

Arkansas Nonpoint Source Pollution Program



NATURAL RESOURCES DIVISION

FY2017 Projects

Upper Cache River Watershed Monitoring

[Project #: 17-200](#)

Lead Project Partner: Arkansas State University Ecotoxicology Research Facility

Status: Complete

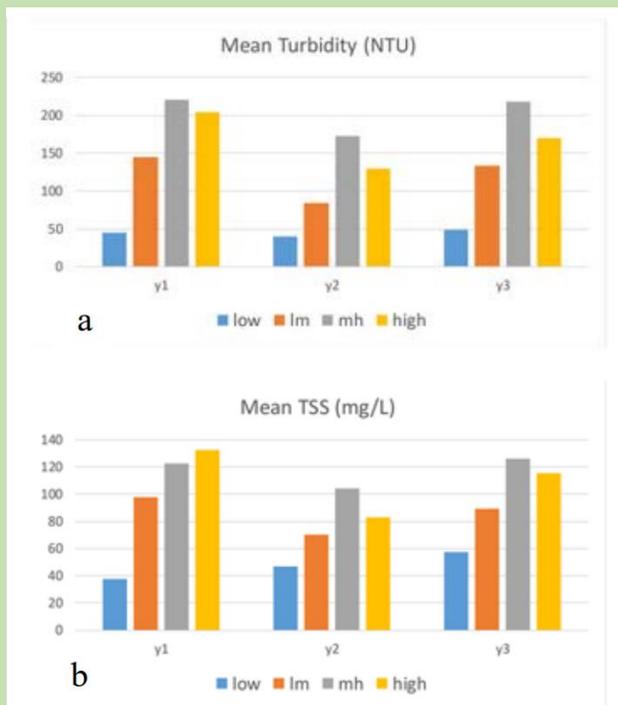


Figure 9. Mean annual turbidity (a) and TSS (b) by agricultural intensities of subwatersheds of the Upper Cache River Watershed.

The Cache River has been identified as a source of excess nutrients that is contributing to the hypoxic zone in the Gulf of Mexico, with agricultural activities in the area thought to be contributing to the problem. The watershed is highly channelized, which makes managing sediment and nutrient input challenging. This project builds on previous monitoring within the Cache River watershed by measuring water quality parameters at the inputs of each of the 12 main tributaries of the mainstem, with 2 sampling sites in the mainstem itself. The results of the project found that agricultural intensity drives the need for Best Management Practices to adequately manage sediment. More “natural” systems in the watershed, such as on Crowley’s Ridge, tended to acquire less pollutants than areas with heavy agricultural use and channelization. A few of the sub-

watersheds saw an increase in nonpoint source pollution over the three-year period of the project. This project has helped to understand our water resources in the watershed area, as well as highlighted the need for certain interventions.

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Water Quality Monitoring in the Upper Poteau River

Watershed

[Project #: 17-300](#)

Lead Project Partner: Arkansas Water Resources Center

Status: Complete

The Upper Poteau River Watershed has been an NPS Program priority watershed since the late 1990's. Over the years, targeted management has resulted in the reduction of pollutants, but there is still work to be done. ANRD has funded several 319 projects in the area, including ones involving monitoring, BMP implementation, and education. The purpose of this project is to measure just how much these measures have impacted the watershed. Data was collected across the watershed at 15 sites (3 near existing USGS flow gauges and 12 at the outflow of each HUC-12 sub-watershed) for a period of 3 years. Results indicated that urban and agricultural land use increases predicted increases in some water quality parameters, such as total nitrogen, total phosphorus, and total dissolved solids, but not in others, such as turbidity and sulfate. Concentrations of constituents tended to be greatest during the summer months and least in the spring but were variable across sites and seasons. The Lower Poteau River site, which was downstream from Waldron's wastewater treatment plant and has a watershed with 33% agricultural land use, saw the highest magnitude of constituent loads. Some data from the sites near USGS gauges indicated that where water quality is improving, it is improving faster than where water quality is decreasing. The results of the project highlighted the value and need for water quality data in understanding pollutants and long-term trends in small-scale sub-watersheds.

Water Quality Monitoring for the Bayou Bartholomew

Watershed

[Project #: 17-400](#)

Lead Project Partner: Equilibrium Inc.

