



## Researchers Make Discoveries About How Water Moves Through Soil



Water moving through an Andrews Forest watershed. Photo by Lina DiGregorio.

Andrews Forest researchers have made a discovery that profoundly changes our view of the movement of water through mountain soil and into streams. The new findings suggest that in a seasonally dry climate such as the Pacific Northwest, soil contains two semi-independent water reservoirs: tightly-held water that is accessed by plants and loosely-held water that supplies streamflow. This substantially modifies a century of hydrologic theory that rain and snowmelt enter the soil, mix with soil water, and displace it downslope and into the stream.

Several years of diligent study of the isotopic composition of precipitation, soil water, and streamflow within Watershed 10 at the Andrews Forest reveal that early wet season precipita-

tion becomes tightly bound within the dry, end-of-summer soil. Water from precipitation later in the fall and winter washes past the bound water without mixing and eventually contributes to streamflow. The sequestered water exits the watershed via plant transpiration in subsequent dry seasons.

This work by Renee Brooks (EPA), graduate student Holly Barnard (OSU), Jeff McDonald (OSU), and Rob Coulumbe (Dynamac) was published in *Nature Geosciences* and can be viewed online at [www.nature.com/ngeo/journal/v3/n2/full/ngeo722.html](http://www.nature.com/ngeo/journal/v3/n2/full/ngeo722.html).

*Ecohydrologic separation of water between trees and streams in a Mediterranean climate.* 2010. J. Renée Brooks, Holly R. Barnard, Rob Coulombe & Jeffrey J. McDonnell. *Nature Geoscience*. 3,100-104.

## The Forgotten Stage of Forest Succession

Old growth has been central to the culture, science, and politics of the Pacific Northwest for decades. A new publication in *Frontiers in Ecology and the Environment* highlights “The forgotten stage of forest succession: early-successional ecosystems on forest sites,” as the article is titled. Mark Swanson (Washington State University) and Jerry Franklin (University of Washington) led a diverse group of eight authors to characterize the important and incredibly varied suites of organisms and ecological processes operating in recently disturbed areas. Decades of intensive management of private forest lands, fire suppression, and lack of intensive management on public forest lands now appear to be reducing the extent of this landscape condition. The authors argue that intensive site “restoration” measures can reduce the early-successional attributes of recently disturbed sites. The project was stimulated by well-received workshops on the topic organized by the Central Cascades Adaptive Management Partnership in 2007 and 2010. Perspectives from long-term studies at Andrews

Forest and Mount St. Helens are important sources of information in the paper. The article can be viewed online at [www.esajournals.org/doi/pdf/10.1890/090157](http://www.esajournals.org/doi/pdf/10.1890/090157).



This partially-cut area in the Andrews Forest provides elements of early seral habitat. Photo by Thomas Iraci.



HJ ANDREWS EXPERIMENTAL FOREST

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## The H.J. Andrews Experimental Forest

### Where Ecosystems Are Revealed

The H.J. Andrews Experimental Forest is the hub of a cooperative program of research, education, and research-management partnership involving Oregon State University and the USDA Forest Service's Pacific Northwest Research Station and Willamette National Forest. The mission of this partnership is to support basic and applied research concerning forests, streams, and watersheds, and to foster strong collaboration among ecosystem science, education, natural resource management, and the humanities.



## Letter from the Leadership

I gave a talk recently at an NSF Long-Term Ecological Research (LTER) Mini Symposium in Washington, DC, about ecosystem services that come from forests. I was happy to have an opportunity to share how the knowledge gained from long-term ecological research programs like ours is essential for making wise decisions about management and economics of ecosystem services. As I pulled together ideas and information to serve as examples in this talk, I had an epiphany. Even more than the wealth of data, experiments and research papers that we have produced over many decades, it is the collective wisdom of our community of scientists and managers that is of greatest value in informing decisions and policies about ecosystem services. The research *community*, and the legacy of knowledge and values that is shared within that community over generations of scientists, are among the most important contributions of our long-term research program.



A serendipitous consequence of long-term, site-based research is that the site itself can take on an identity and a value that far exceeds its physical attributes. I am proud that this is especially evident at the Andrews Forest, where we have a history of productive science-management partnerships. Our site has become both a physical and a virtual nexus for nurturing and convening of ideas, and a seedbed for science leadership. At the Mini-Symposium, I described LTERs as “leaky”: good ideas leak out, others leak in, and often it is impossible to say that a particular concept is an “LTER product.” But it is easy to find fingerprints of Andrews Forest researchers on most important forest policies of the past few decades, and this is continuing as policy-makers turn their attention to the ecosystem services that forests provide.

