



GOAL 4: Communicate science findings and enhance their application



KEY FINDINGS

-  *New framework used to guide monitoring associated with the Northwest Forest Plan and report related science findings in an annual interagency report.*
-  *Station scientists provide information and modeling tools that assist Pacific Northwest Region forest plan revisions.*
-  *Station scientists complete six scientific reviews for the Tongass Forest Plan Amendment.*
-  *An informed public is more likely to accept fire and fuel management strategies, and interactive learning is an effective format for communicating information.*
-  *Clients want to know more about markets for ecosystem services and identify the need to clarify role of federal agencies.*
-  *New science delivery strategy puts fire science information in the hands of users, and further informational needs are identified.*
-  *First reference book about silviculture and ecology of western forests examines management within an ecosystem context.*

Left: Alder stand in southeast Alaska. Photo by Tom Iraci.

Above: Ecologists discuss research findings at Mount St. Helens. Photo by Charlie Crisafulli.

Framework is developed to guide monitoring and report science findings

The Regional Interagency Executive Committee (RIEC) identified adaptive management as a priority following the Northwest Forest Plan conference in 2005. To facilitate adaptive management, the RIEC developed a framework consisting of 16 priority questions to guide regional monitoring and collaborative research investments over the next 10 years. The Station compiled key findings for all the research agencies involved in the Northwest Forest Plan for the first annual report using this new framework.

The RIEC will review the adaptive management strategy annually to determine if changes in management policies, standards and guides, or priority questions are warranted. Forest Service and Bureau of Land Management managers will use the annual report findings to better implement adaptive management and regional monitoring efforts across the region.

Contact: Becky Gravenmier, bgravenmier@fs.fed.us, Station Director's Office

Partners: USDA Forest Service Pacific Northwest Region



Tom Iraci

Homer Demonstration Forest, Alaska.

Station continues its science support in regional planning efforts

The Station participates in Forest Service land-use planning efforts and provides science support by developing new products, synthesizing findings, and providing consultations and scientific reviews. Scientists helped develop regional sustainability models for aquatic species that will be used in forest plan revisions in the Pacific Northwest Region of the Forest Service. These models and other tools will be useful to other regions as they revise their forest plans. Station scientists also consulted with managers about recent postfire forest management research findings and management implications for the Pacific Northwest and Pacific Southwest Regions and the Bureau of Land Management (BLM) in Oregon. Key science findings were provided to the regions, and a summary of recent and forthcoming publications was placed on the Station Web site for easy access by forest and BLM units.

Contact: Becky Gravenmier, bgravenmier@fs.fed.us, Station Director's Office

Partners: USDA Forest Service, Pacific Northwest and Pacific Southwest Regions

Station provides scientific reviews for Alaska Region of Forest Service

The Station provides science support to the Tongass Forest Plan Amendment process. This year, scientists completed six scientific reviews of key components of the forest plan including the conservation strategy, timber demand, climate change, young-growth management, vegetation models, and ecosystem services. These reviews help ensure that the best available science is used in the plan revision process.

Contact: Becky Gravenmier, bgravenmier@fs.fed.us, Station Director's Office

Partners: USDA Forest Service, Alaska Region



Roger Ottmar

Participants at a Station-led fuels workshop in Ohio learn how to classify forest fuels.

People respond positively to interactive communication about fire and fuel management

Public acceptance is key to the success of many fire and fuel management strategies, and acceptance is more likely to evolve from an informed public. Scientists conducted several studies on communication strategies for fire and fuel management programs. They found that outreach programs that engaged citizens as active participants rather than passive recipients were most effective. This finding is consistent with theories on adult learning. A second study found that fire agencies need to further develop their capacity to respond to the public's concerns. The third study found that direct, frequent interactions between scientists and managers are an effective way to communicate findings, observations, and questions, but that few opportunities for this type of dialog exist.

These findings suggest that interactive methods are better able to incorporate the participants' experiences with real-world problems. These experiences include attachment to special places, perceptions of uncertainty and risk, and community concerns. A workshop is being planned to share these findings with managers

and to jointly develop processes that will reduce communication barriers between scientists and managers.

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Partners: Oregon State University, (jointly funded with Joint Fire Science Program, National Fire Plan, and USDA Forest Service Northern Research Station), University of Washington

Clients share thoughts about markets for ecosystem services

"Ecosystem services" are the benefits people obtain from ecosystems, such as food and forest products, as well as an array of traditionally nonmarketable services provided by nature, such as clean air, clean water, and carbon storage. When forest or agricultural land is converted to more developed uses, many of these services are lost or significantly reduced. As the U.S. population increases, so will demand for these ecosystem services, while the availability of land and natural systems that produce these services will likely be diminished. This realization has created interest in finding incentives to encourage private landowners to include production of ecosystem services in their resource management plans.

At a workshop in January 2007, forest industry, public agencies, conservation groups, and family-forest owners discussed concerns, barriers, regulations, and incentives related to market-based valuation systems for ecosystem services. This was followed by focused client meetings where clients identified key research needs. Several common themes were expressed: (1) clients believe well-structured regulations are crucial to the success of developing ecosystem service markets, (2) clients are insecure about market uncertainties, (3) clients would be better served if the efforts of multiple agencies were integrated across broad geographic areas, and (4) clients are very interested in carbon markets. Discussions also included the appropriate role of federal land management agencies in providing ecosystem services and their assistance to develop markets for these services.

Contact: Robert Deal, rdeal@fs.fed.us, Focused Science Delivery Program

Online watershed seminars offer new format for scientists to share expertise

This new seminar series on watershed sciences allows hydrologists, biologists, ecologists, and others in the watershed-fisheries community of practice to efficiently share key information throughout the year. Topics for 2007 included the effects of forest management on water yield and quality in three experimental forests, modeling biological responses to physical stream changes, and a synthesis of emerging research on the effects of fire and fuel management on fish. Each seminar had about 50 participants. By participating in interactive seminars online, participants avoid the travel costs associated with traditional conferences and symposia, and less travel means fewer carbon emissions. The seminars have been



Charlie Crisafulli

Scientists gather to discuss recent findings in ecological research at Mount St. Helens.

converted to portable electronic presentations for on-demand viewing. More seminars are planned for 2008.

