compounds in soils. In southeast Alaska, wetlands can be composed of peat, a substrate formed when waterlogged soil slowly decomposes owing to a lack of oxygen and acidic conditions. The abundant rainfall typical of the region and subsequent runoff from soils facilitates the movement of elements, like carbon, from terrestrial to aquatic ecosystems. D'Amore's research is quantifying the amount and type of organic material that flows from the soil to the streams of southeast Alaska's rain forests. This research is helping managers better understand the role that soils play in moving nutrients from terrestrial to aquatic ecosystems.

D'Amore also is working to discover the cause of yellow-cedar decline in southeast Alaska. Yellow-cedar, a valuable tree species, is dying on nearly half a million acres in the state for reasons that have yet to be determined. D'Amore is investigating soil risk factors that are associated with the species' decline. His work is guiding management programs that are focused on harvesting and protecting the remaining yellow-cedar populations in southeast Alaska.

Ask Him About

Sustainable wood production, silviculture to enhance wildlife and aquatic resources, stand dynamics, stand reconstruction

Background

Ph.D., forest resources, Oregon State University; Certified Forester; member, Society of American Foresters, International Union of Forest Research Organizations; Chair, Portland Chapter of the Society of American Foresters

Robert Deal

Research silviculturist; Portland, Oregon

Robert Deal credits working as a professional forester in southeast Alaska for almost 20 years as the source of his appreciation for the temperate rain forests that characterize much of the western half of the region.

Deal is a research silviculturist and leader of the Sustainable Wood Production Issue team. His research is focused on applying silviculture to address a variety of forest resource objectives, including wood production and wildlife and aquatic resources enhancement.

In one study, Deal developed silvicultural systems based on partial cutting for the western hemlock-Sitka spruce forest types. These systems have been used by forest managers as an alternative to clearcutting in the coastal rain forests of southeast Alaska. He also has focused on the dynamics of mixed red alder-conifer stands. This research has shown that red alder—a deciduous hardwood tree species common throughout much of the region—can be important for enhancing biodiversity in young stands. Deal's recent focus has been on synthesizing economic, social, and ecological information that is important for sustainable forestry in the Pacific Northwest.

In the future, Deal, who has worked for the Station since 1979, plans to continue to use silviculture to aid in understanding how we can use forest management practices to provide wood and enhance wildlife and aquatic resources.

Ask Him About

Reduced-impact logging, harvesting efficiency, mechanical fuel-reduction treatments, use of small-diameter timber

Background

Ph.D., industrial engineering, Oregon State University; member, Society of American Foresters, Forest Products Society, American Society of Agricultural Engineers

Dennis Dykstra

Research forest products technologist; Portland, Oregon

To Dennis Dykstra, a forest management practice is ideal when it increases efficiency, minimizes environmental impacts, and benefits society. As a research forest products technologist, Dykstra conducts research that informs such practices.

In a study based in northeastern Washington, Dykstra found that small-diameter trees cut to reduce a forest's fire hazard can be used for the production of some wood products, such as framing lumber for houses. These smaller trees were commonly thought to possess little or no economic value. Use of these trees is made possible by newly available automated sawmills that can process small-diameter trees and by highly efficient mechanized harvesting equipment. This study provides foresters with information about the revenue they can generate from fuel-reduction thinnings, which often can cover the cost of the thinnings themselves.

Dykstra also created the Reduced-Impact Logging Simulator (RILSIM), a software program that helps forest managers in developing countries estimate the cost and benefits of converting to reduced-impact logging operations. By inputting their costs and known conditions, managers can estimate potential gains in logging efficiency and lower costs that may result from adopting reduced-impact logging methods. RILSIM has been widely adopted in tropical forests and has been translated for use in West Africa and Brazil.

In the future, Dykstra will study the relationship between timber harvest and community welfare.

Ask Him About

Forest inventory, fire management, ecology, vegetation mapping, climate change impact assessment, natural resource policy, social acceptance of fire and fuels management

Background

Ph.D., wildland resource science, University of California, Berkeley

Jeremy Fried

Research forester; Portland, Oregon

You could say that Jeremy Fried was born to be a scientist. From an early age, he exhibited a curiosity about the natural world around him, a determination to accomplish what he set out to do, and a knack for problem-solving. Today, these traits drive his research, which is centered on a range of contemporary natural resource issues.

Fried is a research forester and leader of the Forest Inventory and Analysis Program's Environmental Analysis and Research team. Although his work spans several topics and disciplines, most of it applies analysis and modeling to critical natural resource management issues. Fried developed the California Fire Economics Simulator, a model used to evaluate how changes in initial firefighting response, such as the availability and positioning of resources, affect wildland fires. The simulator is used by state and federal fire protection agencies in California, Montana, and Idaho and also has been adopted as a component of the national interagency fire planning model being developed by the U.S. Departments of Agriculture and the Interior.

He also developed the BioSum modeling framework, which evaluates the economic feasibility of fuel treatments over broad landscapes.

In the future, Fried expects to continue to pursue policy-relevant, issue-driven, and hypothesis-based research that leverages the value of forest inventory data and addresses complex questions at the nexus of forests and people.

Ask Her About

Oregon white oak, red alder, western redcedar, western white pine, effects of thinning on tree growth and plant communities, effects of management practices on plant growth and soil, variable-density thinning

Background

Ph.D., physiology and silviculture, University of Washington

Constance Harrington

Research forester; Olympia, Washington

Constance Harrington is driven by a keen curiosity in the natural world and a desire to understand its complexities and help others do the same. As a research forester, her work helps enhance the understanding of neglected plant species and the responses of plants to change.

Harrington's research has contributed greatly to the understanding of several of the region's lesser-studied woody plants. One such plant is red alder, a common deciduous tree that enriches the soil with nitrogen. Harrington's studies and publications on the biology and silviculture of the species are being used by forest managers and researchers. Recently, she produced a guide that helps landowners select suitable sites to plant alder.

Another species Harrington's research is helping scientists better understand is Oregon white oak. Most white oak communities in Washington and Oregon are degraded and in need of restoration to return them to their historical condition. Harrington published an exhaustive oak bibliography that summarizes what is known about the species along with results of recent studies, including her own. Her work has encouraged managers and owners to try some treatments that they might not have otherwise, like oak release—a practice that thins conifers that overtop and shade out oaks. This work is helping to preserve the legacy of Oregon white oak communities in the region.

Harrington also is working with forest industry and university colleagues to study factors influencing stand establishment and short- and long-term site productivity.

Ask Him About

Forest plantations, invasive plant ecology, vegetation competition

Background

Ph.D., silviculture, Oregon State University; member, Society of American Foresters

Timothy Harrington

Research forester; Olympia, Washington

For Timothy Harrington, the scientific process starts with careful observation of the complex relationships between plant species and their environment.

Harrington is a research forester whose work is focused on identifying opportunities to manage forests to improve their productivity, biodiversity, and sustainability.

One of his research emphases is on the mechanisms by which overstory trees interact with understory vegetation in young and in mature forests. In one study, he found that conifer seedlings must compete more for their survival and growth in forest understories than in recently harvested lands, like clearcuts. This finding has encouraged forest managers to widely space overstory trees and create gaps in understory vegetation to provide adequate resources for conifer seedlings.

In another study, Harrington is testing whether planting ultra-dense patches of native plants can suppress the growth of existing seedlings and prevent new seedlings of invasive plants from emerging. Such results would offer managers a technique for controlling the spread of invasive plants in production forests and ecological reserves.

In the future, Harrington plans to enhance understanding of how timber harvesting, planting of conifer seedlings, and control of competing vegetation affect longer term vegetation dynamics, including forest productivity and native and invasive plant development.

Ask Him About

Landscape simulations, fire, fuel treatments, plant communities of the Pacific Northwest, natural resource management

Background

Ph.D., plant ecology, Oregon State University

Miles Hemstrom

Research ecologist; Portland, Oregon

Miles Hemstrom knows the Pacific Northwest. He has been an ecologist in the region for over 25 years—first as an area ecologist and regional ecologist with the National Forest System and now as a research ecologist with the Station.

The focus of Hemstrom's early research was on the plant communities, disturbance history, and environments of forest ecosystems west of the Cascade Mountains. Much of the emphasis of this work was on providing field managers with tools to recognize different environments and plant communities and to understand the implications of their management activities on these landscapes.

Hemstrom's current research focus is on landscape ecology. He works with silviculturists, rangeland managers, ecologists, and other researchers to build models that combine a wide variety of vegetation types, management activities, and disturbances into landscape simulations. A good part of this research involves developing methods for land management planning and statewide forest assessment in cooperation with state agencies.

Because most of Hemstrom's research is applied science, it is focused on producing tools useful to land managers and those interested in the effects of land management activities.

Ask Him About

Dead trees, forest decline, old growth, southeast Alaska, forest structure, wood decay, multiple-resource management

Background

Ph.D., forest pathology, Oregon State University; member, American Phytopathological Society, Mycological Society of America, Northwest Scientific Association

Paul Hennon

Research plant pathologist; Juneau, Alaska

Many researchers in the Pacific Northwest are fascinated by the ecological role trees serve in our region's ecosystems. Others are concerned with the commercial role trees serve in our region's economy. Paul Hennon, a research plant pathologist, is interested in both of these roles—but he's more interested in how they play out among dead trees.

Hennon's research has two major areas of emphasis. One is on yellow-cedar, a culturally and economically important tree species in Alaska that is declining on nearly a half million acres in the southeastern portion of the state. Hennon is exploring the cause of this decline and is evaluating the properties and value of wood that can be recovered from dead yellow-cedar to see if the trees might continue to have market value after their death.

Hennon's other major area of emphasis is on hemlock-dominated forests. He is studying patterns of tree death in different stages of these forests' developmental cycles. As part of this work, he is quantifying the spread and impact of diseases, such as dwarf mistletoe and heart rot, so that each can be managed to desirable levels.

Hennon sees his research as important to improving the management of southeast Alaska's forests for multiple resources. He also sees his work as helping to develop a basic understanding of how the forests of the region have developed and how they likely will change in a warming climate or under different management scenarios.

Ask Him About

Forest landscape dynamics, insect and pathogen ecology and management, fire ecology

Background

Ph.D., forest pathology, Oregon State University; member, American Phytopathological Society, International Association of Landscape Ecologists, Ecological Society of America

Paul Hessburg

Research ecologist; Wenatchee, Washington

In a field as broad as landscape ecology, Paul Hessburg has found his niche. As a research ecologist and leader of the Eastside Forest Health Restoration team, he explores what he calls the "spaces between disciplines" to develop ways to restore and maintain ecosystems amidst complex and shifting climatic, biotic, and social conditions.

