

Hancock Biological Station



CONFLUENCE

Director's Overflow by Dr. Howard Whiteman



The science that drives WSI and HBS has never been more important. Recently, scientists determined that the planet has warmed over 1.5 deg.C since the Industrial Revolution, something that the Paris Accord Treaty was created to stop. It didn't work. Such a drastic change over a few hundred years is faster than anything that our planet, or the organisms that we share it with, have ever experienced. The results can be seen in raging wildfires, violent storms, drought, and climate-induced migrations of species from butterflies to people. WSI and HBS research has shown that such climate change can have profound effects on our local watersheds as well as the plants and wildlife that inhabit them, and the scientists we serve are helping us to understand how our watersheds are doing their best to adapt to this changing world. Unlike these species, we humans have a choice. We can adapt and try to deal with a changing climate, or we can mitigate and try to do things to reduce the effects of climate change—like reducing our use of fossil fuels. The hydroelectricity coming from Kentucky Dam is but one alternative energy source that has reduced our reliance on fossil fuels, and the production of wind and solar energy is increasing each year, but we need to do even more to stave off our changing climate. One thing is for sure: science has shown definitively that climate change is a real phenomenon that deserves national and international attention. To help our own region, WSI and HBS will continue to lead regional research efforts on all the environmental change affecting us—including climate change.

Winter 2024/2025

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Featured Faculty: Dr. Andrea Darracq

"There are some who can live without wild things, and some who cannot." – Aldo Leopold

As a wildlife biologist, I've always connected with this quote. If I'd known of Leopold as a child, I would have felt the same way then too. This passion led me to my current role at Murray State University, where I am an Associate Professor in the Department of Biological Sciences, the Wildlife and Conservation Biology Program Coordinator, and advisor to our student chapter of The Wildlife Society. Before joining MSU in 2017, I earned my B.S. in Wildlife Ecology from the University of Maine, M.S. in Forest Resources (Wildlife Biology focus) from the University of Arkansas at Monticello, and Ph.D. in Wildlife Ecology and Conservation (quantitative focus) from the University of Florida.

Like Leopold, I cannot live without wild things, and I'm fortunate to teach future wildlife biologists and work alongside colleagues who share that passion. In my lab, I mentor undergraduate and graduate students on research considering how management and anthropogenic stressors influence wildlife. Our work spans multiple taxonomic groups (see figure) and aims to inform wildlife conservation and management, a growing priority in the face of global biodiversity loss.

My most active research project is Green Heart Louisville (greenheartlouisville.com), where I lead bird, bat, and arthropod biodiversity monitoring alongside Dr. Howard Whiteman (MSU) and Dr. Nancy Buschhaus (UT-Martin). This project, directed by Dr. Aruni Bhatnagar (UofL), explores how urban greening impacts human health, and our team is working to assess biodiversity's role in those health outcomes. In the lab, I collaborate with Dr. Wendell Haag (USFS) to study mussel health. His team monitors juvenile mussels in silos across multiple states to investigate mysterious mussel declines. I've optimized biochemical assays (total protein, carbohydrates, and lipids and electron transport system activity) to measure cellular energy allocation from small tissue samples. We recently completed analysis on 400+ samples, and I'm excited to see what the data reveals. Another project, in partnership with the St. Louis Zoo and the Box Turtle Conservation Society, examines how turtle racing impacts eastern box turtle movements and health. I also have graduate students actively researching Wood Ducks at Land Between the Lakes, as well as studying the impact of red wolves on predation risk behaviors and mammalian communities and the effects of timber management on mammal and bird communities at Clarks River National Wildlife Refuge.

While much of my research is not conducted at HBS, I regularly take my students there for hands-on learning. In Wildlife Techniques, we practice small mammal trapping and powder tracking, vegetation surveys, orienteering, and, with HBS staff, tractor and trailer operation. In Wildlife Management, we use HBS as a case study to help students prepare management plans for local landowners. We've also partnered with the Kentucky Prescribed Fire Council for three years to offer an 8-hour prescribed fire course followed by a controlled burn (weather permitting). The HBS is truly a gem of our university, and I'm grateful to work with the fantastic people there.