Contact: Michael Furniss, mfurniss@fs.fed.us, Communications and Applications Program

Partners: USDA Forest Service National Forest System and State and Private Forestry

More information: Visit <http://stream.fs.fed.us/wss/>

Fire science information is now more accessible



Over the past decade, the federal Joint Fire Science Program has generated a substantial volume of new knowledge, methods, and tools related to fire and fuel management. Until recently, however, there was no organized system for introducing and delivering these products to managers, regulators, decisionmakers, and policymakers. To address this need, scientists developed a science delivery strategy and implementation plan designed to move away from the current ad hoc method of science delivery and application to a more systematic process. A range of written products designed to meet the communication needs of various audiences is now available on the Joint Fire Science Web site: <http://www.fire-science.gov/>.

Contact: Jamie Barbour, jbarbour01@fs.fed.us, Focused Science Delivery Program

Partners: Joint Fire Science Program



Graphic images created from forest inventory data are increasingly used to depict different forest types.

NEW TOOL

A Consumer Guide to Vegetation and Fuels Management Tools

Function: This publication provides a state-of-science summary of tools currently available for management of vegetation and fuels. Detailed summaries include a description of each tool, where it can be obtained, relevant spatial scale, level of user knowledge required, data requirements, model outputs, application in fuel treatments, linkage to other tools, and availability of training and support. Streamlined summaries in tabular format allow users to rapidly identify those tools that could potentially be applied to a specific management need. In addition, an interdisciplinary team process is described that facilitates application of tools and decisionmaking at different spatial scales.

Outcomes: This guide is currently being used by the Joint Fire Science Program and Carnegie-Mellon University as the basis for a national review of fire modeling tools produced by federal agencies. It is also being used by the U.S. Geological Survey as a source document for information on fire models within their fire research program.

How to Get It: General Technical Report PNW-GTR-690. A Consumer Guide to Vegetation and Fuels Management Tools. Available at http://www.fs.fed.us/pnw/pubs/pnw_gtr690.pdf or contact David L. Peterson, peterson@fs.fed.us, Managing Disturbance Regimes Program

Improved computer-generated images of forested landscapes facilitate better communication

Computer-generated images that illustrate different conditions in forest stands facilitate discussion about prospective management treatments. These images are based on forest inventory data and are used to convey information such as forest age, density, stand size, vertical layering, and fire hazard. Before this study, little research had been done to determine the accuracy of interpretations of forest attributes from computer-generated images. Based on the response of 183 forestry professionals in California, Oregon, and Washington, several factors were identified, that when altered, affected observer perception of forest conditions based on the image. For example, including



more visual information, such as groundcover, changed the observer's perception of tree size, age, and stand density.

A new nationally consistent forest inventory system has been implemented for 43 states, providing a wealth of inventory measurements that can be used to create images of the diverse forest types found across the United States. Improved computer-generated images provide scientists and managers with another way to communicate and involve the public in forest planning discussions.

Contact: Tara M. Barrett, tbarrett@fs.fed.us, Forest Inventory and Analysis Program

Partner: University of Montana

Proceedings highlights insights on the transfer of forest science knowledge and technology

An ongoing challenge for forest science organizations around the world is disseminating information and innovations in ways that facilitate their implementation. A conference in 2005, sponsored in part by the Station and the International Union of Forest Research Organizations, addressed this topic. The proceedings resulting from the conference includes papers by people who work in extension services, natural resource specialists, scientists, and technology transfer specialists. A major theme is the concept of technology transfer as a two-way channel between researchers and users. The collection of papers examines knowledge and technology transfer theories, methods, and case studies that cover digital media, engagement of users and communication specialists in the full cycle of research, integrated forestry applications, Internet-based systems, science writing,



Sara Jovan

Cup lichen (Cladonia sp.)

training, video conferencing, and Web-based encyclopedias.

Contact: Cynthia Miner, clminer@fs.fed.us, Communications and Application Program

More information: General Technical Report PNW-GTR-726. Proceedings: International Conference on Transfer of Forest Science Knowledge and Technology. http://www.fs.fed.us/pnw/pubs/pnw_gtr726.pdf

Scientists characterize east-side old-growth forests

When land management agencies are charged with managing for and maintaining "old-growth forest conditions," it helps to have an agreed-upon definition of the term. The Washington Department of Natural Resources (DNR) is required by the state legislature to do just that, so Station scientists and staff from state agencies are developing definitions of old-growth forest for several forest environments east of the Cascade Crest ranging from very dry to cool and moist. The development of these definitions is part of a larger examination of how

DNR manages forested lands to meet legislative requirements.

Contact: Miles Hemstrom, mhemstrom@fs.fed.us, Focused Science Delivery Program

Partners: University of Washington, Washington Department of Fish and Wildlife, Washington Department of Natural Resources

Station expertise helps combat illegal logging worldwide

Illegal logging threatens sustainable forest management around the world. One method for thwarting this activity is to establish a chain of custody that tracks logs and wood products from the forests where they are harvested through their final sale to the consumer. The Forest Service's International Programs Office

Left: Hikers at Breitenbush Hot Springs, Oregon.
Photo by Tom Iraci.

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Robert Szaro

Tillamook State Forest, Oregon.

asked a Station scientist, recognized as a world authority on the subject, to develop training materials on log tracking systems to assist officials in Russia and Columbia combat illegal logging. The scientist was also invited to Jakarta, Indonesia, to help plan a training program for implementing that country's new legal standard for harvested timber.

Contact: Dennis Dykstra, ddykstra@fs.fed.us, Human and Natural Resources Interactions Program

Partners: USDA Forest Service International Forestry; Food and Agricultural Organization, Center for International Forestry Research

► **Outcome:** Officials in Russia, Columbia, and Indonesia receive training to establish log tracking systems.

New book provides international perspective on sustainable forestry management

Sustainable Forestry Management and Wood Production in a Global Economy, published by Haworth Press, is a compilation of international studies and strategies for sustainable forest management in a global economy. A Station scientist edited the volume and several others contributed chapters. Topics included the influence of forest products markets on sustainable forestry in the United States, the development of conservation reserves and changes in forest policy in Australia, the challenges associated with even-aged

plantations of conifer species in Scotland, illegal logging and the economic challenges of forest management in Central America, and similarities and differences in sustainable forest management criteria and indicators and their role for sustainable forestry in the Pacific Rim region. Forest researchers and practitioners around the world seeking to manage forests on a continual basis will find this book useful.

Contact: Robert Deal, rdeal@fs.fed.us, Focused Science Delivery Program

New reference book examines forest management within an ecosystem context

Modern silviculture is more than just a collection of methods for cultivating forests. Through carefully designed prescriptions, today's foresters use silviculture to implement specific management objectives, such as improving forest health, reducing wildfire hazard, and creating wildlife habitat.

