

The Arkansas Discovery Watershed Program

Led by Dr. Shannon Speir at the University of Arkansas

Program Overview

Project Objective

Expand the Arkansas Discovery Farm Program to provide evidence-based assessment of how field-level conservation impacts on water quality scale to the whole watershed scale

Approach

Scale up conservation in the watershed incrementally to determine “how much” improvement in water quality is feasible.

Our Site

Brush Creek is an agricultural watershed located in NW AR. It is a key tributary to Beaver Lake Reservoir, NWA’s drinking water source.



Brush Creek after a storm



Brush Creek in summer

Outcomes

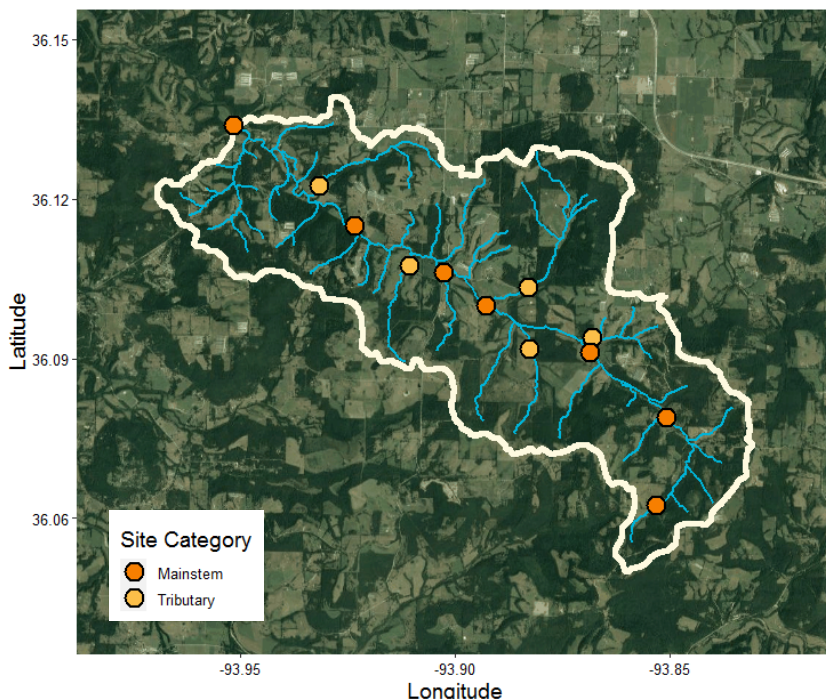
Develop a collective understanding of how to best address water quality issues across scales in agricultural landscapes



Phase 01 - Baseline Sampling

We are currently conducting baseline sampling in Brush Creek, beginning consistently in May 2023. Every two weeks, we sample 12 sites along the mainstem and key tributaries for nutrients, streamflow, and other water quality metrics, like conductivity, turbidity, and dissolved oxygen. Our nested sampling design allows us to understand how nutrients move through the watershed and assess potential target areas for conservation implementation.

Preliminary results indicate prioritizing conservation in the lower watershed will likely result in the “biggest bang for the buck,” as this area has the highest nutrient concentrations and most frequent flow. Additionally, implementing in-stream practices in areas downstream of pools can prevent accumulated nutrients from being transported downstream.



Phase 02 - Conservation Implementation

In 2024, we will begin meeting with local farmers to better understand their goals and concerns around water quality within the Brush Creek watershed. This will aid us in planning for conservation implementation and allow us to collect other types of data that may be of interest to local landowners and stakeholders.

After approximately two years of baseline data collection, we will begin to increase conservation implementation across the watershed. We will use our baseline data to target areas of concern in the watershed and maximize water quality improvements. We will aim to increase conservation incrementally across the watershed in order to identify thresholds at which we may see maximum water quality benefits.



Phase 03 - Expand the Program

As we establish conservation across the Brush Creek watershed, we will look to expand the program beyond biweekly water quality monitoring. Within Brush Creek, we will conduct mechanistic experiments to assess the movement of water throughout the watershed and quantify the rates of key ecosystem processes (e.g., denitrification). We also have plans to establish a high-frequency sensor network within the watershed to monitor streamflow and water quality metrics, such as nitrate, dissolved oxygen, and turbidity, at 15-minute intervals across Brush Creek.



Another key component in expanding the Arkansas Discovery Watershed Program is to add more watersheds. As Brush Creek is dominated by animal agriculture, we will establish at least two additional Discovery Watersheds. One will be dominated by row crop agriculture, while the other will be dominated by forestry. This will allow us to assess the impacts of conservation on water quality across the three key types of agriculture in the state of Arkansas.



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