NONPOINT SOURCE SUCCESS STORY

Delaware

Controlling Nonpoint Source Pollution from Agricultural Areas Restores Abbott's Mill Pond

Waterbody Improved

Runoff from agricultural and residential areas caused high bacteria levels in Delaware's Abbott's Mill Pond. As a result, the Delaware Department of Natural Resources and Environmental Control (DNREC) added the pond to the 1998 Clean Water Act (CWA) section 303(d) list of impaired waters for bacteria. Watershed stakeholders provided technical assistance and installed agricultural best management practices (BMPs) in the pond's watershed, causing bacteria levels to decline. As a result, DNREC removed Abbott's Mill Pond from the state's 2006 list of impaired waters for bacteria.

Problem

Abbott's Mill Pond was created more than 200 years ago when Johnson Branch was dammed to provide power to a grist mill. Today, the pond covers approximately 25 acres on Johnson Branch, which is a tributary near the headwaters of Delaware's 76-square-mile Mispillion River watershed. The mill pond is now part of the Abbott's Mill Nature Center, which maintains the pond and the restored mill for public education and recreation purposes.

The 20-mile-long Mispillion River meanders through farmlands and wetlands in southeastern Kent County and northeastern Sussex County, and eventually flows into Delaware Bay (Figure 1). Although the upper watershed drains mostly agricultural lands and wetlands, it includes two urban areas: Milford and Houston.

Primary sources of nonpoint source pollution in the watershed likely include runoff from agricultural activities (e.g., fertilizer and manure application), concentrated areas of animal production and failing septic systems.

Monitoring data collected in the late 1990s indicated that Abbott's Mill Pond failed to meet the state's enterococcus bacteria numeric criterion, which requires that the annual geometric mean be less than 100 colony-forming units (cfu) per 100 milliliters (mL). The pond did not support its freshwater primary contact designated use, prompting the state to add the pond to Delaware's 1998 CWA section 303(d) list of impaired waters for bacteria.

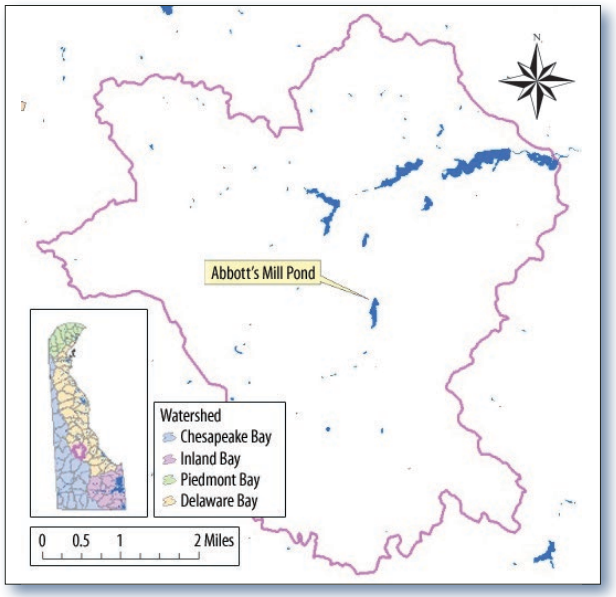

Figure 1. Abbott's Mill Pond is in the Upper Mispillion River watershed in central Delaware.

In 2006 the U.S. Environmental Protection Agency developed a total maximum daily load (TMDL) to address the nutrients and bacteria loading throughout the Mispillion River watershed, which includes Abbott's Mill Pond. To achieve TMDL targets and meet water quality standards in the pond, the TMDL required a 57 percent reduction in nitrogen and phosphorus loadings and an 87 percent reduction in bacteria loadings from the surrounding watershed.

Project Highlights

The Sussex and Kent County conservation districts (SCD and KCD, respectively) offered technical assistance to the farming community by providing nutrient management planning and cost-share funding for agricultural BMPs. The conservation districts also partnered with the U.S. Department of Agriculture's (USDA's) Natural Resources Conservation Service (NRCS) to develop conservation plans and Environmental Quality Incentive Program (EQIP) contracts. Between 2002 and 2014, watershed partners worked with landowners to enroll an average of 1,400 acres of cover crop per year and implement nutrient management plans on approximately 100 percent of available lands.

In addition, several BMPs were installed on poultry operations within the watershed, including 13 manure storage structures, 11 composters, and 25 heavy use protection areas. The SCD and KCD Planners continue to work with farmers throughout the watershed, providing ongoing technical assistance to ensure improved water quality.

Delaware's USDA Conservation Reserve Enhancement Program (CREP) was established in 1999 to protect and enhance environmentally sensitive land and waters in the coastal plain geographic areas of the Delaware, Chesapeake and Inland Bays watersheds by establishing voluntary land retirement agreements with agricultural producers. To assist in CREP program development and implementation, in 1999 Delaware's Nonpoint Source Program committed CWA section 319 funds to create a full-time Delaware CREP Program Coordinator position. Between 1999 and 2014, the CREP Program Coordinator helped install 4.9 acres of wildlife plantings, 15 acres of grass buffers, 3.5 acres of wetland restoration, and 187 acres of hardwood trees in the Abbott's Mill Pond watershed.

Figure 2. Abbott's Mill Pond water quality has improved, thanks to restoration efforts.

Results

Bacteria levels in the pond have decreased in response to the more than 10 years of water quality protection and restoration efforts in the Mispillion River watershed (Figure 2). DNREC collected monitoring data at two stations in Abbott's Mill Pond between September 2000 and August 2005. In one station, the geometric mean of the 22 samples collected over the 5-year period was 50 cfu/100 mL. In the other station, 16 samples showed a geometric mean of 53 cfu/100ml. Since both were well below Delaware's fresh water bacteria water quality standard of 100 cfu/100 mL, DNREC removed the 25-acre Abbott's Mill Pond (DE-210-L06) from the state's list of impaired waters in 2006.

Partners and Funding

Key partners included KCD, SCD, NRCS and the Delaware Nonpoint Source Program. Approximately $1.5 million in federal CWA section 319 funds supported the costs of the Abbott's Mill Pond subwatershed restoration effort. Additional funding came from the USDA (through EQIP and CREP) and Delaware's Conservation Cost Share Program (which was provided through KCD and SCD). Because of the nature of the funding and enrollment procedures, much of the funding provided by watershed partners has been immeasurable.

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