A YEAR IN REVIEW

The Arkansas Water Resources Center continues to focus on helping local, state and federal agencies manage and protect Arkansas’ water resources. The Center succeeds in this effort through research activities, education and training outreach and sharing water resources information to stakeholders throughout the State and region.

The AWRC has contributed substantially to the State’s understanding of its water resources by conducting and funding scientific research and monitoring activities. Current projects generally focus on:

- drinking water treatment
- non-point source pollution
- water quality and quantity related to agricultural activities in the delta
- land use and climate change impacts on water quality, water quantity, and the availability of water resources
- harmful algal blooms

Training students is a top priority for the Center. We provide direct opportunities for students in scientific research, laboratory work, GIS, and even website development. We indirectly support student training by funding student research projects and faculty projects that include student work through the US Geological Survey 104B program.

Another important component of the AWRC is the transfer of information to water resources stakeholders. Some of the ways we disseminate information is through an annual conference, publishing a variety of content on our website, and the use of other media outlets like Facebook and email newsletters.

The mission of the AWRC is to support and conduct water resources research, train future scientists and engineers and transfer water research results to stakeholders throughout the State. This document serves as a summary of the Center’s projects and activities as related to its mission.
What are our Research Accomplishments?

Monitoring in Northwest Arkansas
Completed the second year of a $449,000 continuation grant from the 319 non-point source pollution program to monitor water quality in the Upper Illinois River Watershed and Upper White River Basin.

Project will result in over 10 years of water-quality data at many of the study sites! Data will be used to estimate constituent loads and evaluate how water quality is changing over time in these priority watersheds.

Monitoring in the Poteau River Watershed
Began work on a $400,000 grant from the 319 non-point source pollution program in the transboundary Poteau River Watershed, on the Arkansas side.

Water-quality data will be used to prioritize subwatersheds, estimate nutrient and sediment loads, and look at how water quality is changing over time at 15 study sites.

Also collecting water samples on the Oklahoma side for a grant from the Poteau Valley Improvement Authority. Water-quality data is collected from 26 sites to identify “hot spots” where nutrients, sediments, and salts might occur in high concentrations.

Monitoring in the West Fork White River
Completed the fourth year of sampling for ions and turbidity at 9 sites in the West Fork of the White River in northwest Arkansas.

The purpose is to better understand human versus natural sources of chemical constituents. Also, all 28 river miles are listed as impaired for turbidity, but data suggest that the upstream portion of the river meets the standard.

Nutrients in Big Creek, Buffalo River Watershed
The Big Creek Research and Extension team studies nutrient concentrations in Big Creek to identify potential impact of a confined animal feeding operation.

Published paper in Agriculture & Environmental Letters titled “Nutrient Concentrations in Big Creek Correlate to Regional Watershed Land Use” (open access).

Nutrient Study at Cave Springs Lake
Completed a series of nutrient studies at Partner’s Lake in Cave Springs, which experiences frequent, unsightly algal blooms. The purpose is to figure out how much nitrogen and phosphorus is in the water, what the main sources are - external from the watershed or internal from the sediments, and what’s limiting algal growth.

Water Quality Lab
Analyzed over 20,000 constituents this year in service to researchers, landowners and others across the State.

More about our research can be seen at: arkansas-water-center.uark.edu
The Arkansas Water Resources Center funded five research projects, including three faculty proposals and two projects that supplemented graduate student research.

Projects were selected through external peer review by the Technical Advisory Committee, whose input is integral to proposal selection. The TAC is made up of a diverse group of professionals from academia, state agencies, non-profit groups, and water utilities. Research projects included:

- **Regionalizing Agricultural Field Evapotranspiration Observations**, Dr. Benjamin Runkle, Department of Biological and Agricultural Engineering, University of Arkansas

- **Herbicide Mitigation Potential of Tailwater Recovery Systems in the Cache River Critical Groundwater Area**, Dr. Cammy Willett, Department of Crop, Soil, and Environmental Sciences, University of Arkansas

- **Combined Application of Nutrient Manipulation and Hydrogen Peroxide Exposure to Selectively Control Cyanobacteria Growth and Promote Eukaryote Phytoplankton Production in Aquaculture Ponds**, Dr. Amit Sinha, Department of Aquaculture and Fisheries, University of Arkansas at Pine Bluff

- **Investigating Impact of Lead Service Lines in Drinking Water Distribution Systems at the City of Tulsa**, Dr. Wen Zhang and Kaleb Belcher, Department of Civil Engineering, University of Arkansas

- **Assessment of Strategies to Address Future Irrigation Water Shortage in the Arkansas Delta**, Dr. Qiuqiong Huang and Tyler Knapp, Department of Agricultural Economics and Agribusiness, University of Arkansas

The funded research addresses our congressional authorized mission and promotes the national objectives of the U.S. Geological Survey.

**How do we train future water scientists?**

- **Research Experience for Undergraduates** - Mentored an undergraduate student in water research. The student developed skills in research design and data analysis of nutrient dynamics in a small impoundment. Student presented findings at AWRC annual conference, and presented at the Council on Undergraduate Research Conference.

- **Freshman Engineering Research** - Mentored freshman students who developed their research and scientific skills, including project design, water sample collection, data analysis, reporting and presenting their findings.

- **Student Summer Internship and Semester Hourlies** - Worked with undergraduate student intern from computer sciences to enhance website and improve stakeholder access to AWRC information. Other students gained valuable experience in our water quality lab during the school year.
Annual Conference
Over 150 people attended from throughout Arkansas and the region, including researchers, students, consulting firms, utilities, watershed groups, state agencies and the public. “Protecting Water Supplies for People and the Environment” was the theme.

Session topics included:

- Science and policy in the Illinois River Watershed
- Current research from the USGS
- Water management for agricultural irrigation
- Water quality in agriculture
- Urban water management
- Undergraduate and graduate student research poster competitions

Partnered with the Arkansas chapter of American Water Resources Association to hold their annual symposium in coordination with our conference. The focus was on dam safety and water supply issues in Arkansas.

Social Media
Utilized Facebook and twitter to disseminate information about the activities of the Center as well as sharing news and opportunities from other water organizations.

Facebook followers continue to grow, and “boosting” posts to advertise our monthly electronic newsletters enhances our reach.

Electronic Newsletters and “Arkansas Water Currents”
Published monthly email newsletters to the growing AWRC listserv, consisting of several hundred professionals, students and citizens.

Wrote articles about USGS 104B research, water resources topics in Arkansas, upcoming conferences and events and more.

Shared relevant news stories from other sources and organizations.

Continued publishing newsletter articles on “Arkansas Water Currents”. This enhanced the Center’s information transfer agenda through improved search engine optimization and ability to more easily share individual articles through various media outlets. watercurrents.uark.edu

Website
Worked with computer science student to improve the usability of the website and stakeholder access to AWRC information. The website is critical to the information transfer mission of the AWRC as a platform for the following:

- Immediate electronic availability of AWRC publication of technical reports
- A warehouse of raw data provided as data reports in reference to research and monitoring projects
- Information about submitting a water sample to the AWRC Water Quality Laboratory
- Information on upcoming conferences, funding opportunities for researchers and other events
- Information about Center-related research and monitoring activities

watercurrents.uark.edu