Status: Complete

Bayou Bartholomew Watershed, with the main channel beginning northwest of Pine Bluff and flowing into Louisiana, is listed as impaired on ADEQ's 303(d) List. Impairments include Monitoring projects help identify issues and trends in watersheds. The goal of this monitoring project was to collect and analyze water quality and discharge data across the watershed, especially in HUC-12 sub-watersheds, across a four-year period. Only 11 out of 90 trend analyses for contaminant concentration resulted in statistically

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significant trends. At a few sampling sites, turbidity has been decreasing over time, with sulfate concentrations shown to be decreasing at one of those sites, as well. Additionally, parameter loadings were summed at each sampling station, most of which increased as water moved downstream from station to station, especially in the Cousart Bayou and Deep Bayou sub-watersheds.

Lake Conway-Point Remove Watershed Monitoring and Assessment

[Project #: 17-500](#)

Lead Project Partner: Lake Conway-Point Remove Watershed Alliance

Status: Complete

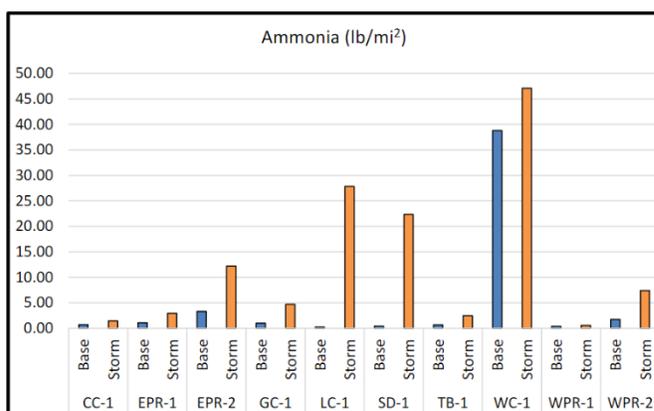


Figure 3. Average ammonia results (lb/mi²) from each sampling site during baseflow and storm flow events.

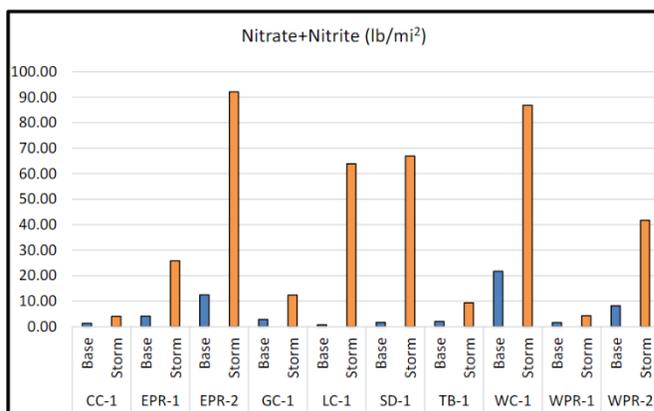


Figure 4. Average nitrate-nitrite results (lb/mi²) from each sampling site during baseflow and storm flow events.

Primarily an Arkansas River Valley watershed, the Lake Conway-Point Remove (LCPR) Watershed is somewhat anomalous in that it does not have a mainstem. Instead, several stream systems ultimately flow into the Arkansas River. There are several streams within the watershed that are also impaired due to excessive levels of metals and nutrients. Monitoring projects have been ongoing in the watershed in previous years, like Project #11-600 and 15-300, completed by Equilibrium Inc. While these projects have been instrumental in understanding baseflow water quality within the watershed, there was not enough data to develop a comprehensive watershed management plan. This project aimed to fill in the gaps. Data was collected and analyzed by GBM & Associates, University of Central Arkansas, and the Arkansas

Water Resource Laboratory. Results showed striking differences between pollutant levels during storm flow events versus baseflow events. Potential NPS sources were identified

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by thoroughly assessing land use types in each sub-watershed, for example calculating the number of chicken houses in the area. The water quality data combined with the land use data is a valuable tool for prioritizing sub-watersheds in a 9-Element Watershed Based Plan.

