Andrews Forest NEWSLETTER

Issue 13 Fall 2012

Experimental Watersheds—60 Years and Going Strong

We pause to reflect as the streamgaging measurements in the Andrews Forest reach their 60th year. Our research program has seen amazing advances in the complexity of questions and tools, building on the body of data and plots established back in the 1950s. Our initial objectives were to assess responses of vegetation, hydrology, and sediment production to logging and road construction. Simple methods of vegetation plots, gaging, and sediment basins led to lessons about watershed function (including roles of roads in streamflow and sediment production) and vegetation dynamics that contributed to changes in forest management and policy. The scope of our fundamental studies has grown dramatically in recent decades. For example, basic research on subsurface water pathways has helped explain how younger forests are using surprisingly large amounts of water. A critical foundation for many studies is the continued measurement of streamflow, water chemistry, and vegetation. These records will be especially important in a changing climate.

(Above) *Jerry Franklin measures water depth at the weir in Watershed 1 at the Andrews Forest in 1957. Photo by Jack Rothacker.* (Right) *A tower supports instruments to sample carbon flux in the air stream flowing out of the Watershed 1.*

In the past decade, Andrews Forest researchers have launched studies that view watersheds as carbonsheds. Researchers have been studying the distribution of carbon stocks (*e.g.*, in trees and soil) and fluxes. A tower is used to sample air, wind direction, wind speed, and other variables below, within, and above the tree canopy. The measurements assess carbon export in the stream of air that drains from the watershed. New questions, techniques, and scientists capitalize on the work of predecessors, which is a vital feature of long-term ecological research.

Paradox of Cooling Streams

Post doc Ivan Arismendi visits a rain gage in the Andrews Forest. Photo by Lina DiGregorio

A recent, provocative publication with the title "The paradox of cooling streams in a warming world: Regional climate trends do not parallel variable local trends in stream temperature in the Pacific continental United States" examines long-term records of streamflow and water temperature. Time-series records of stream temperature (at least 13 years duration) were examined for 63 sites in six western states. Of those, 18 watersheds were forested and only minimally impacted by land use and the remainder were substantially affected by water and land management. The researchers expected to find trends of increasing temperature and variability, but lead author Ivan Arismendi, a post doc associated with the Andrews Forest program, concludes, "the bottom line is that recent trends in overall stream temperature do not parallel climate-related trends." Warming trends were clearest in the longest records (dating from the 1950s). Cooling trends were evident in watersheds of both low and high land use impact. Lack of long-term records and understanding of watershed hydrology limit our ability to disentangle human effects on water storage and routing from climate signals.

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.

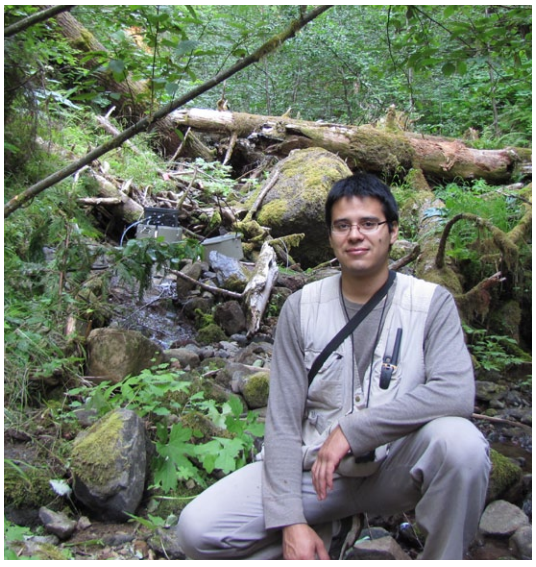
Letter from the Leadership

Digging into a new job, in a new place, with new colleagues, and a fresh sense of purpose brings a sense of excitement and honor. For over a decade I have admired, from afar, the Andrews Forest LTER science program and the "coalition of the willing" dedicated to it. It is both trite and true to say that I am humbled to have been gifted the position of Lead Principal Investigator of the Andrews Forest LTER. But excitement and honor are tempered by a healthy dose of insecurity. It is all quite different, everything. My job is to lead or facilitate or steer (or something) this crew, and I've never done anything like this before. Over the past three months, my insecurity has been replaced by gratitude, for the kindness and support I have received. Also, and perhaps most importantly, is the anticipation of participating in a place with a history of understanding the relationship between claims about the nature of the world and claims about how we ought to interact with the world. The Andrews Forest program does not shy away from the mixture of science, values, and policy. For the sake of a future we hope to influence, many of us look for opportunities to bind these things. Too often we feel like the man who collects rope on "the stone beaches of the North," in Alison Hawthorne Deming's poem "Rope," "the man who wishes he could save one strand of the world from unraveling." The Andrews Forest program is a confluence, a bringing together, not only of trickles and streams and creeks, but of inquiry in many forms, from the sciences both biophysical and social, to the arts and humanities. As we sustain and strengthen our foundation of basic science in a time of change, we will also branch more broadly into other disciplines. If preventing the world from unraveling will require the sum of our collective wisdom, the Andrews becomes a place and a group of people—rare indeed—of special importance. Thanks, everyone, for the opportunity to dig in.

