

Andrews Forest NEWSLETTER

Issue 3

Fall 2007

The DIRT on Soil Carbon



DIRT plots without litter are screened, and screens are swept to remove fallen debris. Photo by Lina DiGregorio

This year marks the ten-year anniversary of the Detrital Input and Removal Treatment (DIRT) experiment at the Andrews Forest. DIRT is a long-term experiment designed to examine the effects of the quality and quantity of forest litter and roots on soil organic matter, carbon balance, and nutrient cycling. It is one of the long-term manipulative experiments at the Andrews Forest Long-Term Ecological Research site. OSU

professor, Kate Lajtha, and colleagues have removed all forest litter inputs from some plots, increased needle litter or woody debris in other plots, and excluded roots from trenched plots. The goal is to continue this experiment for decades, if not centuries, and to conduct sampling and analysis every ten years. The DIRT experiment at the Andrews Forest is part of a network of DIRT experiments across the U.S. and Europe. Scientists will use the DIRT experiment to examine the response of soil carbon to changes in forests and climate. At the Andrews Forest, Kate Lajtha is measuring the stability of soil carbon in different soils, Dave Myrold and his students are examining soil microbial populations and nitrogen turnover dynamics, and Bruce Caldwell is studying soil enzymatic processes. Recent DIRT soil samples from the Andrews Forest have traveled far for analysis by colleagues; 50 pounds of soil were shipped to Germany for analysis of soil organic matter chemistry and smaller samples of soil were shipped to scientists across the U.S. who are assessing soil organic matter composition and stability. To date, the team of DIRT scientists has seen a decrease in labile carbon in plots without forest litter inputs and an increase in carbon retention in plots with added litter. It is not yet known if the increased carbon retention is in an easily respired form or if it represents increased ecosystem carbon storage. DIRT was featured in a KVAL (Eugene) television news story on June 20. Go online to www.kval.com/news/8101687.html for text and photos or to www.kval.com/news/8101687.html?video=YHl&t=a for the video clip.

Andrews Forest History Book

A new book on the Andrews Forest has been published by the Pacific Northwest (PNW) Research Station. Max Geier, a professor of western US history with a focus on history of natural resources communities, conducted 40 oral histories and examined archival material as a basis for this record of the community of scientists and land managers who have worked in the experimental forest since its inception in 1948. More than 60 photographs feature scientists, students, and land managers working in the Forest. Thirteen one-page sidebars overview key science themes. This book, *Necessary Work: Discovering Old Forests, New Outlooks, and Community on the H.J. Andrews Experimental Forest, 1948-2000*, is available in electronic form at www.fs.fed.us/pnw/publications/gtr687/. Print copies can be acquired from the PNW Research Station publication office, 503-808-2138.



A photo used in the history book. Jerry Franklin measures streamflow at the weir of the Watershed 1 gaging station in 1957. Photo by Jack Rothacher

New Andrews Forest Webcam

Now you can see real-time video of the Andrews Forest from your computer! Daily time lapse movies and current weather conditions are also available. Log onto <http://webcam.oregonstate.edu/andrews/>.





HJ ANDREWS EXPERIMENTAL FOREST

The Andrews Forest Newsletter Issue 3 Fall 2007

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.

The **Andrews Forest Newsletter** is a semi-annual publication of the Andrews Forest Program.

Editors:
Lina DiGregorio, OSU
Fred Swanson, USFS

Contact:
Andrews Forest Newsletter
Department of Forest Science
330 Richardson Hall
Oregon State University
Corvallis, OR 97331-5752

andrewsnewsletter@fsl.orst.edu

Website:
www.fsl.orst.edu/lter



Letter from the Leadership

One of the joys of participating in a long-term research program like the Andrews Forest Program is having an opportunity to watch the successional processes in research mirror succession in the natural world. For half a millennium, the old Douglas-fir trees in our forest have carried out their life's business through spring rains, summer droughts, fires and insect attacks. Meanwhile, newcomers come and go, with some young seedlings and saplings eventually becoming part of the long-term forest community. This issue of the Andrews Forest Newsletter provides a view of the successional process at work over the last half century on our research program. Max Geier's new book, highlighted on the first page, shows how a group of hardy and energetic scientists established our program, setting up the intellectual foundation, plots, and measurement programs that now serve as the program's "overstory." In other articles you can see succession at work over subsequent decades. The DIRT experiment (a research activity that was "introduced" to the Andrews from other research sites) is completing its first decade, with (hopefully) many more to come. Eric Seabloom and Elizabeth Borer, showcased below, are examples of our newest cohort of scientists. I am looking forward to seeing how their studies of meadows in the Andrews Forest and throughout our region will similarly grow and develop into an integral part of our long-term research program.

