

# Andrews Forest NEWSLETTER



Issue 21

Spring/Fall 2017

## Leaf Litter and Carbon

Sherri Johnson represented the Andrews Forest in a global synthesis of the role of temperature in leaf litter breakdown and carbon export in streams and rivers. A recent paper in *Global Change Biology* reports analysis of more than 1,000 records of litter breakdown and identified groups of plant species with a range of litter breakdown rates as a function of temperature. Breakdown rate varied with leaf litter quality and microbial and detritivore community responses to temperature. The results suggest that average litter breakdown rates may increase by 5–21% with a 1–4 °C rise in water temperature, which is about half the increase predicted by metabolic theory. The relative proportions of gaseous vs. particulate loss of carbon downstream are not expected to change with increasing water temperature.



Leaf litter breakdown rates in streams increases with a rise in water temperature.

## Streamflow Reflects Land Use Decades Later

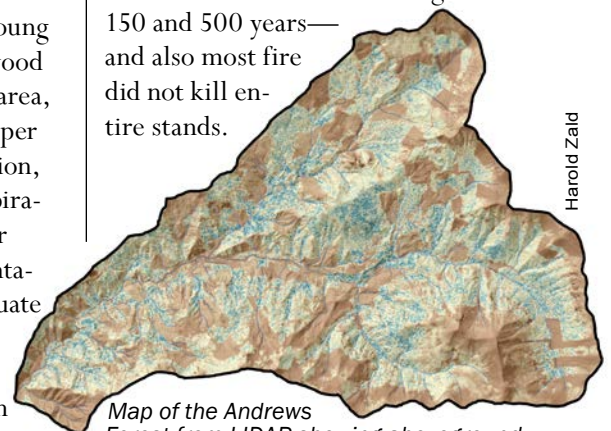
Former MS student Tim Perry and professor Julia Jones recently published an article in *Ecohydrology* based on analysis of 60-year records of daily streamflow from eight experimental watersheds at Andrews and South Umpqua Experimental Forests. They found that average daily streamflow in summer in watersheds with 34- to 43-year-old plantations of Douglas-fir was 50% lower than flow from reference watersheds with 150- to 500-year-old forests dominated by a mix of conifer species. Study plantations are comparable to managed forests widespread throughout the region. Young Douglas-fir trees, which have higher sapwood area, higher sapflow per unit of sapwood area, higher concentration of leaf area in the upper canopy, and less ability to limit transpiration, appear to have higher rates of evapotranspiration than older conifers. Reduced summer streamflow in watersheds with forest plantations may limit aquatic habitat and accentuate warming of streamwater. This highlights the importance of continuing long-term studies because streamflow and ecosystem responses to forest practices may continue to develop decades after logging.



Summer streamflow was lower in watersheds with plantation forests.

## Carbon Density and Land Use Legacies

Harold Zald, a recent OSU PhD graduate and now a professor at Humboldt State University, led a team using high-resolution LIDAR imagery to assess carbon storage in forests blanketing the Andrews Forest landscape. Their paper in *Forest Ecology and Management* reports that the complex mountain topography and disturbance history of the Lookout Creek landscape cause substantial variation in the amount of carbon stored aboveground in live trees. Verifying the remote sensing data with observations from 702 field plots, they mapped standing carbon stocks and found that the history of clearcutting had the greatest impact on change, although it affected only 23% of the landscape. It is interesting to note that the resolution of LIDAR is adequate to detect growth in plantations over a six-year period, based on comparison of assessments of repeated flights. Past wildfire history had little effect on standing stocks of carbon in part because the time elapsed since disturbance is much longer—about 150 and 500 years—and also most fire did not kill entire stands.



Map of the Andrews Forest from LIDAR showing aboveground live carbon (ALC) density, in Mg/ha, where areas of high ALC density are shown as blue and low ALC density as brown.



HJ ANDREWS EXPERIMENTAL FOREST

## The Andrews Forest Newsletter Issue 21 Spring/Fall 2017

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

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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.



