

2025 Kentucky Water Resources Annual Symposium

September 12, 2025

Central Bank Center, Lexington, Kentucky

Registration (Coffee Break) (8:00 a.m. - 8:30 a.m.)

PLENARY SESSION (8:30 a.m. - 09:20 a.m.)

Location: Meeting Rooms 10 & 11

8:30 *Welcome, Introductions, and KWRI Updates*, Jason Unrine, Director, KWRI.

8:40 *USGS Flood Monitoring, Tools, and Partnerships*, Peter J. Cinotto, Acting Director, USGS Ohio-Kentucky-Indiana Water Science Center.

9:10 Q & A.

SESSION 1 (9:20 a.m. - 10:40 a.m.)

Location: Meeting Rooms 12, 13, & 14

Track 1A - Room 12— Flooding

Moderator: Donna McNeil

9:20 *Overview of the Historic February & April 2025 Floods including Usage of the New NWS Flood Inundation Mapping in Kentucky*, Andrea Schoettmer, NOAA/NWS.

9:40 *Don't Change the Channel: Untangling Drivers of Appalachian Flooding*, Meredith Swallow & Jason Dortch, KGS, UK.

10:00

10:20 *Spatiotemporal Shifts in Extreme Streamflow Events Across the Kentucky River Watershed*, C. Andrew Day, Geographic and Environmental Sciences, UL.*

Track 1B - Room 13— PFAS- Occurrence, Toxicity and Treatment

Moderator: Emily Byers

Deep Eutectic Solvents as an Eco-friendly Alternatives in the Fabrication of Polymeric Membranes for Water Treatment Applications, Odianosen Ewah, Chemical and Materials Engineering, UK. +

Membrane-supported Catalytic Strategies for PFAS Detoxification, Subrajit Bosu, Chemical and Materials Engineering, UK. +

Toxicity Assessment of Hexagonal-Boron Nitride and PFAS Through Behavioral and Lipid Accumulation Assays Towards Caenorhabditis Elegans, Lucca Madeo Cortarelli, Plant and Soil Sciences, UK. +

Track 1C - Room 14— Nutrients and Watershed Management I

Moderator: Andrea Drayer

Six Year Record of Nitrate Isotopic Ratios Suggest Soil Nitrogen and Denitrification Control Seasonality: Evidence From a Karst Aquifer and Meta-Analysis for Tracer-Aided Numerical Modelling, Brenden Riddle, Civil Engineering, UK. +

Development of a Concept Model of the Causes of Cyanobacterial Algal Blooms on the Ohio River, Jordan Spears, Civil Engineering, UK. +

Water Quality Monitoring at McConnell Springs, Lexington, KY (2010-2025), David Price, Division of Water Quality, LFUCG.

Reimagining Watershed Planning: An Interactive Approach for the Glenss Creek Watershed, Adam Shelley, Kentucky Water Research Institute, UK.

BREAK (10:40 p.m. - 11:00 a.m.)

SESSION 2 (11:00 a.m. - 12:00 p.m.)

Location: Meeting Rooms 12, 13, & 14

**Track 2A - Room 12—
Flooding**

Moderator: Emily Byers

11:00 *Stormwater Management Using an Integrated Flood Modeling Approach for FEMA Floodplain Mapping in Urban Karst Watersheds*, Jason Polk, Center for Human GeoEnvironmental Studies, WKU. *

11:20 *Karst Groundwater Flow Profile for Jennings Creek, Kentucky for Flood Management*, Noah Jennings & Logan Sileo, Center for Human GeoEnvironmental Studies, WKU. *+

11:40 *Urban Karst Flood Hazard Mitigation at Fairview Plaza, Bowling Green, Kentucky, USA*, Quade Miles, Center for Human GeoEnvironmental Studies, WKU. *+

**Track 2B - Room 13—
Utility Planning**

Moderator: Donna McNeil

Drinking Water Shutoffs in Kentucky, Rebecca Shelton, Appalachian Citizens' Law Center.

