



10 YEARS IN NUMBERS

The Spring of 2015 marks the 10th year of the Hardwood Ecosystem Experiment. In an effort to commemorate such an important milestone, consider the following figures that represent the hard work of those involved in HEE research and outreach:

26-Total number of research projects conducted in the HEE

114-Total number of HEE project inventories completed to date

25-Total number of graduate students who have worked in the HEE to date

26-Total number of scientific articles published using HEE data

193-Total number of field technicians hired to work in the HEE

For a long-term study in its infancy, these numbers are impressive for a variety of reasons. Not only has the number of study taxa increased since the HEE's inception, but so has the total number of graduate researchers and undergraduate field technicians. These numbers reflect both the experiment's burgeoning interest with young and budding scientists, as well as the ever-important ability of HEE principal investigators to recruit these individuals to a diverse number of fascinating projects. The growing interest, recruitment, and number of new and ongoing projects are promising signs that the Hardwood Ecosystem Experiment has become and will remain a powerhouse of important ecological research.

SPRING BURNS: SUCCESSES AND LESSONS LEARNED

On April 1st, Division of Forestry Fire Management personnel spent the morning establishing fire breaks in two adjacent HEE units in Morgan-Monroe State Forest. By exposing bare mineral soil and felling snags, the crews drastically reduced the risk of fire escaping containment. Meanwhile, a team of Purdue fire scientists rushed to install sensory equipment within the units to quantify fire behavior. At 1PM, the firing crew had a final safety briefing and began operations. Starting on the northern anchor-point, a team of three worked south along the western fire break, setting a low intensity fire to consume fuels and further increase the width of the break to decrease the momentum of the oncoming headfire. Lagging behind the western crew, the remainder of the crew set a high intensity fire along the eastern break. As intended, the two fire fronts converged, slowing the fire's momentum, exhausting fuels, and starving the fire. Afterwards, personnel fell smoldering snags and other potentially hazardous trees, ending operations around 5PM.

The fire burned cooler in the unit with the northerly aspect, and hotter in the unit with the southerly aspect. Flame lengths reached a maximum of 3 feet in the cooler unit, and 6-8 feet in the hotter unit. Generally, the two units burned well, however there were several spots that did not ignite, which was to be expected after a cool and wet Spring. The HEE prescribed fire program initially planned to burn four research units this Spring, however the number of days with favorable "fire weather"-the combination of atmospheric stability, litter moisture, and humidity needed to carry fire safely- was limited to one afternoon and therefore only two units were burned. The immediate take-home message is that prescribed fire, while a useful tool for oak regeneration, can be difficult implement due to its heavy dependence on weather.

HEE RESEARCH SPOTLIGHT

Water Chemistry Responses to Even-Aged Stand Management

Dr. Todd Royer, Associate Professor, School of Public and Environmental Affairs, Indiana University

Water chemistry responses to forest management practices are a very important, yet unstudied aspect of the Hardwood Ecosystem Experiment. It is well understood that responsible forest management, coupled with best management practices in riparian zones, can reduce nutrient and sediment runoff into local waters. However, there are some impacts of even-age stand management—specifically clearcuts—on water chemistry that are not fully understood. Of particular interest is how water chemistry might change in the coming years in response to fires and forest regrowth.

Dr. Royer seeks to monitor water chemistry both upstream and downstream of the even-age stand on unit 3 in Morgan-Monroe State Forest by analyzing the following variables from each water sample: nitrate, ammonium, soluble reactive phosphorus, dissolved organic carbon, alkalinity, and major cations. Other factors Dr. Royer will be quantifying through this experiment are water temperature and stream stage (height of water at particular point and time). In order to achieve these objectives, Dr. Royer's lab will be



collecting water samples by hand, as well as installing pressure transducers and temperature loggers.

We look forward to incorporating water chemistry research into the Hardwood Ecosystem Experiment, as water quality can play a very important role in the ecological health of both local streams, and regional watersheds. If you see Dr. Royer or any of his research associates in the stream by the clearcuts in unit 3, please extend them a warm welcome!

