Hancock Biological Station

On Kentucky Lake

CONFLUENCE

Watershed Studies Institute
MURRAY STATE UNIVERSITY

SPRING 2022

"Shout Out" Section

Shout out to all the Volunteers that made each of our Four Rivers Watershed Sustainability Festival events a success!

A big thanks to Monte Kennedy for mesh replacements to upgrade all the cabin internet access.

Many thanks to Steele and Albritten for fixing our water leak in February.

Highlights

This Edition features:
*Graduate Student Matthew Meyer
*Staff Jane Benson
*Highlights from Four Rivers Watershed Sustainability Festival
*Highlights from Environmental Science Day
*Highlights from the Wildlife Society Beast Feast
*Highlights from the Wastershed Studies Institute Syposium

More Information
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Featured Graduate Student: Matthew Meyer

Pictured here: Matt in a test pit getting soil together

Volcanos, mounds, rivers, and clay: the Tuxtlas Volcanic Field in southern Veracruz have been host to complex societies for thousands of years. On its western fringes in the Papaloapan Basin is Tres Zapotes, one of the oldest urban centers in the Americas and the third major Olmec center known for stone heads, were-jaguars, and one of the longest near-continuously inhabited centers in Mesoamerica (occupied for around 2000 years, starting at 1000 BC). Just east of Tres Zapotes sits San Marcos, a smaller mound center overlooked by the extinct Cerro el Vigía (CEV) volcano.

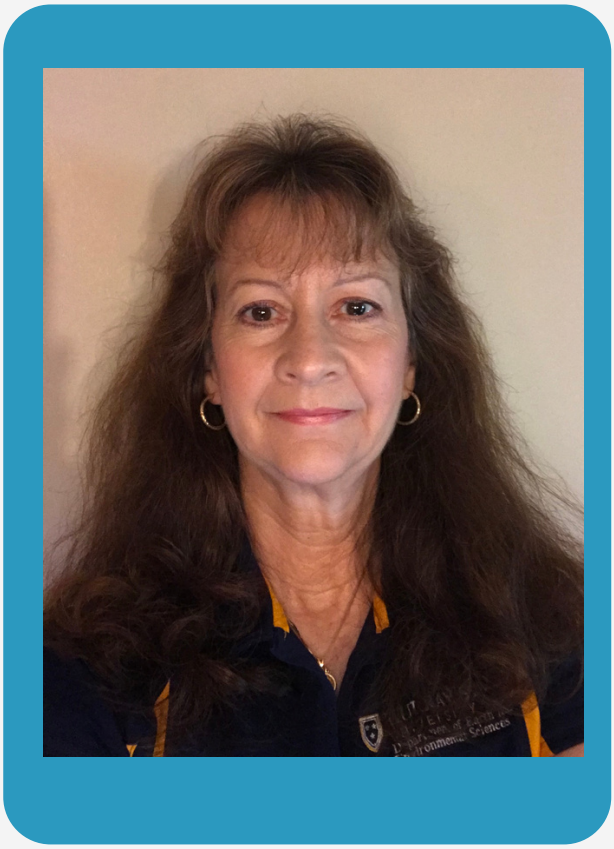
San Marcos was originally thought to be little more than a satellite village to Tres Zapotes. Initial studies suggested that they had roughly the same chronologies, with both being abandoned around AD 900-1000 (known as the end of the Classic Period). Unlike Tres Zapotes, though, San Marcos was thought to have remained abandoned until the later, current settlement was established to the west of the old center. Reassessments of ceramic data from San Marcos, however, suggests that a Postclassic (AD1000-1520) center existed in the area.

This study, beginning in Spring 2019, first set out to identify potential markers for a Postclassic settlement from previous work done in the CEV area that contained San Marcos: high percentages of green or clear obsidian blades, the presence of Texcoco-Molded Censers (an Aztec-style frying-pan shaped incense burner made from a mold) and their molds, the presence of comales (tortilla griddles) and collanders, and the presence of fondo sellado (stamped base) ceramics. Once collections with these data were identified, collections were clustered into arbitrary sites, one of which included San Marcos. This portion of my work has identified San Marcos as a center connected to the Aztecs through the nearby Toztlan and the provincial capital of Tochtepec, with evidence suggesting local production and distribution of Texcoco-Molded censers in the region.

