Andrews Forest NEWSLETTER

Issue 20 Spring 2016

Andrews Conservation Ethics Program in the Journal of Forestry

Although the importance of science is widely acknowledged among forestry researchers and practitioners, the ethical dimensions of forest management have been neglected by comparison. In their recent paper published in the *Journal of Forestry*, "Conceptual ambiguities and practical challenges of ecological forestry: A critical review" (doi:10.5849/jof.15-103), Andrews Forest researchers Chelsea Batavia and Michael Paul Nelson illustrate this trend and explain why it is problematic. The paper considers the meaning of the word "ecological" in "ecological forestry," suggesting that, rather than a scientific or descriptive term, "ecological" is being used ambiguously, reflecting equally ambiguous ethics. They argue that, without clarification, these ambiguities allow for a problematic range of variability in how ecological forestry can be applied, potentially leading to outcomes that are both socially and environmentally damaging. Batavia and Nelson suggest that for ecological forestry to gain traction as a cohesive philosophy of forest management it must be grounded clearly and explicitly in an ethical framework, and a non-anthropocentric one at that. Pointing out that the conceptual ambiguities and practical challenges highlighted in the paper are not unique to ecological forestry, Batavia and Nelson suggest that any enduring philosophy for sustainable natural resource management and conservation requires clear normative and ethical foundations. The paper concludes with some practical tools and programs that might be introduced into various institutions, to begin the important work of integrating ethics more deeply into natural resource management.

Aerial view of variable retention harvest units in the Blue River Landscape Study.

Old-Growth Forests May Buffer Against Rising Air Temperature

Old-growth forests, such as this one at the Andrews Forest, may provide buffered refugia in a changing climate.

Old-growth forests may provide an insulating effect against a warming climate. Andrews Forest researchers Sarah Frey and colleagues found that the characteristics of old growth reduce maximum spring and summer under-canopy air temperatures as much as 2.5°C (4.5°F) over those recorded in younger second-growth forests. The findings were published in *Science Advances* (doi:10.1126/sciadv.1501392). The researchers collected temperature data in 2012 and 2013 at 183 understory locations. They also analyzed data on forest structure collected through LiDAR, an aerial mapping technique that uses lasers to detect very small-scale structural differences in forests. Variations in the landscape, such as elevation and slope, helped explain temperature differences over short distances of 100 feet or less; however, at broader scales, the characteristics of the forest itself exerted a significant influence. The study suggests that that the way forests are managed is a critical factor in explaining temperature differences. "To our knowledge, ours is the first broad-scale test of whether changes in forest structure due to differing management practices influence forest temperature regimes," they wrote. "Given that old-growth forests continue to decline globally and that plantations continue to proliferate, understanding microclimatic impacts is of great conservation importance." Matt Betts, a co-author, explained, "Mature plantations might look similar to old-growth forest in terms of the aspects that influence temperature, particularly canopy cover. So the magnitude of the cooling effect of old-growth structure is surprising."

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, arts, and the humanities.

Letter from the Leadership

Say you want to propose a policy, maybe about changing timber harvest patterns or riparian buffers. As all policies do, this policy will culminate with a prescriptive conclusion: we ought to harvest in this way or that, we ought to move riparian buffers in or out. And your justification will, as a matter of logical necessity, be built upon two types of claims. First, there will be empirical or scientific claims: doing something (e.g., harvesting in a certain way), will likely have a certain kind of impact (e.g., on soil erosion and stream sediment, etc.). Second, whether you make them explicit or not, your justification will be built upon normative claims as well: this level of soil erosion and stream sediment is acceptable, or not. While no policy can be justified simply by an appeal to the facts of the matter, that's a hard and uncomfortable truth for many in natural resources. From this perspective "the best science" does not, in fact it cannot, go all the way to making a decision.

The Andrews Forest Program has a deep and proud tradition of directly engaging in management issues. And we've long understood there is more to engagement than simply providing scientific information. This issue of our newsletter, however, might be seen as a more formal, even brazen, affirmation that our work mirrors the larger task of management—it is both empirical and prescriptive, even expressive and artistic. The global challenges we face require the full force and power of the human imagination, scientific information of course, but far more as well. Only a fool would intentionally limit their intellectual arsenal when a full arsenal is demanded. We're no fools.

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

Student Spotlight—Lydia Nickolas

Lydia downloading stream level logger data at McRae Creek within the Andrews Forest.

