

LOCAL SPOTLIGHT

Mackinaw River Watershed, Bloomington, Illinois, United States—Creating wetlands to improve water quality

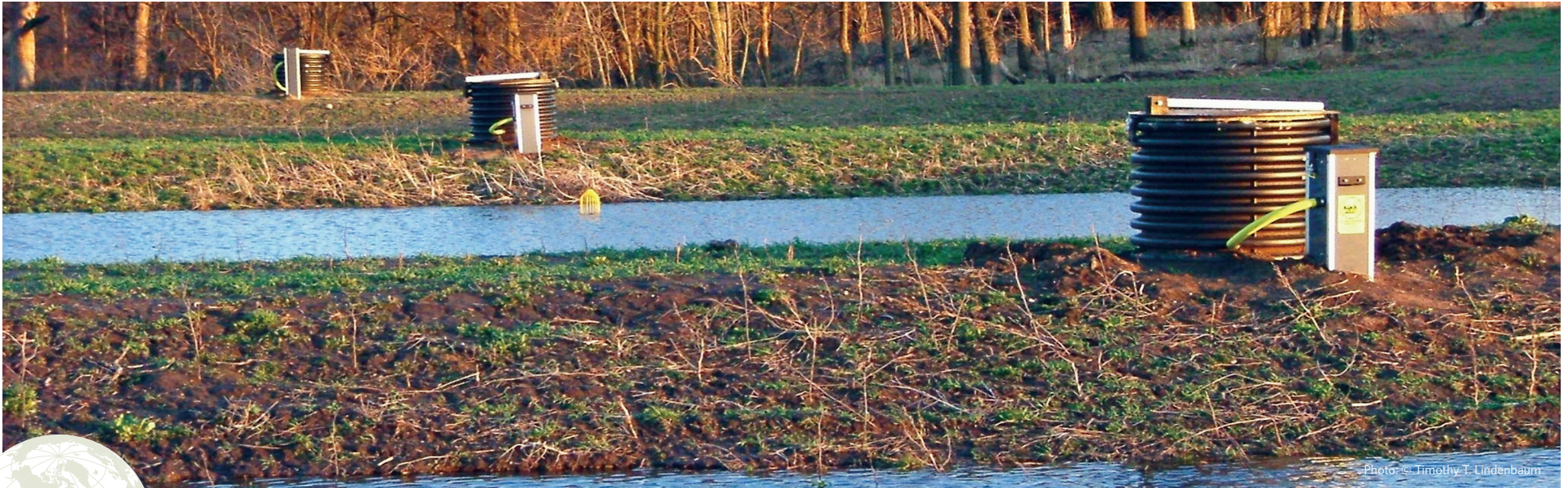
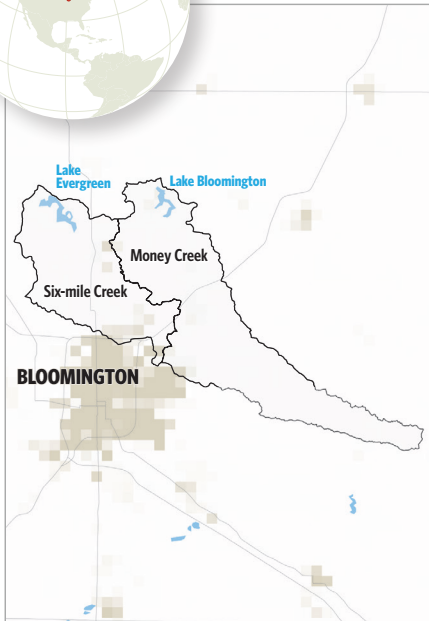


Photo: © Timothy T. Lindenbaum

Constructed wetland at the Franklin demonstration farm in the Mackinaw River watershed.



The challenge

The watershed of the Mackinaw River, a tributary to the Illinois River, covers 295,000 hectares and contains some of the most productive agricultural land on Earth. The Nature Conservancy has been working in the watershed since 1994 to protect the river, which remains home to 66 native fish species and nearly 30 species of mussels. The fact that such aquatic diversity has remained in a watershed that has been subjected to over 150 years of intensive row-crop production is extraordinary.

Much of the watershed's land was historically too wet to farm, resulting in the installation of drainage tile systems below the farmland's surface to remove water and reduce soil moisture down to a level that is optimal for crop production. Unfortunately, the excess water that drains away also washes fertilizers and chemicals into adjacent waterways.

