Nonpoint Source Program

2022 Annual Report

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Table of Contents

Preface

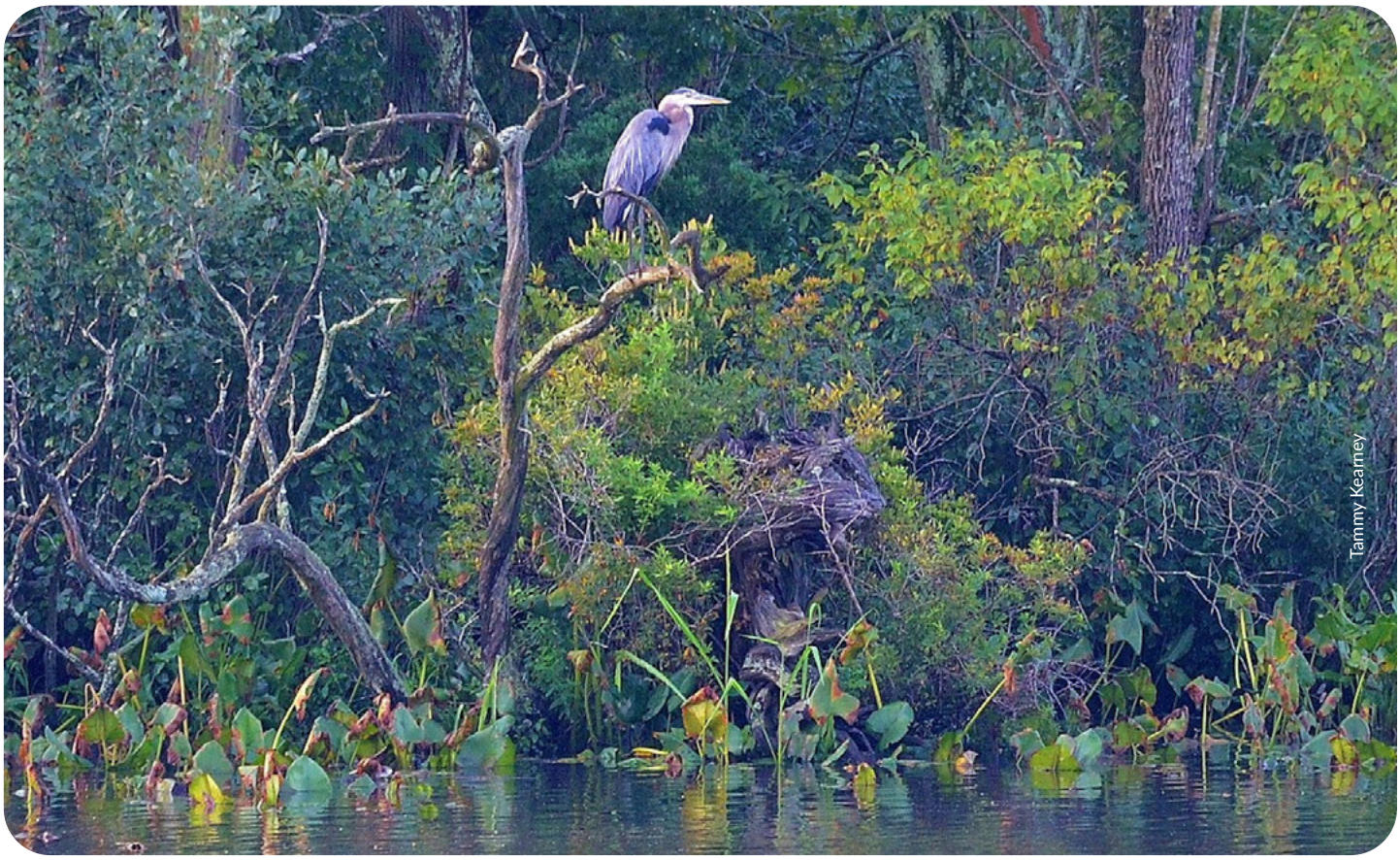
Junction and Breakwater Trail Bridge at Munchy Branch

