



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

Connecticut

Improving Agricultural Practices Restores North Running Brook

Waterbody Improved

Excessive nutrients from dairy farm runoff had impaired Connecticut's North Running Brook. As a result, the Connecticut Department of Energy and Environmental Protection (DEEP) added the brook to the state's 2004 Clean Water Act (CWA) section 303(d) list of impaired waters for not supporting its aquatic life use. Local, state and federal partners collaborated with local farm producers to implement targeted agricultural best management practices (BMPs). The BMPs include improved manure management and silage leachate collection, as well as agronomic practices such as no-till/minimum tillage and continuous cover crops. Improved water quality prompted DEEP to remove the 0.19-mile impaired segment of North Running Brook from the state's impaired waters list in 2012.

Problem

North Running Brook is a 2.5-mile-long tributary nested within the 39-square-mile Muddy Brook and Little River watersheds in northeastern Connecticut. North Running Brook drains a largely rural, upland watershed with a locally high percentage of active agricultural land (21 percent) in eight large dairy farms and an additional 57 percent in forested landscape. The watershed is experiencing a trend of greater commuter-based rural residential development and its commensurate activities and impacts; as a result, some urban development pockets are present.

Twenty years of DEEP and U.S. Geological Survey water quality monitoring program data from the Muddy Brook and Little River watersheds indicated excessively high nutrient levels in several streams and river impoundments. An assessment of data collected in 2003 from the lower stretch of North Running Brook showed that macroinvertebrate populations were dominated by pollution-tolerant species and lacked diversity; therefore, they did not meet the state's water quality criteria for benthic macroinvertebrate communities. DEEP's in-stream field work identified an extremely thick fungal mat across the stream substrate at the confluence with a nearby farm field ditch, which indicated silage leachate discharges coming from upstream corn/hay silage storage (Figure 1). The silage leachate contained high concentrations of sugars and nutrients, which even in small amounts can deplete oxygen, killing fish and other aquatic organisms. Sampling immediately upstream of the ditch and its silage leachate input revealed stream conditions typical of a high-quality, small headwater stream.



Figure 1. A farm ditch contributed silage leachate and farm runoff to North Running Brook.

As a result of data assessment and the threat of future leachate discharges occurring, DEEP placed a segment of the brook (segment CT3708-10-02) on its 2004 CWA section 303(d) list of impaired waters for failing to support the aquatic life designated use.

Project Highlights

The Eastern Connecticut Conservation District (ECCD) used a 2005 CWA section 319 grant to complete an in-depth evaluation of land uses and farm practices in the impaired Muddy Brook and Little River watershed sections to identify ways to reduce nonpoint source pollution. The resulting information was used to develop the *2009 Muddy Brook and Little River Watershed-Based Plan*. Soon afterwards, DEEP and ECCD, in cooperation with the Connecticut



Figure 2. The completed silage bunker and leachate collection system helps to manage manure at Valleyside Farm in Woodstock, Connecticut.

office of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), met with stakeholders to prioritize the opportunities identified in the watershed plan. As part of the process, the owners of a 250-head dairy farm with a history of responsible manure management expressed interest in fixing a continuing problem they had with silage leachate release. Following stakeholder agreement, ECCD received a CWA section 319 grant in 2010 to plan, design and add a portion of a silage leachate collection and transfer system to the farmers' nearby long-term manure storage facility (Figure 2).

The grant funds were used to develop plans, relocate and construct several silage bunkers, and redirect the flow of bunker-based silage leachate away from North Running Brook and into an underground pipe drainage system that leads to a secure manure storage facility. NRCS leveraged that work as part of the design and installation of a larger integrated collection, pumping and transport system. Overall construction was completed in mid-2011. Since project completion, NRCS staff have continued to provide additional technical agronomic assistance to the farm producers.

Over the past five years, NRCS has used Environmental Quality Incentive Program funds to partner with farmers throughout the larger Little River watershed to install waste storage facilities, improve nutrient management, and implement other practices to reduce nitrogen and phosphorus loadings. In 2012 the Little River watershed was selected as a National Water Quality Initiative (NWQI) priority watershed.

Results

Implementing agricultural BMPs and improving agronomic practices reduced nutrients contained in barnyard and farm field runoff and allowed water quality to improve in North Running Brook. Benthic data collected in 2009 and 2010 show that North Running Brook scored 67 on a macroinvertebrate multimetric index (MMI), surpassing the minimum MMI score of 43 needed to indicate aquatic life support. Physical and chemical data collected during the same period also showed no exceedances of water quality criteria. On the basis of these data, DEEP determined that the lower North Running Brook segment meets the Connecticut Water Quality Standards for aquatic life use and removed a 0.19-mile segment from the state's 2012 CWA section 303(d) list.

Partners and Funding

In 2010 ECCD received a \$111,000 CWA section 319 grant to implement agricultural BMPs on private farmland, along with a contributing match of \$104,000 and significant contributions from NRCS and the farm producers. ECCD and NRCS developed an operation and maintenance plan for the farm producers. The farm producers own, operate and maintain the silage leachate system, which has an estimated design life of 25 years.

A technical transfer workshop for area farmers was then held, and NRCS national Chief Dave White and state and federal agency and legislative representatives visited the site in the summer of 2012. An additional large dairy farm producer who attended the site tour has since collaborated with the listed partners to install a silage leachate collection system to further protect an adjacent tributary feeding Muddy Brook.

DEEP and ECCD continue to partner with the Town of Woodstock, the Woodstock History Society and Roseland Lake Association, all of which have also demonstrated support and assistance by installing demonstration bioretention and riparian buffer plantings, using \$63,000 in CWA section 319 funds and contributing \$45,000 in matching funds. DEEP and ECCD used another \$152,000 in CWA section 319 funds to help additional animal agricultural producers implement BMPs in the watershed. The Last Green Valley, Inc., a nonprofit group, helped ECCD to conduct water quality monitoring to assess improvements.



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