

2023 Kentucky Water Resources Annual Symposium

September 15, 2023

Central Bank Center, Lexington, Kentucky

Registration and Continental Breakfast (8:00 a.m. - 8:40 a.m.)

PLENARY SESSION (8:40 a.m. - 09:50 a.m.)

Location: Meeting Rooms 12 & 13

8:40 *Welcome & Introductions*, Steve Evans, Associate Director, KWRI.

8:50 *KWRI Updates*, Jason Unrine, Director, KWRI.

9:00 *TITLE TBD*, Craig Butler, Vice Chair, Ohio River Basin Alliance (ORBA) and Executive Director, Muskingum Watershed Conservancy District.

9:35 Q & A.

Break/Poster Viewing (09:50 a.m. - 10:20 a.m.)

Location: Meeting Rooms 10 & 11

SESSION 1 (10:20 a.m. - 12:00 p.m.)

Location: Meeting Rooms 9 & 14

Track 1A - Room 9—Climate

Moderator: Andrea Drayer (KWRI)

- 10:20 **Characterizing Louisville Wetlands from Above and Below to Better Predict Wetland Carbon Sink-Source Status*, Dr. Andrea E. Gaughan, Geographic & Environmental Sciences, UL.
- 10:40 **Measuring the Contribution of Bald Cypress “Knees” to Greenhouse Gas Emissions During Climate Extremes*, Skylar Ross, Earth and Environmental Sciences and the Watershed Studies Institute, MSU.
- 11:00 **Floating Vegetation as a Driver of CH₄ Emissions in Small Ponds Across Louisville, KY*, Mark Tierney, Biology Department, UL.
- 11:20 **Methane Dynamics of Kentucky Bottomland Hardwood Forested Systems*, Marissa Miles, Biological Sciences & the Watershed Studies Institute, MSU.
- 11:40 *Climate Change Flood Assessment Vulnerability of a Karst Landscape for Hazard Mitigation Planning*, Kara Brunot, Center for Human GeoEnvironmental Studies, WKU.

Track 1B - Room 14 — Stream

Moderator: Steve Evans (KWRI)

- The Role of Beavers in Mediating Short-Term Organic Matter Accretion in Kentucky ACEP WRE Easements*, Logan Firkins, Biological Sciences & the Watershed Studies Institute, MSU.
- Impacts of Land Use and Groundwater Inputs on Biological Stream Health and Habitat of Jennings Creek, Bowling Green, Kentucky*, Allison Francis, Center for Human GeoEnvironmental Studies, WKU.
- Jennings Creek Watershed Restoration and Recovery from Tornado Impacts*, Meghan Forbes & Gracie Brown, Center for Human GeoEnvironmental Studies, WKU.
- A Critical Review of Vegetation Issues in So-Called “Stream Restoration” on Daniel Boone National Forest*, Julian J.N. Campbell, bluegrasswoodland.com.
- Investigating the Impact of Stream Restoration on Sediment Transport at a Karst Spring Using Hydrograph Unmixing, Sediment Transport Modeling and Multi-Source Hysteresis*, Leonie Bettel, Department of Civil Engineering, UK.

AWARDS LUNCHEON (12:00 p.m. - 1:00 p.m.)

Location: Meeting Rooms 12 & 13

SESSION 2 (1:00 p.m. - 2:20 p.m.)

Location: Meeting Rooms 9 & 14

2A - Room 9—Watershed

Moderator: Andrea Drayer (KWRI)

1:00 *Antibiotic-Resistant E. coli in Kentucky Watersheds Impacted by Various Land Uses*, Dr. Jason Marion, Environmental Health Science, EKU.

1:20 *Karst Watershed Planning for the Jennings Creek/Lost River Watershed in South-Central Kentucky to Improve Water Quality and Community Awareness*, Dr. Jason Polk, Center for Human GeoEnvironmental Studies, WKU.

1:40 *Exploring Water Quality on the Reclaimed Surface Mines Lands in Eastern Kentucky*, Whitney 'Tara' Maynard, College of Agriculture, Community, & the Sciences, KSU.

2:00 *Identifying Controls on Sediment Hysteresis Patterns Using Interpretable Machine Learning*, Arlex Marin-Ramirez, Civil & Environmental Engineering, UL.

