

Hancock Biological Station



On Kentucky Lake



CONFLUENCE

Director's Overflow by Howard Whiteman

I ran into a distant relative earlier this month and he was telling me how a cousin had visited him at his home in South Carolina. Coming from Las Vegas, the young man had never seen so much green. Although he had been east before, it had only been during the winter, and so he had never seen the vibrant green of a southeastern summer. You and I often take that green for granted, but folks from the desert never do.

All of that green happens because of our abundant water resources, another thing we often take for granted. Four rivers converge in western Kentucky, and numerous streams and creeks feed those rivers, along with the multitudes of ponds and wetlands. We can't help but be green here; all of that water ensures it. The green around us is an indicator of many activities we also sometimes take for granted: the great fishing, boating, swimming, birding, and hunting, among other things, much of which comes either directly or indirectly from water.

That's where WSI and HBS come in. We are here because of these wonderful water resources, as they provide an excellent place to study aquatic science. In this issue, for example, we celebrate the 700th cruise of the Kentucky Lake Monitoring Project (KLMP)!! Our research, however, is critical not only to understand how our aquatic systems work, but also to detect threats to them and learn ways in which we can respond.

As fall approaches, the green will change to orange, brown, and red, and then the leaves will fall and winter will be here. But we all know that as next spring emerges, the green will be back, through the mix of water, warmer temperatures, and longer hours of sunlight. We will celebrate the green then, as we should now. WSI and HBS will be there helping to celebrate, as well as making sure we have the science to keep our region green, through improved management and conservation of our water resources.



Summer 2024

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More Information

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Featured Faculty: Dr. Bassil Masri



My teaching/research career at Murray State University (MSU) started in 2014. Before joining MSU, I was a postdoctoral research associate at the University of Illinois at Urbana-Champaign. I completed my MS (2006) in Range Management from Texas Tech University and my PhD. (2011) in Geography from Indiana University-Bloomington. Currently, I am a professor at the Department of Earth and Environmental Sciences.

As a physical geographer and modeler, I am interested in the soil-vegetation-atmosphere interactions and how these interactions are affected by the changing climate. I use remotely sensed data to estimate the terrestrial ecosystem carbon and water fluxes and for scaling up site measurements to regional and global scales. I use land surface models and process-based models to understand the terrestrial ecosystem carbon, water, and nitrogen fluxes responses to environmental change. During my postdoctoral work, my research was focused on improving and calibrating a land surface model. I was part of several interesting projects to understand the impacts of climate change on the tropical and arctic ecosystem's carbon cycle and to evaluate the models against elevated CO₂ terrestrial ecosystem experiments. At MSU, my research has focused on understanding vegetation phenology and soil-vegetation interactions under changing climate. Using statistical methods, we linked vegetation functions derived using satellite imagery to soil chemical and physical properties.

The picture below on left: was taken by the sign of latitude Ooat the Intiñan Museum in Ecuador. The middle picture below: was taken with a “famous” bald cypress knee on the CRNWR channel. The picture below on the right: shows the installation of a sap flux sensor at a bald cypress tree in CRNWR.

Recently, we have been studying methane fluxes from bottomland hardwood forest soils, stems, and knees in CRNWR and HBS funded by the US Department of Energy. We will expand our measurements to Murphy’s Pond in the coming year and install an eddy covariance flux tower for continuous measurements of greenhouse gases at Murphy’s Pond as part of a research project funded by NSF. We will use our ongoing monitoring, to improve our understanding of soil-vegetation interaction in hardwood bottomland wetlands and incorporate these functions into ongoing processes-based modeling efforts.



Featured Graduate Student: Andrew Brown



My name is Andrew Brown. I was born and raised in Murray, KY, and arrived at Murray State University in the Fall of 2020. I originally declared as an Earth and Environmental Sciences major, but switched to Wildlife Biology in the Spring of 2021. Growing up in western Kentucky meant living in close proximity to Land Between the Lakes and vast forests and wetlands. I spent much of my childhood exploring these wilderness areas fishing and collecting snakes, frogs, and toads. This led me to where I am now, as a graduate researcher working with Dr. Howard Whiteman to obtain a Master of Science degree in Wildlife and Conservation Biology.

