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Hardwood Ecosystem Experiment

THE HEE UPDATE

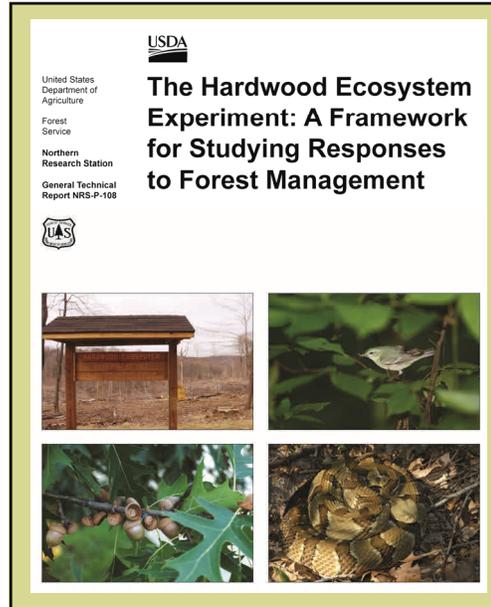
<http://HEEForestStudy.org>

Andy Meier, Project Coordinator | 765-494-1472 | meiera@purdue.edu

HEE GENERAL TECHNICAL REPORT PUBLISHED

After many years of hard work, the Hardwood Ecosystem Experiment is proud to announce the release of “The Hardwood Ecosystem Experiment: A Framework for Studying Responses to Forest Management.” This compendium of HEE data prior to timber harvesting in 2008-09 was published by the North-

ern Research Station of the USDA-Forest Service as General Technical Report NRS-P-108. All manuscripts in the document were reviewed by at least two anonymous scientists prior to publication.



The entire document spans a total of 350 pages and includes 21 chapters describing baseline conditions on all of the HEE sites before the initiation of harvesting treatments. It is intended to be a reference for future researchers as well as a resource for the general public. The entire manuscript is available free of charge online at <http://www.nrs.fs.fed.us/pubs/42882>. No printed copies are available, but requests for CD-ROMs can also be made at this website.

North American Forest Ecology Workshop

The 9th North American Forest Ecology Workshop (NAFEW) was held in Bloomington, Indiana from June 16-20, 2013. Dr. Mike Saunders, Purdue University associate professor of silviculture and HEE Executive Committee member, was the chair for the workshop, so the HEE was a central component of the program. One full-day field tour of the HEE sites and nearby Brown County State Park was scheduled which was attended by more than 20 scientists and natural resource managers from across North America. In addition, a session of oral presentations titled “Long-term Experiments in Managed Central Hardwood Forests” was organized along with the Missouri Ozark Forest Ecosystem Project (MOFEP) to highlight findings from these two studies.

The workshop was well attended, well received, and provided many opportunities to showcase the valuable work being conducted on the HEE. Many thanks are due to the researchers who took the time to present for the workshop. See <http://nafew.org> for the workshop agenda.



Ball State University graduate students Sasha Auer and Kevin Barnes presenting during the NAFEW HEE Field Tour

Habitat Selection and Roosting Ranges of Northern Long-eared Bats

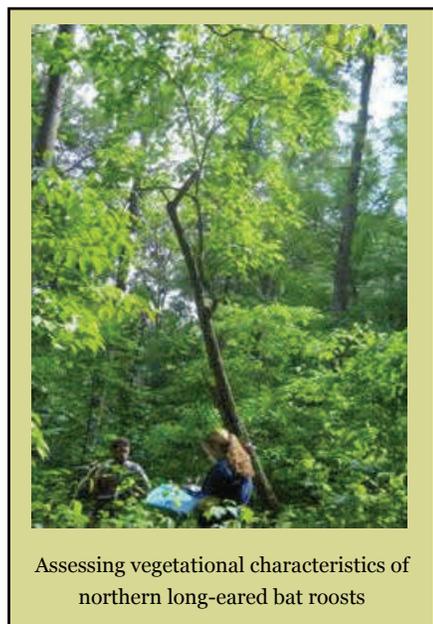
Holly Badin, M.S. student, Ball State University

Advisor: Dr. Tim Carter

Many common *Myotis* species, including the northern long-eared bat (*M. septentrionalis*) reside in forests over the summer where they depend on trees for roosting during the day. Since bats rely so heavily on their roost trees, determining the best timber harvesting practices is essential for effective bat conservation and management. The purpose of this study is to determine habitat selection and roosting range size on the microhabitat and stand levels of female northern long-eared bats in an ecosystem of differing forest harvest regimes in southern Indiana (the HEE). Data collected from this research project will be important because populations of northern long-eared bats are predicted to decline due to the emerging fungal disease, white nose syndrome.



