



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Minnesota

## Implementing Best Management Practices Improves Water Quality in the Heron Lake Watershed

### Waterbodies Improved

Runoff from agricultural and urban areas contributed phosphorus and sediment to waterbodies in Minnesota's Heron Lake watershed. Because three of the watershed lakes failed to meet Minnesota's water quality standards, the Minnesota Pollution Control Agency (MPCA) added them to the Clean Water Act (CWA) section 303(d) list of impaired waters—North Heron and South Heron lakes in 2002 and Fulda Lake in 2008. Implementing best management practices (BMPs) and conducting public outreach in the watershed have led to significant water quality improvements.

### Problem

The 472-square-mile Heron Lake watershed empties into the West Fork Des Moines River in southwestern Minnesota (Figure 1). The watershed includes the Heron, Graham, and Fulda lake systems and drains portions of Jackson, Nobles, Murray, and Cottonwood counties. These lakes, particularly the Heron lake system (which includes the 3,204-acre North Heron Lake and the 2,641-acre South Heron Lake) and the Fulda lake system (which includes the 182-acre, interconnected First Fulda and Second Fulda lakes), have elevated phosphorus levels. The levels are high because of inputs from agriculture (cropland and pastureland), sediment eroded from streambanks, atmospheric deposition, and urban runoff.

In 1992 MPCA completed a diagnostic study and classified North Heron and South Heron lakes as hypereutrophic. Results of monitoring from 1997 through 2002 showed that levels of phosphorus and chlorophyll *a* in the Fulda lakes exceeded Minnesota's water quality standards. The standards require that the summer (June–September) average for total phosphorus concentration be 90 micrograms per liter ( $\mu\text{g/L}$ ) or less and that the chlorophyll *a* concentration be 32  $\mu\text{g/L}$  or less. On the basis of these data, MPCA added these three waterbodies to the CWA section 303(d) list of impaired waters: North Heron Lake (waterbody ID 32-0057-05) and South Heron Lake (waterbody ID 32-0057-07) in 2002 and the Fulda lake system (waterbody ID 51-0021-00) in 2008. All three waterbodies failed to support their aquatic life designated uses and were listed as impaired for nutrients and biological indicators.

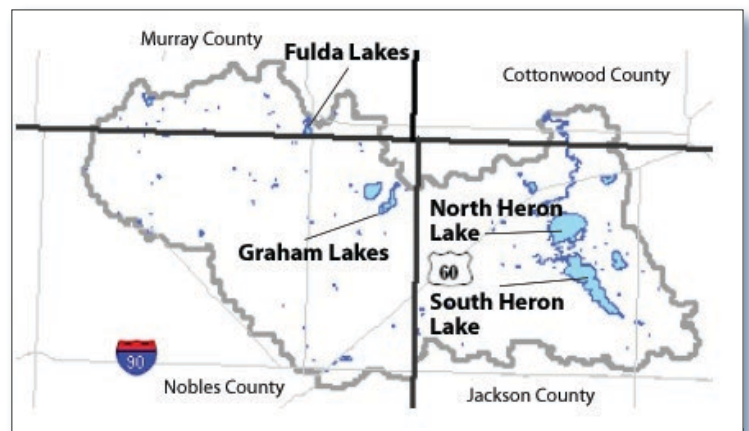


Figure 1. The Heron Lake watershed is in southwestern Minnesota.

### Project Highlights

From 2007 to 2011, Heron Lake Watershed District staff undertook a BMP incentive project in Alba Township, providing information to 137 landowners and 82 farm operators through direct mailing, a newsletter, a meeting, and reports to the general public and local officials. The District issued payments to 29 operators in 2008, 15 operators in 2009, and 22 operators in 2010. The operators enrolled a total of 8,042 acres in conservation tillage practices, surpassing the project's 6,000-acre goal. They expressed enthusiasm for the program, commenting that the incentive helped them choose to switch to less-aggressive tillage. According to the Board of Water and Soil Resources' (BWSR's) eLINK conservation practice tracking system, implement-

ing these practices prevented 258 pounds per year of phosphorus and 426 tons per year of sediment from leaving the land surface.

