



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

ILLINOIS

Stormwater Wetland Basins Trap and Treat Nonpoint Source Pollutants

Waterbody Improved

Governor Bond Lake suffered from excessive algal growth and turbidity, causing Illinois to list the lake on its 1998 303(d) list of impaired waters. The impairments were caused by suspended solids, nutrients and other nonpoint source pollutants both from within the lake (from legacy bottom sediments) and from the lake's watershed. Project partners implemented best management practices (BMPs) such as stormwater wetland basins (SWBs) and shoreline protection and stabilization practices. As a result, levels of nutrients and suspended solids decreased, allowing Illinois to remove the lake from its 2006 303(d) list of impaired waters for those pollutants. However, the waterbody remains impaired by a high concentration of manganese from an unknown source.

Problem

Algal blooms and suspended sediment had reduced clarity and dissolved oxygen in Governor Bond Lake, which caused it to not support its designated uses of recreation, swimming, overall use and public water supply. Illinois Environmental Protection Agency (EPA) identified the potential causes of the impairment as manganese, phosphorus, total suspended solids, excessive algal growth/chlorophyll *a* and atrazine. The source of manganese in Governor Bond Lake is unknown, but monitoring results found concentrations exceeding the state standard of 0.15 milligrams per liter.

Turbidity is a measurement of the *cloudiness* of water due to solids suspended in the water column. This can be detrimental to fish and macroinvertebrates because it clogs their gills, limits their visibility for feeding and reduces growth.

High concentrations of phosphorus released from bottom sediments result in eutrophication and low dissolved oxygen levels due to the decay of algal blooms. This lack of dissolved oxygen degraded water quality and reduced fish populations.

In 2002 Illinois EPA completed nutrients and sediment total maximum daily loads (TMDLs) for Governor Bond Lake. Illinois EPA selected

water quality endpoints for the TMDLs that were considered acceptable for the most sensitive designated uses (e.g., to meet all designated uses, the waterbody must meet the guidelines identified for the most sensitive use). Consequently, the most stringent values serve as the endpoints for the TMDL analysis. In this case, the endpoints for the TMDLs included the Trophic State Index and Secchi depth values required to meet the *swimming use* guidelines; the non-volatile suspended solids value required to meet the *recreation use* guidelines; and chlorophyll *a*, total phosphorus, and siltation rate values required to meet additional applicable guidelines.

Project Highlights

To fulfill the goals set forth in the TMDLs, the project partners implemented a series of BMPs in the Governor Bond Lake watershed between 2002 and 2006. They constructed four SWBs on the two main tributaries of Governor Bond Lake—two on the Kingsbury Branch and two on Dry Branch (see Figure 1). The basins were designed to enhance aesthetics, provide excellent wildlife habitat and remove nutrients and suspended sediments from the stormwater that flows off a portion of the watershed. The wetland plants absorb and filter nutrients and other



Figure 1. Stormwater wetland basin: pre-construction.

soluble nonpoint source pollutants. Sediment settles out and is stored at the bottom of the SWBs (Figure 2).

Using section 319 funding and local matching funds, project partners also implemented shoreline protection and stabilization practices (concrete seawalls, steel seawalls, riprap and riparian plantings) along 4,608 linear feet of Governor Bond Lake's shoreline. These practices reduced shoreline erosion, which eliminated a source of sediment entering the lake.

Results

The Illinois EPA in partnership with the city of Greenville and cooperating landowners have made great progress in meeting the endpoint for the Governor Bond Lake TMDLs. Implementing BMPs (SWBs, shoreline protection and stabilization) resulted in an estimated 75 percent reduction in total suspended solids, 45 percent reduction in phosphorus and 28 percent reduction in total nitrogen contributed



Figure 2. Stormwater wetland basin: post-construction.

to the lake. In 2006 Illinois removed four of the five sources of pollution from the 303(d) list of impaired waters, and the lake reached attainment for three of the four designated uses. The project partners' combined efforts are achieving water quality improvements in Governor Bond Lake. According to Illinois EPA's 2006 303(d) list, only one impaired designated use (public water supply) and one pollutant (manganese) remain.

Partners and Funding

The Illinois EPA administered \$523,542 in section 319 funding. Conservation 2000 and Illinois Clean Lakes Program provided \$383,339 in matching funds as well as technical and administrative assistance. The Illinois EPA Nonpoint Source Unit, Clean Lakes Unit and the city of Greenville helped review, develop and install the completed BMPs. The city of Greenville contracted with several environmental engineering firms for creating design specifications and overseeing construction.



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