NONPOINT SOURCE SUCCESS STORY

Delaware

Controlling Nonpoint Source Pollution from Agricultural and Residential Areas Restores Stockley Branch

Waterbody Improved

Runoff from agricultural and residential areas caused high bacteria levels in Delaware's Stockley Branch. As a result, the Delaware Department of Natural Resources and Environmental Control (DNREC) added Stockley Branch to the 1996 Clean Water Act (CWA) section 303(d) list of impaired waters for bacteria and nutrients. Watershed stakeholders provided technical assistance and installed agricultural best management practices (BMPs) in the watershed, causing bacteria levels to decline in the stream. As a result, DNREC removed the Stockley Branch from the state's 2008 list of impaired waters for bacteria.

Problem

Stockley Branch is in the 28,676-acre Cow Bridge Branch watershed, which is in the Indian River basin in southeastern Sussex County, Delaware (Figure 1). 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 urban activities. Monitoring data collected in the late 1990s indicated that Stockley Branch failed to meet the state's enterococcus bacteria numeric criterion, which requires the annual geometric mean to be less than 100 colony-forming units (cfu) per 100 milliliters (mL). Stockley Branch did not support its freshwater primary contact designated use, prompting the state to add it to Delaware's 1996 CWA section 303(d) list of impaired waters for bacteria and nutrients.

In 1998 and 2006 the U.S. Environmental Protection Agency developed total maximum daily loads (TMDLs) to address the nutrients and bacteria loading, respectively, throughout the Indian River watershed. The 1998 TMDL required an 85 percent reduction in nitrogen and a 65 percent reduction in phosphorus loadings to achieve TMDL targets and meet water quality standards. The 2006 TMDL required that the overall bacteria loading be reduced by 42 percent from the 2000–2005 baseline levels in fresh water regions of the Inland Bays Drainage Basin, which includes the Indian River basin.

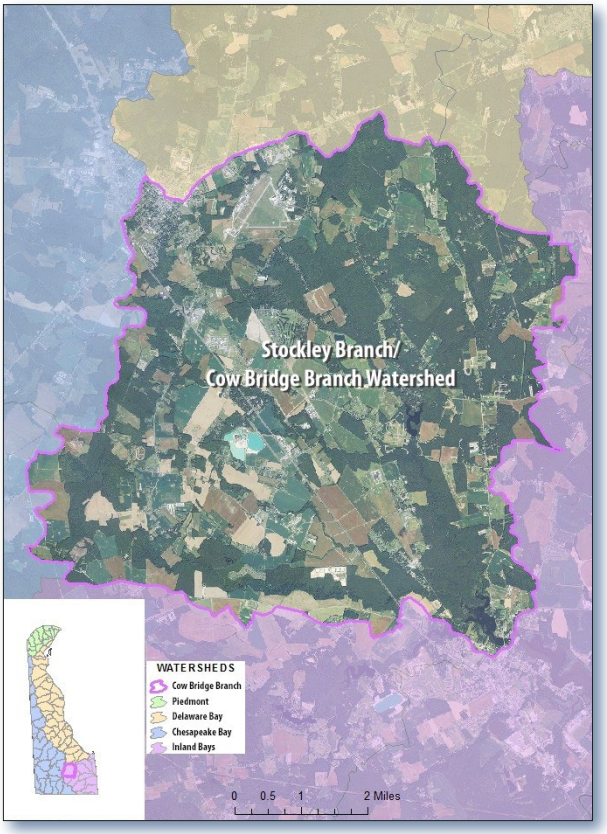

Figure 1. Stockley Branch flows into Cow Bridge Branch, which is in the headwaters of Delaware's Inland Bays Drainage Basin.

Story Highlights

The Sussex Conservation District (SCD) offered technical assistance to the farming community by providing nutrient management planning and cost-share funding for agricultural BMPs. The SCD 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. Watershed partners worked with landowners to enroll 11,000 acres of cover crops over 5 years and implement nutrient management plans on approximately 9,228 acres.

In addition, several BMPs were installed on poultry operations within the watershed, including 26 manure storage structures, 11 poultry carcass composters, 84 heavy use area protection pads and the transfer of 7,492 tons of manure. SCD planning staff 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. In 1999, to assist in CREP program development and implementation, Delaware's Nonpoint Source Program committed CWA section 319 funds to create a full-time Delaware CREP Program Coordinator position. The CREP Program Coordinator helped install 1 acre of grass buffers, 9 acres of riparian buffers, 10.2 acres of wetland restoration, 17.3 acres of wildlife plantings, and 219.4 acres of hardwood trees in the Cow Bridge Branch watershed, which includes Stockley Branch.

Continued water quality implementation efforts between 2011 and 2016, including the installation of the following urban practices, have helped maintain water quality in Cow Bridge Branch: (1) adding a retrofit dry stormwater pond to a bioretention facility with the use of biochar on 1.6 acres and (2) restoring 1,000 feet of impaired stream that treated 30 acres.

Figure 2. Stockley Branch water quality has improved, thanks to watershed restoration efforts.

Results

Bacteria levels have decreased in response to the more than 10 years of water quality protection and restoration efforts in the Cow Bridge Branch watershed (Figure 2). DNREC collected monitoring data at STORET Station 308281 in Stockley Branch between September 2002 and August 2007. The geometric mean of the 31 samples collected over the 5-year period was 59 cfu/100 mL. This was well below Delaware's fresh water bacteria water quality standard maximum of 100 cfu/100 mL, so DNREC removed the 8.23-mile segment of Stockley Branch (DE-140-006) from the state's list of impaired waters in 2008 per its Assessment and Listing Methodology.

Partners and Funding

Key partners included SCD, NRCS, Delaware Center for the Inland Bays and the Delaware Nonpoint Source Program. Approximately $1.1 million in federal CWA section 319 funds supported the costs of restoration in the Stockley Branch and Cow Bridge Branch watersheds. Additional funding came from the USDA (through EQIP and CREP) and Delaware's Conservation Cost Share Program, which was provided through the SCD.

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