The 2022 Nonpoint Source (NPS) Program Annual Report is developed by the Delaware Department of Natural Resources and Environmental Control (DNREC) to meet a grant condition in each annual **Clean Water Act (CWA) Section 319(h)** Grant award to the State of Delaware from the U.S. Environmental Protection Agency (EPA). This programmatic condition in the award states that the report shall contain the following:

- A brief summary of progress in meeting the schedule of milestones in the approved **Delaware NPS Management Program**;
- Reductions in nonpoint source pollutant loading and improvements in water quality that have resulted from implementation of the management program; and
- Descriptions of priority watershed-based plan accomplishments. Accomplishments should be based on the implementation milestone goals/objectives as identified in each priority plan. The goal information can be displayed in the form of a watershed goal/accomplishment chart showing percentage achieved, supplemented by a short narrative that should give the reader a clear understanding of the actions being taken as well as the outputs and outcomes which are occurring from the actions. If monitoring was completed, a summary of that information should also be included.

What Is Nonpoint Source Pollution?

NPS pollution is defined as polluted stormwater runoff associated with rainfall, snowmelt or irrigation water moving over and through the ground. As this water travels, it can collect and carry pollutants such as sediments, nutrients, toxics and pathogens. These pollutants eventually reach lakes, rivers, streams, wetlands, coastal waters and ground waters of Delaware.



A great blue heron on the bank of the St. Jones River, Dover.

NPS pollution is associated with a variety of activities on the land, including farming, logging, urban/construction runoff, onsite sewage systems, streambank degradation and shore erosion. For example, stormwater runoff from large storm events can transport nutrient sources of nitrogen and phosphorus into local streams, rivers and ponds. Under natural conditions, this is beneficial. However, if excessive nutrients enter these water bodies and cause nuisance algae blooms, then these nutrients are deemed pollutants.

The pollution contributed by nonpoint sources is the main reason why many of Delaware's waters are considered "impaired." Impaired waters are those waters that do not meet Water Quality Standards for designated uses (e.g., fishing, swimming, drinking water, shellfish harvesting, etc.). Progress in managing NPS pollution in Delaware is represented in this report. It was produced by the **DNREC NPS Program to meet the Clean Water Act, Section 319(h)** grant conditions and to demonstrate consistency with **EPA's 2022-2026 Strategic Plan**. The main area of EPA's Strategic Plan in which Delaware intends to focus its work is: Goal 1: Tackle the Climate Crisis, Objective 1.2: Accelerate Resilience and Adaptation to Climate Change Efforts, and Goal 5: Ensure Clean and Safe Water for All Communities, Objectives 5.1: Ensure Safe Drinking Water and Reliable Water Infrastructure and 5.2: Protect and Restore Waterbodies and Watersheds.

The DNREC NPS Program

As part of DNREC, **Delaware's NPS Program** is committed to addressing the issue of NPS pollution as it affects Delaware's numerous waterbodies. Efforts include grant funding, education, outreach and partnerships with other organizations that work together to reduce NPS pollution in Delaware.

NPS Program Funding

NPS pollution constitutes the nation's largest source of water quality problems. Approximately 40% of the United States rivers, lakes and estuaries surveyed to date are not clean enough to meet basic uses, such as fishing or swimming, due to NPS pollution.

To counter the ever-expanding NPS pollution problem, Congress established the NPS Pollution Management Program under **Section 319** of the Clean Water Act (CWA) in 1987. This program provides states with grants to implement NPS pollution controls to achieve goals that are described in NPS pollution management program plans.

On Aug. 4, 1988, Delaware's original NPS Program was approved by the EPA, making it one of the first programs in the nation to comply with **Section 319** of the CWA. Delaware administers its NPS Program utilizing the Five-Year Nonpoint Source Program Management Plan that was most recently updated in 2019. Using CWA **Section 319** federal grant funding, Delaware's NPS Program administers a competitive grant program to solicit best management practices (BMP) implementation project proposals that address NPS pollution and enhance water quality efforts.