In one recent study, Hessburg characterized the differences in landscape patterns between presettlement and modern-day forests of about a dozen ecoregions of the inland Northwest. He found that settlement and management altered the structure and composition of the region's dry forests. These changes, in turn, dramatically altered the dynamics of native disturbances, like fires and insect and disease outbreaks. By linking the forest structure and composition of premanagement and modern eras with their associated disturbance processes, Hessburg demonstrated to land managers the importance of managing patterns across broad landscapes through time.

In another study, Hessburg developed a decision-support system that allows land managers to evaluate fire hazard and prioritize fuel treatments.

In the future, Hessburg will continue to conduct interdisciplinary research that examines the interactions among environments, climatic conditions, and disturbances. This way, he will promote the management of the region's forests in ways that ensure they will support people, native species, and native processes into the future.

Ask Her About

Boreal (northern) forests, succession following fire, long-term response of plants to climate change and disturbance, plant community ecology, vegetation mapping

Background

Ph.D., biology, University of Alaska, Fairbanks

Teresa Hollingsworth

Research ecologist; Fairbanks, Alaska

Science is a discipline that works best when it is driven by a series of questions and answers that, in turn, lead to more questions. To ask meaningful questions in the first place, one needs the kind of information Teresa Hollingsworth generates.

Hollingsworth is a research ecologist who works to generate fundamental knowledge—in particular, about the boreal forests of Alaska's vast interior. Although these forests, composed mainly of black spruce communities, cover great expanses of land, relatively little is known about even their basic ecology.

In one study, Hollingsworth examined the influence the environment has on the composition of black spruce communities. As part of the study, she named and described three black spruce plant communities and five community subtypes and then connected their composition to environmental gradients—the first community classification of its kind in the region. She found that patterns in soil-carbon pools, which are terrestrial storage sites for carbon, were highly influential in determining a black spruce forest's composition.

Hollingsworth currently is investigating whether fire, common in the interior during the summer months, weakens the relationship between environmental factors and black spruce community dynamics.

For Hollingsworth, the most rewarding parts of her work are conducting field studies and collaborating with other scientists. The former helps to put her research in context, and the latter introduces new perspectives to her work.

Ask Her About

Forest management, silviculture, wood quality

Background

Ph.D., forest resources, Oregon State University

Susan Hummel

Research forester; Portland, Oregon

With a diverse background that includes working at La Selva Biological Station in Costa Rica and with the Wood Panel Association in Indonesia, Susan Hummel finds that continually asking questions can lead to surprising places and unexpected outcomes.

As a research forester, Hummel focuses on how stand and landscape structures influence the quality and quantity of forest resources that people want. She combines field research with computer modeling to understand the effects of management practices on forest resources over time. Hummel's research includes investigating the dynamics of mixed-species forests on the eastern slope of the Cascade Mountains, identifying tradeoffs involved in managing forests for multiple resources, and describing the effects of changing forest structures on fire behavior and wildlife habitat.

Hummel's future research will continue to address the effects of forest management practices on resources that people value—such as wood and water quality—and that the resources depend on—such as nutrient cycling.

With a guiding philosophy of learning from history, being observant, and balancing passion and objectivity, Hummel sees her research as important to the public because it helps clarify how the choices we make affect the forest resources we desire.

Ask Her About

Value of fire- and insect-damaged and killed trees, volume and value loss in wood, effects of forest management on wood quality and forest products

Background

M.S., forest products, Oregon State University; member, Forest Products Society, Society of Wood Science and Technology

Eini Lowell

Research forest products technologist; Portland, Oregon

Wood is just one of many important ecosystem products healthy forests provide. Eini Lowell, a research forest products technologist, studies ways that ensure that wood produced by western forests is fully utilized.

In several studies, Lowell examined value-added product opportunities for wood from trees killed or damaged by fire and insects. As a first step, she conducted and published a comprehensive synthesis of the literature available on the deterioration of fire-killed and damaged timber. Lowell then investigated volume loss in southwestern Oregon and northern California and found much less deterioration in the first year than the existing literature indicated. This finding is critical to determining the number of years fire-killed timber is considered salvable. Information from this study is being used by land managers to analyze the economic potential for salvage of dead and dying timber.

In another study, she helped to develop the Harvest Cost Revenue Estimator, a software program that allows logging contractors and forest planners to examine all costs of fuel reduction treatments given regional market conditions. By using the program, users can calculate potential net profit or loss values that can be expected from the timber removed during the treatments.

In the future, Lowell will continue to study the effects of disturbance—like fire—on wood quality and properties and work toward the development of methods that maximize wood use.

Frederick Meinzer

Research ecologist; Corvallis, Oregon

Ask Him About

Tree physiology; uptake, transport, and loss of water; tree hydraulic architecture; causes of decline in growth rates with increasing tree height; Wind River canopy crane

Background

Ph.D., botany, University of Washington; member, Ecological Society of America, American Association for the Advancement of Science; research associate, Smithsonian Tropical Research Institute

Not many scientists can say that their research takes them to new heights, but Frederick Meinzer can. Meinzer is a research ecologist who conducts much of his work in the Wind River Experimental Forest, often hovering above the forest's canopy in the gondola of the 250-foot-tall Wind River canopy crane—one of about a dozen in the world and the only one located in North America and in old-growth coniferous forest.

Meinzer, who is leader of the Canopy Processes in Temperate Mesic Forests team and the Station's lead scientist with the Wind River canopy crane project, uses the crane to obtain a unique vantage point for his studies on tree physiology and water movement in trees. In one study, he found that during summer droughts, the roots of conifers in the region redistribute water from deeper soil depths to the upper layer of soil, which experiences seasonal drying. This process, he found, is important in preventing excessive dehydration of shallow roots, which could lead to permanent loss of root function.

In another study, Meinzer investigated the phenomenon of declining growth rates in older trees. He found that gravitational forces play an important role in limiting both leaf expansion and shoot extension in Douglas-fir as the tree gets taller.

In the future, Meinzer plans to continue conducting research that helps enhance the understanding of how plants cope with their environment.

Ask Him About

Fire ecology, forest restoration, postfire forest management, forest responses to climate change, oak savanna ecology and management

Background

Ph.D., forest ecology, University of Minnesota

David W. Peterson

Research forest ecologist; Wenatchee, Washington

David Peterson is fascinated by change. As a research forest ecologist, he studies forests and how they change over time and in response to disturbances, like wildfires and climate change.

In one study, Peterson examined the effects of climate variability on the growth of conifers in high-elevation forests. By studying tree-ring patterns, whose thickness can reveal periods of increased or decreased growth, he found that the annual growth patterns of mountain hemlock and subalpine fir trees often were closely related to winter precipitation rates and spring snowpack depths. Spring snowpack depths, in turn, are influenced by climatic variability. These findings suggest that future climatic changes, especially warmer winter temperatures, could significantly increase the growth and productivity of high-elevation forests until other factors, like summer drought stress, begin to limit growth.

In another study, Peterson examined the effectiveness of seeding and fertilizing severely burned forests in north-central Washington to increase plant cover and reduce soil erosion during the first few years after a wildfire. He found that seeding and fertilizing did produce small increases in plant cover overall, but did so inconsistently. He plans to conduct similar studies in the future to see if the same is true following other fires.

In the future, Peterson will continue his work to better understand how forest ecosystems respond to disturbances and how they can be better managed.

Ask Him About

Remote sensing, spatial data, aerial photography, airborne laser scanning, LIDAR (light detection and ranging), IFSAR (interferometric synthetic aperture radar), silviculture

Background

M.S., forest engineering, University of Washington; Certified Photogrammetrist; member, American Society for Photogrammetry and Remote Sensing

Stephen Reutebuch

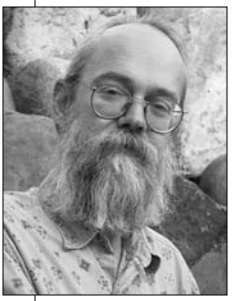
Research forester; Seattle, Washington

Although some researchers look at forests from the ground up, Stephen Reutebuch prefers a top-down approach to understand the region's forested landscapes. He studies forests from a remote vantage point—the air—and uses aerial photographs and airborne laser scanning and radar to help him.

Reutebuch, who is based at the University of Washington in Seattle, is a research forester and leader of the Olympia Silviculture and Forest Models team. Since 1986, he has been researching more efficient remote-sensing methods for collecting spatial data.

Recently, Reutebuch has conducted research on emerging remote-sensing technologies, such as LIDAR (light detection and ranging) and IFSAR (interferometric synthetic aperture radar). Both technologies use airborne devices to generate digital elevation models, three-dimensional representations of the topography of a forest or landscape. These technologies produce greatly improved terrain surface measurements in heavily forested areas and, at the same time, provide detailed forest vegetation structure measurements that can be used in a wide range of forest planning and monitoring applications.

In the future, Reutebuch plans to focus on developing improved remote-sensing techniques for measuring vegetation structure. He also will continue to contribute to a better understanding of how silvicultural practices influence forest development in the region.



Keith Reynolds

Research forester; Corvallis, Oregon

Ask Him About

Decision support, logic models, decision models

Background

Ph.D., plant pathology, North Carolina State University; member, Society of American Foresters, International Association for Wildland Fire

A self-described "incurable pragmatist," Keith Reynolds is ideally suited for tackling what he sees as a major challenge facing natural resource researchers and managers: translating science into practical application. Reynolds is a research forester who combines his expertise in forestry with his passion for problem solving to conduct decision-support research.

Decision support is a field of research that combines scientific knowledge with reasoning and logic to help those making complex decisions. As part of his work, Reynolds developed the ecosystem management decision support (EMDS) system to help natural resource managers, who often must choose among alternative management options that have both positive and negative effects. The EMDS system combines science-based reasoning and decision modeling in a geographic information system environment. By inputting information specific to their scenarios in the system, resource managers can learn what conclusions they can soundly make, what influence missing data has on the soundness of these conclusions, and what missing data is most critical to obtain. The EMDS system is widely used around the world.

Reynolds also works on applying the EMDS framework to specific decision-support applications. Currently, he is developing applications to evaluate wildfire hazard and fuels-treatment planning and watershed assessments.

In the future, Reynolds will continue conducting decision-support research, ultimately improving the management of both landscapes and resources.

Ask Her About

Inventory sampling design, data management for large-scale projects, forest vegetation, invasive plants, insects and diseases of forest and urban vegetation

Background

M.S., natural resource management, University of Alaska, Fairbanks; member, Ecological Society of America

Beth Schulz

Research forester; Anchorage, Alaska

In ecological terms, plants are primary producers, a reference to the fact that they convert sunlight and carbon dioxide into energy that is subsequently transferred to the species browsing them. If you ask Beth Schulz, she would tell you that plants, through changes in their population dynamics, also can be primary indicators—alerting scientists to forest health issues before they become unmanageable. Schulz is a research forester whose work focuses on forest vegetation and invasive species, and, often, the interaction of the two.

