Hancock Biological Station
On Kentucky Lake

WSI Watershed Studies Institute
MURRAY STATE UNIVERSITY

CONFLUENCE

Director's Overflow by Michael Flinn

With the return of the unfamiliar warmth of the sun comes all things spring: flowers in bloom, birds singing before daylight and, of course, taxes. You may have been involved in discussions about how this particular spring was earlier than last year. Or, definitely earlier than when you were a kid.

The study of the timing of certain natural phenomena is called phenology. Research has shown that in many places around the world the timing of major events is changing. The most drastic changes are occurring in places where water is frozen much of the time (high latitude locations, i.e., the Arctic) and are shown by changes in the timing when lakes thaw in the spring or freeze up during autumn. As you could imagine, this major shift has a major effect on biological processes. But, even slight changes in phenology can influence patterns closer to home. For example, the life history of some insects is strongly influenced by highly predictable changes in light. We know, with almost absolute certainty, the length of each day (and night). Alternatively, some plants respond indirectly to the day length (sun) and more to soil temperatures resulting in more variability in spring flowering. A mismatch is produced when the pollinator is using light cues and the flower is using temperature cues. When every flower counts, or every drop of nectar and pollen may influence the success of a hive, then a single day of mismatch could change an entire season. The mismatch is amplified when shifts in timing occur over successive seasons.

Winter 2023/2024

Inside this Issue

More Information
Follow us:

Featured Staff: Jason Harris

Hello, my name is Jason Harris and my title here at Hancock is operations supervisor. I was born and raised in the small community of Watseka, Illinois. I moved to Murray in 2002 and have called this area home ever since. I obtained my B.A. in horticulture from MSU in the winter of 2022 and I am currently working toward my masters degree in Ag Education. This summer will be my 8th year at the station. My duties at the station include; grounds, buildings, vehicle maintenance, assisting students, faculty, and fellow coworkers with projects and field work. I also obtained a drinking and wastewater license for Kentucky DOW for our facilities' state compliance requirements.

My greatest passions in life, outside of my family, are working with plants and my position at Hancock is a perfect outlet. My life with flora before HBS was mostly involved with ornamental trees and shrubs but since coming to Hancock and getting to know and work with our natives, my passion now rests with natives exclusively. I also enjoy that no day here at Hancock looks the same. One day I might be operating a chainsaw on a forestry project and the next I'm helping out on a sampling cruise. I look forward to the future and to see what kind of impact my tenure here will do for the beautification and continued improvement of HBS and its campus.

Picture on left: Jason is sowing seed in the prairie. Middle picture: Jason is helping lay the grid in the road to the dock. Picture on right: Jason is driving field trip students for education on the lake.

Featured Student: Isaiah Radford

My name is Isaiah Radford, and I am from Hopkinsville, Ky. During the summer, I enjoy hiking and fishing. In the winter, I enjoy reading books, drawing, and painting. Nearly half of my family went to Murray State University, including my mother and my father, and I chose to follow in their footsteps. I started attending Murray State in 2020 and will get my Bachelor of Science in Wildlife Biology and Conservation this May. I am also excited to start my journey this coming fall as a Master's student at Murray State in the Biological Sciences Department, with a concentration in Watershed Science.

Wetland soils have anaerobic conditions, which help to store carbon by slowing the decomposition of organic material. However, these conditions also promote methane production by methanogens. This methane is then released from the soil to the atmosphere, acting as a greenhouse gas. As part of my independent research, I have been investigating if and how soil patchiness affects the levels of methane emission from these soils. Our team hypothesized that if a carbon source is clumped within the anaerobic soils, there will be lower methane emissions when compared to evenly spaced carbon sources due to limits on microbial growth and use of the carbon source.