—Michael P. Nelson, Lead Principal Investigator of the Andrews Forest LTER, Ruth H. Spaniol Chair, Department of Forest Ecosystems and Society, Oregon State University

Student Spotlight—Ricardo Gonzáles-Pinzón

Ricardo González-Pinzón, a PhD student in Water Resources Engineering working with Roy Haggerty in the Institute for Water and Watersheds at OSU, is exploring the use of "smart tracers" to track the metabolism of microbial communities in stream ecosystems. A smart tracer can be used to examine not only the flux of fluids through a system, but also the rate of a process of interest as the tracer undergoes an irreversible biologically-mediated reaction. Ricardo's work involves reaction of the color-imparting, organic compounds resazurin to resorufuin in both laboratory culture experiments and also in the hyporheic zone of gravel bars in the Andrews Forest. This work is an important and innovative bridging of biogeochemistry and physical hydrology in our complex stream ecosystems.



Ricardo conducted solute transport and metabolism experiments in streams at the Andrews Forest. Photo by Ricardo Gonzáles-Pinzón

Faculty Faces—Michael P. Nelson

Welcome to Michael P. Nelson in his new role of Lead Principal Investigator of the Andrews Forest LTER program. As an environmental philosopher and conservation ethicist, Michael brings an unusual mix of experience, including involvement in the Isle Royale wolf-moose project —now in its sixth decade. And he brings an unusual dose of enthusiasm and sense of adventure to his work. For example, at the LTER All-Scientists Meeting in September, Michael was given two minutes and two slides to present the entire Andrews Forest program. So he donned a Lorax hat and began, "We are the Andrews, we speak for the trees," proceeding to describe the breadth of the Andrews Forest program's work in a Dr. Seuss-style poem of his own creation. He won the prize for best description of our site's program among the 25 presenters for all LTER sites (see the Andrews website for text of the poem).

Michael (center) at a recent discussion in a meadow at the Andrews Forest. Photo by Lina DiGregorio.

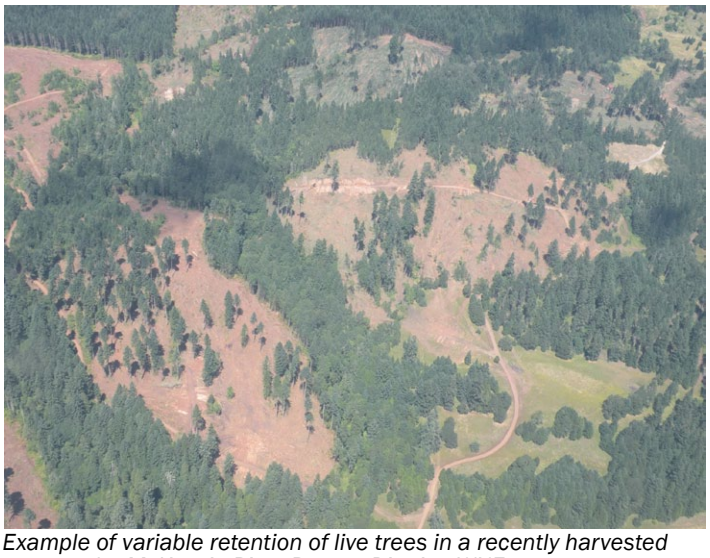
Memorial—Jim Sedell, a Leader of Stream Research and Reflections

Jim Sedell, on a fish-tagging research trip at Martin Lake on the Copper River Delta, Alaska. Photo by Stan Gregory.

Reared as an Oregonian and fresh from graduate studies at Univ. of Pittsburgh, Jim Sedell joined the International Biological Program at Andrews Forest in 1971. He quickly rose to a leadership role in the vibrant Stream Team and in the continent-spanning River Continuum project in the late 1970s. He presented at President Clinton's 1993 Forest Summit and was a major player in formulation of the Northwest Forest Plan and other bioregional conservation strategies. After a stint with Weyerhaeuser, Jim returned to Corvallis to lead aquatic research at Mount St. Helens after her 1980 eruption. In a 2005 gathering of writers and scientists at the volcano, Jim fondly recollected the days working with his "science tribe"—an energetic, unbridled, interdisciplinary band of scientists he would exhort with "Drive, nuggets!" Jim inspired colleagues with a big smile, boundless spirit and ideas, and attention to finding stories that would make a difference—"What's the story line?" he would ask. Jim died of cancer in August at the age of 68.