In one study, Schulz evaluated the changes in forest composition and structure in south-central Alaska following a spruce beetle outbreak. The beetle, which bores into trees to lay its eggs in the inner bark, has caused significant tree mortality throughout much of the spruce-dominated forests of the state's Kenai Peninsula. Schulz found that how a forest changes after a beetle outbreak is dependent on the forest's initial composition and structure. She also discovered that forests with mixed species and ages are more resistant to change than single species and age-class forests.

Schulz also is the National Advisor for the Vegetation Diversity and Structure Indicator, a component of the Forest Inventory and Analysis Program. She is working to design standard monitoring techniques applicable to the Pacific Northwest and the rest of the country and its territories.

In the future, Schulz will continue to address forest vegetation issues, including the use of certain plants as indicators of site conditions.

Ask Her About

Forest fungi, fungal diversity, impacts of fire and disturbance on belowground ecosystems, microbial interactions with invasive plants

Background

Ph.D., botany and plant pathology, Oregon State University; member, Soil Ecology Society, Mycological Society of America, Native Plant Society of Oregon

Jane Smith

Research botanist; Corvallis, Oregon

When most people see a forest, they only see it from the ground up. But when others, like Jane Smith, see trees above, they also see soil fungi and other microbes below, which play a critical role in linking the above- and belowground components of forest communities.

Smith, a research botanist, studies these fungi and their response to forest management activities and natural disturbances. She recently found that prescribed fire restoration treatments significantly reduced the richness of mycorrhizal species compared to nonburned areas in dry forests of eastern Oregon's Blue Mountains. Mycorrhizal fungi are particularly important in Pacific Northwest forests, as they grow symbiotically on the roots of some tree species, aiding in the uptake and transfer of nutrients. Smith also found that prescribed underburning in the fall significantly reduced the number of mycorrhizal species present in the soil for at least two years compared to spring underburning.

How an ecosystem recovers aboveground after a disturbance, like a fire, is directly linked to the survival of mycorrhizal fungi belowground. Smith's research is helping to further understanding of how these fungi respond to prescribed fire and thinning and, thus, assists forest managers in selecting fuel-reducing restoration treatments that maintain critical soil processes.

Smith currently is exploring the impacts of fire severity and postfire logging operations on soil productivity and forest recovery in east-side forests in central Oregon's Cascade Range.

Ask Him About

Forest management, influences of forest management on biodiversity, old-growth forests, landscape dynamics, integrating ecological and social science

Background

Ph.D., forest ecology and landscape ecology, University of Michigan; member, Ecological Society of America, International Association of Landscape Ecology

Thomas Spies

Research forester; Corvallis, Oregon

The high value the public places on old-growth forests may be well understood, but the forests themselves are not. Scientists know relatively little about old-growth's diversity, development, and function in the face of natural and human-caused change. Thomas Spies is working to change this.

Spies is a research forester and leader of the Forest Landscapes and Ecosystems team. His work is aimed at better understanding the region's old-growth forests and their likely response to management and disturbance.

In one study, Spies characterized old-growth structure and dynamics. Findings from his work have helped researchers better understand how conifer forests change in structure and composition over long periods, a process known as succession. His findings also have led to definitions that managers can use to inventory old growth, both with inventory methods and remote-sensing technologies.

Spies also leads a team that evaluated how forest management practices and policies might affect biodiversity across forest ownerships. He found that, as expected, current policies will strongly increase the amount of older forest, but some vegetation types, such as hardwoods, and diverse, less complex forests, will probably decline because no owner is currently managing for them. These findings are critical to planning for future forest conditions.

In the future, Spies will evaluate the risk of severe fires to old-growth forests and study different approaches to conserving old forests in landscapes prone to disturbances.

Ask Him About

Plant genetics, gene conservation, ecological restoration, tree improvement, genetics in silviculture

Background

Ph.D., forest genetics, Oregon State University

Brad St. Clair

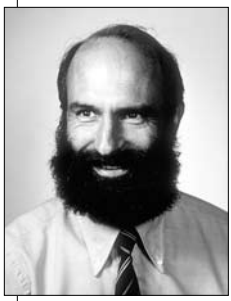
Research geneticist; Corvallis, Oregon

Brad St. Clair is fascinated by the diversity of the natural world and has found that studying genetics is an ideal way to understand its biological basis.

St. Clair is a research geneticist and leader of the Forest Genetics team. Much of his research is aimed at understanding the genetic basis for how plants adapt to their environment. His research on Douglas-fir—the region's most common tree species west of the Cascade Mountains—has helped determine guidelines for moving populations and delineating breeding zones. His research also has helped enhance understanding of the likely problems associated with the inability of Douglas-fir populations to adapt to a warmer climate. Results are being used to examine the genes involved in adaptive traits in Douglas-fir.

Recently, St. Clair led an extensive study to evaluate how well the genetic resources of eight conifer species in the Pacific Northwest are being conserved. He found that much of the genetic diversity of these species is present in protected areas. He also found that for some species, like Douglas-fir, tree improvement programs and other offsite populations of trees are important repositories of genetic resources.

St. Clair, who says the most rewarding part of his work is seeing his research shape management decisions, currently is focused on bluebunch wheatgrass and other native plant species used in restoration projects.



Ask Him About

Forest land erosion, forest and watershed disturbances, ecology and geology of Mount St. Helens

Background

Ph.D., geology, University of Oregon; member, Ecological Society of America, Geological Society of America

Fred Swanson

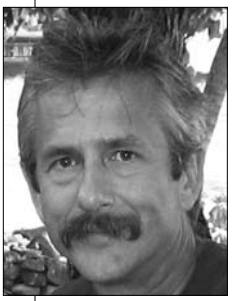
Research geologist; Corvallis, Oregon

Given that many of the region's forests can easily live for centuries, it is probably no surprise that a landscape's past can offer fascinating insight into its future. Fred Swanson is a research geologist who often finds himself taking a historical perspective in his studies.

Much of Swanson's work looks at the effects of potentially major disturbances—such as floods, fires, landslides, and volcanic eruptions—on a landscape scale. He was one of the first researchers on the ground after the catastrophic 1980 eruption of Mount St. Helens. In the quarter-century since, he and his colleagues have made major discoveries that demonstrate the resilience of landscapes and that have been applied to other landscapes facing change.

Swanson also is actively conducting research at the H.J. Andrews Experimental Forest in Oregon's Cascade Range. The Andrews Forest, which has been an extremely productive research center, has an extensive research history that spans nearly 60 years. In addition to leading studies there that draw on historical records of forest fire, landslides, and floods, Swanson helped to establish a collaborative program between Andrews Forest researchers and creative and nonfiction writers. The program brings the skills of writers into the scientific learning process and is demonstrating new ways of communicating about forests and watersheds to ever-broader audiences.

In the future, Swanson will continue exploring the use of landscape history in management planning with the ultimate goal of conducting research that benefits society.



Willem van Hees

Research forester; Anchorage, Alaska

One can't effectively manage—or sustainably use—forest products unless the character and quantity of those resources are known. This fact is what drives Willem van Hees, a research forester, in his work.

Van Hees is the leader of the Anchorage team of the Station's Forest Inventory and Analysis (FIA) Program. His team, like the FIA Program, is responsible for inventorying and assessing the region's ecosystems and their components. In one study, van Hees helped to improve field data collection efficiency and precision by developing new forest-type designation decision rules for over 2,000 forested sample locations in southeast Alaska. These decision rules, which help identify forest types, sped up the inventory of forests and resulted in less time being spent on data processing and reconciliation. The general approach developed in the study will be applied to future inventory efforts by the FIA Program throughout Alaska.

In another study, van Hees and his colleagues developed and applied an innovative and extensive sampling design that allowed them to inventory 65 million acres while maintaining their research focus on a relatively minor component of the area—productive forest land.

In the future, van Hees plans to look for even more innovative ways to analyze biodiversity. He intends to combine spatial analyses with remotely sensed information and geographic information systems data to develop new techniques that will help him in his research.

Ask Him About

Forest resources, forest inventories, resource analysis techniques, land cover, land cover change

Background

M.S., forest management, Oregon State University

Ask Her About

Forest inventory and monitoring, forest products, wood measurement systems, tree grading, tree value

Background

M.S., forest science, Oregon State University

Susan Willits

Supervisory physical scientist; Portland, Oregon

As a supervisory physical scientist and manager of the Forest Inventory and Analysis (FIA) Program, Susan Willits is responsible for coordinating the inventory and analysis efforts of all forested lands throughout Alaska, California, Hawaii, Oregon, Washington, and six Pacific Islands.

Willits began leading the program in 1997 and has managed it through its most significant expansion and change in 30 years. The program has initiated annual inventories in four states, started inventory work in the Pacific Islands, merged the field portions of its inventory and forest health monitoring components, and more than doubled its research staff.

With a diverse background in forestry, wood science and technology, forest management, and biometrics, Willits, who has worked for the Station for more than 20 years, provides the public with baseline information to use in decisionmaking. She assisted in the development of a volume measurement system for logs and trees. She also developed a tree grading system for second-growth ponderosa pine and produced information on product output and tree value for commercial species throughout the Western United States.

In the future, Willits plans to continue managing the FIA Program. In particular, she will continue to actively seek partnerships with state forestry organizations, consultants, environmental organizations, and others and increase the program's communication efforts.

Ask Her About

Boreal (northern) forests, invasive plants in Alaska, alternatives to clearcutting, white spruce, ecology and commercial harvest of postfire morel mushrooms, moose, bark beetles, long-term ecological research

Background

Ph.D., forest ecology, University of Oregon; member, Alaska Regional Committee on Invasives, Alaska Committee on Noxious and Invasive Plant Management

Tricia Wurtz

Research ecologist; Fairbanks, Alaska

Tricia Wurtz is at the forefront of what could prove to be one of the most important chapters in the history of invasive plants in this country. A research ecologist, Wurtz is working to stop the spread of a plant that has the potential to mar Alaska's distinction of being the last state in which invasive species have yet to gain a stronghold.

Wurtz is studying sweetclover, a species that was deliberately sown along the state's road system as a stabilization species. Sweetclover is now spreading from roadsides to areas underneath bridges, where it can displace native plants and alter soil chemistry. Wurtz found sweetclover growing on natural flood-plain surfaces below about 11 percent of the bridges she examined and on roadsides adjacent to more than 40 additional bridges. She is now modeling the state's network of roads and rivers to determine which river crossings are critical control points for stopping sweetclover's spread.

Wurtz also is Alaska's authority on morels—edible mushrooms that can fruit prolifically after wildfires. After the record fire years of 2003 and 2004 in Alaska's interior, she and her colleagues taught more than 600 residents from 11 rural Alaskan communities, where the annual income often is less than $15,000, about the economic opportunities associated with morels, helping the residents to generate income from lands that otherwise have limited economic value.