Doing Community-Engaged, Collaborative, Action-Oriented Research on Small Rural Water Systems in Central Appalachia: LiKEN's Approach, Values and Methodological Framework, Deborah Thompson & Madison Mooney, LiKEN.

WaterWorks: A Serious Gaming Platform for Effective Water Distribution System Training, Brent Vizanko, Civil Engineering, UK.

**Track 2C - Room 14—
Restoration**

Moderator: Andrea Drayer

Evaluating Urban Stream Restoration Success: Assessing the Impact of Urban Reforestation Efforts on Water Quality and Aquatic Systems in the Inner Bluegrass, Ben Brammell, Science and Health, Asbury, Kenton Sena, Lewis Honors College, UK. *

Incorporation of a Kentucky Trade Association for Ecological Restoration, Chuck Davis, Beaver Creek Hydrology, Kentucky Ecological Restoration Association.

Insights from Kentucky Stream Restoration Professional Interviews, Noah Lane, Biosystems and Agricultural Engineering, UK. +

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

Location: Meeting Rooms 10 & 11

SESSION 3 (1:00 p.m. - 2:20 p.m.)

Location: Meeting Rooms 12, 13, & 14

**Track 3A - Room 12—
Climate**

Moderator: Steve Evans

1:00 *Measuring Extreme Weather and its Effects on Agricultural Productivity in the United States*, Steven Buck, Agricultural Economics, UK.

**Track 3B - Room 13—
Water Quality**

Moderator: Brent Vizanko

Tiny Troubles in Karst: Landuse and Transport of Microplastics in South-Central Kentucky, Katie Norman, Earth, Environmental, and Atmospheric Sciences, WKU. +

**Track 3C - Room 14—
Remote Sensing/Drones**

Moderator: Chuck Davis

Semiautomated Approach for Mapping Complex Sinkholes in the Pennyroyal Karst Plain Using Lidar and Machine Learning, Desiree Cunningham, Kentucky Geological Survey, UK.

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**Track 3B - Room 13—
Water Quality**

Moderator: Brent Vizanko

**Track 3C - Room 14—
Remote Sensing/Drones**

Moderator: Chuck Davis

1:20 *Mapping the Landscape: A National Inventory of University-Based Climate Entities*, Myranda Hentges, Biosystems and Agricultural Engineering, UK. +

Community-Engaged Research Approach for Disinfection By-Product (DBP) Risk Mitigation in Rural Appalachian Kentucky Households, Abelline Fionah, Civil Engineering, UK.

Analysis of Soil Loss in Western Kentucky Agricultural Watersheds using sUAV-Based LiDAR and Multispectral Imaging, Leighia Eggett, Plant and Soil Sciences, UK.

1:40 *Emergent Vegetation (Typha spp.) Synergistically Enhances Methane Emissions in Small, Peri-Urban Wetlands Dominated by Floating Vegetation (Lemna, Wolffia spp.)*, Nathan Earl, Biology, UL. *+

The Impact of Extreme Weather Events on Drinking Water Quality in Kentucky, Munib Inam, Agricultural Economics, UK. +

The Greatest Threat(s) to Prairie Pothole Wetlands, Brett Werner, Centre College.

2:00 *Effects of Duckweed (Lemna and Wolffia spp.) on Decomposition Rates in Small, Peri-Urban Wetlands*, McKenzie Goodwyn, Biology, UL. *+

Disinfection Byproduct Concentrations at Point of use in Rural Drinking Water Systems Impacted by Elevated Bromide Concentrations, Emily Byers, Kentucky Water Research Institute, UK.

Division of Water Drone Program- Collecting Data Via Unmanned Vehicles, Wesley Turner, Watershed Management, KDOW.

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

Location: Meeting Room 9

SESSION 4 (3:30 p.m. - 4:40 p.m.)

Location: Meeting Rooms 12, 13, & 14

**Track 4A - Room 12—
Groundwater**

Moderator: Steve Evans

**Track 4B - Room 13—
Sediment**

Moderator: Brent Vizanko

**Track 4C - Room 14—
Nutrients and Watershed
Management II**

Moderator: Chuck Davis

3:30 *Investigating Groundwater Dynamics in Barbados using Forensic Hydrology and Dye Tracing Techniques*, Autumn Singer, Crawford Hydrology Laboratory, WKU.