Willamette National Forest Update—Ecological Forestry

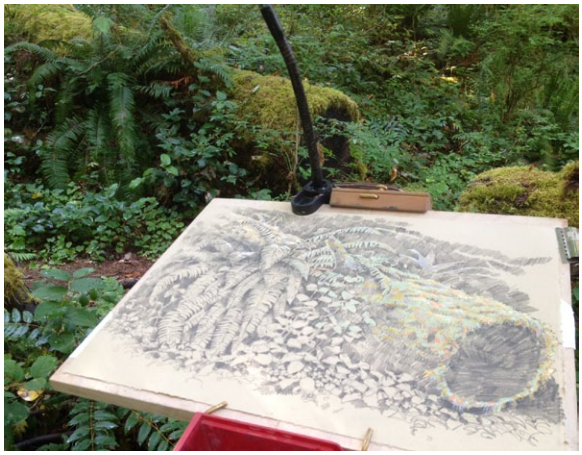
There's a new term in town for managing forests: ecological forestry. The Andrews Forest and Willamette National Forest partners have been on the forefront of many new developments in forest management, including minimum-fragmentation, new perspectives, and ecosystem management. Ecological Forestry, an approach put forth by Norm Johnson and Jerry Franklin, has been gaining traction through pilot efforts on BLM lands in southwest Oregon. In September our science-management partnership hosted a field trip for discussion on this evolving strategy. Managers from BLM and the Forest Service, as well as scientists from OSU and the PNW Station and our partners with the USFWS headed to the field to look at options for managing public forest lands that include consideration across all seral stages. Emphasis has been put on the need to restore an early-seral forest component on our landscape. Disturbance agents that historically created early seral forest, such as regeneration harvesting and stand-replacing fires have decreased in recent decades. Now foresters are working toward promoting openings with structural diversity as well as abundant forbs and shrubs. Delayed regeneration is also a key to the approach, so that conifer canopy closure is delayed for several decades. The strategy also includes a conservation element for all old-growth forest, as well as limited harvest in mature stands (80-120 yrs). The Willamette National Forest continues discussions with partners, and may undertake pilot installations in the future.



Example of variable retention of live trees in a recently harvested area on the McKenzie River Ranger District, WNF. Photo by Kurt Steel (USFS)

Long-Term Ecological Reflections

Among more than 20 LTER and other types of research and arts/humanities sites that have programs of arts-humanities-science collaborations, the Andrews Forest's Long-Term Ecological Reflections program is distinctive for its strong emphasis on creative writing and philosophy. During August 2012, Oklahoman Debby Kaspari became our first designated Artist in Residence. Over the course of a 10-day visit she created more than a dozen pastels and sketches in the forest and along Lookout Creek. She plans to return for more work, including pieces that display differences in land use legacies between Andrews Forest and Harvard Forest, where she was in residence for 8 months. Look for more art in the next newsletter.



The forest as a studio: (Left) *A closeup of a clump of ferns, which is seen on the left in the painting.* (Right) *Artist in Residence Debby Kaspari set up her bench in the forest for painting a decomposing log which was cut for trail passage. Photos and artwork by Debby Kaspari.*

GREENHouse Build Out

The GREENHouse residence building is rapidly taking shape at the Andrews Forest headquarters. The building envelope is complete and electrical and mechanical systems are operational. We have focused on energy efficiency through design and selection of materials. The building orientation and design facilitate winter passive solar gain. Triple-pane windows limit heat loss during the long winter nights. Eight-inch walls with offset studs allowed us to 'super-insulate', achieving thermal resistance (R) values more than double those found in most residential buildings. Attention to detail in sealing all potential air leaks resulted in an extremely tight building that achieved 0.89 air changes per hour in a blower door test; in a typical residence this ranges from 5-15. With a building this tight, healthy indoor air is a concern; our heat recovery ventilation system will provide a consistent supply of fresh air while limiting heat loss.

Throughout the winter we will be focusing on interior finishing and installation of systems to monitor the building environment and energy use. Soon we will stream monitoring data and post other performance and educational materials on our website. To attain our ultimate goal of net zero energy we continue to explore photovoltaic and solar water heating options (see sidebar for information on how you can help).

The new residence building at the Andrews Forest headquarters: the GREENHouse. Photo by Mark Schulze.

Artwork by Debby Kaspari, inspired by lower Lookout Creek.

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 needs your support for a special project! The GREENHouse is a 2200-sq-ft building which will serve as a residence for the Forest Director plus a studio and a one-bedroom apartment for visiting scientists, scholars, writers, and artists. The building design incorporates careful attention to energy efficiency, including monitoring to assess energy use and loss. Thus, the building will be valued for its utility and as a learning opportunity. See the article at left for more about the building's features.

Generous private donors and the PNW Research Station contributed funds to complete the architecture/engineering planning; ***we need additional donations for solar heating, electric systems, finish work, and furniture.***

In addition, the Andrews Forest program has many other funding opportunities, such as support of undergraduate and graduate students, and forest research programs. Please be a part of the Andrews Forest program by making a contribution. Call 541-737-8480, or donate online: *http://andrewsforest.oregonstate.edu/donate*