



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Massachusetts

Restoring Historical Cranberry Bogs Improves Aquatic Life in the Eel River

Waterbody Improved

Historical cranberry farming activities in Massachusetts' Eel River resulted in aquatic life impairments caused by fish barriers and non-native aquatic plants. As a result, in 2001 the state of Massachusetts listed Eel River as Category 4c in the state's Integrated Report, for non-attainment of the state's water quality standard for aquatic life. Project partners performed a series of restoration activities that simplified channel and floodplain structure and addressed barriers to fish and wildlife passage as well as Eel River's altered hydrology and degraded wetland soils. Aquatic life improved after completion of the restoration project.

Problem

The Eel River (Figure 1) is a small spring-fed system that flows east of Long Pond Road in the town of Plymouth, flows through Russell Mill Pond, and discharges into Plymouth Harbor in southeastern Massachusetts. Current land use estimates for the South Shore Coastal watershed (an approximately 15-square-mile subwatershed within the Cape Cod watershed) are forest (70 percent), open land (11 percent), and residential (8 percent). Historically, this area was a wetland known as Finney's Meadow.

The river's flow was uninterrupted and supported a wide variety of wildlife until a series of mills and dams were constructed in the early 1800s. In the late 1800s, cranberry farming began and continued until 2002. Cranberry farmers removed trees, modified the stream channel, and built upland berms and water control structures. In addition, the Sawmill Pond dam was a barrier to fish migration, and the impoundment affected habitat, water quality, and natural riverine processes.

The Massachusetts Department of Fish and Wildlife surveyed the fish population on the Eel River in 2001. With the exception of American eel, the overall number of fish was low. This was attributed to the lack of quality fish habitat, including available fish cover which was noted as poor. It was also noted that two small impoundments of this segment of the Eel River were both heavily infested with the non-native aquatic plant *Cambomba caroliniana* (fanwort). In order for the Eel River to meet the aquatic life designated use, the fish population



Photo by USDA NRCS

Figure 1. The Eel River meanders through a restored wetland area that was once a commercial cranberry bog.

should contain multiple age classes (indicative of reproducing populations) of any cold water fish and there should be no non-native aquatic species. As a result, in 2001 the Massachusetts Department of Environmental Protection listed the 3.9-mile Eel River (Segment MA94-23) as impaired (Category 4c) in the state's Integrated Report because it was not meeting its designated use for fish, other aquatic life, and wildlife.

Project Highlights

Beginning in 2004, project partners worked to improve water quality and reduce the impacts of hydromodification on fish and wildlife in the Eel River. Project partners naturalized over 40 acres of retired cranberry bogs (Figure 2) to mitigate the effects of historical hydromodification and removed



Photo by USDA NRCS

Figure 2. Land around the Eel River was converted for cranberry farming as early as the late 1800s.



Photo by Brian Graber

Figure 3. The Sawmill Pond Dam, built downstream of one of the bogs, altered the river's hydrology and blocked fish passage.



Photo by Alex Hackman

Figure 4. Wetlands have been restored in a portion of the river that was once a commercial cranberry bog.



Photo by Alex Hackman

Figure 5. Removing an impoundment has restored the hydrology of the Eel River and improved fish passage.

Sawmill Pond Dam, a large stone dam located downstream of the bogs (Figure 3). Restoration techniques included stream channel and floodplain reconstruction, fill removal, extensive wetland plantings, rare-species habitat creation and enhancement, dam removals, and culvert replacements (Figures 4 and 5). The project took approximately 5 years to complete from feasibility through construction.

Results

In 2006 the town of Plymouth's Community Preservation Committee purchased the cranberry bogs and upland areas. Through the Eel River Headwaters Restoration Project, the town and project partners transformed over 40 acres of former commercial cranberry farm into self-sustaining freshwater wetlands. In addition to improving over 40 acres of habitat, the project addressed the flow of 1.7 miles of headwater stream that had been extensively altered and degraded by human use. This project has made dramatic improvements to wetland and riverine habitat that resulted in new and more abundant fish and wildlife, helped the local ecology become more resilient to climate change, and enhanced public use of the conservation land.

Rare wetland plant communities have also been reestablished. Over 24,000 plants, including more than 17,000 Atlantic white cedar trees, have been planted, representing the first large-scale restoration of this rare wetland type in Massachusetts. Now known as the Eel River Preserve, the area is managed by the town of Plymouth for public use and benefit. The Eel River project won the 2011 Coastal America Partnership Award, and provides valuable guidance for other wetland restoration projects.

Partners and Funding

Partners included the town of Plymouth, the Massachusetts Division of Ecological Restoration, the Massachusetts Department of Environmental Protection, the U.S. Fish and Wildlife Service, the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS), American Rivers, The Nature Conservancy, the Massachusetts Corporate Wetlands Restoration Partnership, and the Horsley Witten Group. The project was funded through several sources with major contributions provided by the U.S. Fish and Wildlife Service (\$1 million), the Massachusetts Department of Environmental Protection (\$400,000 in Clean Water Act section 319 funds), and NRCS (\$350,000).



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

EPA 841-F-14-001X
May 2014

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