A New Model for the Characterization of Concentration-Discharge Hysteresis loops Based on Self-Organizing Maps, Arlex Marin-Ramirez, Civil and Environmental Engineering, UL. +

Development of the Kentucky Watershed Watch Data Portal, Doug Curl, Kentucky Geological Survey, UK.

3:50 *Application of Stable Isotopes to Estimate Ohio River Infiltration and Groundwater Contributions to Radial Collector Wells in the Alluvial Aquifer, Louisville, Kentucky, 2019–20*, Surya Freeman, OH-KY-IN WSC, USGS.

Sediment Transport Dynamics in a Complex Fluvio-karst System, South-Central Kentucky, Sarah Arpin, Kentucky Geological Survey, UK. +

Partnering Up for Planning, Haileigh Arnold, Watershed Management Branch, KDOW.

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Moderator: Brent Vizanko

**Track 4C - Room 14—
Nutrients and Watershed
Management II**

Moderator: Chuck Davis

4:10

*Seasonal Variation of the
Stream's Sediment Transport
Regime Using Sensor Networks
in the South Elkhorn
Watershed*, Melissa Beckman,
Civil Engineering, UK. +

*Clearing the Way: A
Framework for Supporting
Local Efforts in Aquatic Trash
Removal*, Nathan Alexander,
Nonpoint Source Section,
KDOW.

4:30

*A Half-Century Ahead of Its
Time: R.B. Anderson's
Remarkable 1925 Hydrogeologic
Analysis of the Mammoth Cave
System for the Louisville Gas and
Electric Company*, Chris Groves,
Department of Earth,
Environmental, and Atmospheric
Sciences, WKU.

*Predicting Sediment Transport
by Coupling Sediment
Connectivity with the Unit
Sediment Graph: Method
Develop and Watershed-Scale
Application*, Nabil Al Aamery,
Civil Engineering, UK.

*Kentucky Waterways Alliance
Green River Tire and Access
Identification*, Elijah Miller,
Kentucky Waterways Alliance.

Student Awards (4:50 p.m. - 5:00 p.m.)
Location: Meeting Room 9

Adjourn (5:00 p.m.)

Poster Session (2:20 p.m. - 3:30 p.m.)