My graduate research is examining the effects of climate warming on salamanders and salamander trophic interactions using experimental tanks set up at Hancock Biological Station. Salamanders are keystone predators in forested pond ecosystems, and previous studies have shown that experimental warming significantly decreases growth rate, body size, and overall fitness. The questions I want to answer are: will this trend be repeated, and what drives this trend? To answer these questions I have 36 experimental ponds set up to mimic naturally occurring forest ponds, with half of these ponds being heated using an aquarium heater. To quantify the effect of warming on individual salamanders I measure snout-vent length, total length and mass, and to quantify trophic interactions I measure zooplankton and macroinvertebrate diversity and biomass. My hypotheses are that salamander growth and size will be decreased in warmed tanks due to lower diversity and biomass of zooplankton and macroinvertebrates.

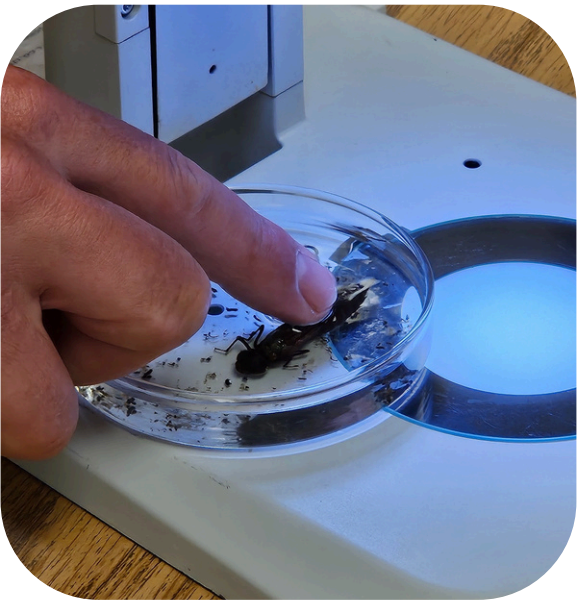
Pictured above: Andrew Brown, collecting mole salamander adults from a western Kentucky farm pond. Below pictured left: Mole salamander larvae collected from one of the experimental tanks. Below middle: Measuring the snout-vent length of a mole salamander larvae. Below right: A metamorph (terrestrial adult) mole salamander that was bred to obtain eggs for the experiment.

My research will help shed light on the impending effects of climate change on forested pond ecosystems, while also helping to understand the effects of climate change in areas that are already experiencing this. If we can begin to peel back the curtain on how ecosystems are going to be affected by climate warming, we can create crucial conservation strategies for the future.



Upward Bound Group Visit

June 2024



Upward Bound is part of the TRIO program and is aimed at High School students who want to attend college or vocational school after they graduate. This group of students helped with water quality sampling on Kentucky Lake and learned about the ecology of freshwater invertebrates and the health of our aquatic ecosystems.



Outdoors 101

June 2024



Outdoor 101 Camp introduces incoming college students to the Murray State campus and the surrounding community. The group visited HBS to learn more about the research that HBS conducts and opportunities for experiential learning.



Little Hands

July 2024



Pre-K students from Little hands learned about aquatic and terrestrial "Bugs" from around the world. Displays included dragonflies, butterflies, beetles, grasshoppers and stinkbugs.



Butler County Educational day

July 2024



“Bears Den” Students from Butler Co. Summer Program visited HBS for a full day of learning about graduate student research, pollinators and aquatic critters. Students made their own bird feeders using pine cones, seed and peanut butter.