2B - Room 14—Groundwater

Moderator: Donna McNeil (KWRI)

River and Conduit Stage Tomography for Characterizing Karst Aquifers, Dr. Junfeng Zhu, Kentucky Geological Survey, UK.

Modeling Moisture Content Variations in the Shallow Subsurface Soil Under Rainfall Infiltration and Different Atmospheric Conditions, Omid Ghasemi Fare, Civil & Environmental Engineering, UL.

Modifying the COP Karst Groundwater Vulnerability Model Using Spring Storm Response, Dr. Benjamin Tobin, Kentucky Geological Survey, UK.

Contaminant Transport Mechanisms and Source Tracking in Karst Groundwater Systems Under Agricultural Land Use, Shreya Pandey, Center for Human GeoEnvironmental Studies, WKU.

POSTER SESSION (2:30 p.m. - 3:20 p.m.)

Location: Meeting Rooms 10 & 11

SESSION 3 (3:20 p.m. - 4:40 p.m.)

Location: Meeting Rooms 9 and 14

3A - Room 9—Toxins & Treatment

Moderator: Donna McNeil (KWRI)

3:20 *Sewer Gas, Siphons and Long-Term Stewardship for Community Interventions*, Hong Cheng (Herman) Tay, Civil Engineering, UK.

3:40 *Temperature-Responsive Membrane with Nano-Sized Catalysts for the Treatment of Contaminated Ground Water*, Rollie Mills, Chemical & Materials Engineering, UK.

3B - Room 14—Flooding

Moderator: Steve Evans (KWRI)

Perceptions and Visual Awareness of Urban Karst Flooding to Inform Preparedness Planning and Management Actions, Grace Herrmann, Center for Human GeoEnvironmental Studies, WKU.

A Flood of Consequences in Louisville, Kentucky: Using HGIS to Track Refugees Impacted by the 1937 Ohio River Flood, Trevor Harry, Department of Earth, Environmental, & Atmospheric Sciences, WKU.

(Session 3 continued on next page)

SESSION 3 (3:20 p.m. - 4:40 p.m.)

Location: Meeting Rooms 9 and 14

3A - Room 9—Toxins & Treatment

Moderator: Donna McNeil (KWRI)

- 4:00 *Development of a Spatial and Statistical Diagnostic Tool to Prioritize PFAS Sample Locations in Kentucky Surface Waters*, Ariel Robinson, Civil Engineering, UK.
- 4:20 *Bridging the Gap Between Academic Research and Reduction to Practice: Manufacturing Scale-Up of Polymeric Membranes for Water Treatment*, David Lu, Chemical & Materials Engineering, UK.

3B - Room 14—Flooding

Moderator: Steve Evans (KWRI)

- Stormwater Management Advances Using Smart Sensing Network Architecture for Precipitation Monitoring*, Brittany Pekara, Center for Human GeoEnvironmental Studies, WKU.
- Modeling, Managing, and Mitigating Stormwater Flooding Using a Real-Time Monitoring Network and Environmental Equity Approach*, Ben Hauschild, Center for Human GeoEnvironmental Studies, WKU.

Student Awards (4:40 p.m. - 5:00 p.m.)

Location: Meeting Rooms 10 & 11

Adjourn (5:00 p.m.)

Poster Session (2:30 p.m. - 3:30 p.m.)