1. *Critical Mineral Recovery from E-Wastes Using Nanocomposite Membranes*, Tridwip Sen, Chemical and Materials Engineering, UK. +
2. *Exploring the Effect of Single-Layer and Polydopamine-bonded Bilayer PVDF-HFP and Polysulfone Membrane via Green Solvents for Wastewater Treatment*, Eesh Kulshrestha, Chemical Engineering, UK. +
3. *Water Workforce Training Center*, Sahar Alameh, College of Education, UK.
4. *Investigating Headwater Contributions to Downstream Discharge: Insights From a Process-based Hydrologic Model*, Ridwan Mohammed Nur, Civil and Environmental Engineering, UL. +
5. *Unraveling the Role of Model Structure to Simulate Streamflow in Appalachian Headwaters using the MARRMoT Framework*, Franklin Kondum, Civil and Environmental Engineering, UL. +
6. *Comparative Evaluation of Satellite and Field-Based Soil Moisture in Eastern Kentucky's Appalachian Headwater System*, Anju Thapa, Civil and Environmental Engineering, UL. +
7. *Investigation of Rainfall-Induced Slope Failure Using Physical Models*, Mir Ali Hosseini, Civil and Environmental Engineering, UL. +
8. *Evaluating the Effects of Ecological Restoration on Amphibian Communities in Lotic Systems in the Inner Bluegrass Region of Kentucky*, Ethan Hoogerheide, Biological Sciences, ECU. *+
9. *Reconstructing Hydrography in Eastern Kentucky Mine Lands*, Demetrio Zourarakis, College of Agriculture, UK.
10. *Predictive Modeling of Total Trihalomethanes in the Martin County Water System: A Comparison of Linear and Machine Learning Approaches*, George Fordjour, Civil Engineering, UK. +
11. *Life Cycle Assessment (LCA) of Green Infrastructure: Urban Tree Soil Cells*, Kimia Khanlari, Civil Engineering, UK. +
12. *Integrated Research and Education to Assess Sustainability of a Mobile Water Treatment System for Emergency Response in Kentucky*, Isaac Oluk, Civil Engineering, UK. *+
13. *Quantifying Soil Moisture Impacts on Sediment Transport and Hysteresis in Karst: A Dual-Sensor-Based Modeling Study with Mentored Undergraduate Research Support*, Leonie Bettel, Civil Engineering, UK. +
14. *Carbon Isotopic Ratios of Benthic Algae Show Impacts to Fluvial Sediment Carbon Seasonality in South Elkhorn Creek, Lexington, Kentucky*, Joseph Ammons, Civil Engineering, UK. +
15. *Hydrologic Modeling to Predict Flash Flood Events and Uncertainty in the Appalachian Region in Future Decades*, Sarah Holt, Civil Engineering, UK. +
16. *Investigation of Turbulence Parameters in a Karst Cave System in the Inner Bluegrass Region, Kentucky, USA*, Matthew Lynch, Civil Engineering, UK. +
17. *What's in the Air and Water? Understanding Per- and Polyfluoroalkyl Substances (PFAS) and Potential Vapor Intrusion Risks in Kentucky*, Ariel Robinson, Civil Engineering, UK. +
18. *Filtering the Future: Evaluating Constructed Wetlands in Rural Water Treatment*, JuLeah Edie, Biosystems and Agricultural Engineering REU, UK. +
19. *Water Quality Modeling and Variability Among Nested Watersheds in Eastern Kentucky Data Deserts*, Amanda Beall, Biosystems and Agricultural Engineering REU, UK. +
20. *Analyzing Factors of Harmful Algal Blooms in Old Lake: A Geospatial Study with Implications for Distilleries*, Avery Krahwinkel, Biosystems and Agricultural Engineering REU, ECU. +
21. *Restoration Without Reconstruction: Hydraulic Function in Urban Riparian Areas*, Abigail Davidson, Biosystems and Agricultural Engineering, UK. +
22. *Modeling Subsurface Sediment Transport Through Macropores in Heterogenous Fine-textured Soils: Importance of Preferential Flow Dynamics and Macropore Connectivity*, Ayesha Sadia, Biosystems and Agricultural Engineering, UK. +
23. *Reforested Stormwater Basins: A help or a hindrance to stormwater management in Lexington, KY?*, Noah Howie & Jacob Crabtree, Biosystems and Agricultural Engineering, UK. *+
24. *Storm Event Nitrate Source Tracking Using $\delta^{15}\text{N}$ and $\delta^{18}\text{O}$ at Edge-of-Field Water Quality Monitoring Stations in Western Kentucky*, Scott Furlong, Earth and Environmental Sciences, UK. *+
25. *The Role Soil Spatial Complexity and Resource Patterning Play in Greenhouse Gas Emissions From Mineral Soil Wetlands*, Delaney McCoy, Biological Sciences, MSU, & Nadia Castillo, Earth and Environmental Sciences, MSU. *+
26. *Analysis of Soil Quality Dynamics under No-Till and Conventional Tillage Practices*, Durga Bastola, MSU. +
27. *Examining Long Term Trends of Precipitation-Based Climate Indices for Kentucky River Basin*, Jasmin Saric, Mechanical and Civil Engineering, PUNW. +
28. *Preliminary Investigation on Stream Flow Variations in the Black Canyon Complex, Roppel Section of the Mammoth Cave System*, Ljubomir Veljan Risteski, Earth, Environmental, and Atmospheric Sciences, WKU. +
29. *Effects of Organic and Inorganic Fertilizers on Soil Properties and Tomato Yield*, Navdeep Singh, WKU.
30. *Rapid and Field-ready System for Fecal Matter Contamination Detection in Water Resources*, Soroosh Torabi, Mechanical and Aerospace Engineering, UK.