Wurtz, who has studied Alaska's boreal forests for more than 20 years, enjoys working in the state, which she describes as one of the best natural laboratories in the world.

Ask Him About

Disturbance; dendrochronology; reducing fire risk; ponderosa pine silviculture; old-growth ponderosa pine; management options for white spruce, paper birch, and trembling aspen

Background

Ph.D., forest ecology, University of Alaska, Fairbanks

Andrew Youngblood

Research forester; La Grande, Oregon

Andrew Youngblood, a research forester, studies the development of forest stands—groups of trees in a landscape that are similar in age, composition, and structure. His research looks at the distribution of stand components and how they interact with natural and human-caused disturbances, such as insects, fire, and timber management practices.

In one study, Youngblood conducted a detailed examination of stand structure in old-growth ponderosa pine forests at three protected study areas in Oregon and northern California. He measured the distribution, size, and age of live and dead trees in the area and assessed the condition of their coarse woody debris. Nearly all of the structure and distribution of old-growth ponderosa pine forests have been lost during the past 100 years owing to harvesting, fire, and forest fragmentation. Thus, Youngblood's findings provide a reference point against which managers can evaluate differences within ponderosa pine ecosystems and gauge the success of restoration treatments.

Youngblood also measured the effects of alternative treatments designed to reduce fuels and accelerate the development of old-growth characteristics in ponderosa pine and Douglas-fir forests in northeastern Oregon. He found that, although thinning and burning can be used to modify stand structure and composition, the changes were minor compared to the changes likely to result from stand-replacement wildfire. Thus, it is unlikely that any single treatment will alleviate the effects of nearly 100 years of fire exclusion and fuel accumulation in these low-elevation dry forests.

Ask Him About

Climate variability; El Niño; smoke predictions; impacts of climate change on wildland fire, forest health, and air quality

Background

Ph.D., climate diagnostics, University of Washington; member, American Meteorological Society, American Geophysical Union, American Statistical Association

Sim Larkin

Research physical climatologist; Seattle, Washington

Climate is the backdrop for weather and, thus, affects virtually every aspect of our lives. Climate also is a critical factor in the health of ecosystems. As a research physical climatologist, Sim Larkin looks for ways to understand the interrelationships between climate and sound management of the region's—and Nation's—ecosystems.

Part of Larkin's current work focuses on the impacts of El Niño—a recurring oceanic-atmospheric phenomenon in the tropical Pacific Ocean that can cause major upheavals in global weather. Scientists agree that nearly a dozen El Niño episodes have occurred in the last 50 years, but, until recently, they were not able to arrive at an agreed-upon definition of the phenomenon. Larkin and colleagues modified a definition provided by the National Oceanic and Atmospheric Administration so that it separates El Niño episodes into two classes based on the source of the increased water temperature driving the episode. This new definition allows for better weather forecasts during El Niño episodes.

Larkin also developed the BlueSky smoke modeling framework, which is being used to provide real-time predictions of smoke impacts from prescribed and wildland fires. BlueSky smoke predictions are currently available throughout the Lower 48 States, and BlueSky emissions calculations are being used in the National Weather Service's smoke forecasts. By providing these projections, BlueSky offers managers a tool to help predict and mitigate smoke issues before they affect the public.

Ask Him About

Fire and landscape ecology, fire history, climate change, air quality, biogeography of conifer species

Background

Ph.D., landscape ecology, University of Washington

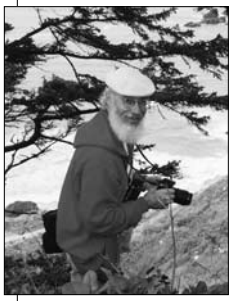
Don McKenzie

Research ecologist; Seattle, Washington

Don McKenzie, a research ecologist, credits great teachers in his past for influencing him and his current research. Now he makes a habit of encouraging younger scientists and students—the same way his teachers encouraged him—to think creatively about difficult research problems.

McKenzie's own research is focused on some often-difficult issues. He studies the ecology of fire across landscapes, how fire is affected by climatic change and management and, in turn, how fire affects smoke emissions and air quality. McKenzie has developed models of fire frequency that help researchers and land managers understand and restore historical fire regimes. He also has identified climatic and biophysical factors, such as soil-water balance and snowpack, that influence the distribution of conifer species. Understanding these factors enables projections of the effects of climate change on forests to be made and identifies plant species and landscapes that are particularly vulnerable. In another study related to climate change, McKenzie evaluated the patterns of increased tree growth in response to 20th-century climate.

For McKenzie, integrating existing databases and models with efforts to identify new directions in research is a productive scientific approach and one ideally suited for studying forests' potential responses to climate variability and the possible effects of future fires on air quality.



Ask Him About

Climate change, vegetation distribution, fire risk forecasts, ecosystem function and change

Background

Ph.D., biology, University of Utah; member, American Association for the Advancement of Science, American Geophysical Union, American Institute of Biological Sciences

Ron Neilson

Bioclimatologist; Corvallis, Oregon

The Western United States is more than just a physiographic region to Ron Neilson. It's a source of scientific and spiritual sustenance.

Neilson, a bioclimatologist and leader of the Mapped Atmosphere-Plant-Soil System (MAPSS) team, combines his passion for biology and physics with his more primitive need to explore the wild landscapes of the West with important results—his research has implications for, literally, everyone on the planet.

Neilson has been studying the theory, mechanisms, and simulation of vegetation distribution for nearly three decades. He develops models that simulate the dynamics of vegetation under a variety of climatic conditions of the past, present, and future. With his MAPSS model, Neilson is able to predict potential vegetation distribution anywhere in the world by using climate and soils information. It is one of only a handful of models in the world that is capable of simulating the possible changes in the distribution of the world's ecosystems under altered climate. Products stemming from the MAPSS team's models have been used by assessment groups and have been presented before Congress and around the world. The MAPSS model was hybridized with nutrient cycling and fire models to create MC1, which is being used to forecast fire risks in upcoming seasons in the contiguous United States as well as the potential national and global impacts of long-term climate change.

In the future, Neilson plans to continue to advance understanding of the likely responses of ecosystems to climate variability and change.

Ask Him About

Climate change, wildfires, human disturbance, environmental stress, mountain ecology, natural resource management

Background

Ph.D., forest ecology, University of Illinois

David L. Peterson

Research biologist; Seattle, Washington

When most people think of old-growth forests in the Pacific Northwest, they immediately picture lush, low-lying landscapes dominated by Douglas-fir. When David Peterson, a research biologist who has studied Pacific Northwest ecosystems for more than a decade, thinks of these landscapes, he also pictures subalpine forests growing high on the peaks of the Olympic Mountains and Cascade Range of Washington state.

Peterson, who is leader of the Fire and Environmental Research Applications team, has focused much of his research on these subalpine systems, which, like the region's characteristic old-growth Douglas-fir forests, are complex ecosystems that are often hundreds of years old. Subalpine forests are an ideal setting for his studies on the effects of environmental stressors—such as fires and climate change—on the health of forest ecosystems. Peterson is currently focusing on how fire disturbance can be integrated into the management of forest ecosystems in the Western United States. His work on the development of scientific principles for effective use of thinning and prescribed burning will help remove accumulated fuels and reduce the risk of crown fires.

Because most of Peterson's ecological research is interdisciplinary in its approach, he is able to both learn from scientists in other fields and apply his findings to theirs. Crossing the boundaries of science and drawing from other related disciplines is, as Peterson sees it, not only natural, but the only realistic way to address the complex issues surrounding natural resource management.

Ask Him About

Effects of weather on fire behavior, fire danger, history of fire weather science

Background

Ph.D., atmospheric sciences, University of Washington; member, International Association of Wildland Fire, American Geophysical Union

Brian Potter

Research meteorologist; Seattle, Washington

Just four months after Brian Potter began working for the Forest Service in 1994, Colorado's South Canyon Fire burned unexpectedly out of control owing to a change in the weather. Fourteen firefighters and air crew members perished. For Potter, the tragedy was a pivotal moment in his career—it motivated him to conduct research aimed at better understanding fire-atmospheric interactions.

Potter is a research meteorologist and leader of the Atmosphere and Fire Interactions Research and Engineering team. One of his research emphases is on the influence of weather on fire behavior. Studies conducted in the Eastern United States suggest that even when surface weather is benign, dry and often windy air several thousand feet above the surface can drop down during fires, causing extreme fire behavior. Potter is involved in research that will help determine how common this is and which of the country's regions are affected.

Potter also is examining the impact of fuel moisture on winds near fires. His work is helping to evaluate the importance of a previously unacknowledged connection between water vapor generated during a fire and convection. This moisture, he found, has the potential to cause erratic winds around a fire, which can compromise firefighter safety and alter fire behavior.

In the future, Potter will continue to link forest fuels science to atmospheric physics to improve fire danger and behavior indices and smoke dispersion models.

Ask Him About

Fire ecology, fire history, fuel inventory, prescribed fire, ecological restoration

Background

M.S., forest ecology, University of Washington

Clint Wright

Research forester; Seattle, Washington

Clint Wright understands the complex ecological implications of fires in ecosystems. He also knows that there are potential public health and resource management concerns stemming from fire's impact on air quality and ecosystems.

Wright is a research forester whose work is focused on fire effects and fire ecology. In one study, he developed fuel consumption models for shrub-dominated ecosystems. Fuel consumption—or the rate at which fires consume combustible material—is tied to a host of fire effects, such as biomass emissions. The ability to predict fuel consumption will aid resource managers in determining the impacts of prescribed and wildland fires on air quality. Collectively, these findings will allow resource managers to mitigate the impacts of fires on the general public and the Nation's natural resources.

In the future, Wright will continue to develop models of fuel consumption in ecosystems that have not yet been studied. He also will develop methods for sampling fuels and fire effects at prescribed and wildland fires and explore the effects and effectiveness of forest restoration in forest types adapted to fire.

Ask Him About

Boreal (northern) forest carnivores, Canada lynx, fisher, wolverine, montane red fox, wildlife conservation genetics, pileated woodpecker

Background

Ph.D., wildlife science, University of Washington; member, The Wildlife Society, American Society of Mammalogists, Ecological Society of America

Keith Aubry

Research wildlife biologist; Olympia, Washington

For as long as he can remember, all Keith Aubry ever wanted to do was work with animals. Now, as a research wildlife biologist, his work is helping to inform the management and conservation of wildlife, especially those that may be in peril.