1. *Assessing Water Quality Trends in the Jennings Creek/Lost River Watershed to Develop a Watershed Based Plan in Bowling Green, Kentucky*, Mara Neace, Center for Human GeoEnvironmental Studies, Western Kentucky University.
2. *Investigating Hydrologic Connectivity and Streamflow Permanence in Karstic and Non-Karstic Headwater Streams*, Nicholas Belen, Civil & Environmental Engineering, University of Louisville.
3. *Predicting Wastewater Treatment Plant Influent in Mixed, Separate, and Combined Sewers Using Nearby Surface Water Discharge for Better Wastewater-Based Epidemiology Sampling Designs*, Arlex Marin-Ramirez, Civil & Environmental Engineering, University of Louisville.
4. **Quantifying Impacts of Climate Change on Headwater Streamflow in Robinson Forest: Insights From 35-Years of Data Collection*, Lauren Brown, Civil & Environmental Engineering, University of Louisville.
5. *Long Term Suspended Sediment Dataset Indicate Shifts in Stream Biogeochemistry are a Function of Sediment Transport and Deposition During Extreme Events*, Brenden Riddle, Civil Engineering, University of Kentucky.
6. **Establishing Linkages Between Nutrients, Nitrogen-fixation, and Microcystin Production by Phytoplankton Communities in a Hypereutrophic Lake*, Madison Arnett and Aydin Khosrowshah, Natural Resource and Environmental Science, University of Kentucky.
7. *Influence of Surface Mining on Hydrological Response to Storms Across Eastern Kentucky*, C. Andrew Day, Department of Geographic & Environmental Sciences, University of Louisville.
8. *Quantitative Microbial Risk Assessment (QMRA) for Urban Stormwater After Treatment Through a Bioretention System*, Isaac Oluk, Civil Engineering, University of Kentucky.
9. *Examination of 2D Nanomaterial and Nanocomposite Membrane Toxicity, and Potential for Removal of Per- and Polyfluoroalkyl Substances*, Lucca Madeo Cortarelli, College of Agriculture, Food and Environment, Department of Plant and Soil Sciences, University of Kentucky.
10. *Utilizing Biochar and Stillage for Remediation and Growth Promotion of Waste Soil*, Motunrayo Oladele, Department of Chemistry, University of Kentucky.
11. *Improved Hydrograph, Sedigraph, and Chemograph Separation Techniques for the South Elkhorn Watershed*, Melissa Beckman, Civil Engineering, University of Kentucky.
12. *Implications of Nanopesticides on Downstream Wetland Habitats*, Kiley Power, Biosystems and Agricultural Engineering, University of Kentucky.
13. *How Creating Heterogeneity in Freshwater Wetland Soils Might Reduce Greenhouse Gas Emissions*, Isaiah Radford, Biological Sciences, Murray State University.
14. *Life Cycle Assessment (LCA) of Green Infrastructure: Urban Tree Soil Cells*, Ja'Maya Wilson, Civil Engineering, University of Kentucky.
15. *Development of a Concept Model of the Causes of Cyanobacterial Algal Blooms on the Ohio River*, Jordan Spears, Civil Engineering, University of Kentucky.
16. *Functionalization of Polyether Ether Ketone/Polysulfone Membranes with 2D Materials for the Removal and Destruction of Per- and Polyfluoroalkyl Substances (PFAS)*, Muhammad Usman Yousaf, Chemical and Materials Engineering, University of Kentucky.
17. *Characterizing Local and Regional Water Source and Transport Through Analysis and Comparison of a 5-Year δ^2H & $\delta^{18}O$ Dataset for the Inner Bluegrass to 10 Regional Sites*, Ariel Gold-McCoy, Civil Engineering, University of Kentucky.
18. *Adapting a Path Forward: Results & Implications of a Climate Change Needs Assessment of Kentucky Cooperative Extension*, Michael Corio, Forestry and Natural Resources Extension, University of Kentucky.
19. *eDNA Detection of Northern Red (*Pseudotriton Ruber*) and Spring (*Gyrinophilus Porphyriticus*) Salamanders in Eastern Kentucky Streams*, Sara Brewer, Asbury University.
20. *Updates to Kentucky's Karst Dye Trace Database: A Resource for Managers, Researchers, and the Public*, Sarah Arpin, Kentucky Geological Survey, University of Kentucky.
21. *Investigation of VOCs Leakage through Plumbing System*, Jonathon Orthober, Civil Engineering, University of Kentucky.
22. *Spatial Variability of Soil Properties Under a Corn Field in Kentucky, USA*, Sai Neela Kesumala, Hutson School of Agriculture, Murray State University.
23. *A First Examination of Microtopographic Change and Evolving Hydrology in Reclaimed Mine Sites of Martin Co., Kentucky Using Multi-Temporal Lidar*, Demetrio P. Zourarakis, Martin-Gatton College of Agriculture, Food and Environment, University of Kentucky.
24. *Comparative Study of Chloride and Bromide Concentrations in Two Rivers in Central Appalachia: Implications for Drinking Water Disinfection Byproducts*, Alicia Harriman, Plant and Soil Sciences, University of Kentucky.