A team of scientists from the Station and Oregon State University have written the first comprehensive reference book on



Station scientists write first comprehensive textbook on silviculture and ecology of Western U.S. forests.

silviculture for the Western United States. Using an ecosystem framework as a basis for silviculture, the book includes chapters on ecology of shrubs and hardwoods, methods for regenerating forests, measurement of stand density, and use of controlled fire. The book synthesizes 40 years of forestry research and cites over 900 references as well as the authors'

John Laurence



Ecologists visit a bog near Juneau, Alaska, to collaborate on development of regional ecosystem models.

research and management experiences. Written with forest practitioners, policymakers, and students in mind, the book provides a practical understanding of the science and application of silviculture.

The book serves as a primary reference for land managers, scientists, and students interested in using silvicultural treatments to improve forest health, produce forest products, manage wildlife habitat, and accomplish other forestry objectives. Already, the book is being used as part of silviculture courses at Oregon State University and the University of California, Berkeley.

Contact: Timothy B. Harrington, tharrington@fs.fed.us, Resource Management and Productivity Program

Partner: Oregon State University

More information: Tappeiner, J.C., II; Maguire, D.A.; Harrington, T.B. 2007. *Silviculture and ecology of Western U.S. forests*. Corvallis, OR: Oregon State University Press.

Comprehensive synthesis chronicles silvicultural research and management in the Douglas-fir region

Over the last century, silvicultural practices in the Douglas-fir region evolved through a combination of formal research, observation, practical experience, and changing economic and social factors. These practices have had a great influence not only on the present characteristics of the Pacific Northwest's forests, but the economic well-being of the region. This long history is unknown to most of the public, and much of it is unfamiliar even to many natural resource specialists.

In a new publication, Station scientists trace the history of silvicultural research's contributions to the evolution of forest practices. Special attention is given to the large body of information developed in the first half of the 20th century that is becoming increasingly unfamiliar to both operational foresters and—perhaps, more importantly—to those engaged in forestry research. Current trends in silviculture and silviculture-related research also are emphasized.



This publication provides forest researchers and managers with access to results from older silviculture research that are difficult to find. Many of these studies have relevance to newer silviculture regimes being proposed and implemented to address multiple resource objectives.

Contact: Robert O. Curtis, rcurtis@fs.fed.us, PNW emeritus scientist, Resource Management and Productivity Program

More information: PNW-GTR-696. Silvicultural research and the evolution of forest practices in the Douglas-fir region. http://www.fs.fed.us/pnw/publications/pnw_gtr696/



Starkey Experimental Forest and Range.

PNW's experimental forests and ranges embody rich history of work valuable to science, management

The Pacific Northwest's 11 experimental forests and ranges are part of a national network of long-term research sites whose rich legacies are today helping to address contemporary natural resource issues.

Studies of the histories of two leading experimental forests in the Pacific Northwest reveal a wealth of contributions toward the understanding of the natural resource systems and the

importance of strong working relations among Station scientists, land managers, and university partners. Historical accounts document and interpret the histories of the Wind River Experimental Forest and the H.J. Andrews Experimental Forest, based on archival and oral history research methods. These histories reveal the importance of management systems that balance a strong commitment to long-term studies with attention to the issues of the day.

These historical accounts provide information on how successful management of research facilities can lead to important advances in ecosystem science and natural resource management.

Contact: Sarah Greene, sgreene@fs.fed.us, Ecosystem Processes Program

Partners: Oregon State University, Western Oregon University

More information:

Herring, M.; Greene, S. 2007. *Forest of time: a century of science at Wind River Experimental Forest*. Oregon State University Press. 188 p.

PNW-GTR-687. *Necessary work: discovering old forests, new outlooks, and community on the H.J. Andrews Experimental Forest, 1948–2000*. <http://www.fs.fed.us/pnw/publications/gtr687/>.

Second edition of *Alaska Trees and Shrubs* is published

New techniques and procedures have been developed for plant taxonomy in the 25 years since the first edition of *Alaska Trees and Shrubs* was published. Several Alaska shrubs have been renamed, and others are now categorized in new or different genera. Additionally, the geographic range of Alaska vegetation is better known, and gaps in range maps have been filled, especially in western and southwestern Alaska and the Wrangell-St. Elias region. This updated information is included in the second edition of this reference book published by Snowy Owl Books and is now available for scientific, academic, and general public use.

Contact: Willem van Hees, vanhees@fs.fed.us, Forest Inventory and Analysis Program

Partners: USDA Forest Service State and Private Forestry, Alaska Region, and Bonanza Creek Long-Term Ecological Research Program; USDI National Park Service

Left: Old-growth trees, Olympic National Forest, Washington. Photo by Tom Iraci.

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PNW scientists contribute to special issue of *Forest Science* and help reveal value of headwater streams to downstream resources and watershed condition

In the past, headwater streams—those closest to the water's source—have received considerably less attention than larger fish-bearing streams. Recent research, however, has highlighted the importance of headwater streams to downstream aquatic resources and overall watershed condition.

Station scientists are playing a major role in developing original research and research syntheses that address several high-priority research needs and information gaps surrounding headwater streams. Studies have focused on the basic ecology, biology, and physical attributes of riparian systems and processes as well as the influences of management practices and policy on the provision of riparian services from headwater streams.

This body of work has been captured in a recent special issue of *Forest Science* that focuses on the science and management of forest headwater streams. Of 21 papers included in the issue of this peer-reviewed journal, at least 12 have direct connections to the Station—through authorship by Station scientists or collaborators receiving Station funding.

This volume will be useful to managers and policymakers responsible for developing management practices and riparian reserve

guidelines and to the development of watershed assessments and restoration or conservation plans.

Contact: Paul D. Anderson, pdanderson@fs.fed.us, Resource Management and Productivity Program

Partners: National Council for Air and Stream Improvement, Oregon Headwaters Research Cooperative, USDI Bureau of Land Management, Weyerhaeuser Company

More information: Science and management of forest headwater streams (Special issue). *Forest Science*. 53(2): April 2007.

Second edition of media guide published

This year, the Station published the second edition of its media guide, *Sources and Science: A Guide to Experts at the Pacific Northwest Research Station*. The publication was updated to feature profiles of 62 Station

scientists and is designed to help journalists and others identify expert sources and learn more about the work the Station conducts. Other highlights of the revised edition include a glossary, which defines common forestry and natural resource terms, and an expanded subject index.