The grant provides funding for projects designed to reduce NPS pollution in Delaware's impaired waterbodies. Reduction of NPS pollution is most often achieved through incorporation of specific BMPs into project workplans. Whenever possible, funds are focused in sub-watersheds where NPS control activities are likely to have the greatest positive impact. Funded restoration activities are implemented using the most effective measures and practices available in order to achieve water quality improvements.

Eligible types of management program implementation activities include the following:

- Non-regulatory NPS reduction programs
- Technical assistance
- Financial assistance
- Education
- Training
- Technology transfer
- Demonstration projects

Proposals are solicited annually from potential grant applicants through an advertised request for proposal (RFP) process. These grant application proposals are reviewed, evaluated and prioritized to determine which are most suitable for implementation funding. At least 40% of the overall project cost must be represented by non-federal matching funds.

Delaware NPS Issues

More than 90% of Delaware's waterways are considered impaired. The state's list of impaired waters in the most recently issued **2022 State of Delaware Combined Watershed Assessment Report (305(b)** and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs, includes assessment units (waterbodies and stream segments) throughout the state with 10 different impairments. The most common impairments are NPS-related pollutants including pathogens and nutrients (nitrogen and phosphorus).

Most impairments come from nonpoint sources which are harder to control. As Delaware is a groundwater-driven state, removing NPS pollutants becomes an even more difficult and complex problem to solve. Due to the rate that groundwater travels through the system, many NPS pollutants that entered the systems 30 years ago are just now entering surface water bodies at the present day. As such, the effectiveness of current agricultural BMPs will not be realized until much further in the future.

"Impaired waters" are polluted waters. More technically, they are waters that do not meet water quality standards for their designated uses, such as recreation, fishing or drinking. Impaired waters could be suffering from excess nutrients, low dissolved oxygen, toxins, bacteria, heat or any combination of these problems.

Reduction of NPS pollution is achieved through the incorporation or installation of specific BMPs addressing agriculture, silviculture, construction, septic systems and hydromodification activities. To encourage and support the BMP installation, the NPS Program administers a competitive grant program currently made possible through **Section 319** of the CWA. While this federal financial support has proven successful in complementing Delaware's NPS efforts, the NPS Program routinely seeks additional finances to expand activities to more systematically address Delaware's NPS concerns.

Additional roles and responsibilities of the NPS Program include geospatial BMP tracking and reporting, management of the Chesapeake Bay Implementation Grant (CBIG), management of the Chesapeake Bay Infrastructure Investment and Jobs Act (IIJA) grant, management of the **Surface Water Matching Planning Grant (SWMPG)** and **Community Water Quality Improvement Grant (CWQIG)** administered through the **Water Infrastructure Advisory Council (WIAC)**, management of the agricultural State Revolving Fund (SRF) Program, support for developing Pollution Control Strategies (PCS), and watershed plan development and/or coordination.

Vision and Mission

DNREC envisions a Delaware that offers a healthy environment where people are committed to the protection, enhancement and enjoyment of the environment; where Delawareans' stewardship of natural resources ensures the sustainability of these resources for the appreciation and enjoyment of future generations; and where people recognize that a healthy environment and a strong economy support one another.

Beautiful Delaware Seashore State Park

DNREC's mission is to protect and manage the state's vital natural resources, protect public health and safety, provide quality outdoor recreation, and to serve and educate the citizens of the First State about the wise use, conservation, and enhancement of Delaware's environment.

The **NPS Management Program** is a dynamic and open-ended program intended to facilitate and promote statewide efforts to manage NPS pollution. The following priorities guide this program:

1. The NPS Program will support the identification and quantification of those problems that are caused specifically by NPS pollution through assessment updates;

2. The NPS Program will be implemented and updated to realistically reduce NPS pollution in a cost-effective manner;

3. The NPS Program will address NPS pollution through a program that balances education, research, technical assistance, financial incentives and regulation;

4. The NPS Program will follow a non-degradation policy in areas where surface and ground waters meet state water quality standards and to realistically improve water quality in areas that do not meet these standards;

5. The NPS Program will continue to use a coordinated approach for implementation and maintain an open-ended framework to incorporate new initiatives and support interactive approaches based on the effectiveness of existing policies and implementation mechanisms; and

6. The NPS Program will support the development and implementation of Pollution Control Strategies (PCS) and/or nine element (a-i) watershed implementation plans for watersheds of identified impaired or threatened waters in accordance with the Unified Watershed Assessment List.

