Hancock Biological Station
On Kentucky Lake

CONFLUENCE

WSI
Watershed Studies Institute
MURRAY STATE UNIVERSITY

SUMMER 2022

"Shout Out" Section

Shout out to all the MSU Air Condition service people and the Outsource team that worked many hours and different days to keep our Air Condition running the best they could.

Thank you to K & M Services that made repairs to our boats over the Summer. The students needing our boats for research are also very appreciative for their service.

Highlights

This Edition features:
*Graduate Student: Karissa Coffield
*Staff: Angie Hayden
*Highlights from Colorado Research Team
*Highlights from Butler County School Visit
*Highlights from the Upward Bound Math and Science Group
*Highlights from the two of the five Summer classes held here

More Information
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Featured Graduate Student: Karissa Coffield

Over the summers of 2021 and 2022, I traveled to the Rocky Mountain Biological Laboratory in Gothic, Colorado to study Arizona Tiger salamanders, *Ambystoma mavortium nebulosum*. I sampled ponds where these salamanders lived around Gunnison County in Colorado, including ponds at the Mexican Cut Nature Preserve. The ponds I visited ranged from around 7,000 feet in elevation to over 11,000 feet. Arizona Tiger salamanders are paedomporhic, meaning there are aquatic adults that retain their gills known as paedomorphs as well as terrestrial adults that metamorphose and are known as metamorphs.

I am studying the coloration of these salamanders. Coloration is a trait involved in phenotypic trade-offs in many species. This means that different colorations can affect the fitness and survival of individuals. For example, male collared lizards that are brighter attract more mates but also face higher predation. Amphibians can alter their coloration in response to environmental changes, including temperature, predation risk, sediment color, and ultra-violet radiation (UVR) exposure. I am focusing on how their coloration changes in response to temperature and UVR, two environmental factors that have been altered by humans. Warmer temperatures promote lighter colorations because amphibians have specific thermal requirements and preferences, but high UVR exposure promotes darker colorations for individuals to screen out the harmful waves. These two factors are affecting the color of amphibians in different ways that are not yet understood.

I captured salamanders from ponds with either long-handled nets or seines depending on the location and depth of the ponds. Once captured, they were measured (total length, snout-to-vent length, mass, sex, and age when known) and photographed in a small animal photography box. They were then returned to the pond. I'm currently analyzing coloration metrics from each photograph in ImageJ. I want to understand how coloration changes over an elevational gradient as well as how age, temperature, and UVR affect color and fitness. Hopefully, this research will allow scientists and managers to understand how climate change will affect amphibian coloration and fitness at varying elevations.

Pictured below: Seining with a fellow graduate student (Melissa Ocampo) Picture on right: A paedomorphic adult Arizona Tiger salamander

Featured Staff: Angie Hayden

Angie is the Lab Manager for Hancock Biological Station. Her primary responsibility is analyzing samples for the KLMP, which collects samples of Kentucky Lake on a 16 day rotation. The analysis ranges from nutrient compound such a nitrogen and phosphorus to chlorophyll in algae. The KLMP is a long term ecological monitoring program to evaluate the aging process of a reservoir. She also assist faculty and students in their research, which adds a nice variety to her schedule. Over the years she has run samples or various research projects, from stable isotope tracking in the food web of a pond in Colorado to analyzing the amount of nitrogen when determining the denitrification in a wetland.

As the Lab Manager, she maintains equipment and supply inventory. She instructs student workers in lab safety and procedures. Angie is the technical instructor for our Scanning Electron Microscope class that is usually taught in the Summer at Hancock Biological Station.

Angie is a member/volunteer for the Four Rivers Watershed Watch which is a nonprofit organization that focuses on the education and awareness of clean water in our area watersheds. The program teaches and supplies equipment to volunteer so they can evaluate and sample stem or body of water. Angie serves as the volunteer coordinator and also analyzes the samples that are taken three times a year. The Four Rivers Watershed Watch is always looking for new volunteers. Check out our website at frww.org for more information.

Colorado Research Team

Picture on left: Pond 12 at the Mexican Cut Nature Preserve, with Galena Mountain in the background. Middle picture: Graduate students Karissa Coffield, Melissa Ocampo, and Megan Zerger are studying salamanders throughout the Gunnison Basin. Picture on Right: Dr. Scott Thomas, NSF Postdoctoral Fellow working with Dr. Whiteman, explains his cannibalism research to a Wildlife Ecology class from the Rocky Mountain Biological Laboratory.