HEE Harvest Panoramas, Spring 2015, 7th Year Post-harvest

No Harvest



Single-tree selection



1 ac. patch cut



10 ac. clearcut



Some Snapshots from the 2015 HEE Field Season



a.



b.

Photo captions (clockwise from upper left):

a. Dr. Michael Saunders sizes up a potential veneer-quality tree within one of the Spring prescribed fire units. Temperature dataloggers were deployed at different heights along the bole to assess fire intensity impacts on veneer trees.

b. An employee from the Division of Forestry, Fire Management crew ignites a backfire from the western fire-break. These “backfires” are a strategy in firing operations used to increase the width of the firebreak, thereby decreasing the risk of fire “jumping the line” (i.e. escaping the containment of the fire break). *Photo credit: Dr. Bryan Murray*



e.



c.

c. Dr. Jeff Holland from Purdue Entomology scales a juvenile American Beech (*Fagus grandifolia*) in order to hang a window trap--one of four types of beetle traps he deploys each spring. Samples from these traps will be collected every 3 weeks in an effort to understand diversity and abundance of several beetle taxa. This year, Dr. Holland will focus his sampling effort in the matrix, i.e. the unharvested landscape surrounding harvest units.



d.

d. Division of Forestry Fire Management personnel meet for the safety and operations briefing before implementing the burn. Dr. Michael Saunders (second from right) briefs the personnel on research objectives.

e. Due to the wet and cool Spring, the prescribed fire had trouble carrying in some areas, burned intensely in other areas, and smoked heavily in others. Fortunately, atmospheric ventilation was favorable and conducive to proper smoke management. This was the view from Main Forest Road in Morgan-Monroe State Forest. The road served as the southern fire break and anchor point for the firing operation.

*Do you have any pictures from any HEE related event or activity?
If so, you can submit them to Patrick Ma (ma376@purdue.edu) for archiving.
Please include any information about the pictures*

New HEE Graduate Students

Clayton Delancey



Clayton is originally from Pennsylvania and is a master's student at Ball State University studying cerulean warblers (*Setophaga cerulea*). His thesis involves attaching

radio transmitters to fledglings in order to track them to look at habitat differences in the post-fledging stage. This will help him determine silvicultural treatments to better manage forests to support cerulean warbler habitats.

Patrick Ruhl



Patrick is a Ph.D. student at Purdue University studying avian ecology with Dr. Barny Dunning. He is using constant-effort mist-netting in the HEE clearcuts to explain the association of mature forest birds with early successional habitat during the post-fledging period.

In addition to comparing avian site-use with environmental variables (e.g., fruit abundance, insect biomass, and vegetation density), Patrick also plans to use stable isotope analyses to corroborate trophic associations.

From the Project Coordinator

It is only fitting that we mark the 10th of the Hardwood Ecosystem Experiment by introducing an equally important forest management practice-- prescribed fire. A rapidly growing body of literature suggests that fire's role as an ecological disturbance was critical to vegetation dynamics, and therefore species diversity. When implemented properly, fire has been used to successfully regenerate desirable tree species such as oaks. However we must also consider fire's impacts on wildlife. How will the different taxa respond? On what scale can prescribed fire be incorporated into a multiple-use approach to sustainable forestry? How will the public perceive fire?

My name is Patrick Ma, and I am as honored as I am humbled to be working with the incredible team of HEE researchers. Born and raised in the great state of Maryland, I earned my B.S. in Biology from Elon University in North Carolina, and my M.S. in Forest Resources from Clemson University in South Carolina. Prior to accepting this position, I spent 6 months with the Maryland DNR Forest Service as part of the Chesapeake Conservation Corps.

As you can see from the photos and descriptions, this Spring has been -quite literally- a baptism by fire. With the many moving parts of the HEE, I am thankful that my first few months have moved smoothly. However, there is a tremendous learning curve with this position, and adding prescribed fire into the mix presents a challenge, both logistically and analytically. I gladly welcome and appreciate any advice, thoughts, or concerns in regards to current HEE projects, programs, and outreach. Please drop me a line!

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Hardwood Ecosystem Experiment

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