Contact: Sherri Richardson Dodge, srichardsondodge@fs.fed.us, Communications and Applications Program

More information: *Sources and science: a guide to experts at the Pacific Northwest Research Station*. <http://www.fs.fed.us/pnw/pubs/sources-science07.pdf>

Conference lays groundwork for establishment of Pacific Northwest Invasive Plant Council

Invasive plant species threaten many of the Pacific Northwest's terrestrial and aquatic ecosystems by outcompeting native species, degrading wildlife habitat, and altering basic



British felt lichen (Peltigera britannica).

ecosystem functions. To address these concerns and set the groundwork for collaboration, Station scientists hosted a conference in Seattle titled "Meeting the Challenge: Invasive Plants in Pacific Northwest Ecosystems." Nearly 60 papers and posters were presented during the 2-day event, which attracted 180 professionals from public and private organizations responsible for monitoring, studying, or managing invasive plants.

In addition to exploring the latest developments in invasive plant research and fostering dialog, the conference also stimulated a scoping process that is currently underway to establish a Pacific Northwest Invasive Plant Council. Similar organizations in other regions of the country have been extremely effective at coordinating early detection and rapid response efforts, as well as educating land managers on prevention and control tactics for invasive plants.

Contact: Timothy B. Harrington, tharrington@fs.fed.us, Resource Management and Productivity Program

Partners: Montana State University, The Nature Conservancy, University of Washington

More information: PNW-GTR-694. Meeting the challenge: invasive plants in Pacific Northwest ecosystems. http://www.fs.fed.us/pnw/pubs/pnw_gtr694.pdf

Scientists provide international leadership on value of long-term studies in a sustainable world

Station scientists have worked closely with the International Union of Forest Research Organizations (IUFRO) in holding three major symposia.

These symposia, held in Europe; Portland, Oregon; and Australia, demonstrated the value and relevance of long-term studies and included information generated from large-scale experiments that address joint production



Lisa Scott

*Although beautiful to the untrained eye, invasive species such as this orange hawkweed (*Hieracium aurantiacum* L.) threaten many of the Pacific Northwest's terrestrial and aquatic ecosystems by outcompeting native species.*

of wood and ecological and social values. Collectively, many of the variable-retention harvest and thinning options presented at the symposia are gaining wider use on federal lands in Alaska, the Western United States, and on crown lands in British Columbia.

Contact: Charley Peterson, cepeterson@fs.fed.us, Resource Management and Productivity Program

Partners: International Union of Forest Research Organizations; British Columbia Ministry of Forestry; Canadian Forest Service; Oregon State University; USDA Forest Service Alaska and Pacific Northwest Regions, Gifford Pinchot and Umpqua National Forests; University of Washington; U.S. Department of Defense; USDI Bureau of Land Management; Washington State Department of Natural Resources

Western Journal of Applied Forestry special issue highlights findings from Sustainable Wood Production Initiative

Key research findings from the Sustainable Wood Production Initiative (SWPI) focused on several important topics for sustaining wood production in the Pacific Northwest region, including sustainable timber supply and markets, sustainable land use, and sustainable forestry options. The research was conducted

W E B P A G E

Large-scale silvicultural experiments in western Oregon and Washington

Description: This Web page describes 12 large-scale silvicultural experiments in western Oregon and Washington. Because these experiments are being conducted at the scale of actual forestry treatments, rather than on smaller experimental plots, the inferences drawn from these experiments can be translated directly to management options.

Function: The Web page enhances communication and information exchange among scientists, cooperators, and other stakeholders interested in large-scale, operational silviculture studies in the Pacific Northwest.

How to get it: Visit <http://www.fs.fed.us/pnw/research/lse/>

in response to the needs of an array of forest landowners who were solicited during the SWPI for their input. Selected findings include (1) market-based harvest projections of private lands suggest that harvests in western Oregon could be sustained at or above recent levels over the period through 2054; (2) urban and developed area is projected to roughly double over the next 30 years, putting pressure on land values; (3) in some cases, riparian harvest restrictions could preclude the thinning of overstocked stands, which, if completed, would enhance riparian fish habitat; and (4) the ecological benefit of forest certification, measured in terms of acres of old-forest structure, is minimal. These studies were written up as a special issue of the *Western Journal of Applied Forestry*.

Contact: Robert Deal, rdeal@fs.fed.us, Focused Science Delivery Program

More information: See *Western Journal of Applied Forestry*, Vol. 22.



Michael Wisdom

Singleleaf pinyon pine and mountain big sagebrush.

PNW Media Highlights

Attracting the most media attention in 2007 was a study that explored the effects of postfire forest management on future fire severity. Led by Station scientist Thomas Spies and published in *Proceedings of the National Academy of Science*, a highly regarded interdisciplinary journal, the study examined forested sites that burned most recently by the massive Biscuit Fire in 2002. The story was run by many print and radio outlets, including *The New York Times*, *Christian Science Monitor*, *Seattle Post-Intelligencer*, and Oregon Public Broadcasting. Outlets in Austria, the United Kingdom, and Australia also covered the story.

Also receiving attention was the capture and radio-collaring of a wolverine in north-central Washington by Station biologists Keith Aubry and Cathy Raley and their colleagues. The wolverine was the third to be captured as part of a study that began in 2006—the first to track the elusive species in the region. The *Wenatchee World* and *Methow Valley News* ran stories.

In response to a pending sawmill closure, reporters sought the expertise of Station economist Richard Haynes. Haynes was quoted about the health of Oregon's timber industry in stories that ran in *The Oregonian* and on the news sites of several regional television stations, including NBC affiliate KGW and CBS affiliate KOIN.

