Andrews Forest NEWSLETTER

Issue 23 Fall 2018

A Stream Through Time

In this 70th anniversary of the experimental forest now named for H.J. Andrews, it is fitting to reflect on examples of long-term trajectories of land change and the evolution of long-term science. An ongoing research theme in ecology is the study of how systems respond to environmental impacts. One of the unique aspects of a long-term ecological research program is the ability to assess not only the impact of a perturbation but also the recovery from that disturbance. This is well illustrated by some of our work on stream ecosystems in the Andrews Forest.

In early stream studies at the Andrews Forest, ecologists were surprised to find that the biomass of cutthroat trout and salamanders appeared to be greater in stream sections where the adjacent forest had been clearcut relative to stream sections in old-growth forest. The biomass difference prompted graduate student Michael Murphy and mentor Jim Hall to go out in the late 1970s and sample streams along paired forested and clearcut areas. They found that the clearcut-adjacent stream reaches did have more fish and more salamanders. They attributed the greater biomass in the clearcut section to higher light levels, which supported algae and stream invertebrates that are food for fish and salamanders. The study was a snapshot in time, though. It did not consider how streams would respond as the forest recovered, or what other factors might affect long-term changes in fish and salamanders.

These were questions that Stan Gregory had when he began a long-term assessment of fish in Mack Creek in 1987, a study that continues to this day. And these were questions that graduate student Matthew Kaylor and mentor Dana Warren had when they returned to the exact same sections of stream that were first sampled by Murphy and Hall 38 years earlier. Matthew found that in 2014, the formerly clearcut sites had largely grown over and that fish and salamanders were now as or less abundant in those sites relative to their old-growth counterparts. These results indicated that early increases in fish production did not persist and that regeneration of a dense riparian forest in planted forest stands could create a prolonged period of lower productivity.

Ultimately these studies demonstrate the importance of long-term research assessing not only landscape disturbances but also subsequent response of the environment and its biota. As forests across the west continue to change we will continue to return to these and other bellwether study sites to refine and revise our understanding of Pacific Northwest forested ecosystems.

Matthew Kaylor resampled streams in 2014, following a 1970s study on effects of clear-cut logging on fish and salamanders.

Celebrating 70 Years of Forest Scholarship

"Oregon's hidden gem." That's how eminent Oregon historian Bill Robbins, Emeritus Distinguished Professor at Oregon State University, refers to the HJ Andrews Experimental Forest in the Cascade Range east of Eugene. In his article "The HJ Andrews Experimental Forest: Seventy Years of Pathbreaking Forest Research," scheduled for publication in the Winter 2018 issue of the Oregon Historical Quarterly, Robbins recounts the 70-year history of the Andrews Forest—the research program and its influence on forest policy and management. Robbins's article calls attention to the Andrews Forest and the stories of its early influences on public perceptions of forests and streams.

Also through Robbins, the HJ Andrews Experimental Forest is featured in a 2018 entry in "The Oregon Encyclopedia," an online reference of the Oregon Historical Society. See *https://oregonencyclopedia.org*.

This 1954 photo shows the Carpenter Mountain fire lookout and the HJ Andrews Experimental Forest watershed valley behind the lookout.

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


Tom Spies

At a recent talk by Andrews Forest friend, the Corvallis writer and philosopher Kathleen Dean Moore spoke eloquently, powerfully about the importance of imagination. Our environmental challenges, she suggested, are the greatest challenges ever faced by humanity. They require so many things of us, not the least of which is the ability to imagine our way into the future. At the end of her comments, Kathleen quoted the writer Erica Jong who wrote: "*In my dream, the angel shrugged and said, 'If we fail this time, it will be a failure of the imagination.' And then she placed the world gently in the palm of my hand*." I have been haunted by those words for weeks.

Whether we are comfortable with this reality or not, we who work to understand the way ecosystems function so as to better care for our shared biotic community are critical partners in the work of imagining our way into a future worth wanting.

This issue of our newsletter reminds me of the community of imaginers we are. From stream ecologists to conservation ethicists, from artists and musicians to the those who tell the stories of the Andrews program over time, from citizens who help track the seasons to ecologists who track bird survival strategies in a warming world, our program is positioned to not only help, but lead society in this great exercise of the human imagination. Our hands now hold the world.