To look at this, we have created mesocosms consisting of wetland soil and a carbon source, Bald cypress needles. Needles are either absent, clumped in one location, or evenly spaced out. Soils are left inundated to induce anaerobic conditions and we measure the methane emissions of each mesocosm weekly using a Li-Cor gas flux analyzer. We also look at the microbial community composition of the soil and measure the mass loss of needles over the larger incubation period. We have just begun our second trial. We hope to explain how the patchiness of natural carbon substrates influences carbon storage and methane emissions in these systems. For my M.S. research, I hope to expand on this work by creating a larger mesocosm setup near the dock of HBS that will incorporate other factors that influence methane production, such as vegetation, microtopography, hydrology, and nitrogen levels.

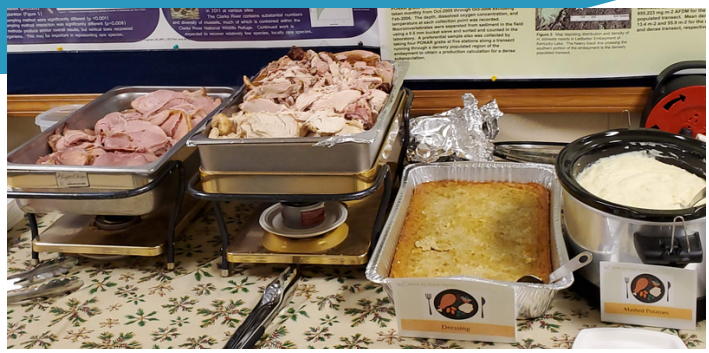
"Exploring methane emissions in mesocosms at Hancock Biological Station"



Photo credit: Skylar Ross

Annual HBS Christmas Luncheon Photos

December 2023



Work Published by Students, Faculty and Staff in 2023

Science Direct

Article: Determination and comparison of freely dissolved PAHs using different types of passive samplers in freshwater

Na Yeong Kim, Bommanna Loganathan, Gi Beum Kim

https://www.sciencedirect.com/science/article/abs/pii/S0048969723034253?via%3Dihub

The Wildlife Society

Title: Wild Cam: Climate change may exacerbate salamander cannibalism

Melissa Ocampo

https://wildlife.org/wild-cam-climate-change-may-exacerbate-salamander-cannibalism/

Journal of Raptor Research

Post-Hatch Egg Laying by American Black Vultures (Coragyps atratus)

Phil Kavouriaris

https://bioone.org/journal-of-raptor/volume-57/issue-4/JRR-23-00018/Post-Hatch-Egg-Laying-by-American-Black-Vultures-Coragyps-atratus/10.3356/JRR-23-00018.short

Ecology Journal

Understanding temporal variability across trophic levels and spatial scales in freshwater ecosystems

Tadeu Siqueira, Charles P. Hawkins, Julian D. Olden, Jonathan Tonkin, Lise Comte, Victor S. Saito, Thomas L. Anderson, Gedimar P. Barbosa, Núria Bonada, Claudia C. Bonecker, Miguel Cañedo-Argüelles, Thibault Datry, Michael B. Flinn, Pau Fortuño, Gretchen A. Gerrish, Peter Haase, Matthew J. Hill, James M. Hood, Kaisa-Leena Huttunen, Michael J. Jeffries, Timo Muotka, Daniel R. O'Donnell, Riku Paavola, Petr Paril, Michael J. Paterson, Christopher J. Patrick, Gilmar Perbiche-Neves, Luzia C. Rodrigues, Susanne C. Schneider, Michal Straka, Albert Ruhi

https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecy.4219

HBS Research conducted by Students, Faculty, and Visitors in 2023

Names and Research conducted

Dr. Laura Sullivan-Beckers brought ornithology group

Dr. Rachel Carroll brought her class to HBS to study the lichen on trees

BHA - used HBS to conduct workshops: such as invasive species removal and tanning deer hides

Dr. James Krupa stayed at HBS a few times to conduct a golden mouse study and located habitats near by at Panther Bay.

Group from Vanderbilt EES water analysis senior project

Isaiah Radford - Constructing mesocosms and looking at how altering the wetland soil composition will change carbon emissions. Work is done primarily in Greenhouse and mesocosm building.