**Oregon State  
University**

## Letter from the Leadership

"Kudos," "impressed," "uniformly positive," "outstanding," "commends," "astonishing," "productive," "excellent," and "!". These are some of my favorite words, and punctuation. They are also words and punctuation that peppered the report from the National Science Foundation (NSF) and the mid-term review team after their visit to the Andrews Forest in early August. We nailed it, we hit it out the park, we totally rocked it. They loved the forest, they loved our graduate students, they loved our information management, they loved our stories, and they loved our research.



Isaac Asimov wrote, "Your assumptions are your windows on the world. Scrub them off every once in a while, or the light won't come in." A mid-term review is the perfect time to scrub our windows. And much like scrubbing windows, while the process is painful and dreaded, we love the result. Our elaborate preparation process for the mid-term is not that dissimilar from our renewal process: it is a moment of deep reflection on the interconnected whole of what we do—a whole which is enormously diverse and complex.

A gigantic thanks to all of you who participated in the 10 months of planning and 4 days of execution of our LTER mid-term review. It was hectic and hot (with record or near-record temperatures), busy and bustling, but it was also fun to share our work and our place with the review team and the NSF representatives.

And the work goes on. This issue of our newsletter is a perfect illustration of why our program is so successful and exciting: from carbon and stream flow, to land use legacies, to new fresh faces, to retirements of deeply esteemed colleagues, to the loss of a dear Andrews and LTER friend, to our efforts in diversity and inclusion, and beyond. We are a blooming and buzzing hive of activity.

—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—Emily Heaston

Emily Heaston first came to the Andrews Forest as an undergraduate field technician in summer 2014. Two years later, the paired old-growth/second-growth stream sections that Emily worked on as an undergraduate provided an ideal set of study sites for a light manipulation experiment she began for a graduate program with Dana Warren in the Department of Forest Ecosystems and Society, OSU. In spring 2016, Emily strung up tarps over sections of Lookout Creek and McRae Creek. She then evaluated how the food web in each stream section responded to this patchy change in stream light. Emily found that creating patches of shade over the stream led to declines not only in the amount of stream algae—which we would expect since algae needs light to photosynthesize—but also in the abundance of stream insects (which eat the algae) and of fish (which eat the insects). Emily's study demonstrated that even small changes in light along a stream can affect the whole stream food web.



Emily presented her work on light and streams at the NSF mid-term review in August 2017.

Lina DiGregorio

## Juntos, at the Forest

Juntos (Spanish for “together”) participants gathered at the Andrews Forest this spring. Juntos began in 2007 as an OSU initiative to increase Latino representation in higher education and prepare students through a college readiness program, helping students navigate the steps toward entering and succeeding in college. The event at the Andrews Forest brought together students, professors, and professionals (and their families) to share what Latinx identity means to them. Andrews Forest researchers Ivan Arismendi and Brooke Penaluna, and graduate student Sativa Cruz, participated in the event.

Resonating with our larger Andrews Forest program, the Juntos gathering celebrated culture and place, and also food and music and dance and family. Graduate student, Sativa Cruz, put it this way, “I appreciated that we weren’t expected to leave the creative aspects of ourselves out of the conversation. Conducting ecological research is often associated with being the quiet observer, allowing the environment to reveal secrets through careful observation and measurement; our interaction with the forest was a time for the celebration of who we are, our experiences, and an opportunity to create a living memory with the forest.”



Juntos participants conversed around the firepit, sharing connections to one another and the forest surrounding them.

## Staff Retirements and Welcomes

We thought royalty had lifetime appointments, but our Queen of the Newts, **Kathy Keable**, retired in spring 2017. As Site Manager, Kathy was critical to station operations, but equally important was her work to make the field feel like home. Kathy’s commitment to environmental education led her and co-conspirators Theresa Damron and Katie Lynch to develop the highly-acclaimed Canopy Connections middle school education program. The Andrews’ loss is the McKenzie Valley’s gain; Kathy now dedicates even more energy to her prodigious volunteer efforts. We thank **Brenda Hamlow** for stepping in expertly as Acting Site Manager.