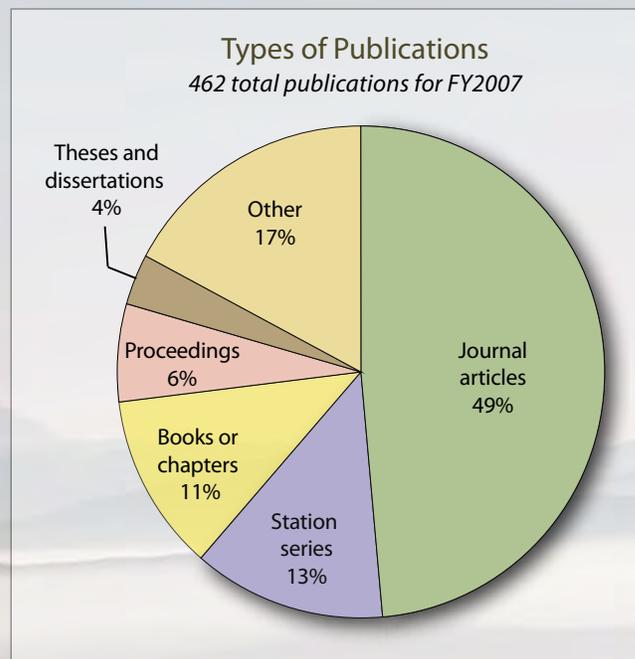
Bioclimatologist Ron Neilson was quoted in stories about a study that found a possible link between ocean temperatures and wildfires. Articles ran in several outlets, including *The Seattle Times*, *Seattle Post-Intelligencer*, and Discovery Channel News.

A study on the effects of recreation on elk and deer also received media attention. The *Casper Star-Tribune* (Wyoming) and *Billings Gazette* (Montana) were among the outlets that ran stories quoting Michael Wisdom, a wildlife biologist and the study's lead investigator.

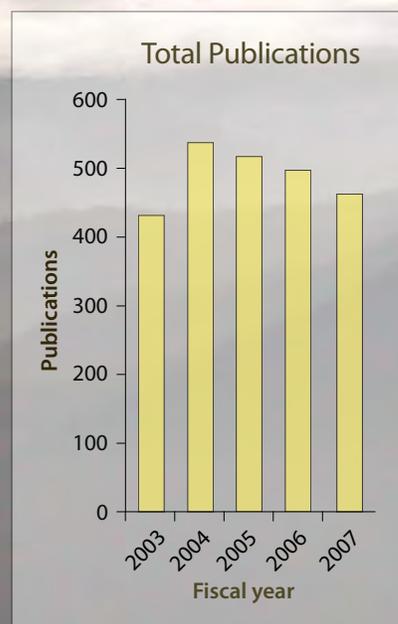
Contact: Sherri Richardson Dodge, srichardsondodge@fs.fed.us, Communications and Applications Program

Types of Publications

Journal articles	225
Station Series	59
Books	53
Proceedings	30
Theses	16
Other	79



- 462 total publications. (Includes Station series publications, journal articles, proceedings, books or book chapters, theses and dissertations, and other publications.)
- 316,955 hardcopies of Station series publications distributed.
- 1,664 Station publications available online (via Station's Web site and Treearch, <http://www.treearch.fs.fed.us>).
- More than 19,000 journal article reprints distributed by scientists in response to requests.
- 10 issues of *PNW Science Findings* published; about 9,800 copies distributed each issue.
- 2 issues of *PNW Science Update* published; about 9,800 distributed each issue.
- 26 multimedia presentations produced.



Publications

Symposia, Workshops, and Tours

- 1,466 people participated in symposia and workshops
- 1,105 people went on field tours
- 4,460 people participated in conservation education activities

The PNW Research Station sponsors scientific and technical events each year, many with the help of partners, including universities, state and federal agencies, and nongovernmental organizations. Below is a description of some of these events.

BlueSky Stakeholders' Meeting. Twenty-seven researchers and users attended the annual meeting in Winthrop, Washington, to discuss new and future developments for the BlueSky smoke modeling framework.

Capitol Forest Research Tour. Scientists from the Silviculture and Forest Models Team met with managers and resource specialists from the Washington Department of Natural Resources to discuss results of the Silvicultural Options Study. Topics included methods for establishing understory conifers in mature forests and silvicultural systems for regenerating forests given different management constraints. Twenty-one people participated in this tour.

Colville Forest Measurement and Monitoring with LIDAR Workshop. At the request of the Colville National Forest and the Northeast Washington Forestry Coalition, PNW scientists presented results from LIDAR forest measurement research in a half-day workshop in Colville, Washington, for 40 attendees. Following the presentations, scientists demonstrated the PNW LIDAR Fusion software system to local, state, and federal resource specialists and managers.



Learning Events

Roger Ottmar



At workshops in California, Idaho, New Mexico, and Ohio, scientists from the PNW Managing Disturbance Regimes Program led participants through a series of exercises on the use of the Fuel Characteristics Classification System.

Dry Forest II. At this workshop in Wenatchee, Washington, 207 participants shared knowledge and experience gained through managing dry forests since the 2001 Dry Forest I workshop. They also discussed ways to translate this knowledge into treatment options so it can be included in management strategies.

Forest Growth and Timber Quality: Crown Models and Simulation Methods for Sustainable Forest Management. This 4-day conference in Portland, Oregon, focused on the relationship between forest management activities and timber quality. Special sessions focused on mechanistic crown modeling and on hybrid models within the context of wood quality and sustainable forest management. Seventy-five scientists from 20 countries participated.

Forest Inventory and Analysis (FIA) Client Meeting. At this annual meeting in Olympia, Washington, FIA updated 30 clients from Washington, Oregon, and California on its activities over the past year and shared research findings. Clients also presented results from their research based on FIA inventory data.

Fuel Treatment Planning and Wildfire Risk Assessment Workshops. This training on ArcFuels and other tools for fuel treatment planning and wildfire risk assessment was offered to fuel planning and management specialists at several workshops throughout the West. Participants included employees with Forest Service, Bureau of Land Management, Bureau of Indian Affairs, and The Nature Conservancy. There were about

45 attendees at the Region 5 workshop in Reno, Nevada, a combined 65 attendees at the two central Oregon workshops, 20 attendees at the Umatilla National Forest workshop, and 25 at the Klamath National Forest workshop.

GIS Day 2006. About 50 adults attended a seminar and poster session at Oregon State University about uses of GIS technology. GIS Day is a global event with the goal of educating millions of children and adults about how geography makes a difference in our lives.

GMWest Workshop. About 15 attendees from various state and federal agencies attended a workshop titled "A Risk Assessment System for Gypsy Moth" in Portland, Oregon.

Hardwood Silviculture Cooperative Annual Meeting. As part of the annual Hardwood Silviculture Cooperative Meeting in Olympia, Washington, PNW scientists conducted a tour of its oak research sites in the Olympia area for 15 private, state, and federal scientists and managers.

H.J. Andrews Experimental Forest. About 950 scientists, natural resource managers, public, students (K-16), and teachers participated in tours of the H.J. Andrews Experimental Forest. Participants were from around the world. Five writers spent a week at H.J. Andrews Experimental Forest, and 15 environmental philosophers spent a long weekend reflecting on their roles in shaping public thinking about the natural world.

