



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Iowa

Conservation Practices and In-Lake Work Improve Lake Binder

Waterbody Improved

Erosion from cropland and pastureland contributed sediment to Iowa's Lake Binder, significantly degrading the lake's water quality and reducing its available storage capacity for raw drinking water. As a result, the Iowa Department of Natural Resources (DNR) added Lake Binder to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for siltation. Agricultural landowners implemented numerous conservation practices, and the DNR performed in-lake restoration work. Water quality improved, prompting DNR to remove the lake from the state's list of impaired waters in 2012.

Problem

Lake Binder is an 80-acre impoundment in Iowa's Nodaway River Basin (Figure 1). Created in 1942, the lake provides drinking water for the nearby city of Corning. Over the years, erosion of pastureland, cropland and lake shoreline areas contributed sediment to the lake, decreasing water clarity and reducing the lake's storage capacity.

During Iowa's 1996 CWA section 305(b) water quality assessment, the DNR compared the fishable use (Class B aquatic life) for Lake Binder against applicable narrative criteria in Iowa's water quality standards. The DNR determined that excess sediment negatively affected the aquatic life designated use of the lake by altering the physical and chemical characteristics of the lake so that it was unable to maintain a balanced aquatic community. Therefore, based on the best professional judgment of fisheries biologists, DNR added the lake to Iowa's 1998 CWA section 303(d) list of impaired waters for sediment.

In 2001, the DNR completed a total maximum daily load (TMDL) for siltation in Lake Binder. As a result, DNR placed the lake into Category 4a (TMDL approved) in the state's integrated report for the 2004 assessment/listing cycle. According to the TMDL, the sediment load capacity for Lake Binder is 2,841 tons per year. According to DNR estimates, approximately 2,906 tons of sediment reached Lake Binder annually before the restoration efforts.

Project Highlights

In 1996, the Adams County Soil and Water Conservation District (SWCD) developed the Three Lakes Water Quality Project, which included three

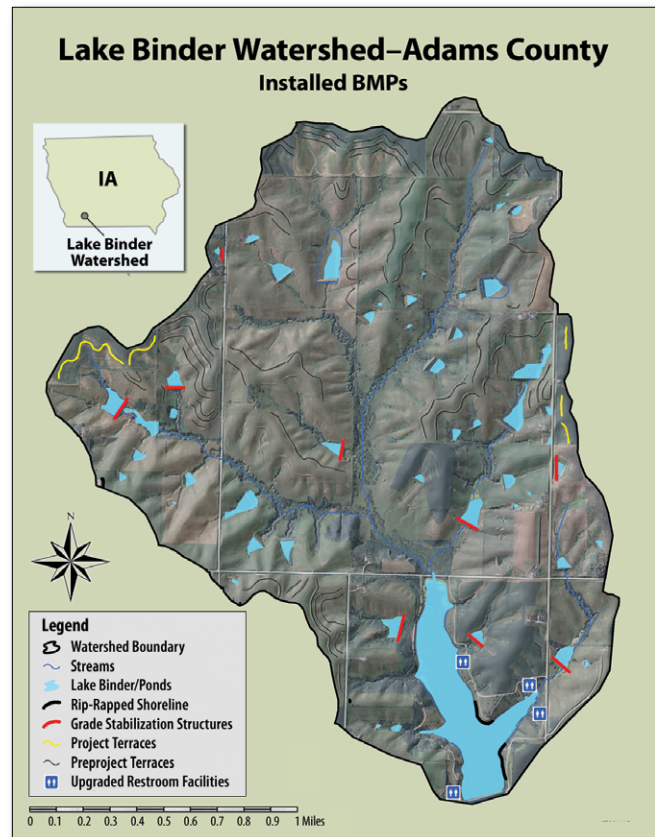


Figure 1. The Lake Binder watershed drains an agricultural area in southwest Iowa.

watersheds—Lake Binder, Lake Icaria and West Lake Corning City Reservoir. Since then, the SWCD has worked with landowners to implement best management practices (BMPs) throughout the project area (see Figure 1). Of the 16 landowners living in the Lake Binder watershed, 12 implemented BMPs to reduce the amount of sediment reaching



Figure 2. A grade stabilization structure installed in the Lake Binder watershed captures and slows runoff into the lake.

the lake. The BMPs included nine grade stabilization structures in key locations above the lakes; these structures prevent gully erosion, trap runoff, provide water for livestock and provide outdoor recreation (Figure 2). Landowners also adopted rotational grazing systems and began injecting liquid manure into the fields, which greatly reduced runoff, odor and production costs. Finally, landowners built numerous terraces that slow overland flow of water across cropland and trap runoff, significantly reducing sediment delivery to the lake.

Prior to 2004, high populations of common carp contributed to elevated turbidity levels in Lake Binder. Carp can uproot aquatic plants and suspend loose bottom sediments as they forage for food. As part of the Lake Binder restoration efforts, DNR Fisheries staff applied rotenone to the lake in fall 2004 to eliminate the problematic common carp. After the successful fish renovation, the DNR restocked the lake with game fish. Staff also stabilized shoreline erosion along approximately 1,500 feet of shoreline with rock riprap. The newly established aquatic plant communities are reducing the frequency of algal blooms, and water quality has improved greatly.

Results

Assessments conducted by DNR Fisheries show that aquatic life diversity and TMDL pollutant reduction goals have been achieved. The lake's water clarity has increased, commonly exceeding four feet in depth and reaching as much as seven

feet in depth. DNR estimates that the installed BMPs have reduced sediment delivery by 466 tons per year, as calculated with Iowa's sediment delivery calculator model. This has resulted in a final estimated sediment load to the lake of 2,440 tons per year, surpassing the TMDL target of 2,841 tons per year. In addition, the resuspension of lake-bottom sediment also declined after the carp were removed.

In 2012, DNR Fisheries staff conducted an aquatic life survey that shows diverse and healthy populations of game fish, including bluegill (25 percent of which are greater than 7 inches in length), largemouth bass (30 percent of which are greater than 13 inches in length), and thriving populations of crappie and channel catfish. On the basis of these data, DNR removed Lake Binder from the state's list of impaired waters in 2012. The lake now fully supports all of its designated uses.

Partners and Funding

Many agencies, partners and funding sources came together to make this project a reality. The Iowa DNR Watershed Improvement Program contributed approximately \$60,000 in EPA CWA section 319 funds to support a project coordinator and cost share for watershed work. DNR Fisheries contributed \$40,000 in staff support and state funding for the fish renovation. The City of Corning funded 25 percent of the shoreline stabilization project; the total cost of \$55,072 was covered by \$13,768 from the city and \$41,304 from the DNR. The U.S. Department of Agriculture's Natural Resources Conservation Service and Farm Services Agency contributed about \$35,000 for BMPs.

Other partners included the Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation, which contributed approximately \$50,000 toward staff and conservation practices. Local contributions from the City of Corning, the Adams County SWCD and local landowners totaled approximately \$80,000. Additional partners included the Adams County Board of Supervisors, Adams County Pheasants Forever, Adams County Ducks Unlimited, Adams County Conservation Board, Adams Economic Development Corps, Iowa State University Extension—Adams County, Corning Chamber of Commerce, Corning Municipal Utilities and Southern Iowa Rural Water Association.



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