After completing the longest artist residency in the history of the LTER network, **Terry Cryer** retired as maintenance lead in November 2017. Over the course of twenty eight years of full-time employment at the Andrews Forest, and nearly a decade of part-time and volunteer work prior to that, Terry had the opportunity to work in nearly every medium—from landscaping painting and sculpture to performance art at the annual Safety Day training. In between art projects, Terry led construction of many of the buildings at headquarters and at remote research sites, maintained more than 40,000 square feet of infra-

structure, and helped countless students and researchers design and build creative tools and gadgets for experiments. Terry’s contributions to the Andrews Forest are too diverse to list, but touched every member of the community, whether they realized it or not. Terry moved to Louisiana to be with family. We hope to see him back at the station from time to time. We welcome **Rod Fouts** and **Doug Fairrington**; maintenance operations are now in their capable hands.



Kathy Keable (above) and Terry Cryer (below) made the Andrews Forest headquarters facility feel like a home.

## In Memory— Henry Gholz

Henry Gholz’s engagement with the Andrews Forest spanned several generations of researchers. He completed his PhD on primary productivity in vegetation zones of the region under the tutelage of Dick Waring in the late 1970s. Henry went on to a successful career at University of Florida before moving to the National Science Foundation where, over a 15-year tenure, he served as Program Director for several programs, including Long-Term Ecological Research (LTER). He was recently recognized as a Distinguished Alumnus of the Department of Forest Ecosystems and Society, OSU. During a visit to campus, Henry reflected on lessons he learned about the importance of team chemistry and altruism in the leadership of large, interdisciplinary projects, such as at LTER sites. For Henry, personal successes were satisfying early in his career, but as time passed he found professional and personal satisfaction in larger team efforts and the nurturing of new generations of researchers. We are deeply saddened by Henry’s untimely death in a climbing accident in his beloved Rocky Mountains of Colorado.



## Arts and Humanities

*“With their death transformed into so much life, I wonder if it’s a pleasure for trees to know that when they die, a community will appear. Surrounded by all this rot, by mosses which are draped everywhere like Christmas tinsel, I see no waste here. This is the forest’s version of a mausoleum—a mossaleum—except there are no embalmed bodies. Quite the contrary. This is death robust with life.”*

—John Bates, writer associated with North Temperate Lakes LTER and an HJA resident, from *What Hath God Rot?* 12/1/15



Lina DiGregorio

## Numbers in Nature

The Numbers in Nature project is a teacher-scientist partnership that supports teachers in developing and implementing authentic and relevant math and science learning opportunities based on data about Oregon’s natural environment. Teachers visit field sites and connect with scientists to learn how to use long-term datasets to tell stories of places or ecological phenomena. Teachers and scientists then collaborate to build and implement 4-12<sup>th</sup>-grade math and science curriculum based on these datasets. For example, a team of 4<sup>th</sup>-grade teachers developed a landslide and erosion unit that introduced landslide data from the Andrews Forest LTER site followed by erosion table experiments and development of erosion models. A middle school math/science team focused their entire year on the theme of climate change, and started an “experimental forest” near their school where they set up long-term forest plots to measure carbon storage of the



Kari O'Connell

*Teachers and scientists work together to connect data to classroom curriculum.*

trees. A high school teacher engaged her students in a study investigating western larch phenology in the parking lot and a natural area near their school. To date, 29 math and science teachers (grades 4–12), reaching over 3,000 students per year, have participated in the project. Next steps for the Numbers in Nature project are to bring together a group of math teachers and scientists to develop “warm up” learning activities based on long-term datasets that can be shared with math teachers beyond the project.



Michael Giamellaro



Lina DiGregorio

## 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.

In this season of giving, 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.