Beyond teaching and research, I maintain a small amphibian and reptile collection, offering students interested in zoological conservation or conservation education hands-on experience in animal husbandry and outreach. In addition to my role as Riverlands Alliance Coordinator, I also lead activities for the Riverlands Alliance Invasive Species Task Force (click the QR code to the left for more information). Outside of teaching and research, I enjoy life in Murray, KY with my husband Eric (also a wildlife biologist), our children Satilla and River, our dog Maple, cat Buffalo, and eight chickens (Satilla would be happy to share their names!). When time allows, I love hiking, kayaking, running, hunting, swimming, and anything that gets me outdoors.



QR code for Riverland Alliance Invasive Species Task Force



Pictured above: conducting Blood samples

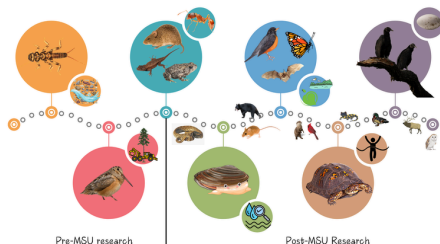


Pictured above: Box turtle research



Pictured below: duck house

Pictured below: Research summary picture



Pictured below is the Darracq family



Featured Graduate Student: Skylar Ross



Collecting soil porewater at Murphy's Pond (photo by Dr. J.B. Moon).



Methane emissions and sap flux being measured from a knee at HBS (photo by Dr. J.B. Moon).



Pictured on Right: Collecting soil porewater at Clarks River National Wildlife Refuge (CRNWR).

Pictured on Left: Collecting methane measurements from 1 m² plots containing both knees and soils at CRNWR.



Hello! My name is Skylar Ross, and I am from Freeburg, Illinois. Growing up in the middle of the woods instilled a love of nature in me at a young age. After high school, I attended community college for one year, where I took a class that made me realize I wanted to pursue environmental science as a career. I transferred to Murray State as a sophomore in Fall 2020, majoring in Environmental Science and later added a minor in Wildlife and Conservation Biology. My main interests involve the interactions between the biotic and abiotic world, and how those interactions may be affected by climate change. While searching for an honors thesis topic, I became involved in a research project that perfectly blended my interests across both departments. After graduating with my bachelor's in Spring 2023, I decided to continue with the work for my master's in Watershed Science at Murray State and am co-advised by professors in both the biology (Dr. J.B Moon) and environmental science (Dr. Bassil El Masri) departments.

My research focuses on bald cypress "knees", which are above ground root structures of the bald cypress tree, an obligate wetland species. While many people believe these knees serve for aeration in the wet environments, their function is still debated in the scientific community. However, they do play a role in wetland biogeochemistry, which is where my research focus resides. The anaerobic soil conditions found in wetland systems can slow the decomposition of organic matter, allowing conditions for the microbial production of methane, a greenhouse gas. Methane can be emitted to the atmosphere by diffusing through the soil or as bubbles in the water. Trees, and other vegetation, can also transport this methane to the atmosphere from the soil via their roots up to their trunks and other aboveground structures, such as the knees of bald cypress.

I am measuring methane emissions from cypress knees and examining potential controlling environmental factors on the rate of emissions, such as water level and temperature. Further, I am also investigating how knees may potentially influence their surrounding soil environments. For example, the aboveground nature of knees may trap debris, such as leaf litter, which can introduce more carbon into the surrounding soils and potentially allow for greater methane production near knees. Measuring how much methane is emitted and identifying the factors influencing the rate at which it is emitted is important for informing ecosystem carbon estimates, as well as predicting how these rates may be affected by climate change.

Holiday Celebration Fish Fry

Due to the construction in our Administrative Building this year we were not able to have our “normal” Christmas Luncheon. We decided it would be appropriate to prepare and enjoy our holiday lunch with the construction crews.