Over the past decade, Aubry has helped to develop national conservation assessments and strategies for several forest carnivores that are of conservation concern, including the Canada lynx, wolverine, and fisher. Through his studies, he has generated new understanding of these species' historical and current distributions and their ecology in boreal forests. The lack of sufficient information on distribution often is cited as a factor that complicates decisions by state and federal regulatory agencies to list a species. Aubry designs his studies and conducts research to fill these gaps so that informed decisions can be made.

Recently, Aubry developed an interactive Web site for archiving and retrieving the results of surveys for forest carnivores by using remote cameras and track-plate boxes, which capture impressions of animals' footprints. He also was the first scientist to radiocollar and track a wolverine in the Pacific Northwest.

In the future, Aubry, who has studied the ecology and conservation biology of the region's terrestrial wildlife for more than 25 years, will continue to conduct research that contributes to the understanding of wildlife ecology and that has value to the management and conservation of sensitive species.

Ask Him About

Watershed management, native fish conservation, natural disturbance and recovery, salmon restoration, stream ecology

Background

Ph.D., fisheries and wildlife, Oregon State University; member, American Fisheries Society, North American Benthological Society, Ecological Society of America

Pete Bisson

Research fish biologist; Olympia, Washington

To Pete Bisson, a life without clean water and healthy fish populations would not be much of a life at all. As a research fish biologist and leader of the Olympia Aquatic and Land Interactions team, Bisson conducts research with a goal of ensuring clean water and healthy fish communities into the future.

Much of Bisson's work is focused on the conservation, management, and restoration of the region's aquatic habitats and their species. He is involved in research on fish populations, stream habitats and food webs, riparian zones, and a variety of water-related management issues. Through his work, he has found that natural disturbances, such as fire and floods, drive the creation and maintenance of productive aquatic habitat. He also found that no one habitat type favors the full range of native aquatic species; a diversity of habitat types is critical.

Prior to joining the Forest Service, Bisson worked as an aquatic biologist for a large forest products company. This experience has given him a unique perspective on the needs of those involved in natural resource management in the private sector. He also has served on two National Research Council committees—one on Pacific salmon and the other on watershed management—and is vice-chair of the Independent Scientific Review Panel, which provides scientific oversight to the Northwest Power and Conservation Council's Fish and Wildlife program.

Ask Her About

Sensitive wildlife species, amphibians, old-growth forests, dead trees, ecosystem indicators, wildlife management

Background

Ph.D., wildlife ecology, University of Idaho

Evelyn Bull

Research wildlife biologist; La Grande, Oregon

The wildlife species that inhabit particular ecosystems can be the best indicators of that ecosystem's health. Evelyn Bull, a research wildlife biologist, studies these "indicator species"—species whose existence is closely tied to certain elements of an ecosystem—in the east-side forests and ranges of the Pacific Northwest.

Bull has been conducting research on sensitive wildlife species and unique or critical wildlife habitats, such as old-growth and dead trees, for 30 years. She has concentrated her research in the Douglas-fir and grand fir zones of the Blue Mountains region of eastern Oregon. Her current research emphasis is on the influence of natural and human-caused disturbance events on amphibian ecology and wildlife that are dependent on coarse woody debris. As part of this, she is working to determine the influence of fuel reduction and forest restoration activities on a diverse array of species, from amphibians to mammals. She also is studying the ecology of wildlife species associated with old-growth forests, including pileated woodpeckers and Vaux's swifts, two cavity-nesting bird species; and American marten, a forest carnivore.

Bull's research is important to understanding both the interactions of wildlife and disturbance events and the role of disturbance in maintaining populations of species of concern, like amphibians, which are experiencing worldwide declines. In this way, she provides information that can improve management for wildlife species.

Ask Her About

Relationships between fish and their habitats, landscape ecology, habitat potential for salmon, debris flows

Background

Ph.D., fisheries science, Oregon State University; member, American Fisheries Society, Ecological Society of America, Society for Conservation Biology

Kelly Burnett

Research fish biologist; Corvallis, Oregon

It is no coincidence that Kelly Burnett refers to research as the ideal way to channel her life-long curiosity. As a research fish biologist, she studies native fish and their relationships with their aquatic habitats.

In one study, Burnett developed a model that tracks landslides and their potential to reach streams inhabited by fish. The impact of landslides on fish has long been a source of debate among researchers and managers—some recognize them only as major disturbances, while others point to their deposition of wood and gravel in streams, primary fish habitat components, as a beneficial effect. Burnett's model identifies sites in western Oregon where landslides are likely to occur and then tracks them over their entire projected course. Using the model, managers are able to identify and prioritize landslide initiation sites that have the greatest potential for delivering materials to fish-bearing streams. Thus, in these areas, they can either avoid conducting activities that may trigger a landslide or target restoration so that if a landslide does occur, it is more likely to benefit fish habitat in the long run.

For Burnett, the most rewarding part of her work is collaborating with managers and regulators to identify knowledge gaps and then working with other researchers to identify ways the gaps can be filled.

In the future, she will develop methods to determine the effect management policies have on streams.

Ask Him About

Ecological responses to the 1980 eruption of Mount St. Helens; volcanic disturbance; succession; disturbance ecology; Pacific Northwest amphibians, small mammals, birds, and vegetation

Background

B.S., wildlife ecology, Utah State University; graduate coursework, ecology, Utah State University; member, Ecological Society of America, Society for Northwestern Vertebrate Biology

Charlie Crisafulli

Research ecologist; Mount St. Helens National Volcanic Monument, Washington state

Within two months of Mount St. Helens' catastrophic eruption on May 18, 1980, Charlie Crisafulli was on the ground conducting research. Crisafulli has been at the volcano ever since, leading studies that are providing insights into the initial and long-term responses of ecosystems to large, infrequent disturbance.

As a research ecologist and the Station's lead scientist at the volcano, Crisafulli conducts research on the ecology of the volcano's plants, animals, and fungi. His findings continue to enhance understanding of how ecosystems respond to major environmental disturbances. Crisafulli found that chance events, such as the season and time of day the disturbance occurred, play a significant role in determining an ecosystem's response. He has found that the most important factor determining the pace of ecological response is the type, amount, and distribution of living and dead organisms remaining at a site after a disturbance event.

Crisafulli recently confirmed the importance of postdisturbance nutrients in his studies of Spirit Lake. Although the introduction of debris into the lake during the eruption killed its previous inhabitants, it also ushered in a diverse and unique variety of microbes that ultimately increased the lake's productivity.

Although he has witnessed ecological responses at Mount St. Helens for more than 25 years, Crisafulli never ceases to be amazed by the lessons the volcano teaches. To him, there is no better living laboratory for conducting ecological research than the dynamic volcanic landscape.

Ask Him About

Environmental effects of roads, fish passage, watershed restoration, innovative science delivery methods, watershed process monitoring, knowledge management

Background

M.S.; soil science, plant nutrition, and forest watershed management; University of California, Berkeley

Michael Furniss

Hydrologist; Arcata, California

Michael Furniss has an ideal background for someone whose work is focused on the communication of science and the application of science to management. The hydrologist and soil scientist has worked for the National Forest System and credits the experience for providing him with a solid understanding of the challenges of applying research to wildland management issues.

To overcome these challenges, much of Furniss' work is focused on developing innovative tools and methods to deliver the science he and his colleagues generate. He created an acclaimed model and interactive computer program—called FishXing—that assesses the ability of fish and other aquatic species to pass through culverts that convey streams under roadways. By inputting information on fish, like species and age class, and the culvert being assessed, such as shape and diameter, land managers can learn of specific conditions that might limit fish passage and of possible remedies. FishXing, which is in worldwide use and is grounded in the scientific literature, reduces the uncertainty typically associated with assessing culverts and gives engineers and managers the unique opportunity to see how a culvert might impact fish before the expensive installation process begins.

Furniss also has used multimedia technology to manage and communicate extensive amounts of data. Recently, he developed techniques for creating multiple-stacked thematic timelines, known as Time-maps. These timelines hold great promise for indexing knowledge resources in research-rich locations.

Ask Him About

Response of rivers to dams, dam removal, land use, climate change, landscape and drainage evolution, dynamics of mountain rivers, hydrologic effects of land use

Background

Ph.D., fluvial geomorphology, Johns Hopkins University; member, American Geophysical Union, Geological Society of America

Gordon Grant

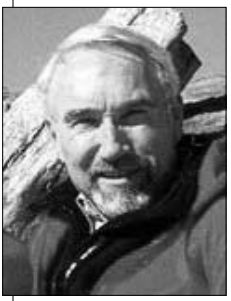
Research hydrologist; Corvallis, Oregon

People are inextricably linked to water—for electricity, sanitation, recreation, and renewal. Water is linked to people, too, but for different reasons—it is impacted by a wide range of human activities. Owing to both our dependence on water and our influence on it, an understanding of how rivers work and what they might look like in the future is important—and that is exactly what Gordon Grant is working toward.

Grant is a research hydrologist whose primary emphasis is on the response of rivers to change. Through field and experimental studies, he documented a complex set of geomorphic responses in rivers, or changes in their form and structure, that accompany the removal of dams. The type and sequence of these processes varies and is influenced, he found, by the size of the dam, the rate at which it is removed, and the flow of the water following removal. This documentation of the ecological and physical impacts of dam removal is critical to those involved in dam removal planning.

In another study, Grant discovered that the underlying geology and topography of the Willamette River basin in Oregon plays a major role in the region's seasonal streamflows. This finding informs the management of municipal water supply and the study of the likely response of Northwest rivers to climate variation and change.

In the future, Grant, whose fascination with rivers began with a 12-year career as a whitewater river guide, plans to develop models that predict rivers' responses to shifting weather and climate conditions.



Thomas Hanley

Research wildlife biologist; Juneau, Alaska

Ask Him About

Black-tailed deer, moose, nutritional ecology, habitat evaluation, Alaska ecosystems, understory plant ecology, silviculture

Background

Ph.D., forest zoology, University of Washington

If you would ask Thomas Hanley about his science findings, he would probably tell you that few of them are truly his own. Hanley, a research wildlife biologist, says he has always worked in collaboration with other scientists and researchers and that his scientific accomplishments are best described as team accomplishments.

Hanley studies the ecology of understory plants and large herbivores—like deer and moose—in Alaska ecosystems. In one study, by using laboratory and analytical techniques, Hanley and his colleagues developed equations for predicting the effects of plant tannins on protein and dry matter digestion in wild ruminants. This finding opened up new ways of evaluating food and habitat for ruminants, especially deer. They also developed modeling techniques for quantitatively evaluating habitat on the basis of both quality and quantity of foods.

In another study, he and his colleagues found that the inclusion of red alder in young-growth spruce-hemlock stands in southeast Alaska may result in greater understory biomass and species diversity than can be accomplished by any other silviculture technique yet known there. The implications of this finding for red alder and alternative silvicultural methods are just beginning to be explored.