Integrating Science and Experience in Silviculture Prescriptions. About 70 participants from federal agencies, nongovernmental organizations, and universities met in Vancouver, Washington, to present and discuss state-of-the-art silviculture projects. Practitioners and researchers established communication networks and identified limitations in existing knowledge and tools.

Leafy Spurge Insect Biocontrol Collection Days. About 40 participants met at the Shake Creek Guard Station on the Sawtooth National Forest for 3 days to collect two species of insects that are being used to control leafy spurge, an invasive weed.

Managing for Wildlife Habitat in West-Side Production Forests. About 150 participants attended this workshop in Vancouver, Washington. The workshop included a panel of 11 speakers from research, management, or policy backgrounds who shared prescriptions and guidelines for managing wildlife habitat in forests cultivated primarily for wood production. A proceedings publication from the workshop (PNW-GTR-695, http://www.fs.fed.us/pnw/pubs/pnw_gtr695.pdf) summarizes each presentation and provides a synthesis of methods for integrating habitat management into existing silvicultural systems.

MIREN II. At this second workshop for the Mountain Invasion Research Network, 17 participants, including 10 international scientists, convened at the La Grande Forestry and Range Sciences Laboratory to discuss the research

direction for the coming year. Participants also toured sites in the Wallowa Mountains to view ongoing plant invasions and to discuss invasive plant survey and monitoring techniques.

NEPA for the 21st Century study review workshop. At this workshop in Stevenson, Washington, principal investigators shared their preliminary findings on how the Forest Service conducts NEPA activities with 25 NEPA practitioners and decisionmakers. Participants provided feedback on these findings and contributed to a discussion about potential changes in the NEPA process.

Modeling Fire Behavior and Landscape Planning Workshop. About 30 employees with the U.S. Geological Survey attended this workshop in Denver, Colorado.

Oregon Remote Sensing Workshop and Training Session. The Oregon Remote Sensing Workshop, held at Oregon State University, introduced 125 people from local, state, regional, and tribal agencies to ways remote sensing imagery can be used and methods for sharing access to acquired imagery. About 30 people participated in a related training.

Portland Forest Measurement and Monitoring with LIDAR Workshop. At the request of the BLM, PNW scientists presented results from LIDAR forest measurement research in a half-day workshop in Portland, Oregon, for 45 attendees. Following the presentations, scientists demonstrated the PNW LIDAR Fusion software system to local, state, and federal resource specialists and managers.

Regional Fuel Workshops. Twenty-two participants in Moscow, Idaho, 20 in Portsmouth, Ohio, 15 in San Luis Obispo, California, and 15 in Albuquerque, New Mexico, partook in a 3-day course on how to use and train others to use the Fuel Characteristics Classification System (FCCS), Consume 2.0, the Natural Fuels Photo Series, and the Digital Photo Series. Scientists from the PNW Managing Disturbance Regimes Program led participants through a series of classroom and field exercises.

Starkey Experimental Forest and Range Tours. During six 1-day tours, 134 people learned about ongoing and past research activities and management of the experimental forest.



Roger Ottmar

A participant at the Southwest Regional Fuels Workshop practices her skills in the field.



John Laurence

Wrangell 2020. Envisioning Our Future. This 2-day workshop in Wrangell, Alaska, focused on cultivating community identity and identifying strengths and opportunities, as well as building capacity for achieving short- and long-term goals. The event included a visioning workshop attended by 30 local residents and a cultural exchange with 35 elementary students (coordinated with the Alaska Native Sisterhood). As part of the workshop, several local organizations and agencies developed vision statements.

Western Forest Climate Change Task Force Workshop. This workshop in Vancouver, Washington, brought together 16 researchers and managers from Oregon, Washington, and British Columbia to learn about climate change impacts on forest ecosystems and discuss the development of a multidisciplinary task force of forest managers, forest geneticists, tree breeders, silviculturists, and tree physiologists to evaluate potential genetic and silvicultural options for mitigating effects of climate change.

Western Stations Bark Beetle Workshop. At this inaugural workshop in Stevenson, Washington, participants developed regional priorities for bark beetle research, identified protocols and processes for inter-station research communication and collaboration, and established links with State and Private Forestry Forest Health Protection. About 15 scientists from the Pacific Northwest, Pacific Southwest, and Rocky Mountain Research Stations were joined by 12 partners from Forest Health Protection.

Westwide Workshop on Forests, Insects, Pathogens, and Climate Change. About 35 attendees gathered in Portland, Oregon, to discuss current tools used to assess and quantify climate change, insects and pathogens, and synergistic effects on natural resources and ecosystem services at scales relevant for forest management and planning.

Wildfire Risk Modeling Workshop. About 120 members of the Army National Guard attended this workshop as part of the National Environmental Coordinators Training in San Diego, California.

Conservation Education

Conservation education introduces children and adults to the natural world. By teaching classes and leading field trips, PNW Station scientists are sharing forest science with broader audiences.

Aquatic Ecology Monitoring Program.

With the help of a Station scientist, students from Battle Ground High School, Washington, developed a multiyear field program. Students learned how to design and implement aquatic scientific studies through hands-on activities. About 120 high school students participated in this program each week over a 6-month period.

Aquatic Entomology Taxonomic Class. A Station scientist spoke about her profession and background to 16 undergraduate science students at Evergreen State College, Washington. Students also learned to identify aquatic insects.

Conservation Education Poster Distribution.

The Station distributed about 2,000 posters related to Mount St. Helens, invasive species, fish, oak communities, and old-growth forests. Most of these posters are requested by teachers in the Pacific Northwest, but many posters also have been sent to teachers throughout the United States and overseas. Posters can be requested online at <http://www.fs.fed.us/pnw/kids/index.shtml>.

Corvallis Outdoor School. About 250 middle school students in Benton County, Oregon, learned about botany, pollination, the natural history of streams and riparian areas, soils, wildlife, and forestry. Station scientists helped develop the curriculum and served as instructors in both field and classroom sessions.

Dry Ice—Discovering CO₂. Seventy third-graders from the Liberty Elementary School District in Albany, Oregon, learned about carbon dioxide gas and its many uses.

Forest Camp. This outdoor learning event in Lebanon, Oregon, taught 250 sixth-graders about the web of life, a concept illustrating the links among biotic and abiotic elements of forest ecosystems. This camp also featured an added segment on the important role fungi play in forest ecosystems. Several Station scientists participated in the camp, which was hosted by the Siuslaw National Forest.