A northern long-eared (r.) and big brown bat (l.) captured during mist-netting



Assessing vegetational characteristics of northern long-eared bat roosts

Bats were captured by mist nets in two designated areas per management unit. Female northern long-eared bats were fitted with radio-transmitters and tracked to their maternity roost trees during the day, where vegetative characteristics were measured. The same characteristics were measured around a randomly selected tree within 100 meters of the roost. I will be able to determine how the microhabitat around female MYSE roosts in a particular harvest regime differ when compared to the microhabitat around randomly selected trees in that same regime, and what characteristics these bats select for when choosing roost trees. So far, 17 northern long-eared bats were tracked to 40 roost trees: 37 were in the intact forest, two were in a shelterwood, and one was in a patch cut.

From a PCA analysis of the preliminary data, bats are selecting for trees with a higher DBH, trees on a flatter slope, dead trees over live trees, and trees with a higher decay class and thus more loose bark, which are in plots with a taller understory and taller overstory. I also plan to map the roosting ranges for each individual bat, and determine the distance from the center point of each range to the closest forest harvest and compare these distances to randomly selected points within the HEE area, to determine whether northern long-eared bats chose to roost further or closer to the harvests than random.

Note from the project coordinator: HEE research into the roosting ecology of northern long-eared bats is providing critical information at a critical time. Though the endangered Indiana bat has received substantial research attention, relatively little is known about its close relative, the northern long-eared bat. However, it is possible that, due to population crashes resulting from white nose syndrome, the northern long-eared bat may also be listed as an endangered species by the US Fish and Wildlife Service. Thus, HEE data may be instrumental in directing management of this widespread woodland bat species.



Try to spot the HEE Vegetation Crew in this picture from one of the clearcuts in Unit 6. Eight brave souls are in the process of completing the first comprehensive post-harvest inventory of HEE vegetation.

What's happening this summer?

- Comprehensive overstory and understory vegetation surveys
- Cerulean Warbler surveys
- Bat acoustic monitoring
- Bat mist-netting with radio-telemetry component
- Moth sampling
- Beetle sampling
- Summer Barred Owl productivity surveys
- White-tailed deer fawn study with radio-telemetry

Congratulations!

Olivia Leonard and Jon Moore, both recently graduated seniors at Purdue, won first place in the undergraduate poster competition during the Purdue FNR spring research symposium for their poster on habitat and occupancy of HEE sites by barred owls and eastern screech-owls.

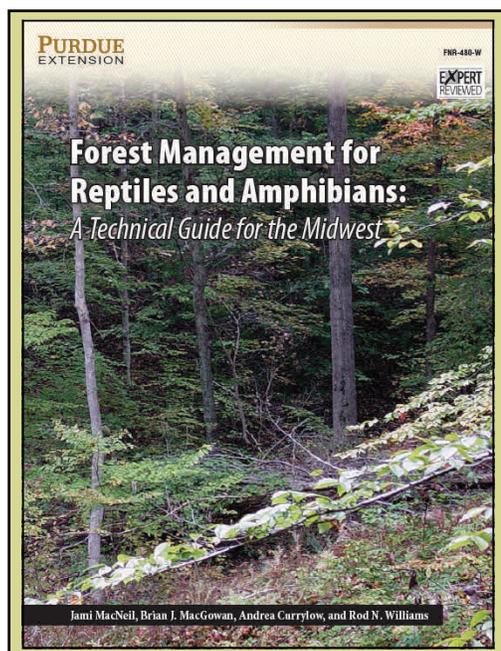
Do you have pictures from any HEE related event or activity?

If so, you can submit them to Andy Meier (meiera@purdue.edu) for archiving. Please include any information about the pictures.



More Recent HEE Publications

The last year has so far been productive in terms of extension and research publications from the HEE in addition to the HEE GTR. Below are a few highlights:



Former HEE M.S. student Jami MacNeil (advisor Dr. Rod Williams) led the development of the first major extension publication from the HEE. She and her co-authors used data from HEE amphibian and reptile studies to produce a technical guide to increase land managers' and landowners' awareness of issues related to these species in the context of forest management. The Purdue Extension Publication FNR-480-W is available for free download online at <http://www.extension.purdue.edu/extmedia/FNR/FNR-480-W.pdf>.