Hanley says the most rewarding part of his work is collaborating with scientists and researchers from all over the world. In the future, he plans to continue his research on understory plant ecology and the role of large herbivores in Alaska ecosystems.

Ask Her About

Bark and wood-boring beetles, arthropods' role in ecosystems, disturbance ecology and management

Background

Ph.D., entomology, University of Kansas

Jane Leslie Hayes

Research biological scientist; La Grande, Oregon

It was the sheer diversity of arthropods that initially attracted Jane Hayes to a career in science. Her desire to better understand their biology, ecology, and evolution has kept her both busy and thoroughly intrigued ever since.

Hayes is a research biological scientist whose work examines arthropod biological and ecological interactions within stands and across forest landscapes. Her studies have focused on the role of disturbances, like insect outbreaks, in forest ecosystems and how their undesirable effects might best be managed.

In one study, she designed and led an integrated management strategy for the control of a western pine beetle outbreak in Oregon's Imnaha Wild and Scenic River Corridor. There was an urgent need to prevent the continued loss of large, old pines, which define the character of this high-use area. Hayes' strategy included the use of pheromone-baited traps, which ultimately removed an estimated 320,000 beetles. First-year results indicated a 90-percent reduction in tree mortality in the area following treatments.

In another study, Hayes and colleagues used simulation models to examine the relationship among thinning, bark beetles, and fire.

In the future, Hayes will continue to develop and evaluate tools that allow managers to better address insect interactions and their critical role in the health of the region's forest ecosystems.

Ask Her About

Associations between physical characteristics and water movement, soil saturation, flooding, landslides

Background

Ph.D. candidate, ecohydrology, Portland State University; member, American Geophysical Union

Adelaide Johnson

Hydrologist; Portland, Oregon

In Adelaide Johnson's research, it is important to go with the flow. Johnson, a hydrologist, studies water—especially how its movement is influenced by geomorphologic characteristics such as landform, soils, and vegetation.

In one study, Johnson found that streams originating from bogs, a common fixture of the southeast Alaskan landscape, discharge more water per area than do upland and forested wetland streams during storms. This is an important finding, as it suggests that the risk of flooding during stormy weather may increase with the number of bogs.

Johnson also found that water can act very differently following forest harvests, even when the harvests are similar in type. These differences, she found, can be traced to geomorphic characteristics, like land slope and soil depth. This suggests that, depending on these characteristics, areas with only a quarter of the forest being harvested can potentially increase soil saturation—and, thus, an area's flood risk—more than can an area that has been clearcut.

In the future, Johnson, who says it is an honor to be paid for being curious, plans to continue her pursuit of interdisciplinary projects that link physical and biological processes. In this way, she will continue contributing to better management of the region's forests.

Ask Her About

Forest-stream interactions, stream food webs, water quality, stream temperature, nutrient cycling in streams

Background

Ph.D., stream ecology, University of Oklahoma

Sherri Johnson

Research ecologist; Corvallis, Oregon

The connection between land and water has tremendous implications for natural resource management—managing one can have an unintended effect on the other. Sherri Johnson, a research ecologist, examines the complex interactions between terrestrial and aquatic ecosystems so that potential impacts can be better understood.

In a group of studies, Johnson and colleagues examined the fate of ammonium and nitrate, two forms of nitrogen, in streams. Nitrogen is a critical nutrient for all organisms and is often a limiting factor in mountainous areas of the Pacific Northwest. They found that half of the ammonium was taken up over short travel distances in the stream, with the rest being converted to nitrate and transported downstream. Nitrate is a less preferred form of nitrogen, but does get taken up by the instream food web and riparian plants. A very small portion of instream nitrate was converted by denitrification to N^2, atmospheric nitrogen.

Johnson also found that forest type was not a good predictor of the concentrations of instream nitrate, as old-growth forest streams had high or low levels. Streams through forests comprising mainly alder, a nitrogen-fixing tree species, generally had high nitrate levels. These findings have helped to enhance the understanding of nutrient dynamics and develop ways to mitigate the effects of activities that introduce nitrogen into ecosystems.

In the future, Johnson intends to continue her research on forest-stream interactions.

Ask Him About

Forest wildlife, disturbance ecology and management, effects of fire and fuels management on wildlife, ecology and management of mammals, South Asian ecology and management

Background

Ph.D., forest science and wildlife ecology, University of Washington; member, The Wildlife Society, Ecological Society of America, Society for Conservation Biology

John Lehmkuhl

Research wildlife biologist; Wenatchee, Washington

To John Lehmkuhl, wildlife has a role not only in maintaining the health of forests, but in contributing to the well-being of the public. When many people visit a forest, they expect to see wildlife, or, at the very least, know the land is being managed with species in mind. Lehmkuhl works to make sure that happens.

As a research wildlife biologist, Lehmkuhl helps to ensure that management practices not only benefit forests, but also the wildlife species they support.

One of Lehmkuhl's research emphases is on the ecological connections in the dry forests east of the region's Cascade Mountain Range. These forests often are the focus of fuel reduction treatments because of their fire danger, but the effects of these treatments on the forest, its inhabitants, and its processes are not completely understood. Through studies of a variety of birds and mammals, such as woodpeckers and northern flying squirrels, Lehmkuhl is helping to better understand the effects of fuel reduction on wildlife biodiversity and the ecosystem components, like lichens and mycorrhizal fungi, that support wildlife.

In the future, Lehmkuhl—who also has extensive experience with the ecology and management of south Asian forests, grasslands, and wildlife—will collaborate with natural resource managers to research, design, and test dry forest fuel reduction and ecosystem restoration treatments.

Ask Him About

Population ecology of fish, behavioral ecology of fish, aquatic ecology, evolution

Background

Ph.D., ecology and evolution, University of Chicago; member, Ecological Society of America, American Fisheries Society, American Society of Ichthyologists and Herpetologists

Karl Polivka

Research fish biologist; Wenatchee, Washington

Few species embody the quintessence of the Pacific Northwest like native salmon. Their presence in the region has tremendous cultural, social, and ecological importance. Karl Polivka is a research fish biologist who has made both salmonid fishes and aquatic habitats the focus of his work.

In one study, Polivka found that the foraging behavior of young salmonids—the group of fish to which salmon and steelhead belong—is affected by the composition of species in the foraging groups they form. In streams where wild steelhead trout foraged alongside hatchery-raised coho salmon, for example, Polivka found that steelhead foraging was reduced. More complex behavioral analyses, however, suggested that overall group size is important regardless of competition between species. Modeling the effects of competition on fish behavior will ultimately enable researchers to predict sustainable fish population carrying capacity for streams in the Pacific Northwest.

In another study, Polivka examined the transport of organic matter and prey species by headwater streams. In a nutrient-poor lake, he found that inputs from headwater streams did little to change the availability of these nonfish prey species, known as macroinvertebrates, in near-shore lake habitats. He did find, however, that during the summer months, fish tended to gather along the shore around stream junctions, where temperatures likely are cooler. These cool refuges might help the prey avoid predatory fishes. These findings are important to understanding the factors that influence the structure and dynamics of aquatic food webs.

Ask Him About

Wildlife-habitat relationships, population dynamics, marbled murrelet, wildlife monitoring, wildlife management, sensitive wildlife species

Background

Ph.D., wildland resource science, University of California, Berkeley; member, Phi Beta Kappa, American Ornithologists' Union, Cooper Ornithological Society

Martin Raphael

Research wildlife biologist; Olympia, Washington

For Martin Raphael, the decision to pursue a career in science was an easy one to make: he had a strong desire to better understand the natural world around him. Now, as a research wildlife biologist and leader of the Ecology, Management, and Conservation of Sensitive Wildlife Species team, Raphael is helping to enhance the understanding of sensitive wildlife species and ecosystems.

Much of Raphael's current research is focused on the marbled murrelet, a federally listed seabird whose nesting habitat in California, Oregon, and Washington has been protected by the Northwest Forest Plan since 1994. In one study, Raphael and his colleagues developed a range-wide map of potentially suitable nesting habitat for the bird. Based on vegetation attributes, like tree diameter and canopy cover, and refined by using additional data on slope, elevation, aspect, and distance to the coast, the map gives managers a way to assess changes in the murrelet's habitat under the plan.

In another study, Raphael tracked the movement of radio-tagged murrelets in Washington throughout their breeding season. He found that the birds traveled widely—those that nested in Washington's Olympic National Park foraged as far away as the coast of Canada's Vancouver Island.

In the future, Raphael, who enjoys working outdoors in what he describes as one of the most beautiful regions in the world, will continue to add to the knowledge base on the conservation of species and ecosystems of concern.

Ask Him About

Aquatic ecosystems, landscape ecology, land management practices, salmonids (salmon, trout, and steelhead), salmonid conservation

Background

Ph.D., fisheries science, Oregon State University

Gordon Reeves

Research fish biologist; Corvallis, Oregon

Gordon Reeves, a research fish biologist, went into research for two reasons. For one, he wanted to be able to continually learn new things—not only about fish species and aquatic habitats, but about a wide range of other subjects. For another, he wanted to work with people from a variety of other disciplines. For him, the field of fisheries biology was the perfect combination.

Reeves' research has focused on the impact of management practices on juvenile anadromous salmon and trout and their freshwater habitats. He also has examined the dynamics of aquatic ecosystems and the role of disturbances—such as landslides—in creating and maintaining fish habitats in the Pacific Northwest and Alaska. In addition to his formal research, Reeves has been involved in several efforts aimed at developing and evaluating options for managing aquatic ecosystems and developing recovery plans for fish species listed as threatened or endangered.

In the future, Reeves' research emphasis will shift to examining the dynamics of aquatic ecosystems and landscapes and determining the pattern of fish and fish habitat over large spatial and temporal scales—such as across landscapes and over several seasons.

Reeves enjoys his work because it helps provide a scientific foundation for the development of new practices and policies involving the management of public lands in the Pacific Northwest. More specifically, his science findings help people understand aquatic ecosystems and their fish populations and provide the basis for developing and evaluating new policies and practices for land management.

Ask Him About

Ungulates, herbivory (grazing), effects of ungulates on plant growth, effects of ungulates on vegetation recovery after fire or other disturbances, grazing systems

Background

Ph.D., animal nutrition, University of Wyoming; member, Society for Range Management, The Wildlife Society, Society of American Foresters

Martin Vavra

Supervisory rangeland scientist;
La Grande, Oregon

The health of an ecosystem can have tremendous impacts on its inhabitants. Not surprisingly, the inhabitants, too, can have effects on their ecosystems. Martin Vavra, a supervisory rangeland scientist, has focused his research on this dynamic. He studies the effects of vegetation on ungulates—large, hoofed browsers such as cattle, deer, and elk—and the effects of ungulates on vegetation.

