



NONPOINT SOURCE SUCCESS STORY

Illinois

Reducing Nutrient Runoff to Reduce Algae Growth in Patriot's Park Lake

Waterbody Protected

Patriot's Park Lake, in southwestern Illinois, was impaired by algae caused by phosphorus runoff. Illinois placed 25.1 acres of Greenville's Patriot's Park Lake on the 2006 Clean Water Act (CWA) Section 303(d) list of impaired waters based on data collected by the Illinois Environmental Protection Agency (EPA) Surface Water Section. Installing best management practices (BMPs), such as streambank stabilization and a sediment forebay, contributed to measurable improvements in water quality. As a result, Illinois removed the Patriot's Park Lake algae impairment from the Section 303(d) list in 2020.

Water Quality Challenge

The Greenville Lake–East Fork Shoal Creek watershed lies within Bond County in southwestern Illinois. The lake flows south and southwest into the Shoal River and serves as a source of drinking water. Swimming was a major recreational activity on the lake until 1974, when it was prohibited due to poor water quality. The lake, located west of Greenville, Illinois, is managed by the Kingsbury Park District. Agriculture cropland accounts for about 78.5% of the total 830-acre watershed. Forest land accounts for 11.9%; urban land (including farmstead) accounts for 2%, wetlands account for 5.1% and water surface accounts for 2.6%.

The phosphorus loads contribute to algal growth, which led to the lake being listed as impaired for algae in 2006 under the Illinois EPA's Title 35: Subpart B: General Use Water Quality Standards: Offensive Conditions, which states that waters "must be free from sludge or bottom deposits, floating debris, visible oil, odor, plant or algal growth, and color or turbidity of other than natural origin." A total maximum daily load for phosphorus was approved in 2007, and there has been a concerted effort to reduce phosphorus runoff into the waterbody.



Figure 1. Forebay reconstruction

Project Highlights

In 2005, the Kingsbury Park District received CWA Section 319 funding to support projects at Patriot's Park Lake. From 2006 through 2009, partners installed BMPs designed to reduce polluted runoff (Figures 1 – 4). These measures significantly reduced the amount of contamination reaching the lake. Locally led efforts continue to address phosphorus loading in the Greenville Lake–East Fork Shoal Creek watershed. These included:

- Rehabilitating a forebay control structure

- Dredging the forebay and lake
- Stabilizing 1,900 feet of lake shoreline
- Constructing an agricultural stream crossing
- Stabilizing 150 feet of streambank
- Ongoing water quality monitoring during the project



Figure 2. Riprap revetment

Best Management Practice	Number Installed	Units	Comments
Water & Sediment Control Basin	90	FT	
Dredging	17763	TONS	
Streambank & Shoreline Protection	2050	FT	

Results

Initial monitoring during the project showed mixed results. While total phosphorus levels at the top of the lake were lower later in the project, levels at the bottom of the lake were higher (Figure 5). This could be attributed to the need to lower the lake for dredging, combined with increased precipitation during the second year of the project and disruptions caused by construction itself.

Over the long term, visual inspections of the lake by qualified Illinois EPA staff indicated aesthetic improvement. Illinois EPA assessed water quality in Patriot's Park Lake to determine its eligibility for delisting from the Section 303(d) list for algae. Monitoring records from 2012 and 2015 listed the lake as not meeting the criteria. Similar visual inspections performed in 2017 listed the lake as meeting criteria. The inspections indicated that algae no longer impaired Patriot's Park Lake.

Some of the improvements can be attributed to efforts in the watershed to address phosphorus-driven algal growth, which was the primary source of the impairment. The risk of algae is an ongoing issue that will be monitored due to the continued pollutant loadings that can enter the lake. The BMPs implemented in 2006 – 2009 resulted in an estimated annual pollutant load reductions of 212 pounds of nitrogen, 1,106 pounds of phosphorus and 887 tons of sediment. The *Phase 1 Diagnostic and Feasibility Study: Patriot's Park Lake*, conducted by the Kingsbury Park District in Bond County, Illinois, is also addressing water quality issues beyond algae. The Illinois EPA and local watershed groups will continue to monitor progress and determine what further work may be needed.