From 2009 to 2012, operators of a conservation tillage demonstration plot continued a field-scale trial established in the fall of 2005 to evaluate the effect of long-term tillage practices on percent residue, population, yield, and economics in corn and soybean rotations. Trials were rotated in subsequent years in a corn/soybean rotation; tillage treatments were practiced continuously in each tillage strip. The six treatments evaluated were strip tillage; no tillage; ridge tillage; chisel plow; chisel plow with an alternative nitrogen application; and one-pass, spring-only field cultivation (Figure 2). The project showed that strip tillage and ridge tillage were competitive with chisel plow in a corn/soybean rotation in yield and economics, demonstrating that these systems can be viable in southwestern Minnesota, even in heavy, clay loam soils with poor drainage. Project partners conducted a workshop and bus tour of the project area to share information about tillage practices with the wider agricultural community.

From 2007 to 2011, the District provided cost share to encourage landowners in the Fulda Lakes subwatershed to implement conservation tillage, critical area plantings, and shoreline restoration projects to reduce water pollution. Landowners implemented conservation tillage on 5,828.5 acres. Watershed partners completed three shoreline restoration projects, ranging from a simple filter strip to a complex restoration that involved a complete bank stabilization using all bioengineered practices. The District held a walking tour to showcase the shoreline restorations. According to BWSR's eLINK system, implementing these practices prevented 1,251 pounds per year of phosphorus and 1,312 tons per year of sediment from leaving the land surface.

## Results

Water quality monitoring following project implementation showed significant improvement in all three impaired waterbodies. From 1997 through 2010, the mean concentration of total suspended solids decreased by 72 percent in both First Fulda and Second Fulda lakes. Total phosphorus decreased by 45 percent in First Fulda Lake and 56 percent in Second Fulda Lake. Monitoring in North Heron Lake shows that the average orthophosphorus concentrations are around 0.0069 milligram per liter (mg/L) in North Heron Lake (a 94 percent reduction) and range from 0.008 mg/L to 0.155 mg/L in South Heron Lake (a 95 percent reduction) (Figure 3).



Figure 2. This strip till plot was part of the Conservation Tillage Demonstration Project.

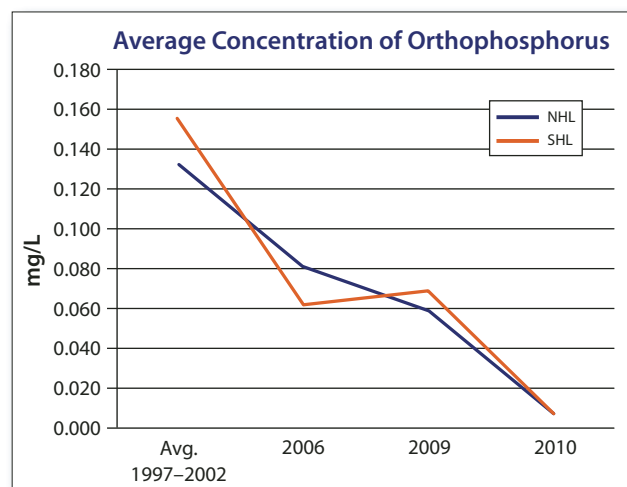


Figure 3. The average orthophosphorus concentrations in North Heron Lake (NHL) and South Heron Lake (SHL) decreased from 1997 through 2010.

## Partners and Funding

Restoration work in the Heron Lake watershed was supported by \$114,043 in CWA section 319 funding. The District served as the project sponsor and lead agency, providing \$59,880 in cash match and \$37,325 through in-kind match. The Murray, Nobles, and Jackson soil and water conservation districts; Minnesota Department of Natural Resources; Minnesota Extension; Fairland Management; Alba Grain, Inc./Mark Pietz; and Vern Uit de Flesch provided in-kind match (a combined total of \$28,553), which included contributions such as supporting restoration efforts, lake management, and research planning and data analysis. Dawn Equipment provided \$2,540 in equipment for examples at a field day. North Heron Lake Game Producers Association provided \$80, and local volunteers provided \$872 through in-kind match.



U.S. Environmental Protection Agency  
Office of Water  
Washington, DC

EPA 841-F-14-KK  
June 2014

## For additional information contact:

**Jan Voit**

Heron Lake Watershed District  
507-793-2462 • [jan.voit@mysmb.com](mailto:jan.voit@mysmb.com)

**Katherine Pekarek-Scott**

Minnesota Pollution Control Agency  
320-441-6973 • [katherine.pekarek-scott@state.mn.us](mailto:katherine.pekarek-scott@state.mn.us)