Vavra's research emphases are on identifying the effects of ungulates on the structure and composition of plant communities and identifying the influence of a forest's canopy layer on the production and composition of its bottom layer, which often supplies browse for ungulates. He also is studying the effect of fuels reduction—a type of understory thinning designed to reduce fuel for fires—on ungulates.

In one study, Vavra and colleagues found that a properly designed livestock grazing system could be used to improve the availability of winter forage for deer and elk. In this system, spring livestock grazing followed by removal of the ungulates allowed plants to regrow by winter. This regrowth had higher nutritional value than plants that were ungrazed by livestock and could, thus, play a role in the winter survival of deer and elk and in the birth of healthy young in the spring.

In the future, Vavra will continue to design his studies so that their end products are useful to land and natural resource managers and, more broadly, improve the understanding of the ecosystems from which they are based.

Ask Him About

Ecology-based silviculture, sustainable forests, northern flying squirrels, variable-density thinning, tree-dwelling rodents, forest-floor small mammals, terrestrial amphibians, snags, coarse woody debris, Neotropical and resident songbirds

Background

Ph.D. candidate, forest ecology and management, The Union Institute and University

Todd Wilson

Wildlife biologist; Olympia, Washington

Todd Wilson has a formula for the management of the region's second-growth forests: use ecology-based forest management strategies to promote the development of sustainable forests that can meet environmental, social, and economic needs.

Wilson is a wildlife biologist whose research develops and tests ecoforestry strategies that might help accelerate the development of biological and structural complexity in young, second-growth forests—the kind of complexity found in certain old-growth forests that support a rich and diverse array of life.

Wilson currently is leading two major, long-term studies in stands across western Washington that examine whether new tools, like variable-density thinning (VDT), can accelerate the development of older-forest structures. Variable-density thinning involves creating a mosaic of small openings in the forest canopy through the removal of trees as a way to mimic small-scale natural disturbances that help lead to forest complexity. Early results indicate that VDT in the short term has helped increase the abundance and richness of many bird and mammal species to the same levels found in complex natural forests. Wilson also found that a forest's past management history has a significant effect on how forests will develop after VDT is applied, suggesting the importance of site-specific, rather than general, management prescriptions.

Wilson also is evaluating the habitat needs of flying squirrels, a primary prey species of the federally threatened northern spotted owl.

Ask Him About

Streams, aquatic habitat, water quality and quantity, land use practices

Background

Ph.D., geomorphology, Oregon State University; member, American Geophysical Union, Geological Society of America, American Water Resources Association

Richard Woodsmith

Research hydrologist; Wenatchee, Washington

At first, geomorphology—the study of the processes that shape the physical features of the Earth—might seem far-removed from the study of forests and fish in the Pacific Northwest. But if you ask Richard Woodsmith, a research hydrologist, to tell you why the field is important to understanding ecosystems in the region, he would tell you it is because geomorphology is, literally, quite fundamental. Geomorphic processes on hillslopes and in streams, which can be altered by human land use patterns, have a direct effect both on water quality and quantity and on the availability of high-quality habitat for important species like Pacific salmon.

Woodsmith's research is centered on these geomorphic processes. Much of his work focuses on understanding the formation and maintenance of the physical characteristics of forest stream channels. He found, for example, that large woody debris, such as fallen trees, plays a critical role in maintaining high-quality habitat and processes that distribute sediment in these streams.

Woodsmith, who spent 14 years at the Forestry Sciences Laboratory in Juneau, Alaska, before becoming leader of the Wenatchee Aquatic and Land Interactions team, is now studying the role of fire in maintaining high-quality aquatic habitat and the effects of fire on water quality and quantity. He enjoys his work because it provides him with the opportunity to further the understanding of issues that are important to society.

Ralph Alig

Research forester; Corvallis, Oregon

Ask Him About

Land use, urban growth, land use models, national land use change, land policies, Renewable Resources Planning Act

Background

Ph.D., land economics, Oregon State University; National Coordinator for Land Use and Land Cover Projections, USDA Forest Service Renewable Resources Planning Act team

What do land use changes, timber supply, wildlife habitat, global change, and conservation programs all have in common? If you ask Ralph Alig, he would tell you that they are all natural resource management issues that his research impacts.

A research forester and leader of the Land Use and Land Cover Dynamics team, Alig has studied the dynamics of land use and land cover changes for more than 25 years. Much of his research involves studying the changes in the way land is used and examining the changing landscape across ownerships, from socioeconomic and demographic perspectives. He currently is developing methods to analyze the relationships between socioeconomic forces, such as population, and area changes. He also is improving existing methods that predict area changes in land uses and land covers over time. He has found, for example, that by 2050, more than 50 million acres of private U.S. forests could be converted to urban and developed uses.

Alig's research has been applied to policy analyses involving timber, wildlife, global change, and land conservation. His findings also have been used to develop a network of area change models that are used in national natural resource assessments.

Lee Cerveny

Research social scientist; Seattle, Washington

Ask Her About

Tourism, recreation, forest-based communities, implications of commercial recreation on public lands and resources, decisionmaking in natural resource institutions

Background

Ph.D., anthropology, Syracuse University; member, American Anthropological Association, Society for Applied Anthropology, International Association for Society and Natural Resources

With its specialized language and practices, a research institution might not seem all that different from a tribe in a remote corner of the world. And, to Lee Cerveny, it is not. As a research social scientist and anthropologist, Cerveny approaches her study of institutions and organizations in the same way as she would a tribe—recognizing its unique set of symbols, rituals, structures, and meanings.

As a member of the Rural Urban Wildland Interactions team, Cerveny explores two concurrent research themes, one of which is the dynamics of natural resource institutions. In one study, she helped enhance the interactions and knowledge sharing between recreation scientists and managers—critical in resolving recreation management problems. Recent organizational changes, Cerveny found, such as shifts in budget and personnel, have diminished the capacity of the Forest Service to engage in these interactions. By analyzing examples of successful interactions, Cerveny identified institutional factors that promote healthy interactions and information sharing.

Cerveny's second concurrent research theme is tourism and recreation. Her work is helping to create a better understanding of the changes in local patterns of resource use, owing to tourism, and their implications for the livelihoods and lifestyles of rural residents in coastal Alaska.

In the future, Cerveny will continue to use her expertise to explore recreation and tourism issues and research capacity at natural resource institutions.

Ask Her About

Science delivery, risk communication, human dimensions of wildfire risk assessment, interdisciplinary research

Background

Ph.D., natural resources, University of Idaho; member, International Association of Wildland Fire, Society of American Foresters, International Association for Society and Natural Resources

Heidi Bigler Cole

Social scientist; La Grande, Oregon

Heidi Bigler Cole firmly believes that people are more likely to use research if they are involved in formulating the questions it seeks to answer. Cole is a social scientist who combines her dual expertise in the environmental and social sciences to conduct research that is rooted in the people it ultimately serves.

In one study, Cole's research helped to foster productive discussions between adversarial groups in Australia. Members of the public and scientists contested some of the science underpinning the Western Australian Regional Forest Agreement, a forest plan designed to last 20 years. Her work suggested that the perceptions of scientific bias could be addressed by several factors, including involving community members in framing the research questions and collecting data. Ultimately, a Western Australian parliamentarian requested a copy of her work and used it to inform the management debate.

Recently, Cole has been investigating managers' reactions to science delivery strategies. One collaborative study is designed to improve fuel reduction science delivery efforts by identifying potential science users and exploring their information needs. She worked with fuel reduction researchers to develop a series of workshops that fostered conversations between scientists and managers. Cole also has developed a survey that identifies factors influencing land manager decisions about using fuel reduction research. Results from these studies will give researchers a scientific basis for improving science delivery.

Ask Him About

U.S. timber situation; economic models; timber industry; timber markets, including trade; jobs versus the environment; forest management; national forest timber demand; communities in transition; ecosystem goods and services

Background

Ph.D., forest economics, North Carolina State University; member, Society of American Foresters

Richard Haynes

Natural resource economist; Portland, Oregon

In addition to influencing natural resources planning and policy, Richard Haynes' research also impacts forest stewardship, helping to ensure forest resources are available for future generations.

Haynes, a natural resource economist and manager of the Human and Natural Resources Interactions Program, is responsible for conducting social, utilization, and economics research in Alaska, Oregon, and Washington. More specifically, he develops analytical methods that are used to make long-term projections of market activity and then uses these models in planning and policy analyses.

Haynes produced trends in resource and forest products industry conditions for the United States from 1952 to 2050 that are organized by region. He also measured the likelihood of communities and economies to adjust to changes in the way resources are managed. This work has allowed him to contribute to the development of socioeconomic resiliency, especially in communities where timber and other natural resource-based jobs dominate.

Currently, Haynes, who has worked for the Station for over 30 years, is analyzing the U.S. timber situation and studying the demand for national forest timber. He also is examining the relationship between jobs and the environment and broad-scale strategies for management.

Ask Him About

Land use change, land use policies and programs, development's effects on forests and forestry, open space, forest benefits, environmental and natural resource economics

Background

Ph.D., environmental and natural resource economics, University of Rhode Island

Jeff Kline

Research forester; Corvallis, Oregon

As a native of the Northeastern United States, Jeff Kline is accustomed to witnessing population growth and major changes in land use. Now, as a research forester, he studies land use change in the context of the Pacific Northwest.

Recently, Kline has studied forest and farmland development by using changes in building densities as a measure of human dispersion in western Oregon. Whereas previous land use models described simple forest, agriculture, and urban land use categories, Kline's work acknowledges a gradient of human occupation of land, from very dense—such as in cities—to very unoccupied—such as in undisturbed forest settings. This innovation allows scientists to account for a variety of potentially positive and negative impacts human occupation may have on timber production and habitat quality.

Kline also has examined how development affects the ways in which private forests are managed. He found that low-density development of private forest lands in western Oregon is accompanied by reduced forest management and forestry investment on those lands. This suggests that when there is timber on private forest land, owners in western Oregon tend to harvest and then not invest as intensively as before when managing their forests for future harvests.

In the future, Kline plans to work toward better understanding how and why society values different types of landscapes and crafting policies that ensure the greatest likelihood of achieving those landscapes that are most desired.

Ask Her About

Recreation and tourism, place-based planning processes, public perceptions of the environment, traditional cultures, rural communities, people-place relations

Background

Ph.D., forest resources/social sciences, University of Washington; member, Society for Applied Anthropology, International Association for Society and Natural Resources, Rural Sociological Society

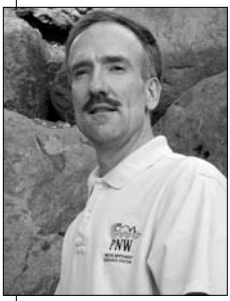
Linda Kruger

Research social scientist; Juneau, Alaska

In Linda Kruger's research, people are always included in the formula.

