



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Wisconsin

Implementing Agricultural Best Management Practices Restores Coldwater Fisheries in Eagle and Joos Valley Creeks

Waterbodies Improved

Erosion from streambanks, pasturelands and wooded grazing lands had contributed to excess sediment and degraded habitat in Wisconsin's Waumandee Creek watershed. As a result, segments of Eagle Creek and Joos Valley Creek (8.5 and 7.4 miles, respectively) were added to the state's 1998 Clean Water Act (CWA) section 303(d) list of impaired waters. Beginning in the mid-1990s, project partners implemented agricultural best management practices (BMPs) to limit soil erosion and nutrient loading. Partners also stabilized streambanks and waterways to restore fisheries habitat. Monitoring data show that water quality has improved in Eagle and Joos Valley creeks as a result of these efforts. Therefore, the Wisconsin Department of Natural Resources (WDNR) removed both waterbodies from the state's list of impaired waters in 2012.

Problem

Eagle Creek and Joos Valley Creek (Figure 1) lie within the Waumandee Creek watershed in Buffalo County, along the western border of Wisconsin. The watershed is characterized by steep topography, narrow valleys and numerous streams. Agricultural activities make up 34 percent of the land use in the watershed. Because of the close proximity of farming and dairy cow grazing to the creeks, WDNR's Nonpoint Source Pollution Abatement Program identified Waumandee Creek as a priority watershed in 1985. Five years later, WDNR developed the Waumandee Creek Priority Watershed Plan, which identified severe nonpoint source pollution impacts degrading stream water quality; the Plan was updated in 2011.

Excess sediment loading, elevated water temperatures and habitat degradation from streambank erosion (primarily from cattle grazing) prevented Eagle and Joos Valley creeks from supporting their coldwater fishery designated uses. As a result, WDNR added an 8.5-mile-long segment of Joos Valley Creek and a 7.4-mile-long segment of Eagle Creek to the state's CWA section 303(d) list of impaired waters in 1998. Both waterbodies were listed as impaired by total suspended solids (TSS), which had degraded habitat.

A sediment total maximum daily load (TMDL) for Eagle Creek and Joos Valley Creek was developed by WDNR and approved by EPA in 2003. The TMDL set a goal of a 58 percent reduction in the average annual sediment load, based on 1990 conditions. Streambank erosion and livestock grazing on pasturelands and in wooded areas were identified as major sources of suspended solids.

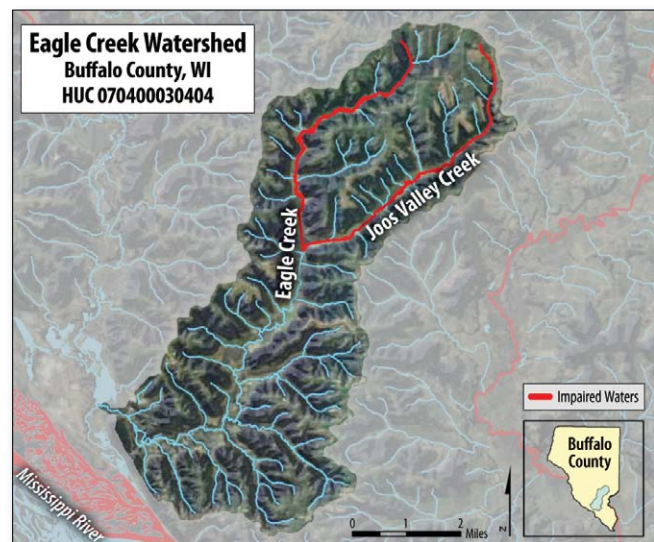


Figure 1. Impaired segments in Buffalo County's Eagle Creek watershed include upper Eagle Creek and all of Joos Valley Creek.

Project Highlights

Between 1993 and 2000, project partners coordinated to implement BMPs in Eagle Creek and Joos Valley Creek. They built three manure storage facilities and 10 barnyard runoff systems to reduce the amount of nutrient loading into the creeks from local farming operations; installed more than 11,000 linear feet of streambank protection structures and approximately 3,640 linear feet of livestock fencing to restrict cattle access to the creeks; added riprap (rock or other structures used to armor shoreline to control streambank erosion) and graded and sloped



Figure 2. Before restoration, erosion contributed excess sediment, which collected and formed this mud bank on Joos Valley Creek.

the creek waterways; and installed in-stream structures that provide streambank stability and edge-cover aquatic habitat. Farmers also implemented cropland and nutrient management practices on approximately 470 acres of highly erodible lands and installed erosion control structures and grassed waterways to decrease soil erosion due to stormwater runoff (Figures 2 and 3).

Results

Between 1990 and 2007 WDNR and the U.S. Geological Survey (USGS) collaborated on a long-term study examining the effects of BMP implementation on water quality in Eagle and Joos Valley creeks. The study monitored levels of TSS, ammonia nitrogen, and phosphorus (1) before BMP implementation, (2) during the installation phase and (3) for a seven-year period following BMP implementation. Results show significant decreases in the median loads of TSS in both creeks—an 89 percent decline in Eagle Creek and an 84 percent decline in Joos Valley Creek. These reductions exceeded the TMDL goal of a 58 percent TSS reduction. Study results also show declines in total phosphorus and ammonia in Eagle Creek (77 percent phosphorus and 66 percent ammonia nitrogen reduction) and Joos Valley Creek (67 percent phosphorus and 60 percent ammonia nitrogen reduction) between pre- and post-BMP implementation. WDNR estimates that pollutant load reductions and water quality improvements are due to changing land practices and livestock herd reductions in the watershed. On the basis of these data, WDNR removed both creeks from the state's list of impaired waters in 2012 for TSS.



Figure 3. Joos Valley Creek, after stakeholders restored the stream and implemented erosion control practices in the watershed.

Partners and Funding

The success of this project is the result of coordination between multiple non-governmental and local, state and federal government partners. WDNR led watershed planning efforts prior to implementation, committed \$392,044 in state Priority Watershed Program funds for BMP implementation, and supported monitoring and data evaluation in the watershed. Other funding for BMP implementation included \$52,313 in EPA CWA section 319 funds (supporting the installation of riprap and barnyard runoff control systems) and grant funding from the U.S. Fish and Wildlife Service.

The Buffalo County Land Conservation Department played a key role in coordinating with local farms to promote BMP implementation. The Fountain City and Alma Rod and Gun clubs helped with fundraising to meet farmer cost-sharing requirements; they also helped to install in-stream habitat structures and other stream restoration practices.

USGS provided monitoring and data evaluation support during the 17-year Waumandee Creek watershed study. The U.S. Department of Agriculture's Natural Resource Conservation Service offered technical assistance for BMP implementation and provided Conservation Reserve Enhancement Program funds to promote voluntary land retirement, which helps agricultural producers to protect natural resources. The Wisconsin Department of Agriculture provided technical assistance, and the University of Wisconsin–Extension led local education and outreach efforts throughout the watershed.



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