Dr. Whiteman's summer research focuses on salamander ecology in the West Elk mountains of Colorado. He has been collaborating on research with Murray State students and faculty and colleagues from a variety of other institutions since 1990. Every year since that time he has traveled to the Rocky Mountain Biological Laboratory and conducted research at The Nature Conservancy's Mexican Cut Nature Preserve, which is approximately 11,000 feet above sea level. He has studied the life history evolution, population dynamics, community interactions, and ecosystem impacts of salamanders, which play a keystone predator role in subalpine ponds. Most recently, his research has focused on the effects of climate change, which are much more evident at the high elevation ponds that he studies than other places. For example, three of Dr. Whiteman's current graduate students are focusing their theses on climate change. Karissa Coffield is studying how climate change influences the color of salamanders, which is important for both thermoregulation and reducing exposure to ultraviolet light at high elevations. Melissa Ocampo is studying how climate change impacts cannibalism, because warm, faster drying ponds should produce more cannibalistic behavior. Megan Zerger is studying how climate change might affect stress hormones and susceptibility to disease. To better understand the effects of climate change, the lab also studies other, lower elevation populations in the region. If you would like to learn more about Dr. Whiteman's research, check out his website at https://web3.murraystate.edu/hwhiteman/, or search for Whiteman Lab on facebook to see the most recent news.

Picture to the Right: Dr. Whiteman showing off a paedomorphic (aquatic adult) tiger salamander to students.

Butler County "Bear's Den" School Visit

July 2022

Butler County School students visited the Station to learn about wetlands.

Dr. Darracq's Wildlife Technique Class

May 2022

A survey and application of methods and techniques used in wildlife management and research including research design and analysis, passive sampling techniques, capture techniques, animal handling and marking, population estimation, telemetry, measuring habitat use and selection, and chemical immobilization. This class includes a weekend trip and other field work outside which is a great use for Hancock Biological Station.

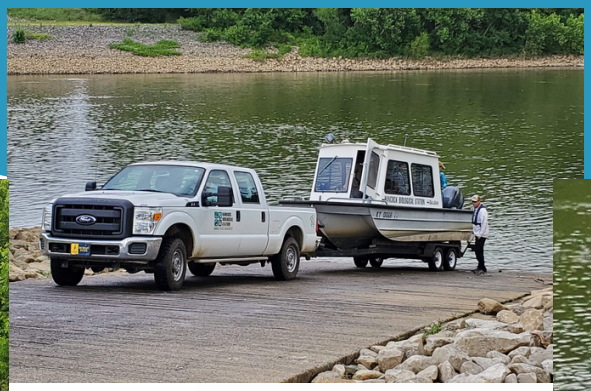
Upward Bound Math and Science Group

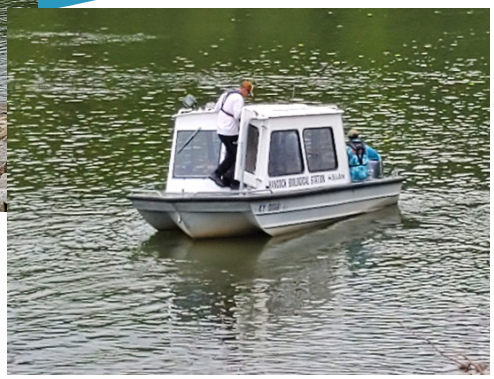
June 2022

Upward Bound Math and Science students visited Hancock Biological Station to learn about STEM related careers and how aquatic ecologists process biological samples. These pictures show the students looking at zooplankton, phytoplankton and other macroinvertebrates through the microscopes for identification.

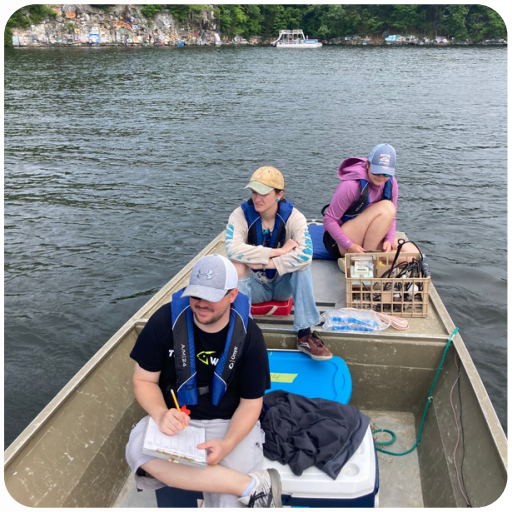
BIO 588/688 RESERVOIR ECOLOGY

Dr. Michael Flinn's class





The Reservoir Ecology class utilized their last day to experience the Lock and Dam at Lake Barkley. The hydrology of the reservoir is one of the many important aspects of maintaining balance between ecology and commercial navigation and flood control.



Hancock Biological Station 50th Celebration

October 29, 2022
8:00 am - 1:30 pm

Hourly Pontoon Boat Rides
Station History Exhibits
Hourly Raffle Drawings
Silent Auction
Building Dedication
Live Music
Lunch provided

Don't forget to check out our Facebook page

Scan the QR Code below to take you to the facebook page to get updates on our upcoming event.

we would like to invite you to:

HANCOCK BIOLOGICAL STATION

50th Celebration

OCTOBER 29, 2022

Must schedule for the boat rides

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SCAN ME