Lydia Nickolas is currently pursuing an MS in Water Resources Science (WRS) with Dr. Catalina Segura in the department of Forest Engineering, Resources and Management at Oregon State University. Lydia will transition to a PhD in WRS during the summer of 2016. She has been working in the Andrews Forest for a year and a half and has delighted in the opportunity to work in such an active research forest and community. Her work within the Andrews Forest centers on the investigation of seasonal and spatial variability of the delivery of water from hillslopes to streams and its relation to the transport and flux of nutrients. The interpretation of these trends is based upon the characterization of the evolution of water stable isotope signatures ($\delta^{18}O$ and $\delta^{2}H$) and nutrient concentrations during storm events over the course of 2015–2016. Based on this information, Lydia and Catalina will create a model that enables the prediction of hydrologic response and dissolved nitrogen flux under alternative scenarios. This work links to the LTER7 emphasis on understanding how hydrologic connectivity, and lack thereof, influences forest and stream ecosystems.

Retirements—John Moreau and Theresa Valentine

After 42 years in the woods, John Moreau hung up his field notebooks and retired from his position as Andrews Forest Climate Technician. John had a distinctive knack for keeping long-term monitoring going, while also undertaking new, specialized projects with notable competence and enthusiasm. John's attention to detail and meticulous notetaking contributed to the quality of records flowing from the forest to scientists. John especially enjoyed extending Jerry Franklin's 50+ year observations of cone production in upper elevation forests along the Oregon and Washington Cascades, which is also a late-summer sampling of spectacular vistas. Thank you, John, for a job well done.

Theresa Valentine retired from her position with US Forest Service PNW Research Station as a GIS Information Manager with primary focus on the HJ Andrews Experimental Forest. Theresa tirelessly prepared many of the current and historic spatial data sets, including hundreds of spatial entities, for placement online. Many other accomplishments include creating of a new site map, developing web pages including interactive mapping applications, and developing a comprehensive map of all experimental study sites on the Andrews Forest. Theresa also spent many years as Chair of the GIS Committee of the LTER Network. Theresa, you will be missed!

Left: *John Moreau on Carpenter Mountain during a cone count field sampling in 2015.* Right: *Theresa Valentine sampling permanent vegetation plots in 2008.*

Forest on Display

An extensive collection of images, early maps, artifacts, and literary excerpts honoring forests is on display in the Special Collections and Archives Research Center on the 5th floor of the OSU Library this spring and summer. Several Andrews Forest folks assisted Archives staff and Spring Creek Project colleagues in assembling this display which addresses the forest as habitat, provider, laboratory, studio, sanctuary, and classroom. Display items and a timeline trace evolving human relations with forests in the Pacific Northwest from ca. 1900 to the present—and into the future. The over-arching message: we are thoroughly connected with the region's forests and the nature of these connections changes inexorably over time.

Display at the OSU Special Collections and Archives Research Center, spring and summer 2016.

Tracking Snowmelt in a Mountain Ecotone

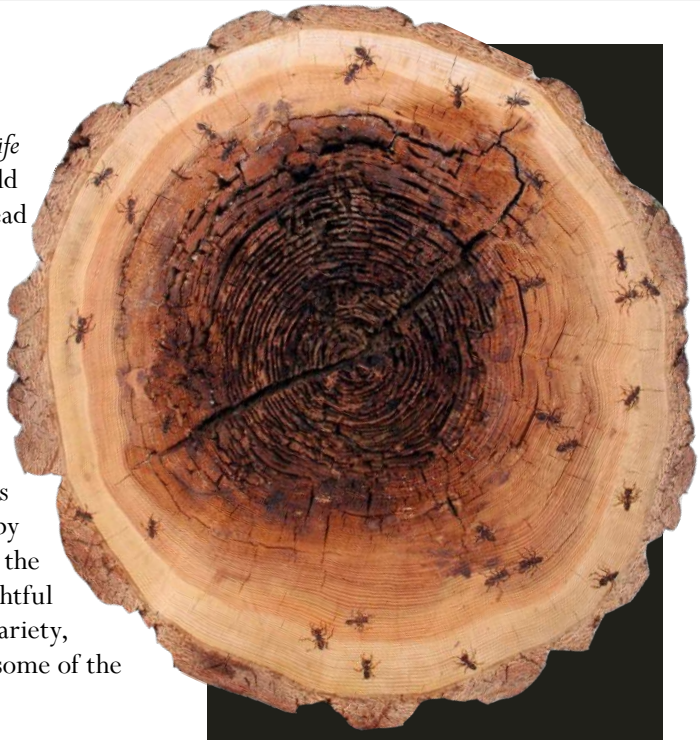
Seasonal snowpack dynamics are directly relevant to plant ecology.