—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—Allison Swartz


Lina DiGregorio

Allison studies how forest canopy structure affects nutrient uptake and stream metabolism.

Allison Swartz is a Master's student who has been working in and along streams of the HJ Andrews Experimental Forest for the past two years. Her research uses an experimental approach to follow up on the results of Kaylor *et al* (see page 1) and explores how forest canopy structure influences aquatic ecosystems, specifically how light from canopy gaps can enhance bottom-up processes that promote increases in primary and secondary production in headwater ecosystems. Allison's research focus has direct application to the Andrews Forest and to streams across the broader landscape of western Oregon where we see ongoing changes in forest age and structure along stream corridors in response to current and historic forest management. Allison just finished her final summer of fieldwork at the Andrews Forest where she not only led research on her own project but also helped to mentor an undergraduate student honor thesis and two Research Experience for Teachers (RET) participants. Having now completed pre- and post-treatment data collection on her gap experiment, Allison will spend the next 6 months analyzing and writing up her findings. Preliminary analysis are promising so keep an eye out for papers and talks about Allison's results in the coming year.

Andrews Forest in NEON Lights

The National Ecological Observatory Network (NEON) is an NSF-funded environmental sampling program that has been deployed across the US over the past decade. The Andrews Forest LTER program is participating in NEON in several ways.

Sherri Johnson has been instrumental in the siting of a NEON stream monitoring site in McRae Creek on the Andrews Forest to track streamflow, water quality, fish, and other variables in conjunction with a streamside meteorological station. The data collection is compatible with our existing measurement sites and programs, so it expands our spatial coverage. The extensive and deep-time observations of our own observations systems provide geographic and temporal context for the NEON data.

Christopher Still runs complementary studies on canopy ecology and ecophysiology at the Wind River NEON site and the Andrews Forest LTER site.

Julia Jones has been part of two NSF-sponsored projects to develop synergies among NSF's LTER, NEON, and the Critical Zone Observatory networks. These three programs differ in concept and strategy of deployment, but many measurements are in common or are complementary, so researchers are identifying opportunities for collaborations in ecosystem modeling.

NEON was set up "to understand ***how*** our aquatic and terrestrial ecosystems are changing." Paired with the LTER, we can assess ***why*** changes are occurring.

Stream measurements by LTER and NEON are complementary and allow a broader spatial coverage.

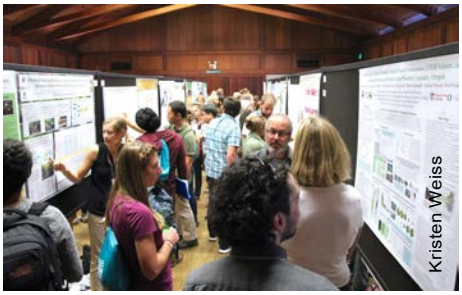
Ethical Dimensions of Forest Management

The scientific dimensions of forest management are well appreciated and researched, but its ethical dimensions receive comparatively little attention. In a new paper, Chelsea Batavia and Michael Paul Nelson illustrate how ethics pertain to the debates around federal forest management, carbon storage, and climate change mitigation.

As public lands, federal forests are supposed to be managed for multiple uses in a combination that best meets the needs of the public. Managers have tried to balance objectives such as timber, wildlife habitat, and recreational access. Over the past decade, national policy directives added carbon sequestration and storage to the suite of public benefits federal forests should provide. However, national policy does not specify when, why, or how climate change mitigation should be operationalized in forest management practice.

Batavia and Nelson investigate whether forest managers have enough direction to balance carbon storage and sequestration with other objectives, given only the charge to serve the public good and a mandate to manage for multiple uses. They employed a philosophical method called argument analysis to show that policies predicated on these two overarching principles—the public good and multiple-use—do not in themselves suggest any specific management actions or objectives on the ground. Particularly in the context of global climate change, public values can be defined at multiple spatial and temporal scales. To arrive at an actionable conclusion ("we should do X") requires managers to make judgments about which public(s) they serve, and how much the interests of those publics count relative to one another. Although also informed by broader political and social considerations, these judgments also fall squarely in the domain of ethics, potentially impacting the welfare, representation, and rights of forest stakeholders. The paper was published in the journal *Climatic Change*.