Publications from 2024

Dr. Andrea Darracq

[Barn Owl \(*Tyto alba*\) Habitat Suitability, Nest Box Occupancy, and Management Implications Based on Kentucky Surveys 2010–2022](#)

KG Slankard, A Darracq, JO Barnard

Journal of Raptor Research 58 (4), 464-479

[Climate, food and humans predict communities of mammals in the United States](#)

R Kays, MH Snider, G Hess, MV Cove, A Jensen, H Shamon, WJ McShea, ...

Diversity and Distributions 30 (9), e13900

[SNAPSHOT USA 2021: A third coordinated national camera trap survey of the United States](#)

H Shamon, R Maor, MV Cove, R Kays, J Adley, PD Alexander, DN Allen, ...

Ecology 105 (6), e4318

[Mammal responses to global changes in human activity vary by trophic group and landscape](#)

AC Burton, C Beirne, KM Gaynor, C Sun, A Granados, ML Allen, ...

Nature ecology & evolution 8 (5), 924-935

Dr. Bommanna Loganathan

Article: Assessment of toxicity potential of freely dissolved PAHs using passive sampler in Kentucky Lake and Ohio River

Na Yeong Kim, Bommanna Loganathan, Gi Beum Kim

<https://www.sciencedirect.com/science/article/abs/pii/S0025326X24008105>

Dr. Timothy Spier

2024 Umland, Levi, T. W. Spier, and N. Klein. Diel movements of Silver Carp *Hypophthalmichthys molitrix* in Kentucky Reservoir and Barkley Reservoir (Kentucky, USA). Journal of the Kentucky Academy of Science. In revision.

2024 Vallazza, J., K. Mosel, D. Gibson-Reinemer, J. Tompkins, J. Morris, T. Spier, T. Cox, M. Rogers, C. Harty, B. Knights, M. Brey, and A. Fritts. Silver Carp Passage at Three Locks and Dams on the Tennessee and Cumberland Rivers from 2016–2019. Journal of Fish and Wildlife Management. In revision.

Dr. Howard Whiteman

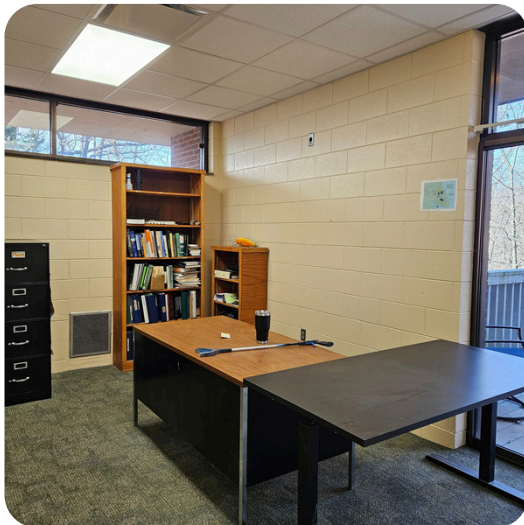
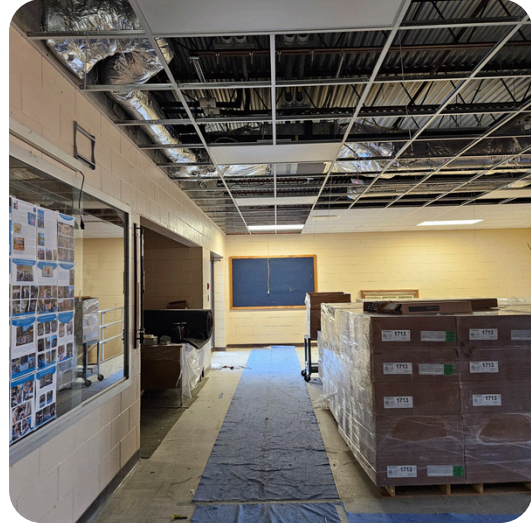
Johnston, E. M, H. H. Whiteman, H. S. Greig, B. J. Olsen, and A. J. Klemmer. 2025. Females know best: life history trade-off maintained by sex-specific foraging. Behavioral Ecology and Sociobiology doi.org/10.1007/s00265-024-03550-8. Kirk3, M. A., A. C. R. Lackey3, K. E. Reider3, S. A. Thomas3, and H. H. Whiteman. 2024.

