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BELOW: Rocky Bluff Photo Credit: Jorge Ribas

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A tile-fed owxbow in the Boone River watershed. © Karen Wilke

Unlocking Nutrient Reduction Potential

Insights from new research on tile-fed oxbow restorations on agricultural lands

A newly published article from the University of Iowa has shed light on the nutrient removal power of tile-fed oxbow restorations. This study compared water quality sampling data from four oxbow wetlands in the Boone River Watershed over two years, from 2020 to 2021. The first two oxbows received input from agriculture drainage tile, and the other two received no input from tile. Past research has suggested that reconstructed oxbows receiving tile drainage input receive considerably more nitrate-nitrogen than oxbows fed by groundwater or flooding, which was confirmed by this study.

The hydrologic conditions for the duration of this study were "exceptionally dry and well below normal for the region," meaning there was less water input and retention within the oxbow sites. Past research has indicated that these dry periods with less water input have a higher percentage of nitrate-nitrogen removal than wetter periods with much higher water input. Another way to look at this, however, is that the more the tile water fed into the wetland, the more nutrient loading and availability of nutrients are available to be removed, just at a lower rate than in dry periods. Overall, this study concluded a 62% average reduction of nitrate-nitrogen was found in the tile-fed oxbows, higher than previously found.

In light of this new research, there are several key takeaways to consider. First, restored oxbow wetlands that receive agriculture tile drainage are an effective tool for reducing nutrient loading into adjacent streams and, per the study, "should be considered a sustainable conservation practice for tile drainage treatment in agricultural areas."

In addition to being high impact, these restored wetlands are a relatively inexpensive practice that achieves a large "bang for its buck" with costs and nutrient removal capabilities similar to woodchip bioreactors (~$13,000). These wetlands, however, provide the multipurpose benefit of supporting habitat for a rich diversity of plants and wildlife and storage for excess water in times of flood.

Within the Boone River watershed remain hundreds of degraded oxbows that have the potential for restoration, and efforts have been expanded to identify and contact landowners with this feature on their property.

WANT TO LEARN MORE?
To learn more about oxbow restoration work in Iowa visit **nature.org/iaoxbow.**

Drone photo of restorations immediately after completion. © City of Webster City

Webster City Oxbow Restoration

First urban oxbow restoration in watershed

Visit Brewers Park in Webster City, and you may notice two striking new features. The park is home to two recently installed oxbow wetlands, which will serve as a refuge area for excess water during periods of flood, a treatment point for nutrients and pollutants contained within the water, and a habitat for various plants and wildlife. Historic maps dating back to the 1960s showed a moment when a meander of the river became isolated from the main channel. Over time, this isolated oxbow filled in with sediment, eventually becoming invisible to the naked eye.

However, thanks to satellite imagery and historical maps, this once prominent feature was identified and analyzed by The Nature Conservancy to become a priority site for restoration. This restoration project is unique in the Boone River watershed, as the previous 50+ restorations are located on rural land. As a high visibility restoration, the site has been equipped with education signage, where trail-goers and other passersby can learn about the process and benefits of these restorations (See bottom of next page).

A primary goal of these restored oxbows is to provide the habitat necessary to attract and retain the endangered Topeka Shiner (*Notropis topeka*). This 3-inch minnow has an olive-yellow back, dark scales, and silvery-white sides that need specific site conditions for survival, which can be assisted through the restoration design. Shiners once inhabited the low-order prairie streams of Iowa and have become endangered through the alteration of these streams. However, not all hope is lost; shiners are making a strong comeback as the natural habitat that supports them is being restored.

© Karen Wilke

Biodiversity Hotspot

The Boone River watershed is a biodiversity hotspot because it hosts diverse habitats, including forests, wetlands, and grasslands, supporting various plant and animal species. TNC is committed to implementing conservation practices to reduce nutrient runoff, improve wildlife habitats and build resilient farms and communities.

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The Nature Conservancy Welcomes New Freshwater Coordinator

Andrew Rust will help advance conservation within the watershed

The Nature Conservancy welcomed a new Freshwater Coordinator to add capacity to the rapidly expanding freshwater conservation work in the Boone River Watershed. For the near future, this position will primarily focus on identifying oxbow restoration sites and working with landowners to put this dynamic conservation practice on the landscape. Rust joins Karen Wilke, Associate Director of Freshwater for The Nature Conservancy, who has worked for over a decade in the Boone River Watershed while serving as the Boone River Project Director for The Nature Conservancy.

© Andrew Rust

Welcome, Andrew

Greetings! My name is Andrew Rust, and I am a recent addition to The Nature Conservancy's freshwater team working within the Boone River watershed. Born and raised in rural north central Iowa, I have a strong connection to the land and water within this part of the state and a strong drive to protect these valuable resources. I received my Bachelor of Arts in Environmental Science from the University of Northern Iowa and subsequently served in environmental outreach and landowner engagement positions. I come into this position having been exposed specifically to The Nature Conservancy's oxbow restoration work within the Boone River watershed. Through this, I gained a great sense of interest and excitement, and I look forward to carrying my excitement into the field as I work with landowners and other stakeholders in protecting our freshwater resources and the lives that depend on them.

© Karen Wilke

Visit Our Work

The newly installed educational signage on the benefits of oxbow wetlands can be found along the Brewer Creek Park Trail in Webster City.