All Scientists Meeting



Twenty five researchers, including nine graduate students, represented the Andrews Forest at the LTER Network's All Scientists Meeting, October 1-4, 2018. The meeting featured workshops, talks, and poster sessions to highlight the meeting's theme, "Next Generation Synthesis: Successes and Strategies." Andrews Forest researchers presented on topics such as wireless instrumentation, food webs, arts and humanities, educational tools for data exploration, and climate change at LTER sites. The All Scientist's Meeting, which happens every three years, offers the 28 sites across the LTER Network the opportunity to connect and share ideas.

Catch us on OPB!

Researchers at the Andrews Forest, and the forest itself, are featured in an Oregon Public Broadcasting (OPB) EarthFix television show, "Old Growth Could Be Key For Native Songbird Species To Beat Climate-Change Heat." Get a stunning, bird's-eye view of the forest from above the trees, and through the canopy, and find out what scientists are learning about how birds may be using the old-growth forest to beat the heat: *https://www.opb.org/television/programs/ofg/segment/climate-change-heat-oregon-washington-hermit-warbler-birds/*

Arts and Humanities

Last summer Portland drummer and sound artist Lisa Schonberg created a music piece based on recordings of Lookout Creek using submerged and surface microphones. Inspired by Leah Wilson's *Ambient* paintings of the colors of water, Lisa became excited about "taking readings/documentation of the myriad of sonic textures, pitches and combinations that can occur in that one point—and thus making a tangible representation of what might ordinarily seem like an indecipherable stream of noise." So, Lisa sampled the sounds at sites where Leah had sampled the visual qualities to compose her paintings and where David Bayles had photographed the stream (see the Spring 2018 Newsletter). Lisa "thought about the immense musicality of stream acoustics" as she composed *Lookout Creek: Eighth Notes*, which was played at the August *Old Growth Dialogues* photography exhibit of David Bayles, and at Leah Wilson's *Collecting Evanescence* exhibit of paintings in October at the Joan Truckenbrod Pop Up Gallery in Corvallis, Oregon.

Sound artist Lisa Schonberg works at the intersection of ecology and art.

Oregon Season Tracker

About fifty Oregon Season Tracker (OST) citizen scientists, teachers, OSU Extension personnel, and researchers gathered at the Andrews Forest to exchange ideas and inspiration at the Oregon Season Tracker retreat in mid-August 2018.

Oregon Season Tracker is a project of Oregon State University that aims to link natural resource managers, educators, researchers and others in the community through collaborative citizen science. Oregon Season Tracker is a joint program of OSU Extension and HJ Andrews Experimental Forest Long-Term Ecological Research program.

The OST retreat created an opportunity for volunteers to visit with researchers from Oregon State University and the US Forest Service to learn about the work they are doing. Most importantly, the retreat was a chance for the OST volunteers to see how their observations at home, woodland or school yard contribute to work being done at the Andrews forest and elsewhere. It made a strong impression. "I feel that I am contributing important data and observations that matter to researchers," said one OST volunteer. All seemed to head home with renewed enthusiasm and dedication to their science work. "I became a volunteer because I felt there was a need and a value, but it was here that it became real for me," commented a volunteer.

OSU graduate students (on right), Karla Jarecke and Emily Crampe, share their research on hydrology and soil moisture.

Support the Andrews Forest

Did you know that you can, through a charitable gift, support research, educational programs, and facilities at the Andrews Forest? Some people have specific ideas for support, like a long-term monitoring project, or training for K-12 school teachers, or even new furniture for the apartments. Others give to support a broad range of activities at the Andrews Forest, and every gift helps. Gifts from people like you provide a lasting impact.

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.

We encourage you to support the Andrews Forest. To learn more, please call 541-737-8480 or visit *http://andrewsforest.oregonstate.edu/donate.* Thank you for being part of our future.