Dr. Kyle Benowitz from UT Martin studies burying beetles on HBS grounds

Miranda Belanger, Megan Brandt, Justin Graben use HBS boats and equipment for their research with Dr. Spier

Marissa Miles and Rosie Carey researches the Cypress trees at Wolfson bay

Andrew Brown - Salamanders studies for Dr. Whiteman

Serena Ciparis, Environmental Contaminants Biologist, used HBS labs for toxicology research

KY Department of Fish and Wildlife Resources Motus tower was installed at HBS for telemetry tracking birds, bats, and other radio tagged animals.

Keegan McConnell from SIU and fellow classmates came to conduct *Triodanis* Research

Grant Updates

Wetland Restoration Project Grant - This grant allowed for multiple years of monitoring physical and biological responses of restored wetlands in western Kentucky. The team includes: Murray State members Dr. Flinn, Dr. Whiteman, Dr. Darracq, Dr. Moon, and Jane Benson. Funding by the Nature Conservancy and USDA - National Resource Conservation Service.

NSF RAPID Grant: This grant focused on the community and ecosystem effects of a climate-migrant caddisfly on subalpine ponds in Colorado. The research team included Dr. Whiteman and collaborators from the University of Maine and Western Colorado University.

KWRI Grant - The funds support work that advances two ongoing student-driven studies at Murray State University centered around predicting patterns of greenhouse gas emissions from hydric soils and *T. distichum* woody structures in bottomland hardwood wetlands in western KY. The team includes Dr. J.B. Moon, Dr. Bassil El Masri, Skylar Ross (M.S. candidate in WSI), Marissa Miles (M.S. candidate in WSI), and Isaiah Radford (B.S. candidate in Wildlife and Conservation). Dr. Moon's research has been supported by HBS, WSI, CISR, KAS, and KWRI.

Influence of Silver Carp on Native species - Silver carp are invasive fish species and we are concerned about the influence on native species. We are studying several things such as movement pattern of both silver carp and native species that include paddlefish, small mouth buffalo, and red ear sunfish. We are also studying native shad which might compete with the invasive carp. We are working with commercial anglers to discover new techniques for removing silver carp.

Alligator gar in Western Kentucky - Alligator Gar are a large native fish that are being reintroduced to western Kentucky. We have been tracking movement of alligator gar for several years. We are also planning to sample river bottoms along the Ohio River to look for Alligator gar and to determine if they are successfully spawning.

Fabrication Room Cleanup

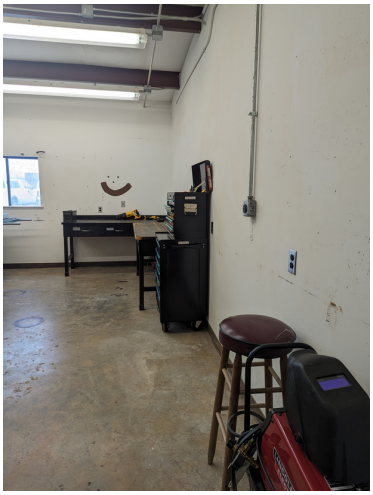
Big Shout out to Clay Thompson and Michelle Weaver for removing everything from the Fabrication room, cleaning and recycling before organizing and renewing

Before




Midway


After


Upcoming Events

Spring 2024

Most activities listed are open to public participatation and volunteers are appreciated. Please contact us if you would like to emailed or notified of upcoming events.

April 2nd

Family Day at the Arboretum will be April 2nd from 10:00 am to 1:30 pm. Featured programs will be LBL Nature Station presentation followed by Hooked on Science with Jason Lindsey. Learning stations include “Goats at work”, water models, gardening clubs, tree giveaway and more. Pizza lunch will be available for purchase and proceeds benefit The Wildlife Society (TWS). Open to the public.

April 17th

Watershed Studies Institute will host its 15th Annual Research Symposium on April 17th in the Barkley room of the Curris Center. WSI Student Research scholarship recipients will give short presentations of their projects. Open to the public.