Figure 3. Completed control structure

Partners and Funding

Partner Type	Agency	Funding	Notes
Federal	Clean Water Act Section 319(h) grant	\$316,649	
Other	KINGSBURY PARK DISTRICT	\$496,000	

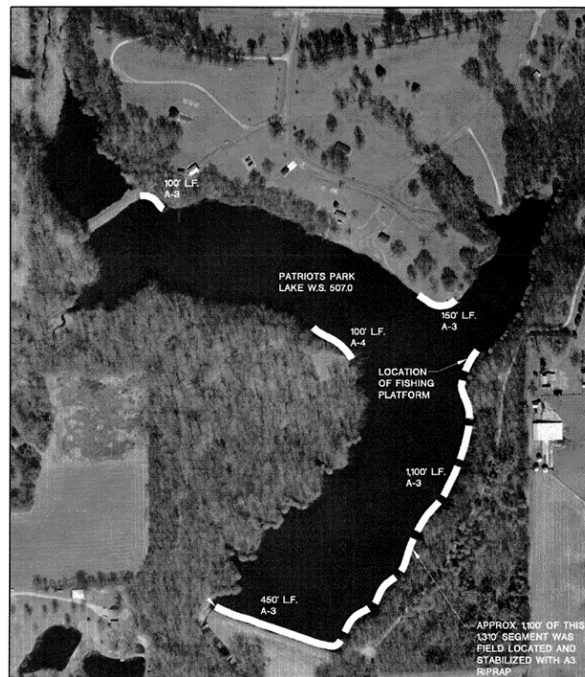


Figure 4. Shoreline reconstruction locations

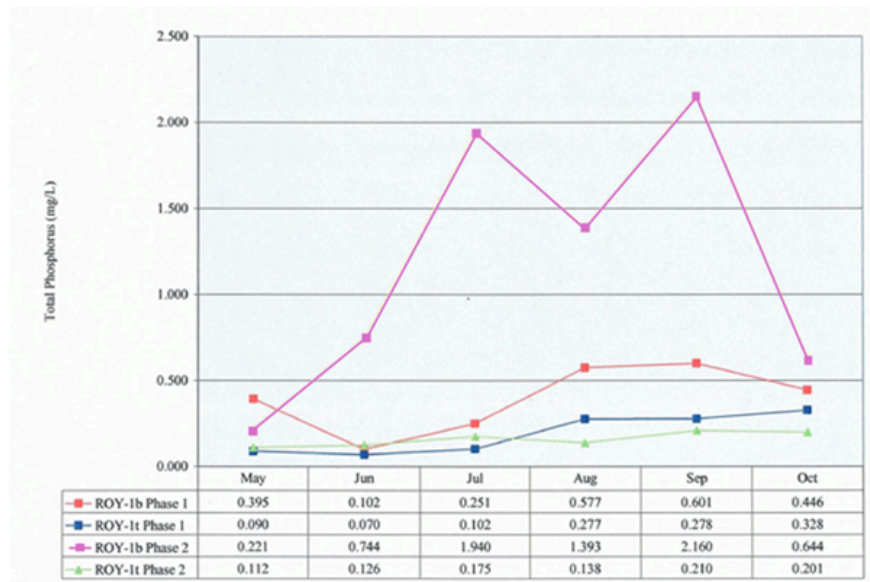


Figure 5. Comparison of monthly mean total phosphorus concentrations for Phase 1 (2001–2002) and Phase 2 (2007–2008)



U.S. Environmental Protection Agency
Office of Water
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For additional information contact:

Jeff Edstrom
Illinois Environmental Protection Agency
217-524-6140 • jeffrey.edstrom@illinois.gov

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