Forest Camp—Project Learning Tree. Fifth- and sixth-graders near Sweet Home, Oregon, also learned about forest ecology using the web of life curriculum. Several Station scientists each contributed 1 day of instruction for about 120 students.

GIS Day. About 450 sixth-grade students from Corvallis and Portland, Oregon, participated in this event at Oregon State University. Students saw demonstrations of geographic information systems (GIS) applications, participated in a global positioning systems hike around campus, and learned about using GIS technology for climate mapping.

Hands-On Experience With Science Series.

A Station forester made 12 visits to Lincoln Elementary School in Olympia, Washington, to speak with 25 second- and third-graders about a variety of natural resource topics, including radio tracking, measuring trees, weather stations, plant reproduction, and graphing ecological data.



Michelle Kinzel

Learning to use a compass at GIS Day in Corvallis, Oregon.

H.J. Andrews Experimental Forest Used by Students and Faculty. Classes from 10 universities and colleges used the Andrews facilities and forests in 2007 (University of Oregon, Willamette University, Evergreen State College, Lane Community College, University of Wisconsin-Platteville, Portland State University, Lewis & Clark College, Washington State-Vancouver, and Western Oregon University). The forest also hosted a professional development workshop on fire ecology for 20 community college faculty from around the United States.

Inner City Youth Institute. The Station continued its support of the Inner City Youth Institute (ICYI). The ICYI sponsors ecology clubs in inner city middle schools and high schools and a summer camp in Corvallis, Oregon, as away to encourage students to pursue higher education and careers in the natural resource and environmental fields. The ICYI is a collaborative effort between the Forest Service, Bureau of Land Management, Oregon State University, and Portland Public Schools. About 200 students participated in ICYI programs.

Kids in the Creek. About 150 biology students from Wenatchee High School, Washington, participated in hands-on watershed monitoring at a site in the Wenatchee River subbasin.

Launch Your Future: A Math and Science Career Fair. Station scientists spoke to 200 middle school students about math and science careers with the Forest Service at an event hosted by Intel in DuPont, Washington.

Northwest Science Expo. The Station sponsored the "Outstanding Forest Science" award that is given to a high school student and a middle school student at the Northwest Science Expo. This science fair for young scientists, engineers, and mathematicians was held at Portland State University, and Station scientists served as judges.

Oregon State University Extension Outdoor School. About 150 middle school students in Astoria, Oregon, attended classroom sessions on the ecology of riparian zones.

Petri Dish Experiment. By participating in an activity called "Growing fungi and bacteria from the dirt on our hands," 70 third-graders from Liberty Elementary School District in Albany, Oregon, learned about the scientific method. The children rubbed dirty hands on an agar petri plate and then clean hands on another to see what sort of fungus and bacteria would grow.

Salmon Steward Program. Over 2,000 people participated in interpretive field trips to various salmon spawning locations near Olympia, Washington. A Station scientist was on hand to explain the salmon life history to the general public.

Salmon Watch. About 200 grade and middle school students in Corvallis, Oregon, visited streams with spawning salmon to learn about stream and fish ecology.

South Sound Farm Forestry Association. In Tumwater, Washington, 20 tree farmers attended a presentation about current research in the Capital State Forest. The presentation was called "Response of several small, invertebrate and vertebrate species to different riparian buffers along headwater streams" and was hosted by the South Sound Farm Forestry Association.

Washington State Science and Engineering Fair. The Station sponsored the "Outstanding Forest Science Project Award," for high school students at the Washington State Science and Engineering Fair held at Olympic College, Bremerton. Station scientists also served as judges.

Wolfree. Station employees participated in ecology programs with Portland and Vancouver area middle and high schools. About 100 students were involved. The Station also contributed funds for supplies and equipment.

Nobel Peace Prize

Ralph Alig, an economist with the Human and Natural Resources Interaction Program, **Ron Neilson**, a research bioclimatologist, and **David L. Peterson**, a research biologist, both with the Managing Disturbance Regimes Program, were honored for their research related to climate change. The three Station scientists share the Nobel Prize with many other scientists worldwide who also have contributed to the Intergovernmental Panel on Climate Change and with former Vice President Al Gore.

Chief's Distinguished Science Award

Richard Haynes, program manager for the Human and Natural Resources Interactions Program, received the Chief's Distinguished

Science Award. He was honored for his work on developing bioeconomic models for forest assessments and policy analyses.

Chief's Global Stewardship Award

Bruce Marcot, a wildlife biologist with the Ecosystem Processes Program, was honored for fostering conservation of wildlife and forest biodiversity through global projects and partnerships.

Chief's Excellence in Budget and Financial Accountability Award

Gail Hodgson, a budget analyst for the Station Director's Office, was awarded for her dedicated and proactive service to the Station in the area of budget and financial accountability.

Society for Technical Communication Awards

Charlie Crisafulli, an ecologist, and **Fred Swanson**, a research geologist, with the Aquatic and Land Interactions Program along with their colleague Virginia Dale received the Society's highest award for distinguished technical communication for their publication, *Ecological Responses to the 1980 Eruption of Mount St. Helens*. In the international competition, the book received a merit award. The Society for Technical Communication is the world's largest professional organization dedicated to technical communicators, with more than 18,000 members and 150 chapters.

The **Communications and Applications Program** also received a distinguished rating from the Society for Technical



Honors and Awards

Communication for its publication, *2005 Science Accomplishments of the Pacific Northwest Research Station*. Because of its success at the chapter level, the publication was entered in the Society's 2006–2007 International Technical Publications competition where it was rated as excellent.

Director's Award for FIA Excellence

Team leaders **Ray Koleser** and **Bob Rhoads** each received the director's award, while **Ken Winterberger**, forester, and **Sue Willits**, program manager, received honorable mentions for their outstanding efforts in advancing the Forest Inventory and Analysis Program. In particular, the four recipients were honored for their contributions to developing and publishing national field manuals over the past 10 years.

Society of American Foresters, Oregon Chapter

Robert Deal, research forester with the Focused Science Delivery Program, was named forester of the year by the Oregon chapter of the Society of American Foresters (SAF). He was recognized for his exceptional service to SAF as program chair of the Portland chapter, as co-chair at the 2005 tri-state meeting, and for his work on the national SAF Forest Science and Technology Board.