The next step, which is currently underway and will hopefully be completed by Spring 2023, is past network reconstruction through path analysis. In 2020 and 2021, some preliminary models were created to suggest a general communication network, but ceramic sources could not yet be identified and there exists a series of “voids” in data between obsidian sources and the local surveys. My next plan here is to identify those sources, particularly with the interest of identifying whether these Texcoco-Molded Censers were imported or locally produced by testing and comparing clay sources. There is evidence for local production, but the degree to which the surviving assemblage represents local production vs. importation has yet to be identified. These implications would better define where San Marcos and its surrounding area stood within the Aztec Empire and how it looked on the arrival of Cortés in 1519.

My other research includes settlement density reconstruction to identify past community areas where features such as earthworks or standing structures may be absent. This has been applied primarily to Mesoamerica, but has also been done in Kentucky as well and I hope to do some historical archaeology both in Mesoamerica and Kentucky in the future. This work in conjunction with identifying production centers help gain a more refined local understanding of how early frontiers got to the present from the past.

Featured Staff: Jane Benson



When I became part of the research staff for the Watershed Studies Institute (WSI) back in the 90s, it was called the Center for Reservoir Research (CRR) and focused on the Kentucky Lake watershed. As a geospatial analyst with the Mapping Applications and Resource Center (MARC), (formerly the Mid-America Remote sensing Center), my responsibilities for WSI are to manage and update the geospatial data for the Kentucky Lake Geographic Information System (KLGIS) and create maps for the research scientists and students in WSI. Updating the geospatial data and creating maps often involves processing remotely sensed data such as Landsat (TM, ETM, OLI) or Lidar data using the software available through MARC, including ESRI ArcGIS Pro and ERDAS Imagine. It also requires obtaining the most recent data available for hydrology, elevation, soils, and land cover and land use. Working with an amazing group of diverse and talented researchers, staff and students over the years has enabled me to learn about and map a wide range of subjects from water quality and watershed processes to wetlands and wildlands ecosystems, from Kentucky Lake to Alaska, Belize, and the Virgin Islands.

Another part of my job is to check the “Cruise data” for the Kentucky Lake Monitoring Program (KLMP)which began in 1988. Initially, I received the dBase files on floppy disks through Campus Mail from HBS. Now the KLMP database is maintained and accessed on a web server and has over 30 years of Cruise data, and I continue to check the data that is collected by the crew at HBS. The water quality data is used in many studies by scientists and students and reflects the changes in the watershed as well as the climate.

As part of the outreach program for WSI and MARC, I work with the Four Rivers Watershed Watch (FRWW) volunteer organization whose members collect water samples from streams and lakes in the Four Rivers region (Cumberland River, Tennessee River, Ohio River and Mississippi River). The samples are analyzed at HBS for E.coli, and I map the results and maintain the database that stores the E.coli values and the other data that the volunteers collect. I have been the FRWW Data Manager for over twenty years. The FRWW is one of the 7 major river basins in the Watershed Watch of Kentucky (WWKY) organization, and the sampling results, maps, and photos are available on their website (kywater.org).

My job is challenging and exciting as I try to keep up with the changes in technology- the data collection, analysis, and visualization tools- as well as the scientific information and understanding of Earth’s physical and environmental processes that the tools enable. Being part of the WSI research staff allows me to help others in finding some ways to understand, protect, and restore our lands and water.

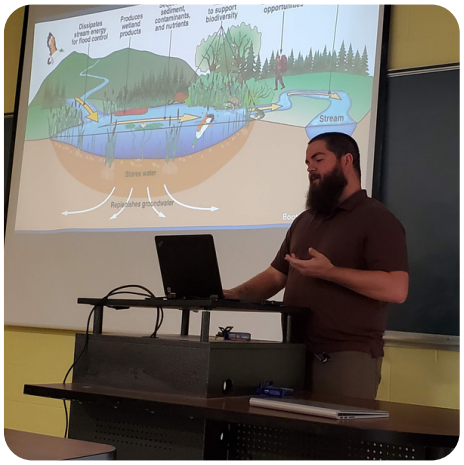
Four Rivers Watershed Sustainability Festival

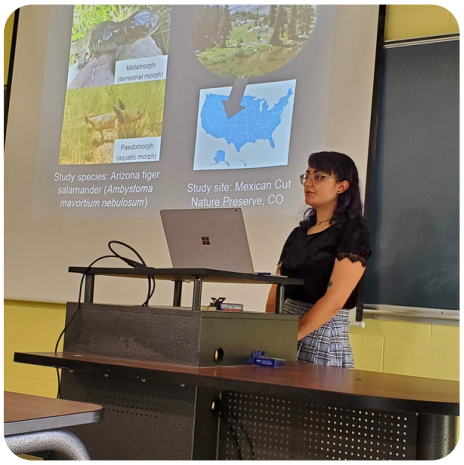
Family Day was moved to the Expo Center at Murray State University due the weather. There were over 200 visitors and many sponsors. This was one of the Sustainability events in April. There were tables set up with planting stations, running water models, soil filtration, wildlife, and recycle games. Music was performed by the MSU department of Music Guitar ensemble and we finished the day with Hooked on Science program by Jason Lindsey.