JCSET Admin's Lunch

July 2023

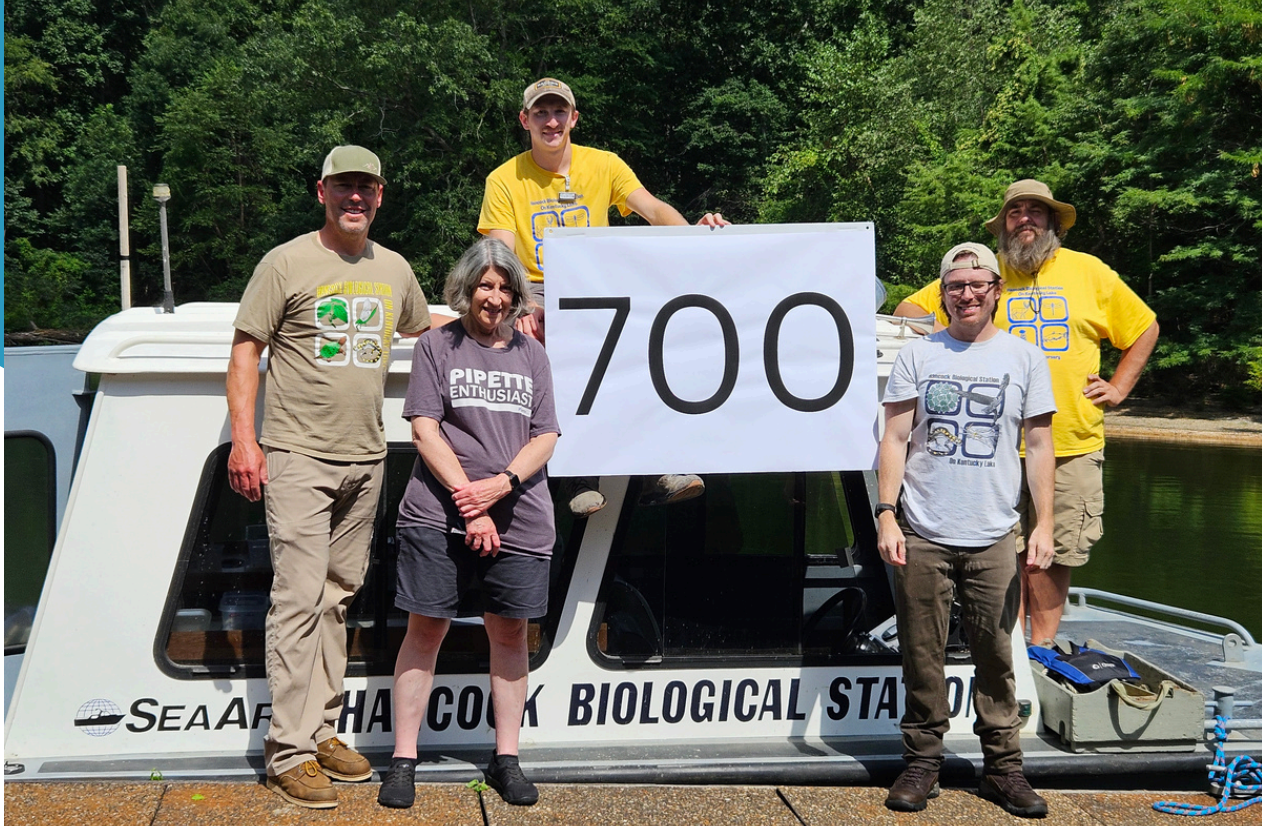


Monthly, the Administrative Assistants in the Jones College of Science, Engineering and Technology get together for a work lunch. In July, we add a boat ride to the Marina to eat and plan next years events.

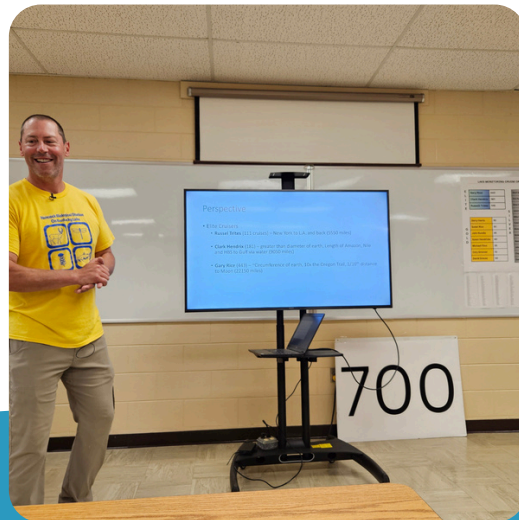


700th Lake Monitoring Cruise and Celebration

August 2024



HBS and the Kentucky Lake Long-term Monitoring Program celebrated their 700th cruise in August. Starting in 1988, students, staff, faculty and volunteers have collected samples on Kentucky Lake to quantify water quality and biological communities. These efforts have served as the backbone for many research projects and publications. The KLMP sampling cruises have resulted in one of the longest running sampling efforts on reservoirs worldwide. Guests included HBS alums, previous boat captains and friends.



Pollinator Garden

August 2024



The Department of Biological Sciences, with the help of JCSET, has created a new garden on campus for native plants and pollinators. This garden will function as a “living laboratory” which will allow our students to learn about native vegetation and the organisms which depend on that vegetation. The garden will also serve as a demonstration of how native plants can be used in landscaping. Replacing lawns with native vegetation can reduce the use of fossil fuels, water, and nutrients because the native plants do not need to be mowed, but they also do not require any supplemental irrigation or fertilizer. Native plants also attract native pollinators, many of which are showing rapid declines in number. The MSU Pollinator Garden is intended to show that landscaping with native plants can be sustainable, beautiful, and functional.



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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