Wings Across the Americas

John Lehmkuhl, research wildlife biologist with the Managing Disturbance Regimes Program, received an international research and partnership award

for his work with the Birds and Burns project, which examines fire effects on populations and habitat of cavity-nesting birds and songbirds in ponderosa pine forests in the interior Western United States.

Wagon Wheel Gap Award

Michael Furniss, a hydrologist with the Communications and Applications Program, received the 2006 Wagon Wheel Gap Award for excellence in hydrology. This award is named in honor of the first watershed experiments in the United States at the Wagon Wheel Gap Experimental Forest on the Rio Grande National Forest.

Finances and Workforce

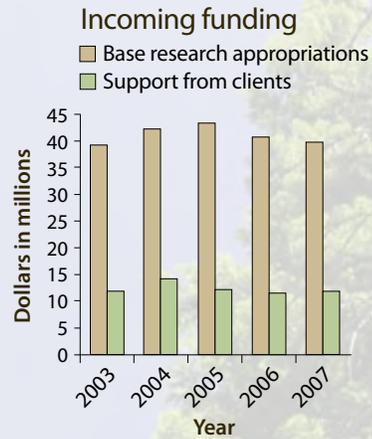
Two sources of funding support the work of the PNW Research Station: **federal appropriations**, which contribute the greatest percentage of funds; and **direct client support**, which comes from organizations in need of scientific information.

2007 PNW Research Station finances and workforce, by the numbers:

Fiscal year 2007: October 1, 2006, to September 30, 2007

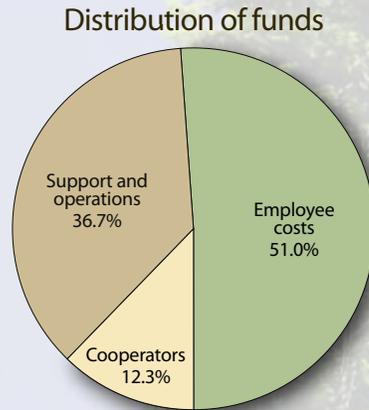
Incoming funding

Base research appropriations: \$39.9 million
 Client support: \$12.3 million
 Total funding: \$52.2 million



Distribution of funds

Permanent employee costs: (\$26.6 million) — 51.0%
 Support and operations: (\$19.2 million) — 36.7%
 Distributed to cooperators: (\$6.5 million) — 12.3%
 Of \$6.5 million to cooperators, 90 percent went to educational institutions.



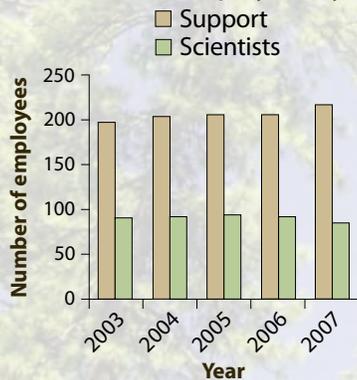
Workforce statistics:

Permanent workforce: 302 employees
 Of the permanent workforce, 28 percent, or 85 employees, are scientists.

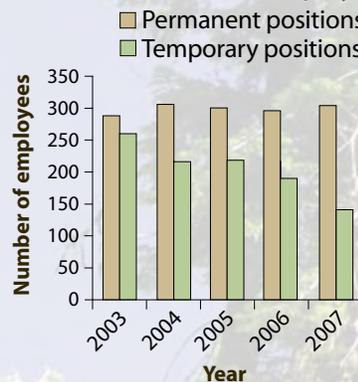
Temporary workforce: 141 employees

Total Station workforce: 443 employees

Permanent employees by type



Total number of employees



Funding Partners for 2007

Cooperators Who Received Funding for Studies From the PNW Research Station

Educational Institutions

Alaska Pacific University
Duke University
Eastern Oregon University
Loyola University
Michigan State University
Oregon State University
Southern Illinois University
Southern Oregon University
San Jose State University Foundation
University of Alaska Anchorage
University of Alaska Fairbanks
University of Arizona
University of California at Berkeley
University of Georgia
University of Idaho
University of Illinois
University of Maine
University of Montana
University of Oregon
University of Washington
University of Wyoming
Virginia Polytechnic Institute and State College
Virginia Tech University
Washington State University
West Virginia University
Yale University

Other Federal Agencies

National Academy of Sciences
National Institute of Standards and Technology

National Weather Service
USDA Farm Service Agency
USDA Natural Resources Conservation Service
USDA Office of Assistant Secretary for Civil Rights
USDI Bureau of Land Management, Alaska Fire Service
USDI National Park Service
U.S. Fish and Wildlife Service
U.S. Geological Survey

State Agencies

Oregon Department of Agriculture
Oregon Department of Forestry
Texas Agricultural Experiment Station

Private Industry

MacGregor-Bates, Inc.

County and Municipal Governments

Crook County
Fairbanks Economic Development Corporation
Juneau Economic Development Council

Nongovernmental Organizations

Earth Systems Institute
Forest Research Institute of Baden-Wuerttemberg
International Association of Wildland Fire
Sustainable Northwest
Washington Conservation Corps
Western Forestry and Conservation Association

Foreign Institutes

SCION (New Zealand Forest Research Institute)

Clients Who Provided Funding for Studies to the PNW Research Station

Educational Institutions

California State University
Montana State University
University of Alaska Fairbanks
University of Maryland
University of Notre Dame

Other Federal Agencies

Bonneville Power Administration
National Aeronautics and Space Administration
National Oceanic and Atmospheric Administration
Fisheries Science Center
USDA Agricultural Research Service
USDC National Marine Fisheries Service
USDI Bureau of Land Management
USDI National Park Service
U.S. Army, Fort Lewis
U.S. Department of Energy
U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service
U.S. Geological Survey

State Agencies

Washington Department of Fish and Wildlife
Washington Department of Natural Resources

County and Municipal Governments

City of Seattle
Eugene Water and Electric Board

Private Industry

Portland General Electric
Seattle City Light
Sonoma Technology
Tyler Contracting and General Services

Nongovernmental Organizations

National Council for Air and Stream Improvement, Inc.
Northwest Power and Conservation Council
The Wolverine Foundation, Inc.

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Graphic design and layout—Keith Routman

Photography—see credit with each photo

All uncredited photos—U.S. Forest Service staff

The attached CD-ROM contains the following files:

- 2007 Science Accomplishments.
- PNW Research Program Reports.
- PNW Directory for Research Programs.
- 2007 PNW Research Station publications.



United States
Department of
Agriculture



Forest
Service



Pacific Northwest
Research Station

The Forest Service of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the national forests and national grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

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