Climate and density-dependence underlie the effects of body size on the production of an amphibian polyphenism. Journal of Animal Ecology, DOI: [10.1111/1365-2656.14187](https://doi.org/10.1111/1365-2656.14187).

Cayuela, H., A. Lackey3, V. Ronget, B. Monod-Broca and H. Whiteman. 2024. Polyphenism predicts actuarial senescence and lifespan in tiger salamanders. Journal of Animal Ecology, 93: doi:[10.1111/1365-2656.14048](https://doi.org/10.1111/1365-2656.14048).

HBS HVAC Construction

Construction started October 1st with a complete overhaul of the HVAC system. Expected finish date is February 2025 and move back in March 2025.



HBS Updates

Clay Thompson rehabs our resource building drainage culvert and deep cleans our deep storage building.



Backcountry Hunters and Anglers Student Chapter Tanning Workshop



Upcoming Events

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

March 26th



Ecologies Tournament at the Hop Hound will be held March 26th at 7:30pm. Free to register, open to all ages, and prizes for winners. Must sign up by March 12th to participate.

April 22nd



Earth Day Celebration on April 22nd from 11:00 AM to 4:00 PM on the quad at Murray State. This event is designed to engage college students in eco-friendly activities and raise awareness about sustainability.

April 5th



Wild Game Supper (formerly known as Beast Feast) will be April 5th in Murray City Park from 5 - 7pm. 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.

April 23rd



Science Cafe will be at Hop Hound on April 23rd at 6:00 pm with guest speaker Jeffrey Herod from KYDFWR will discuss "Aquatic Invasive Species". Followed by question and answer session.

April 17th



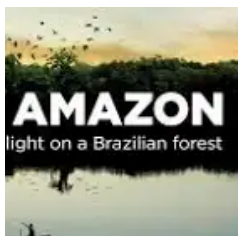
Watershed Studies Institute will host its 16th Annual Research Symposium on April 17th in the Barkley room of the Curris Center. WSI Student Research grant recipients will give short presentations of their projects. Open to the public.

April 24th



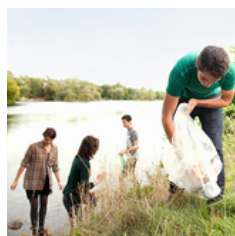
Biodiversity Art Competition will be displayed in the Biology building Atrium for viewing starting April 11th. Art Award reception will be Thursday April 24th starting at 5pm. Contest and reception are open the public.

April 10th & 12th



Cinema International and WSI join together to present two movies with environmental focus. The first movie is the "Eternal Amazon" playing April 10th & 12th will be shown in Faculty Hall Room 208, at 7:30pm.

April 25th



River Cleanup at Hancock Biological Station on Friday April 25th starting at 2pm. Trash pickup followed by meal provided for participants, brief educational program and outdoor movie. Must register.

April 17th & 19th



Cinema International and WSI join together to present two movies with environmental focus. The second movie is "Dark Waters" on April 17th and 19th will be shown in Faculty Hall Room 208, at 7:30pm.

April 26th



Family Day has joined with the Doran Arboretum to create a new Earth Day Celebration on April 26th from 10:00 am to 2:00 pm at the Arboretum. Featured programs will be from the LBL Nature Station and learning stations include "Goats at work", water models, gardening clubs, tree giveaway and more. Pizza lunch will be available for purchase and benefiting The Wildlife Society (TWS).

More Highlights

February 2025

Clay Thompson, Graduate student and Field Technician for HBS, presented his poster titled “How Zooplankton Communities Change after the Establishment of Invasive Planktivores in Kentucky Lake”, at the West Tennessee Water Resource Symposium in Jackson, TN. Clay won the 1st place student presentation.



New HBS logo

The new logo was created this year to represent ongoing research. The top left square is a Red Wolf representing our Resident Graduate student’s research. The top right square is an Alligator Gar to highlight current conservation research and a local capture can be viewed in our HBS main building lobby. The bottom left square is Rattlesnake Master, now established in our native prairie. The bottom right square represents the celebration of the completing 700 Lake monitoring Cruises.



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:



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