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



New Faculty Faces



Eric Seabloom and Elizabeth Borer sample the plant community within their meadow experiment on Lookout Mountain in the Andrews Forest. Photo by Jorge Ramos, EISI student.

Two new faculty members in Zoology at OSU bring strong backgrounds in grassland ecology to vegetation studies at the Andrews Forest. The husband-and-wife team of Eric Seabloom and Elizabeth Borer has been conducting field and modeling studies of the role of viral plant diseases in facilitating invasion and dominance of perennial grasslands by exotic annual grasses. Borer currently advises a PhD student in OSU's Ecosystem Informatics program, Sean Moore (Zoology). Moore is extending studies of plant diseases to Cascade meadows, where the key disease Seabloom and Borer investigated in California has now been found. Seabloom and Borer are also leading a 40-site, worldwide nutrient manipulation study of grassland productivity. They are establishing experiment sites in meadows in the Cascades, including one site within the Andrews Forest.

Forest Management Experiments

With a great deal of leadership from Willamette National Forest staff, especially Cheryl Friesen, and from silviculturists Paul Anderson (PNW Station) and Klaus Puettmann (Forest Science, OSU), two large-scale, long-term forest stand management studies are making important progress. The Uneven-Aged Management Project (UAMP) and Young Stand Thinning and Diversity (YSTD) studies carried out by the research-management partnership based at the Andrews Forest are part of a system of experiments extending across Oregon and Washington which was recently reviewed in the Forest Service General Technical Report PNW-GRT-713, www.fs.fed.us/pnw/publications/gtrs.shtml. The YSTD study is in the process of its ten-year, post-treatment measurements of vegetation, small mammals, dead wood (viewed in terms of fuel load, carbon, habitat), and other parameters. A new publication by Liane Davis (née Beggs), Klaus Puettmann, and Gabe Tucker describes response of the tree layer to the various thinning treatments. The UAMP recently went through its five-year, post-treatment sampling. These long-term studies are providing a foundation of technical information for land managers and also well-documented sites for other studies.



Measuring understory vegetation along a transect in a thinned stand of Douglas-fir. Photo by UAMP.

Visiting Scholars Program

The Andrews Forest Program has instituted a new Visiting Scholars program for people who wish to come to the Forest to work on their own writing projects. The intent of the Visiting Scholars program is to encourage efforts beyond the types of field research and education programs traditionally emphasized at the Andrews Forest. This new program also differs from the Reflections program for visiting writers, who are asked to address particular questions in particular places. Greg Smith, Professor of Education Policy at Lewis and Clark College, was our first Visiting Scholar. He spent a week in Spring 2007 working on his second book on place-based education—an appropriate topic to consider in the Andrews Forest. Additional Visiting Scholars are lined up for later in 2007. For more information contact Fred Swanson (fswanson@fs.fed.us).

Elizabeth Sulzman Remembered

We grieve the loss of Dr. Elizabeth Sulzman, a scientist in the Andrews Forest Program who died in early June. Her boundless energy and sparkling grin endeared her to all who knew her. Sulzman was an award-winning educator and accomplished soil scientist. She came to OSU and the Andrews Forest after earning a bachelor's degree in biology from Yale and MS and PhD degrees in ecology from Colorado State University. Results from Sulzman's studies of carbon dynamics at the Andrews Forest DIRT plots contested conventional knowledge, indicating that increases in leaf litter stimulate microbial digestion of older carbon as well as the newly added carbon, resulting in lower net carbon storage. Her graduate students and colleagues are continuing to pursue this important work (see the article on DIRT in this issue of the Newsletter).

Airshed and Fire Projects Highlighted

Nearly every evening, a river of cool air slides down the valleys in the Andrews Forest. The air pools in low spots like water behind a dam. By analyzing this exhaled forest breath, OSU scientists are learning to diagnose the health of mountain ecosystems. The Andrews Forest's airshed project was featured in the Summer 2007 issue of *Terra* magazine. To see the full article, go to www.oregonstate.edu/terra/features/grasping-air.php.

The Spring 2007 issue of *Terra* magazine highlighted the fire ecology research of Andrews Forest graduate student, Alan Tepley. For centuries, a complex fire history has shaped Oregon's western Cascades. OSU graduate students are part of a team working to understand what the past can teach tomorrow's forest managers. www.oregonstate.edu/terra/2007spring/features/fire.php.



