



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Ohio

Restoration Efforts Improve Aquatic Life in Olentangy River

Waterbody Improved

Lowhead dam structures, failing home septic systems, and increased agricultural and urban stormwater runoff had degraded water quality in Ohio's Olentangy River. As a result, in 2002 the Ohio Environmental Protection Agency (Ohio EPA) added a watershed-based unit of the river to the state's Clean Water Act (CWA) section 303(d) list of impaired waters for failure to meet the water quality standards associated with the unit's designated warm-water habitat (WWH) aquatic life use. Thanks to work completed through the Olentangy River Restoration Project, approximately three miles of the Olentangy River now fully attains the designated WWH aquatic life use. While additional monitoring is required, Ohio EPA expects to remove flow alteration as a cause of impairment in the watershed-based unit of Olentangy River on the state's 2014 list of impaired waters.

Problem

The rapidly developing Olentangy River watershed is in central Ohio, north of the Columbus metropolitan area. The 93-mile-long river originates near the city of Galion, flows through the city of Delaware (Figure 1), and empties into the Scioto River in downtown Columbus. The major land uses in the watershed are cropland (56 percent), urban (14 percent), forest (14 percent) and pasture (13 percent).

Data collected by Ohio EPA in 1999 identified water quality problems in the Olentangy River. As a result, Ohio EPA added a watershed-based unit of the river to the state's 2002 section 303(d) list of impaired waters for failure to meet standards for WWH aquatic life use. In 2005, Ohio EPA collected additional biological data at four Olentangy River monitoring sites within the city of Delaware. Biological metrics showed that fish communities (Index of Biological Integrity) and macroinvertebrate communities (Invertebrate Community Index) were not meeting the state's WWH standards; in addition, the physical habitat conditions (Qualitative Habitat Evaluation Index) were classified as relatively poor.

In 2007 Ohio EPA finalized a total maximum daily load (TMDL) for the Olentangy River. The TMDL report identified habitat alteration, hydromodification, urban and agricultural runoff, and failing home sewage treatment system (HSTS) units as the key causes of impairment leading to partial attainment or nonattainment of the river's designated WWH aquatic life use. Lowhead dams blocked fish migration and contributed to degraded water quality within impounded pools. Failing HSTS units



Figure 1. The Olentangy River flows through the city of Delaware.

contributed nutrients to the river, and high-volume stormwater flows contributed silt and sediment.

Project Highlights

Using CWA section 319(h) grant funds, the Friends of the Lower Olentangy and the Olentangy Watershed Alliance developed watershed action plans. Both the watershed plans and the 2007 TMDL recommended (1) removing all lowhead dams within the city of Delaware, (2) replacing failing HSTS units in the southern portions of Delaware County, and (3) more effectively managing agricultural and urban



Figure 2. Heavy machinery was used to remove the River Street Dam, one of four lowhead dams removed from the Olentangy River during the project period.

stormwater runoff. In addition, because of rapid residential development observed in the area, the TMDL report recommended that riparian buffers be protected.

Multiple partners helped to implement the Olentangy River Restoration Project. The City of Delaware removed four lowhead dam structures (Figure 2). The Delaware County General Health District worked

with homeowners to replace or repair 126 failing HSTS units. Ohio EPA acquired conservation easements on approximately 235 acres of high-quality riparian and headwater areas. The local soil and water conservation districts, the Ohio Department of Natural Resources' Division of Soil and Water Resources (ODNR-DSWR), and the Olentangy River watershed coordinator worked with landowners to enroll more than 12,300 agricultural acres in the U.S. Department of Agriculture's Conservation Reserve Enhancement Program, which provided financial incentives for converting cropland to native grasses, trees and other vegetation. Finally, Ohio EPA implemented a revised Olentangy River Construction Stormwater Permit, which mandated more stringent requirements for stormwater discharges from construction activities in the watershed.

Results

Restoration efforts have improved water quality in the Olentangy River. Bioassessment data collected by Ohio EPA in 2009 showed that water quality in a three-mile-long monitored segment of the river meets WWH biocriteria (Table 1). Further, all sites meet exceptional WWH standards for at least one of the biocriteria used to assess fish and macroinvertebrate community health. The macroinvertebrate scores (ICI) show the most dramatic increases—up by more than 40 percent at some sites. Physical habitat conditions have also increased considerably: Three of four sites exceed the exceptional WWH standards.

Although these data show significant water quality improvement in the Olentangy River, Ohio EPA continues to monitor throughout the watershed to determine whether the entire assessment unit can be removed from the state's list of impaired waters.

Table 1. Pre- and Post-Project Bioassessment Data for the Olentangy River within the city of Delaware, Ohio

Sample Location River Mile	Aquatic Life Use Attainment Status	Index of Biotic Integrity (fish)	Modified Index of Well-Being (fish)	Invertebrate Community Index	Qualitative Habitat Evaluation Index ^a
2005 Data					
28.2	NON	30	6.1	20	55.5
27.5	PARTIAL	42	7.1	42	81.0
26.0	PARTIAL	38	9.5	26	45.5
25.8	PARTIAL	34	8.6	32	49.0
25.4	FULL	46	8.6	50 ^b	84.0
2009 Data					
27.5	FULL	46	9.4 ^b	54 ^b	70.0
26.0	FULL	48 ^b	8.8	44	62.5
25.8	FULL	46	9.1	52 ^b	54.4
25.4	FULL	48 ^b	9.0	52 ^b	63.0

Notes:

Bold indicates impairment, according to the state's WWH biocriteria.

^a = Values > 60 are generally conducive to the establishment of warm-water fauna; values > 75 often typify habitat conditions that can support exceptional fauna.

^b = Meets exceptional WWH standards.

Based on data collected so far, the state expects to remove flow alteration as a cause of impairment for the assessment unit when the 2014 list of impaired waters is prepared.

Partners and Funding

Key partners included the City of Delaware, Delaware County General Health District, Preservation Parks, Ohio's Scenic Rivers, Ohio Department of Transportation (ODOT), ODNR-DSWR and Ohio EPA. Project funding was provided by the U.S. Environmental Protection Agency, Ohio EPA, the City of Delaware and ODOT. The city received a \$105,000 CWA section 104(b)(3) grant to help support dam removals. Approximately \$6.3 million was provided through Ohio EPA's Water Resources Restoration Program for land and conservation easement acquisition. The Health District received approximately \$110,000 in CWA section 319(h) funding to support HSTS inspections and replacements. ODNR-DSWR received \$405,000 in CWA section 319(h) funding for converting an agricultural ditch into a two-stage channel. In addition, \$70,000 in Ohio EPA Surface Water Improvement funds was awarded to the City of Delaware for additional dam removal work. All monitoring was completed by staff from Ohio EPA's Ecological Assessment Unit.



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