Excess fertilizers can generate adverse impacts to local and regional aquatic ecosystems. Nutrients that are common in fertilizers, including nitrogen and phosphorus, have been recognized as a critical source of pollution that is driving water quality problems both near and far. For instance, the state of Illinois has been identified as one of the highest contributors of nitrogen and phosphorus (16.8 percent and 12.9 percent respectively) to the Gulf of Mexico, which has been plagued by hypoxic dead zones for decades that starve marine life of oxygen and coastal fishing communities of livelihoods.

The impacts of agricultural runoff have potential effects on local drinking water supplies that serve the 80,000 people living in the city of Bloomington, Illinois, and several surrounding townships. The city's main water supply comes from Lake Bloomington, a reservoir on a Mackinaw River tributary. Historically, the reservoir experienced periods in which nitrate concentrations exceeded the U.S. Environmental Protection Agency's 10 parts per million drinking water standard, requiring the city to divert water from a secondary reservoir in order to dilute the high concentrations in Lake Bloomington.

“One of my favorite things about this project is to see the number of people that come from all over the world to learn about sustainable farming practices that we’re developing right here in Illinois. We’ve had people from as far as Brazil and Argentina. Water quality is a common issue shared all over the world, anywhere people want to grow food.”

—John Franklin, owner of the Franklin Family Research and Demonstration Farm where the wetland studies have occurred

Action and opportunity

Extensive research conducted by The Nature Conservancy and its partners at the University of Illinois has shown that wetlands, which help to regulate water and filter pollutants, can effectively remove up to 60 percent of inflowing nitrates from subsurface tiles when they are strategically installed alongside agricultural fields. This is significant since other studies have shown that the majority of the nitrate runoff comes from tile drainage of row crops. Using a combination of wetlands and saturated buffers as a natural water treatment solution has the potential to be cost-competitive with traditional ion exchange treatment systems. A multi-practice approach that combines edge-of-field and in-field practices also qualifies for substantial cost-sharing from federal programs like the Conservation Reserve Program. Using economic and watershed mapping, researchers are developing watershed scenarios to identify the optimal places to work that will reduce nutrient pollution from entering Lake Bloomington in the first place.





With these modeled results in hand, the proposed Bloomington Water Fund could include securing public and private funding leveraged with U.S. Farm Bill dollars to help cover watershed conservation costs. The concept of the fund is built on two critical principles: 1) the combination of agricultural best management practices and green infrastructure are an effective approach to address nitrate-nitrogen water quality problems that are persistent across the Mackinaw River watershed; and 2) they can provide meaningful results in an economically efficient way.

Since 2007, The Nature Conservancy and the University of Illinois have been conducting studies at a research and demonstration farm near Bloomington. This multi-practice research is measuring a range of important factors, including: 1) how large wetlands need to be relative to the area drained by tiles to effectively retain tile water long enough to reduce nutrients; and 2) how nitrogen management practices on agricultural landscapes (e.g., cover crops that capture and hold nutrients through the fall and winter) complement wetlands to reduce nitrate loss from the fields.

The future looks promising for the proposed Bloomington Water Fund. The city has developed watershed plans and established a capital fund for watershed practices that include treatment wetlands, nitrogen management and streambank erosion practices. Outreach by the county’s Soil and Water Conservation District is increasing awareness and interest among landowners. A group of local producers, landowners and representatives from agribusinesses are serving as an advisory committee to help promote the project and ensure its compatibility with farming operations. Much more work remains, but this high level of collaboration has already led to the creation of seven wetlands in the Mackinaw River watershed that are being carefully monitored.

There is great replication potential for the water fund model across the Midwest. In Illinois alone, there are over 2.4 million hectares of agricultural lands that drain into surface drinking water supplies serving more than 1.6 million people. These water users will hopefully look to Bloomington to learn how they, too, can partner with farmers to protect their local water sources, and in doing so, the habitat of aquatic life.

BLOOMINGTON DASHBOARD

Water fund start date	Number of upstream participants to date	Number of potential downstream beneficiaries	Number of partners to date	Primary funding sources	Activities	Anticipated co-benefits
N/A*	15	Between 50,000 and 80,000	8	Public (U.S. Farm Bill funds)**	 	 

*Bloomington, Illinois has titled their budget line for watershed conservation “the water fund” for many years. For the past several years, The Nature Conservancy’s strategy has been to grow the project within the existing structure by integrating additional funding mechanisms within the water funds model.

**Also looking into methods of increasing private funding to leverage Farm Bill dollars for watershed conservation.