Watershed Studies Institute
13th Annual Research Symposium

April 2022

Graduates and undergraduates presented their research at the WSI Research Symposium during the Murray State's Scholar's Week





Environmental Science Day at Bee Creek

April 2022

The HBS Staff helped with Environmental Day at Bee Creek for the 7th grade class from Calloway County Middle School. The students were taught about macroinvertebrates and their role in determining the health of the stream.

Wildlife Society Beast Feast & Cinema International Movie

Murray Calloway City Park

The annual Beast Feast hosted by Murray State University's student chapter of The Wildlife Society featured a wide array of North American wildlife dishes carefully prepared for your family's enjoyment. Some of the main dishes included Mountain Lion Carnitas, Rabbit Stew, Silver Carp Eggrolls, and Venison Meatloaf.

MOVIE NIGHT IN THE PARK

Water's way: thinking like a Watershed or 'Beavers are Cool' was the movie featured at the amphitheater following this years Beast Feast. Approximately an hour long, this film highlighted the critical role that beavers play in shaping wetland dynamics and challenged us to "think like a watershed".

5th Annual Watershed Sustainability Summit

50 Years of Clean Water

Sustainability Summit: Educational Summit featuring seminars from speakers from around the region and a poster presentations highlighting research conducted by Murray State University students.

Malissa McAlister, Kentucky Water Resources Research Institute

Introduction to the Clean Water Act

Dr. Bikram Subedi – Department of Chemistry, Murray State University

Wastewater – A Treasure Trove of Public Health

Jessica Morris – Kentucky Division of Fish and Wildlife

Western Kentucky Invasive Carp Update

Robert Brown – Tennessee Tech University

Can Tornado Damage Impact Downstream Water Quality?

HANCOCK BIOLOGICAL STATION
SUMMER 2022

Each summer Murray State University's Hancock Biological Station provides an outstanding offering of field oriented environmental and ecological courses. All courses carry 4 credit hours. Scholarships and housing are available. Contact the Station for additional details. Scholarship applications should be completed by May 1, 2022. Find out more by visiting the Station's web site (www.murraystate.edu/hbs) or calling 270-809-2272 (ask for Barbara Like, or e-mail her at blike@murraystate.edu).

BIO 380 – WILDLIFE TECHNIQUES
Dr. Andrea Darracq
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. (May 16 – May 27)

BIO 588/688 RESERVOIR ECOLOGY
Dr. Michael Flinn
An examination of the variation in chemical and biological phenomena that characterize river impoundments. Literature reading and discussion is followed by 1) learning techniques of observation to identify pattern and process in nature, and 2) designing and conducting field experiments to assess cause and effect relationships. (May 16 – May 27)

BIO 514/614 SCANNING ELECTRON MICROSCOPY
Angela Hayden/Dr. Michael Flinn
The theory, principles and applications of scanning electron microscopy (SEM). After a predetermined number of instructional hours, the participants are expected to successfully complete a test that measures competency in SEM operation, specimen preparation, and remote operations. The course includes remote operations where researchers and teachers have access to the microscope for use in their own labs or classrooms. The course is limited to a maximum of 5 students. Days and times arranged. (May 31 – June 30)
SEM cross section of a leaf

BIO 572/672 – HERPETOLOGY
John Hewlett
A study of the taxonomy, morphology and natural history of reptiles and amphibians. Emphasis is placed on those species occurring in the central United States. (May 31 – June 30)

BIO 553/653 – FIELD BOTANY
Dr. Richard Abbott
A survey of the plants of western Kentucky and surrounding states. Emphasis is on field identification of common species, use of keys, collection and preparation of specimens, and general plant ecology of the region. Wednesday & Saturday (Dr. Abbott is a visiting scholar from the Missouri Botanical Garden)
(July 5 – August 5)

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Factual Friday:
Which caterpillar does NOT eat milkweed plants as a main food source?

1. Tussock Moth
2. Monarch
3. Giant Swallowtail

SCAN ME

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