What vegetation changes are we likely to see as climate change progresses in the mid-elevations of the Western Cascades? The answer to that critical question will depend in part on the extent to which seasonal snowpack dynamics change along with global and regional climate. Tihomir Kostadinov and Todd Lookingbill investigated the potential to use MODIS satellite data to track snowmelt in the hemlock-true fir ecotone of the Western Cascades in a recent article in the journal *Remote Sensing of Environment* (doi:10.1016/j.rse.2015.04.002). The research is part of a long-term project, which Lookingbill started as an Andrews Forest graduate student in the early 2000s, aimed at understanding vegetation dynamics in this ecotone. While conducting a gradient analysis of plant communities on the Andrews Forest, Lookingbill became interested in the ecotone between hemlock and true fir plant communities, and developed predictions about which areas in this elevation zone (1242-1443 m) would first display community changes in response to climate change. Lookingbill and colleagues have been monitoring vegetation dynamics in these areas ever since. Seasonal snowpack dynamics in this ecotone exert a strong influence on fine-scale forest processes, such as seedling recruitment and mortality. The timing of snowmelt influences the length of the growing season for understory plants as well as soil moisture conditions during the peak growing season. Kostadinov and Lookingbill found that MODIS Terra snow products were useful in estimating snow cover and disappearance during the snowmelt season, metrics directly relevant to plant ecology. Interannual variability was high and related to global climate oscillations, which means at least three decades of continuous satellite records would be required before a climate change trend could be detected with this type of data. The study also points to the need for more ground measurements of snow under closed canopy forests for validation and improvement of remotely sensed datasets.

Arts and Humanities

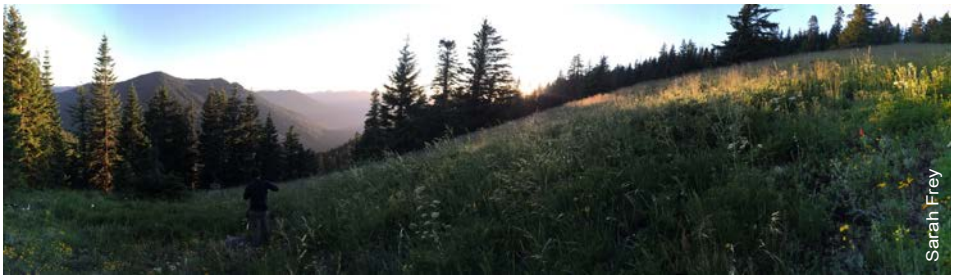
Arts and humanities are bursting out of the seams of the Andrews Forest. Works of 24 artists centered on the theme *ROT: The Afterlife of Trees* have been displayed in The Corvallis Arts Center and the World Forestry Center in Portland this winter and spring. Mark Harmon, head rotter (decomposition scientist and forest ecologist) for the Andrews, conceived of this arts project as the outreach component of a National Science Foundation grant to synthesize his career's work, capped in grand fashion by his 200-year log decomposition study now in year 31. A beautiful catalog documents many of the works illuminated by writers' statements, short essays, and a sampling of decomposition poems.

A collection of writings by three dozen of the more than 70 writers in residence at the Forest was published in the book *Forest Under Story* by University of Washington Press. As Ursula Le Guin comments, "Like the old-growth forests where they were written, these wonderfully thoughtful descriptions, essays, poems, and meditations offer rich and vigorous variety, exquisite detail and broad vistas of time and possibility." Excerpts of some of the writings have appeared in earlier editions of this newsletter.



Image, top right: "Round" by Jeanne Drevas. Wood burning on Douglas-fir, part of ROT Exhibit

Engaging Teachers in Field-Based Science



To build experience in field-based research, middle school teachers will assist researchers in a pollinator networks study in high-elevation meadows at the Andrews Forest.

The goal of the Andrews Schoolyard LTER program is to expand the capacity of Oregon educators to engage their students in field-based science inquiry inspired by Andrews Forest LTER science. In June, middle school educators from across Oregon will participate in a workshop led by the Oregon Natural Resources Education Program (ONREP), our Schoolyard LTER partner. During the workshop, educators will work with Andrews Forest hummingbird researchers Mattew Betts, Adam Hadley, and Sarah Frey to explore ways to engage their students in field investigations about hummingbirds, building upon a Hummingbird Citizen Science Project funded through an NSF grant to Betts and Hadley and funding from the Gray Family Foundation. Workshop participants will help the hummingbird research team collect data on pollinator networks in high-elevation meadows. Educators will build their understanding of field-based research and how it relates to the science inquiry process they teach their students. ONREP staff will help teachers identify and plan field-based projects in which they can engage their students on their school site and in their communities. Participants will explore approaches to connecting science and art in their teaching. The project aims to reach large numbers of Oregon middle school students. We expect 15 educators who reach a conservative total of 1,500 students to participate in this unique professional development opportunity.

Support 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 a range of scientific projects at the Andrews Forest, as well as education and outreach programs.

For instance, private support is helping us preserve the history of the HJ Andrews Experimental Forest through an effort to inventory, organize and digitize historic records, including records of HJ Andrews, the man, who was very influential in mid-20th century federal forestry in this region. Gifts from people like you also help to support the Canopy Connections program for 200 middle school students per year.

You can make a lasting impact on our work with a gift to support the Andrews Forest. To learn more, please call 541-737-8480 or visit *http://andrewsforest.oregonstate.edu/donate*