



# NONPOINT SOURCE SUCCESS STORY

# Delaware

## Controlling Nonpoint Source Pollution from Agricultural Areas Restores Tappahanna Ditch

### Waterbody Improved

Runoff from agricultural areas caused high bacteria levels in Delaware's Tappahanna Ditch of the Choptank River. As a result, the Delaware Department of Natural Resources and Environmental Control (DNREC) added the watershed 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, which led to reduced bacteria levels. As a result, DNREC removed Tappahanna Ditch from the state's list of impaired waters for bacteria in 2018.

### Problem

Tappahanna Ditch is in the Choptank River watershed on the western edge of Delaware in Kent County (Figure 1). The Choptank River watershed consists of the Tappahanna Ditch in the northern portion of the watershed, Culbreth Marsh Ditch in the center, and Cow Marsh Creek in the lower portion. The drainage area of the Choptank River watershed within Delaware is approximately 97 square miles. Primary sources of nonpoint source pollution in the watershed likely include runoff from agricultural activities (e.g., fertilizer and manure application) and concentrated areas of animal production.

Monitoring data collected in the late 1990s indicated that Tappahanna Ditch 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). Tappahanna Ditch did not support its freshwater primary contact designated use, prompting the state to add the watershed to Delaware's 1996 CWA section 303(d) list of impaired waters for bacteria.

In 2006 the U.S. Environmental Protection Agency developed a total maximum daily load (TMDL) to address the nutrients and bacteria loading throughout the Chesapeake Bay watershed, which includes Tappahanna Ditch. Nutrient TMDLs for the Choptank River watershed include a yearly-average cap on total nitrogen at 1,359 pounds per day and a 40% reduction in phosphorus levels. Also, the TMDL requires a 29% reduction in nonpoint source bacteria loads in the Choptank River watershed.

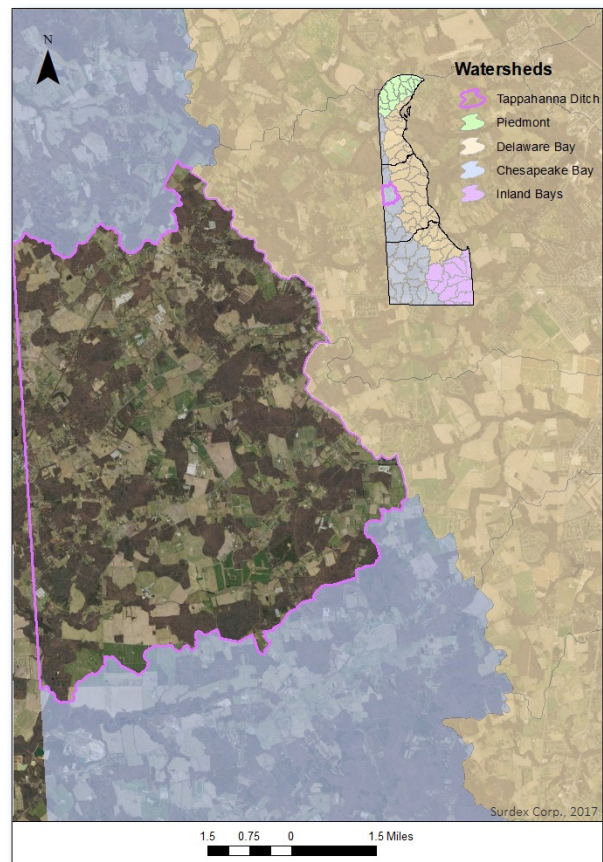


Figure 1. Tappahanna Ditch is part of the Choptank River watershed in the Delaware portion of the Chesapeake Bay basin.

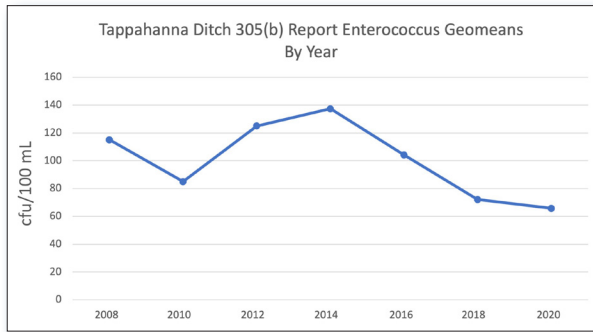


Figure 2. Bacteria geomean levels have dropped and now meet standards.

## Story Highlights

The Kent County Conservation District (KCD) 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. Watershed partners worked with landowners to enroll 4,500 acres of cover crops and implement nutrient management plans on approximately 3,000 acres from 2013 to 2017.

In addition, several BMPs were installed on poultry operations within the watershed, including 17 manure storage structures, 11 poultry carcass composters, 30 heavy-use area protection pads, one animal waste liquid handling system, and the transfer of 115 tons of manure during 2013–2017. The KCD 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. 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. The CREP Program Coordinator helped install 62 acres of grass buffers, 1 acre of riparian buffers, 25 acres of wildlife plantings, and 54 acres of hardwood trees in the Tappahanna Ditch watershed.

## Results

Bacteria levels have decreased in response to the more than 10 years of water quality protection and restoration efforts in the Tappahanna Ditch-Choptank watershed. DNREC collected monitoring data at STORET Station 207081 in Tappahanna Ditch between January 2012 and December 2016. The geometric mean of the 45 samples collected over the 5-year period was 72 cfu/100 mL, down from a high of 137 cfu/100 mL in 2014 (Figure 2). Because the 2018 geomean of 72 cfu/100 mL was well below Delaware's freshwater bacteria water quality standard of 100 cfu/100 mL, DNREC removed the 7.5-mile segment of Tappahanna



Figure 3. Tappahanna Ditch water quality has improved, thanks to restoration efforts.

Ditch (DE-110-001) from the state's list of impaired waters in 2018 per its Assessment and Listing Methodology. The 2018 Integrated Report shows the segment continues to meet the applicable water quality standards for bacteria due to ongoing restoration efforts in the watershed (Figure 3).

## Partners and Funding

Key partners included KCD, NRCS, and the Delaware Nonpoint Source Program. In 2005–2017, NRCS supported implementation efforts within the watershed for \$2.5 million. Over \$236,400 in federal CWA section 319 funds supported the costs of the Tappahanna Ditch restoration effort. Because of the nature of the funding and enrollment procedures, much of the funding provided by watershed partners has been extremely important. Implementation efforts within the watershed are continuing with the collaborations and working relationships that our partners and producers have formed.



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

EPA 841-F-22-001I  
June 2022

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