Kruger, a research social scientist, conducts research that analyzes the complex relationships between people and the environment. Her work is focused on community capacity and resilience; participatory research design; the special connections people have with places on the landscape; and the interactions among population dynamics, tourism, recreation, and traditional and rural cultures. Ultimately, her research helps managers better understand social trends and what they might mean for resource management and local communities.

In her studies, Kruger has found that traditional research methods and public participation approaches are not well suited to drawing out knowledge held by community members. She also has found that formal, scientific assessments may be necessary, but are not sufficient, in understanding community-forest relations. A science based more in civics provides opportunities for community members and agency employees to collaborate and fosters integration of scientific and local knowledge.



David Nicholls

Forest products technologist; Sitka, Alaska

Ask Him About

Hardwood utilization, wood residue utilization, lumber drying, wood products marketing

Background

Ph.D., wood science and technology, Pennsylvania State University; member, Forest Products Society

Wood utilization issues have the potential to significantly impact the local communities and economies of Alaska. David Nicholls, a forest products technologist at the Alaska Wood Utilization Research and Development Center, studies wood utilization—and the ways in which it can be improved for the benefit of both people and the environment.

Nicholls' research examines the ways in which hardwood tree species, such as red alder and birch, and wood residue are used. Much of his research has addressed the theme of producing higher-value products from Alaska's underutilized tree species. Nicholls led one study that examined the feasibility of using red alder for kitchen cabinet construction. His wood residue research focuses on the feasibility of using wood wastes for community heating and lumber drying and on identifying local and export markets for wood compost products.

In addition to work on utilization and residues, Nicholls and his colleagues also are developing computer-based methods that count and measure growth rings in Alaska trees. These methods could be used to evaluate wood quality and tree growth following fires, thinning treatments, or other forest management activities.

Nicholls and his colleagues will continue to focus on wood utilization issues with the intent to create new wood products businesses that can stimulate Alaska's local economies and to help find higher-value uses for the region's underutilized species.

Glossary

An asterisk (*) indicates a term that is defined elsewhere in the glossary.

A

airborne laser scanning—a remote sensing* technology that uses a scanning laser mounted on an aircraft to survey the shape and structure of terrain, buildings, and vegetation.

amphibian—a cold-blooded species that spends some portion of its life in water.

anadromous—a fish species that is born in freshwater, matures in marine (saltwater) ecosystems, and then returns to freshwater to reproduce.

B

benthic—an aquatic organism living on, or very close to, the floor (or bed) of a body of water.

biodiversity—variation in species or life forms within a landscape or ecosystem. Promoting biodiversity is often an objective of ecosystem management.

biogeography—study of the geographical distributions of species and the factors that control them.

biomass—broadly defined, refers to the entire collection of living organisms and dead organic material an ecosystem supports; can include grasses, trees, insects, fish, birds, and mammals. More typically, is used in reference to the amount of living and dead vegetative material an ecosystem is capable of supporting.

biophysical—the physical processes that affect organisms, populations, or communities.

boreal—species or ecosystems of the far north, such as of interior Alaska.

buffer—a strip of land surrounding or bordering a body of water (stream or lake) that is meant to protect it from the effects of land management activities.

C

carnivore—a meat-eating species.

coarse woody debris—large woody material from trees that have fallen to the forest floor; includes the trunk and large branches. Is an important habitat component for numerous wildlife species, although excessive amounts can be a concern for fire managers trying to manage for reduced fire fuel* loads.

conifer—a tree, usually evergreen, whose reproductive bodies (seeds) are contained within a cone.

crown—the upper portion of a tree or plant; ultimately forms the canopy.

D

deciduous—perennial plants that lose their foliage for some time of the year.

dendrochronology—the study of the process of estimating a tree's age by counting its yearly growth rings.

digital elevation model—digital files that consist of points of ground surface elevations that are sampled systematically at equally spaced intervals over an area. Used to represent the terrain surface shape in a form that can be read and displayed by a computer.

disturbance—broad term referring to any event that disrupts an ecosystem and its components; includes fire, insect and disease outbreaks, and thinning.

E

ecology—a field of study concerned with the interactions of organisms and their environment.

emissions—in fire science, refers to the byproducts of fire that are put into the air; includes soot, carbon dioxide, water, and other compounds that are found in smoke.

F

fuel—in fire science, refers to organic matter that can burn in a fire; includes live and dead standing trees, dead and downed logs and branches, pine needles, leaves, grasses, and shrubs.

fuel consumption—in fire science, the process by which fire converts fuels* to energy (heat) and combustion byproducts, such as ash, charcoal, and smoke or emissions. Knowledge of the amount and rate of fuel consumption can help predict fire effects, intensity, and severity.

fuel reduction (fuel treatment)—management activity in which fuels* are removed or altered to reduce the likelihood, intensity, or severity of fire.

G

geographic information system (GIS)—a computer system for capturing, storing, analyzing, managing, and displaying data and associated attributes that are spatially referenced to the Earth.

geomorphology—the study of the processes that shape the physical features of the Earth.

H

habitat—the place where a species lives and where it finds the specific kinds of food, shelter, and other components necessary for its survival and successful reproduction.

hardwood—a deciduous,* nonconifer tree; such as maple, alder, and willow.

headwater—the upper portion of a body of water that is nearest to the source.

herbivory—grazing of vegetation.

I

indicator species—a species that is intimately associated with one or more of an ecosystem's components. The presence and abundance of an indicator species in an ecosystem can be an indication of ecosystem health as well as the presence or abundance of other species in the ecosystem.

integrated resource management—the management of various resource values so that they are utilized in the combination that best meets present and future needs.

invasive species—species that occur outside of their native range and that are detrimental to the new ecosystems they inhabit; includes plants, animals, and pathogens.*

inventory—a research activity in which the quantity and quality of ecosystem components (such as trees) are assessed.

L

land cover—the observed (bio)physical* cover on the Earth's surface, such as Douglas-fir forest.

land use—the use (purpose) to which land is put by people; includes protected areas, plantations, pastures, and human settlements.

landscape ecology—study of how ecological patterns and processes interact across space (landscapes).

legacy trees—trees that are retained while most of the surrounding trees are harvested, or trees that survive catastrophic events that kill most of the surrounding trees; also known as residual trees. Can promote biodiversity by providing important habitat components for some organisms as new forest grows.

long-term ecosystem productivity—managing ecosystems to provide goods and services without reducing the land's capability to provide that rate of production in the future.

M

mycorrhizal fungi—a special group of soil fungi that form symbiotic* associations with plant roots called mycorrhizae. In these associations, the fungi receive their primary energy source from the host plant in the form of simple sugars; in return, the plant receives soil nutrients from the fungus. Mycorrhizal fungi and their resulting plant symbioses are critical to the health of Pacific Northwest ecosystems.

O

old growth—refers to ecosystems characterized by old trees and other structural attributes that are characteristic of the later stages of stand* development, such as coarse woody debris* and multiple canopy layers.

P

pathogen—a disease-causing agent; includes bacteria, viruses, and fungi.

pioneer plants—plants that are adapted to colonize and grow in a site following a disturbance.*

R

reduced-impact logging—technologies and practices designed to minimize damage to residual trees, soils, and other resources in and around a harvesting site.

remote sensing—broad term referring to techniques that measure conditions of forests and landscapes from the air or space; includes Landsat, light detection and ranging (LIDAR), RADAR, and aerial photography.

riparian—an ecosystem bordering a stream, river, or lake that is strongly influenced by the adjacent body of water.

rotation age—the age at which trees are suitable for final harvest and regeneration.

ruminants—hoofed herbivores (plant eaters), such as deer, elk, and cattle, that chew their cud and possess four specially divided stomachs, the first part of which is called a rumen (which contains microbes that digest the foods eaten).

S

salmonids—a group of fish that includes salmon, trout, and chars.

seral—refers to a stage of forest development. Early seral (also known as early successional) refers to relatively young forests with simple attributes; late seral (also known as late successional) refers to mature forests with complex attributes, such as coarse woody debris,* snags,* and spatial heterogeneity.*

silviculture—the science of controlling the vegetation, growth, composition, and health of forests to meet the objectives of landowners.

snag—standing dead tree.

spatial data—data arranging and displaying information across space; often presented in the form of maps.

spatial heterogeneity—typically refers to variation in the amount and diversity of trees, shrubs, and understory plants at various vertical and horizontal areas within a forest. High levels of spatial heterogeneity are believed important for healthy, resilient forests.

spatial scale—the resolution of the scale of reference; includes individual tree, stand, and landscape scale.

special forest product—a harvestable nontimber forest product that has commercial, medicinal, and/or craft value; includes mushrooms and floral greens.

stand—in forestry and silviculture, refers to a contiguous group of trees of relatively similar age, composition, and structure, so as to be a distinguishable unit.

stressor—a physical or biological component that reduces the vigor of organisms or ecosystems and potentially reduces their resilience to other stressors; includes invasive species,* contaminants, drought, and fungal pathogens.*

succession—the growth and change of a forest over time and the replacement of an earlier stage of development with a newer phase (as in early seral* to late seral*).

symbiotic—a type of biological or ecological relationship in which two organisms associate, often to the benefit of one or both; *see* mycorrhizal fungi.*

T

temperate rain forest—forest type characterized by abundant rainfall and mild seasonal temperatures; distinct from tropical rain forest.

temporal scale—the scale of reference that refers to the distribution of a variable across time; includes daily, monthly, and annual resolution of data.

thinning—the removal of some, but not all, trees in a forest.

tree grading—process in which the value of a tree as lumber or other solid wood products is assessed.

tributary—a smaller stream that flows into a larger stream, river, or lake.

U

understory—the lower, or ground, portion of a forest; often consists of grasses, shrubs, or immature trees.

ungulate—hoofed herbivores (plant eaters), such as deer or elk.

urbanization—a land use* change involving the conversion of rural lands (such as agricultural land) to developed areas (such as residential areas or commercial sites). Urban and developed areas consist of residential, industrial, commercial, and institutional lands.

V

variable-density thinning—ecosilvicultural practice in which a forest is thinned* in a way that creates variation in the space between the trees that are left.

W

watershed—the part of a landscape where precipitation flows into a single river system.

weathering—physical or chemical process that breaks down rocks, develops soil profiles, and makes nutrients available to plants.

wildland-urban interface—area at which a wildland (such as a forest, range, or woodland) intersects with a developed area, such as a residential community; also known as the WUI. As urbanization continues and expands into wildlands, the WUI grows, often translating into an increased risk of severe wildfires, as human lives and structures become involved.

windthrow—the uprooting of trees and other vegetation by wind.

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Project Manager	Sherri Richardson Dodge
Writer	Yasmeen Sands
Design and Layout	Yasmeen Sands

www.fs.fed.us/pnw

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