



Improving water quality in an agricultural watershed

Wetlands Initiative begins two studies in Big Bureau Creek

Beaver, once ubiquitous in Midwest floodplains, played a key role in shaping the landscape by constructing dams that slowed rivers and streams. Over the past two centuries, however, humans—rather than beaver—have been the primary architects of our landscape, re-engineering the land with drain tiles and ditches to drain the land for development and agriculture.

Big Bureau Creek Watershed, which drains about 500 square miles of Bureau, Lee, and LaSalle counties into the Illinois River, today is a typical example of the degradation common in heavily agricultural areas of the Corn Belt. Run off quickly erodes and carries tons of sediment off the landscape. Nutrients from farm fields flow unchecked into stream channels, degrading water quality. Flooding is more frequent and severe, costing millions.

In response, the Wetlands Initiative and its partners are developing projects in the Big Bureau Creek watershed aimed to give landowners restoration options that they can voluntarily implement to improve water quality and reduce sedimentation. Specifically, landowners could mimic the beaver's work by creating in-stream habitat improvements such as the pool-and-riffle systems or wetlands.

Problems: Sediment, Nutrients, and Flooding

Because much of the Big Bureau Creek watershed has been altered to keep it dry, its streams boast some of the most significant channel erosion in the state. Streamside bluffs, created from fast-moving streamflow cutting into the channel banks, commonly reach a height of 75 feet (the height of a 6-story building). Moreover, nearly 1.2 million tons of soil becomes detached each year and approximately 15% of that load leaves the watershed, clogging waterways and destroying native habitat.

In addition, Big Bureau Creek and its tributaries are laden with nutrients from agricultural runoff. Approximately 88% of the land use in the watershed is agricultural, including 75.5% for corn and soybean production. Nitrogen-rich fertilizers flow quickly off the land during storm events and into creeks. These nutrients flow into the Illinois River, down the Mississippi, and into the Gulf of Mexico where excess nitrogen fuels a low-oxygen “dead zone” destructive to marine life and coastal economies. Illinois is now the #1 contributor of nutrients to the Gulf.

In addition, flooding is more frequent because water is



V3, Big Bureau Creek Watershed Group

Big Bureau Creek annually erodes tons of sediment and soil from its channel during storms and flooding, creating high bluffs like the one above.



Big Bureau Creek Watershed drains 500 square miles of land in north central Illinois. The watershed empties into Goose Pond, filling it in with sediment and degrading the waterfowl habitat.



V3, Big Bureau Creek Watershed Group



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Drain tiles (left) installed throughout the Big Bureau Creek Watershed in the last century quickly drain water off the land. Before humans re-engineered the landscape, beaver dams (right) created natural systems of wetlands, ponds, and backwater habitat that slowed water flow and limited its erosive power.

no longer held on the land, exacerbating nutrient and sediment pollution and further degrading water quality.

Two Projects

The Initiative and its partners are working to demonstrate how voluntary restoration practices can efficiently solve these problems. The first project is a sediment mapping effort and the second is an economic feasibility study of how water quality trading could work in the watershed.

In the first, the Initiative and two laboratories of the USDA's Agricultural Research Service (ARS) are creating and analyzing detailed topographic maps of a portion of the watershed. These maps will show areas of excessive sedimentation and ideal locations where habitat restoration could be implemented by local landowners. The Initiative will then work with landowners and the Big Bureau Creek Watershed Group to help them voluntarily implement these strategies to control sediment, remove nutrients, and store floodwaters.

Secondly, the Initiative is beginning a two-year study to assess the feasibility of establishing a water quality trading market in the Lower Illinois River-Lake Senachwine Watershed—which includes the Big Bureau Creek subwatershed. The U.S. Environmental Protection Agency has awarded the Initiative a grant to complete this study.

Water quality trading could help finance landowner restoration costs. For example, after restoring wetlands on their land, landowners would optimize natural processes in the wetlands

which remove nutrients. Nutrient-laden waters would be diverted to the wetland, then returned after the wetland removed a portion of the nutrients. Once the removed nutrients are measured and verified, nutrient credits could be sold to cities or industries as a natural and cost-effective way to meet clean water standards.

In the current effort, the Initiative and its partners will examine whether a nutrient trading market is scientifically and economically feasible. Conclusions drawn from this research and restoration practices demonstrated in the watershed could serve as a model for water quality trading throughout the state. Previous research conducted by the Initiative suggests that landowner profit may range from \$6 million to \$38 million in the entire Illinois River Watershed, depending on state regulations.

Partners

Sediment Mapping Project

- Pick Family Fund
- USDA Agricultural Research Service

Market Feasibility Study

- American Corn Growers Association
- Northwestern University
- University of Canterbury
- University of Missouri-Columbia
- U.S. Environmental Protection Agency



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