April 18th & 20th

Cinema International and WSI join together to present a movie with environmental focus. This Spring’s movie is the “Human Element” and will be shown in Faculty Hall on April 18th and 20th

April 24th

Science Cafe will be at Tap216 on April 24th at 6:00 pm with guest speaker Catherine Aubee from Environmental Protection Agency (EPA). Followed by question and answer session. Open to the public.

April 25th

Biodiversity Art Competition will be displayed in the Biology building Atrium for viewing starting April 13th. Art Award reception will be Thursday April 25th starting at 5pm. Contest and reception are open the public. Contact blike@murraystate.edu for entry forms.

April 27th

Beast Feast will be April 27th in Murray City Park from 4 - 6pm. Come join us for a variety of dishes prepared by The Wildlife Society (TWS) and Backcountry Hunters and Anglers (BHA) members. Open to the public.

Improvements

Winter 23/24

Recent improvements to our Campus include the sidewalks and railings to the researchers cabins, new split AC/heat units in all the researcher cabins and a new multi-person cart for hauling people and supplies around HBS.

Backcountry Hunters and Anglers (BHA) Workshop

Winter 2024

BHA completed an eight day tanning workshop. The group tanned Elk, deer, squirrels, raccoons and an alligator.

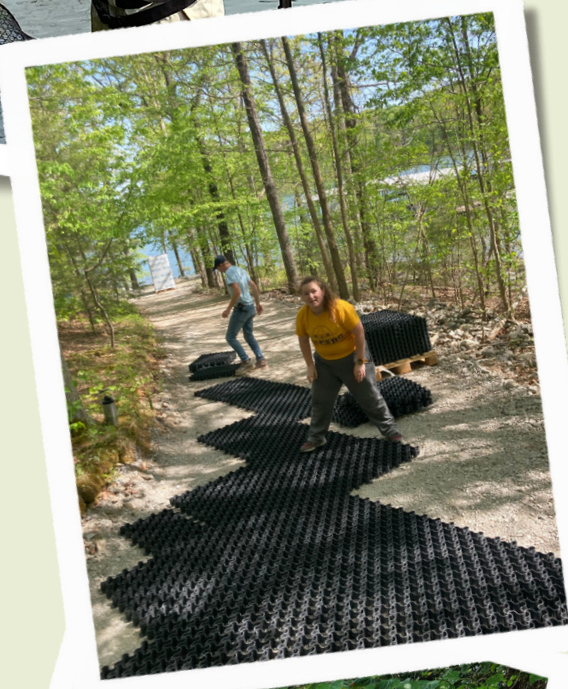
CPR and AED Training

Winter 2024

Thanks to Dr. Traci Byrd for hands-on CPR, AED and first aid training to HBS staff and students.

EXPLORE *Giving*

DONATIONS HELP US IN MANY WAYS! YOUR SUPPORT PROVIDES OPPORTUNITIES FOR STUDENTS IN THE FORM OF SCHOLARSHIPS AND RESEARCH SUPPLIES. YOUR DONATIONS HELP FUND PROJECTS THAT IMPROVE OUR INFRASTRUCTURE: UPDATING LABS, RENOVATING STUDENT AND GUEST HOUSING, AND PROVIDING FUNDS FOR ITEMS NOT COVERED BY GRANTS. LISTED BELOW ARE PROJECTS WE ARE WORKING ON.



- *Monitoring Kentucky Lake Water Quality every 16 days
- *Native and invasive fish tracking on lake and streams
- *eDNA research
- *Backpack electric fishing stream surveys
- *Threatened species tagging and population estimate
- *Shad population age studies
- *Methane emissions from Cypress Trees
- *Golden mouse habitat research
- *Monitoring Armadillo burrows
- *Toad monitoring and tagging
- *Native Beetle surveys
- *Ecology, Herpetology and Wildlife management classes

For a list of Current Needs click QR code:

CONTACT US

561 Emma Drive, Murray, KY

270-809-2272

murraystate.edu/hbs