In this issue of the Newsletter you'll read about our science community and examples of ways that the Andrews Forest is more than just a place to do research—it's a nexus of an ever-broadening community of thinkers.

—Barbara Bond, Lead Principal Investigator of the Andrews Forest LTER, Ruth H. Spaniol Chair, Department of Forest Ecosystems and Society, Oregon State University (photo by Cheryl Hatch/OSU).

## Student Spotlight—Travis Roth



Travis Roth installs new snow depth sensors at his research site at the H.J. Andrews Experimental Forest. Photo by Ben Kibler.

While Oregon is known for its rainy winters and generally wet climate, it is the snow that grabs Travis Roth's attention. Pursuing his PhD in Water Resource Science at OSU, Roth looks at the role of snow melt in head-water catchments to assess the potential effects of a changing precipitation regime. By looking at the stable isotopes of water, O<sup>18</sup> and deuterium, Roth can determine the source of stream runoff and the impacts of snow melt on the spring hydrograph. Since snow, rather than rain, is the primary source of surface runoff and groundwater in many parts of the western United States, Roth's work at the rain/snow transition elevation will help water managers better allocate water and predict water budgets. Roth also serves as an LTER Graduate Student Representative for the Andrews Forest.

## Faculty Faces— Matthew Betts



Matthew Betts presents his acoustical ecology work at HJA Day 2009. Photo by Gabriel Shea.

Matthew Betts, Assistant Professor in Forest Ecosystems and Society, arrived at OSU in 2007 from a post-doc at Dartmouth College where he worked on long-term bird demography research at Hubbard Brook Experimental Forest LTER. Betts brings a strong interest in both applied questions about wildlife responses to forest management and more fundamental questions about cues animals use in selecting breeding sites, and the relevance of these cues to population dynamics. Participation in OSU's Ecosystem Informatics program set the stage for Betts to take a lead in the LTER study of how plants and animals adapt to climate variability at annual and longer time scales. Field surveys over a grid of more than 180 sites and continuous sound recording at 13 sites are revealing temporal and spatial patterns of bird species across the Andrews Forest landscape. The work will test ideas about the capacity of birds to adapt to climate change via movement at local and landscape scales, and address the question of whether certain forest conditions may 'buffer' species against such changes. This work introduces the Andrews Forest program into the field of acoustical ecology—the study of sounds in the landscape to assess biodiversity and ecosystem function.

## Where Are They Now?—Jim Sedell

His heart remains in the Andrews Forest, despite roaming far and wide since he left 30 years ago. Jim Sedell came to the Andrews Forest in 1971 after earning a PhD on caddisflies from the University of Pittsburgh. As a post-doc in the International Biological Program, Sedell quickly grew into leadership of the "Stream Team," which persists today as a hub for lotic networking across a wide community of academic and federal scientists in Corvallis. After holding science leadership positions with Weyerhaeuser and the Forest Service in the Pacific Northwest and Washington, DC, Sedell became Director of the Pacific Southwest Research Station with employees spread across California, Hawaii, and the Pacific Islands. Still, he remembered the Andrews Forest. Sedell created the spark of the idea that led to the Long-Term Ecological Reflections program, which engages the humanities at the Forest. Since his retirement from the Forest Service in 2008, Sedell has worked for the National Fish and Wildlife Foundation, fostering conservation of threatened fish species across the country. Sedell has taken part in several Reflections programs, including the 2005 gathering at Mount St. Helens. In that setting he wrote an essay reflecting on his affection for his "tribe"—the people of the early Andrews Forest and Mount St. Helens days (his *Tribes* essay appears in *In the Blast Zone*, 2008, OSU Press). Many of this tribe still reside in the neighborhood and eagerly await his return.



Jim Sedell, Then (left), in the 1970s, probing the bed of Lookout Creek, and Now (right), as Director of the Pacific Southwest Research Station.