Another former M.S. student in Dr. Williams' lab, Andrea Currylow, is the lead author on two papers describing her work with eastern box turtles on the HEE. These articles were published in the *Journal of Wildlife Management* and *PLoS ONE* and are titled, respectively, "Hibernal thermal ecology of eastern box turtles within a managed forest landscape" and "Short-term forest management effects on a long-lived ectotherm." Brian MacGowan is a co-author on each of these papers.

Dr. Kamal Islam published a synthesis of HEE pre- and post-harvest Cerulean Warbler data with former graduate students Jennifer Wagner, Ryan Dibala, Margaret MacNeil and Lila Prichard-Young. It was published late in 2012 in the journal *Ornitologia Neotropical* and is titled "Cerulean Warbler (*Setophaga cerulea*) responses to changes in forest structure in Indiana."

Dr. Keith Summerville has an article in press at *Ecological Applications* characterizing moth responses to HEE clearcuts and stage 1 shelterwoods titled "Forest lepidopteran communities are more resilient to shelterwood harvest compared to more intensive logging regimes." He has another paper that was accepted in 2012 in *Insect Conservation and Diversity* called "Stability in forest lepidopteran communities: how sensitive are pest species to experimental forest management."



New HEE Graduate Students

Scott Bergeson

Scott is not new to the HEE, having previously worked on other HEE bat studies. However, he is a newly-minted Ph.D. student on the project and will continue his work using mist-netting and radio-telemetry to characterize woodland bat habitat on the HEE, with a particularly focus on the endangered Indiana bat (*Myotis sodalis*).



Katherine Caldwell

Katherine hails from North Carolina and is an M.S. candidate at Ball State University. Her interests center on applied bat ecological research. Katherine is examining bat activity levels in and around HEE treatments using high-frequency acoustic detectors. She aims to compare bat activity between treatment types and among differing locations within treatment areas. She is also quantifying bat activity in forested peripheries adjacent to treatment areas to better understand treatment effect on forest-dwelling *Myotis* bats.



Chad Williamson

Chad is an M.S. candidate at Ball State University working on a project to better understand dispersal and survival of white-tailed deer fawns in urban and rural environments. HEE research units are being used to provide the rural deer for this project. Chad and other technicians spent much of the early summer capturing newly born fawns and fitting them with radio collars; he will be tracking fawn movements over the next two years to increase our understanding of how fawn dynamics influence differences between urban and rural deer populations.



From the Project Coordinator

One of the biggest challenges in long-term projects is to maintain continuity over time. As interests and personnel change, it is easy for important information to get lost in the shuffle. In a recent paper by Laura Kenefic and others on the management of records from long-term field studies¹, the former U.S. Forest Service Deputy Chief for Research and Development is quoted as saying that “researchers leave tracks.” However, those tracks are meaningless if no one can even find the trail.

Consider that a roundabout way to introduce myself as the new project coordinator for the Hardwood Ecosystem Experiment. After completing my M.S. in silviculture last fall at Purdue, I had the privilege of stepping onto the HEE “trail.” I spent about a month with Rebecca Kalb as my guide but, as of January 1, 2013, I was left to maintain the path on my own.

The HEE is at an important time in its history. We’re nearing a decade since the project’s inception. Fifteen graduate students have come and gone, with another eight currently on the project. More than 100 undergraduate and post-graduate technicians have gained valuable experience on the HEE. Close to 20 PIs have participated, with more being tangentially involved. More than 20 peer-reviewed journal articles have been produced, along with the 350 page tome that is the HEE pretreatment General Technical Report.

Even with all of these past successes, the HEE continues to move forward. Much of the initial data comparing pre- and post-harvest conditions is being analyzed and is starting to be published. We’re also seeing the vegetational responses to the first round of harvests and are beginning to think about designing future treatments.

Both maintaining the “trail” behind and envisioning the “trail” ahead are imperative to the long-term success of this project. I am excited for the challenge!

A handwritten signature in black ink that reads "Andy Meier".

Andy Meier
HEE Project Coordinator

1. Kenefic, L.S., C.C. Kern, J. Brissette, M. Russell, L. Irland, A. Weiskittel and K. Bervan. 2013. Suggestions for maintaining records for long-term field studies. A supplement to papers by Bervan et al. and Kenefic and Kern (this volume). In: Camp, A.E., L. Irland and C.J.W Carroll. Long-term silvicultural and ecological studies. Results for science and management. Vol. 2. GISF Res. Pap. 013. New Haven, CT: Yale University, Global Institute of Sustainable Forestry: 126-133.



Hardwood Ecosystem Experiment

Purdue University
Department of Forestry and Natural Resources
Pfendler Hall of Agriculture, Room G021B
715 W. State St.
West Lafayette, IN 47907-2061



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