Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Michigan

Excluding Cattle from Stream Area Reduces Phosphorus Input

Waterbody Improved

Agricultural runoff and direct access by livestock contributed phosphorus to an unnamed tributary of Poterfield Creek. High phosphorus levels, in turn, led to algal blooms in the tributary. As a result, Michigan's Department of Natural Resources and Environment (MDNRE) added the unnamed tributary to Michigan's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002. The landowner installed cattle exclusion fencing and nuisance algae conditions declined. On the basis of those results, MDNRE has proposed to remove the Poterfield Creek tributary from the list of impaired waters in 2010.

Problem

Poterfield Creek drains into the lower Menominee River Watershed near the Village of Carney in Menominee County, Michigan. The Menominee River flows east and follows the boundary between the northeast corner of Wisconsin and the southern tip of the Upper Peninsula of Michigan before emptying into Lake Michigan's Green Bay (Figure 1). The topography in the Menominee River basin was formed and heavily altered by periodic glaciation, the most recent of which was the Wisconsin period (10,000-20,000 years ago). The region is characterized by lakes, glacial plains, end moraines, and poorly integrated east to west drainage. Because of the extensive amount of glacial activity, the Menominee basin consists mostly of sand and gravel called outwash which is underlain by dolomite.

An aquatic biologist from MDNRE observed nuisance algae growth in an unnamed tributary to Poterfield Creek that runs north to south across the Berger Cattle Ranch. Because the aquatic biologist found that the tributary exceeded Michigan's qualitative goal for nuisance algae conditions, MDNRE added a 1.2-mile segment to the 2002 CWA section 303(d) list of impaired waters for excess algal growth and high phosphorus concentrations. MDNRE attributed the algal bloom to phosphorus in agricultural runoff from the cattle ranch.

Figure 1. Poterfield Creek flows into the lower Menominee River.

Project Highlights

In the early 1990s, cattle grazed in and around the Poterfied Creek tributary that runs through Berger's Cattle Ranch (Figure 2). The landowner of Berger's Cattle Ranch installed fencing to exclude the cattle from the stream (Figure 3). The Michigan Department of Agriculture provided technical assistance. The partners used CWA section 319 funds to monitor the tributary after the landowner installed the fencing.

Figure 2. Cows on the Berger Cattle Ranch trample a small stream in the early 1990s. A bare hillside with an uncovered manure storage area (back right of the photo) contributed pollution to the stream.

Figure 3. The same site on Berger Cattle Ranch in 2005, after the landowner installed fencing. Note that the waterway is grassed, paddocks are fenced and bare hillslope in the background is revegetated.

Results

Recent monitoring by MDNRE's aquatic biologist observed an absence of nuisance algae growth and substantially lower total phosphorus concentrations downstream of the ranch, as compared to the upstream reference reach (Table 1).

As a result of the aquatic biologist's determination that algae no longer impaired the 1.2-mile segment of the unnamed tributary to Poterfield Creek, MDNRE has proposed to remove the waterbody from Michigan's 2010 CWA section 303(d) list of impaired waters.

Table 1. Phosphorus (P) concentrations in milligrams per liter (mg/L), before and after the landowner installed fencing along the Poterfield Creek tributary

Sample date	Upstream of project (mg/L P)	Downstream of project (mg/L P)
Pre-project (1992)	Not sampled	1.1
Post-project (2008)	0.052	0.047

Partners and Funding

The landowner funded the fencing project. The Michigan Department of Agriculture provided technical assistance. Approximately $3,000 in CWA section 319 funding supported post-project water quality monitoring.

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

EPA 841-F-10-001O
August 2010

For additional information contact:

Joe Rathbun
MDNRE Water Bureau
517-373-8868 • rathbunj@michigan.gov