Ecological Evaluation of Priority Sub-watersheds in the Illinois River Watershed

[Project #: 17-600](#)

Lead Project Partner: Illinois River Watershed Partnership (IRWP)

Status: Complete

Due to constraints such as funding and personnel, monitoring in the Illinois River Watershed is usually limited to downstream water quality monitoring, which misses important information about habitat and biological parameters. This project aimed at two birds with one stone: educate local students about local water resources and aquatic habitats, while collecting baseline data for long-term monitoring at four priority sub-watersheds, including Moore's Creek, Sager Creek, Lower Muddy Fork, and Clear Creek. IRWP worked with local EAST students to conduct GIS assessments of each sub-watershed, who were then trained in the field to conduct biological and ecological evaluations by Arkansas Game and Fish's Stream Team Program. The team discovered Clear Creek and Sager Creek were over 40% and 30% urbanized, respectively, while Muddy Creek and Moore's Creek had hardly any urbanized land, mostly being forested or pastured. However, it is important to note data used to calculate land use was from 2011, and because of rapid urban growth in the area, the percentages are in reality probably higher. The team also concluded, that based on data gathered for this project, land use does not appear to have an influence on macroinvertebrate diversity. This could indicate that macroinvertebrate diversity is mostly impacted by the immediate habitat within the stream, rather than surrounding areas. IRWP intends to continue this study both in Arkansas and in Oklahoma and share their information with other conservation organizations.

Lower St. Francis River Watershed Cost-Share Project

[Project #: 17-700](#)

Lead Project Partner: St. Francis County Conservation District

Status: Complete

Agricultural activity in the Lower St. Francis Watershed led to impairments of turbidity and chloride in Reach 005 of the mainstem in the 2012 303(d) List. Traditional tillage methods on row crops can result in huge amounts of sediment being deposited in

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waterways, which ultimately lead to the mainstem. The purpose of this project was to educate producers on best management practices (BMPs) and provide cost-share funding to implement said BMPs in order to minimize sediment lost from the fields. The project was advertised in local news media, newsletters, and public meetings. Interested landowners submitted applications to the Conservation District and were then provided with resources such as funding and technical assistance in implementing BMPs that worked best for the individual landowner. The most popular BMPs selected by landowners were cover crop, mulch till, irrigation water conveyance, and drop pipes. The project took place over a three-year period and the Conservation District plans to continue to conduct similar projects in the future.

Poteau River Sub-Watershed Project

[Project #: 17-800](#)

Lead Project Partner: Poteau River Conservation District

Status: Complete

Excessive turbidity and total suspended solids are major concerns in the Poteau River Watershed. Such impairments can be attributed to over application of fertilizer and poultry litter, as well as unrestricted cattle access to tributaries. This project provided Scott County farmers resources needed to implement best management practices (BMPs) in



order to protect local water resources. 319 funding allowed for the installation of nearly 14,600 feet of fencing to keep livestock out of streams and riparian areas, four 500-gallon tire tanks to provide alternate water sources for cattle, and 850 acres of brush management to improve forage and nutrient use in pastureland. Over 200 farms were funded or given technical assistance to implement BMPs! Farmers were eager to participate in the program and glad to receive assistance in a timely manner.

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West Fork Stream Restoration at Brentwood Mountain

[Project #: 17-900](#)

Lead Project Partner: Watershed Conservation Resource Center (WCRC)

Status: Complete



The West Fork of the White River is one of the largest contributors of sediment and nutrients to the Beaver Lake Watershed, a priority HUC-8 in the NPS Management Plan. The WCRC, along with partners Beaver Watershed Alliance and Beaver Water District, has

designed and implemented a channel design restoration at two priority sites on private land in the West Fork sub-watershed, complete with vegetation establishment to aid in streambank stability and quality habitat. Sediment and phosphorus loadings from each site were estimated to be 1,000 tons per year and 500 pounds per year, respectively. The WCRC has worked extensively on the past to restore the West Fork sub-watershed, effectively restoring 12,000 feet of streams, 24,000 feet of riparian zones, and 5 acres of wetlands. Their work has reduced contaminant loadings by an estimated 8,000 tons of sediment and 3,600 pounds of phosphorous per year. With record flooding and rain events increasing, these load reductions have been invaluable to the health of the watershed and all who live there.