



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

New Hampshire

Stakeholders Cooperate to Remove Dam and Restore Stream Hydrology

Waterbody Improved

A century-old dam across Black Brook created an impoundment called Maxwell Pond, which was a site for ice harvesting, fishing, swimming and other recreation. Over time, sediment from poorly managed industrial sites accumulated in the pond, which became stagnant and shallow. As a result, the New Hampshire Department of Environmental Services (NHDES) added Maxwell Pond to the 2002 Clean Water Act (CWA) section 303(d) list of impaired waters. Stakeholders restored the pond's water quality by reducing upstream sediment sources and removing the dam. Once Black Brook returned to its free-flowing condition (and Maxwell Pond ceased to exist and was reclaimed as a segment of Black Brook), the dissolved oxygen level rebounded and the brook could once again support its aquatic life designated use. As a result of the improvements, in 2010 NHDES removed the former Maxwell Pond portion of Black Brook from the state's CWA section 303(d) list of impaired waters for dissolved oxygen.

Problem

New Hampshire's Black Brook flows approximately seven miles from its headwaters in the town of Dunbarton to the city of Manchester, where it empties into the Merrimack River. More than 100 years ago (circa 1900), Maxwell Pond Dam was constructed across Black Brook in northwest Manchester to create an ice-harvesting pond (Figure 1). When first created, Maxwell Pond included 5.5 acres of open water and had a maximum depth of 12 feet.

In the late 1950s, a cement processing plant/sand and gravel company began operating in the Black Brook watershed upstream of Maxwell Pond. Historically, the company stockpiled materials next to the brook, had poor on-site stormwater controls, and built undersized culverts at road crossings, which caused flooding and exacerbated erosion during storm events. The excessive sediment load from within the watershed was transported in the swift flow of Black Brook and then deposited in Maxwell Pond as the flow decreased within the impoundment.

By 2002 the pond that had once hosted ice harvesting, skating, swimming, fishing and other uses had become severely impaired by sediment accumulation. The maximum water depth had diminished to three feet. Maxwell Pond was warm, supported excessive aquatic plant growth, and had low dissolved oxygen levels. The applicable New Hampshire water quality standard for dissolved oxygen requires that Class B waters achieve a 75 percent minimum



Figure 1. Maxwell Pond Dam on Black Brook in September 2008.

daily average dissolved oxygen saturation and meet a minimum instantaneous concentration of 5.0 milligrams per liter (mg/L). Maxwell Pond data showed that dissolved oxygen levels violated both the dissolved oxygen saturation standard (in 10 of 19 samples) and the dissolved oxygen concentration standard (in 6 of 19 samples). Because the waterbody did not support its aquatic life designated use, NHDES added Maxwell Pond to the state's 2002 CWA section 303(d) list of impaired waters for low dissolved oxygen concentration and dissolved oxygen saturation. As a result of those impairments, along with additional environmental concerns, recent flooding, and other public safety issues, the city of Manchester was compelled to repair or remove the dam.

Project Highlights

Multiple partners began work to restore Black Brook in 2002. Using EPA CWA section 319 funds, Trout Unlimited managed a project that studied the causes of the impairments and considered strategies for watershed restoration (including dam removal). The owner of Aggregate Industries implemented sediment control practices and removed perched, undersized culverts to reduce erosion upstream of the project site.

In 2006 the city of Manchester administered a second CWA section 319-funded project to design and implement the restoration project. The NHDES Dam Maintenance Section began removing the dam

in February 2009. By mid-March, Black Brook flowed freely to the Merrimack River for the first time in more than 100 years. Project partners stabilized and replanted slopes in spring 2009 (Figure 2). Additional water quality, vegetation, fish population and physical/hydrological monitoring are ongoing. Partners plan to complete more riparian plantings and additional streambank stabilization activities during 2010.



Figure 2. Same location as Figure 1, showing Black Brook in June 2009 after the dam was removed and natural gas line relocated.

Results

Removing the dam in 2009 drained Maxwell Pond and reestablished the free-flowing condition of Black Brook. Participants in the NHDES Volunteer Lake Assessment Program and Volunteer River Assessment Program monitored dissolved oxygen levels before and after NHDES removed the dam. The data show that the Black Brook riverine assessment unit (NHRIV700060801-05-02) that runs through the former Maxwell Pond site now meets water quality standards for dissolved oxygen (Table 1). If the data had shown continued dissolved oxygen problems at the former Maxwell Pond site, NHDES would have transferred the impairment to Black Brook. However, because the assessment unit now meets water quality standards, NHDES has

Table 1. Maxwell Pond Data for 2009¹

Sample date	Former Impoundment Site (01A-BKB)	
	DO (mg/L)	DO Saturation (%)
28 Jun 09	7.60	84.5
23 Jul 09	8.18	87.9
23 Aug 09	7.62	90.2
18 Sep 09	10.55	101.9
26 Sep 09	9.01	84.0

¹ To meet the water quality standards, the dissolved oxygen (DO) concentration must be at least 5 mg/L and the DO saturation must be at least 75 percent.

removed the former Maxwell Pond portion of Black Brook from the state's 2010 CWA section 303(d) list of impaired waters for dissolved oxygen. Black Brook assessment unit NHRIV700060801-05-02 remains on the impaired waters list for mercury, benthic macroinvertebrate bioassessments and pH.

Partners and Funding

Numerous partners cooperated on the project, including the city of Manchester, local residents, local companies, NHDES and EPA. EPA CWA section 319 funds provided \$13,350 for the initial study and \$105,000 to administer, plan, document and implement the project. The city of Manchester, in close cooperation with NHDES staff, provided project coordination. The city contributed \$40,000. In addition to the CWA section 319 grants, federal support came from a \$50,000 American Rivers/National Oceanic and Atmospheric Administration (NOAA) grant, \$10,000 from Trout Unlimited/NOAA funds, and \$64,000 from Gulf of Maine Council/NOAA funds. State project funding included a \$6,000 New Hampshire Corporate Wetlands Restoration Partnership grant and \$25,000 from the New Hampshire State Conservation Committee. Fairpoint Communications provided \$46,450, and National Grid provided \$149,539 in services to relocate natural gas and telephone lines affected by removal of the dam structure. Aggregate Industries provided \$150,000 in services to correct upstream sediment contribution and fish passage obstructions. Many others, including local residents, representatives from New Hampshire Fish and Game, Dubois & King Inc., Amoskeag Fishways, and state-funded NHDES staff, provided in-kind services (worth \$26,000).



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