## Link with Willamette National Forest — New Forest Supervisor Meg Mitchell

Meg Mitchell comes to her new position as Supervisor of the Willamette National Forest with 20 years of Forest Service experience, most recently as Forest Supervisor on the Green Mountain and Finger Lakes National Forests. Mitchell also worked in Washington, DC, for three years and in Alaska for nine. Mitchell has a degree in Landscape Architecture from Colorado State University and a Masters degree in Forestry from the University of Idaho. Since arriving in Oregon in October 2009, she has demonstrated a keen interest in natural resources issues and especially the public's sense of the values of public lands. "I'm looking forward to serving on the Willamette and being a part of their strong tradition of providing high quality services and sustainable products, and managing public lands with future generations in mind. The Willamette is known for its highly motivated employees and strong relationships with the scientific community and other partners. On a personal note, I'm thrilled to be returning to the landscapes of the Pacific Northwest, and am especially looking forward to exploring the Willamette's world class waters, recreation areas, and Wildernesses."



Meg Mitchell, Forest Supervisor, Willamette National Forest. Photo courtesy of the Forest Service.

## Long Term Ecological Reflections



"Winter Meets Spring" painting by Ellen Dittebrandt. [www.Dittebrandt.com](http://www.Dittebrandt.com)

Scott Russell Sanders from Indiana wrote a wonderful essay drawing on his writer's residency in the Andrews Forest. That essay, *Mind in the Forest*, just received the John Burroughs Association's Outstanding Published Nature Essay Award, based on the work's content and literary value. With this award Sanders becomes the first writer to be recognized twice since the award began—a tribute to his remarkable skill and grace with thought and word.

Sanders begins his essay, "I touch trees, as others might stroke the fenders of automobiles or finger silk fabrics or fondle cats. Trees do not purr, do not flatter, do not inspire a craving for ownership or power. They stand their ground, immune to merely human urges. Saplings yield under the weight of a hand and then spring back when the hand lifts away, but mature trees accept one's touch without so much as a shiver. While I am drawn to all ages and kinds, from maple sprouts barely tall enough to hold their leaves off the ground to towering sequoias with their crowns wreathed in fog, I am especially drawn to the ancient, battered ones, the survivors." Sanders continues on to consider our place in the natural world and the instincts that lead to mutual nurturing—and the forces that work against it.

Read the full essay at: [www.orionmagazine.org/index.php/articles/article/5099](http://www.orionmagazine.org/index.php/articles/article/5099). Information on the LTEReflections program can be found at [andrewsforest.oregonstate.edu/research/related/writers.cfm?topnav=167](http://andrewsforest.oregonstate.edu/research/related/writers.cfm?topnav=167).

## A New Building in the Forest—the GREEN House

The Andrews Forest will have a new energy-efficient residential building thanks to a \$348,000 grant from the National Science Foundation.

The building will be sited at the Andrews Forest headquarters and will provide housing for the growing community of visiting writers, educators, and scientists who contribute to the vitality and productivity of the Andrews Forest Program.

The project is titled "Green Research and Education for Ecological Networks," or GREEN House. In addition to providing housing, the GREEN House will serve as a tool for research and education.

The GREEN House will be constructed using energy efficient designs

and local materials. It will be operated using renewable energy and monitored for energy usage, air quality, and carbon footprint. Wireless sensors will be installed throughout the structure to provide data that will be compared to data from existing buildings on the site. Comparative data will be incorporated into web-based research and teaching modules. Students, scientists and local businesses will participate in the design and building process.

The project organizers look forward to developing new partnerships with researchers, educators, agencies and local enterprises that will be the key to success in this endeavor. Contact Mark Schulze, [mark.schulze@oregonstate.edu](mailto:mark.schulze@oregonstate.edu) if you'd like to be involved.



Springtime at the Andrews Forest.  
Photo by Thomas Iraci

## Support for the Andrews Forest

The Andrews Forest Program is dedicated to research and education about forests, streams, watersheds, and our engagement with the land.

The Andrews Forest Fund enables individuals and organizations to support the important work at the Andrews Forest. There are many opportunities for support at the Forest—from the GREEN House building, to writer and scholar residency support, to support for research and student programs.

By making a contribution to the Andrews Forest Fund, you can make an investment in the long-term viability of our forested ecosystems and training of future forest scientists, educators and managers. Tax-deductible donations of funds, appreciated securities, or property of any amount can be used to support the Andrews Forest Program. To make a gift, please contact the OSU Foundation (800-354-7281) or go to our online giving page at:

<http://andrewsforest.oregonstate.edu/about/forestfund.cfm?topnav=171>