HJA Day, the annual field gathering at the Andrews Forest, occurred on Tuesday, June 19, 2007. The event attracted 130 attendees, the highest number to date. The theme was Climate Variability and Ecosystem Response. As in years past, the day included field trips to sites in the research forest, presentations from researchers and managers, and a barbeque. Speakers included Chris Daly (OSU), Norm Michaels (USFS), Stan Gregory (OSU), and Dick Iverson (USGS). *HJA Day 2007 group photograph by Jay Sexton*

Reflections

The work of writers participating in the Long-Term Ecological Reflections program is increasingly appearing in print. A short essay, “The Owl, Spotted” (*OnEarth* Fall 2006) describes poet Alison Deming’s encounter with a Northern Spotted Owl during a field outing with Steve Ackers, leader of the Spotted Owl crew at the Andrews Forest. She writes:

*“The owl doesn’t make a sound.
She perches on a branch high above us.
She is still. ...”*

What is the consciousness of a spotted owl? There she perches perceiving us, and here we sit perceiving her. We exchange the long, slow, interspecies stare—no fear, no threat, only the confusing mystery of the other. Steve knows her language well enough to speak a few words: the location call, a bark of aggression. Perhaps that means she thinks we are owls. We do not look like owls. But we do, briefly, behave like owls, catching and offering prey, being still, and turning our eyes to the forest.”



Spotted Owl in the Andrews Forest. Photo by Al Levno.

Summer Institute

In summer 2007 the Andrews Forest hosted OSU’s first Eco-Informatics Summer Institute. Eco-Informatics is defined as the interaction of mathematics, computer science, engineering, and ecology. It is an emerging field that trains young scientists for careers in this information- and technology-rich world. Building on the existing Integrative Graduate Education and Research Traineeship (IGERT) program in Eco-Informatics at OSU, students undertook research in topics such as forest carbon cycling, air drainages in forests, and forest fires. Thirteen undergraduate students lived and conducted their research at the Andrews Forest for ten weeks. In addition to interdisciplinary research and education, mentoring, and hands-on experience with field work and data analysis, participants gained the foundation to develop and seek support for their own graduate studies. This National Science Foundation-funded program is coordinated by Desiree Tullos, Biological and Ecological Engineering, OSU. Tullos comments, “The program highlighted the opportunities and challenges of integrating a range of ideas and perspectives, from math and statistics majors to environmental and ecological sciences, and from institutions across the US (Willamette, Univ. of Washington, Illinois, Louisiana State, Maine, Texas, Clarkson, Reed, Stanford, Cal Tech, OSU).” More information at

<http://eco-informatics.engr.oregonstate.edu/>

New Publication

A new publication by Steve Radosevich, Dave Hibbs, and Claudio Ghersa exemplifies the role of Andrews Forest as a home for long-term experiments and a site on the environmental gradient extending from the coast (Cascade Head Experimental Forest) inland. The paper, “Effects of Species Mixtures on Growth and Stand Development of Douglas-fir and Red Alder” (*Canadian Journal of Forest Research*, 2006), reports on the first 16 years of this study in which the two species were planted in a range of species proportions and at two total stand densities. The scientists wished to test hypotheses about competitive interactions (such as, does red alder suppress growth of Douglas-fir at some stem densities?) and look for possible beneficial interactions (do the nitrogen-fixing properties of red alder benefit Douglas-fir?). They found that Douglas-fir grew better at the Andrews Forest, and alder at Cascade Head, reflecting differences in summer moisture stress. Some planting proportions of the two species benefited growth of Douglas-fir at the Andrews Forest plots. Earlier studies led by Dave Myrold and students capitalized on these experiments to study the nitrogen-fixing bacterium, *Frankia*, associated with alder. Other studies are following up on development of understory vegetation and longer-term stand development in contrasting study plots.



Sorrel (*Oxalis oreganum*) at the Andrews Forest.
Photo by Lina DiGregorio

Andrews Forest Fund: Supporting the Forest

The Andrews Forest Fund continues to develop and grow. An Andrews family member made a generous donation to support improvement of forest trails used for public, educational, and research purposes, and to support the tree canopy education program for middle-schoolers. The HJ Andrews Experimental Forest Endowment Fund has now been established to provide an annual income for investment in the future of the program, including seed money for special initiatives. Please consider contributing to the Andrews Forest future in whatever amount and to whatever emphasis you wish!

The Andrews Forest Fund is a way for individuals and organizations to support research, outreach and education, and ecological monitoring. To make a gift, please go to our online giving page www.fs1.orst.edu/lter/about/forestfund.cfm?topnav=171 or contact the OSU Foundation (800-354-7281).