In Delaware, DNREC is the lead agency for the development and implementation of the NPS 319 Program, through its Division of Watershed Stewardship.

Executive Summary

The **DNREC NPS Program** has focused this annual report on nine priority watersheds in Delaware: the Appoquinimink River, Broadkill River, Chester and Choptank River, Christina Basin, Inland Bays, Nanticoke River, Pocomoke and Wicomico River, St. Jones River and the Upper Chesapeake. All of these priority watersheds suffer from impairments linked to nonpoint source water pollution.

In Federal Fiscal Year (FY) 2021 (Oct. 1, 2020 to Sept. 30, 2021), the Delaware NPS Program received $1,223,200 in federal **Section 319**(h) grant funds to focus on nonpoint source water pollution reduction efforts. For Federal FY22 (Oct. 1, 2021 to Sept. 30, 2022), the NPS Program was awarded $1,222,300.

This annual report documents the activities and highlights of the DNREC NPS Program during the 2022 calendar year. It also fulfills the reporting requirements contained in **Section 319** of the federal CWA. The NPS Program annually prepares this report to inform stakeholders on the state's progress in the area of NPS water pollution reduction. Although this report should not be considered a complete enumeration of all NPS pollution reduction activities, it describes the most important features and accomplishments of the NPS Program.

In 2022, the DNREC NPS Program continued to reduce water pollutant levels by working towards achievement of milestone targets. Milestone targets are near-term or long-term commitments that promote a steady pace of progress towards water quality improvement. This report identifies accomplishments during the 2022 calendar year that helped Delaware achieve long-term and short-term milestones (Appendix A), which have been identified in the state's NPS Management Program. Milestone activities successfully implemented during 2022 to support and/or enhance the program include, but are not limited to: providing grant funding, education and outreach, and enhancing partnerships with other organizations to work together to reduce NPS pollution in Delaware.

- **Grant funding –** For Federal FY22 (Oct. 1, 2021 to Sept. 30, 2022), the DNREC NPS Program was awarded $1,232,300 in federal **Section 319**(h) grant funds to focus on nonpoint source pollution reduction efforts. Grant funding was utilized and leveraged to implement pollutant control projects, BMPs, and actions featured in the table on page 11. The Federal FY23 grant cycle began Oct. 1, 2022 and ends Sept. 30, 2023. The NPS Program submitted a federal **Section 319**(h) grant application to the EPA in April 2022 for FY23.

- **Education and Outreach –** The COVID-19 pandemic began to cause major disruptions beginning in March 2020. In-person meetings, events, trainings, conferences and other workshops were either canceled, postponed indefinitelyand/or converted into a virtual format. As of late 2021, the pandemic continued to cause disruptions with outreach and education events that were previously conducted in-person. Some of these events were transitioned into a virtual format, whereas others were suspended until the public health crisis improved. In 2022, outreach events began to transition back into an in-person environment. The NPS Program re-engaged with many outreach events to help educate the public on NPS pollution and water quality. A detailed list of outreach and education events can be found in Appendix C.

- **Partnerships** – The **DNREC NPS Program** continues to develop longstanding relationships with existing partners as well as seeking to foster working relationships with new partners. The NPS Program continues to work closely with the county Conservation Districts to implement various agricultural-related BMPs in the landscape. Periodic meetings with project implementation partners were conducted throughout the year to discuss possible BMP implementation projects.

- **Environmental Justice and Climate Resiliency** - In 2022, the NPS Program incorporated Environmental Justice scoring metrics into the grant request for proposal process when soliciting for BMP projects. DNREC has established a Delaware Climate Action Plan which focuses on minimizing greenhouse gas emissions and maximizing resilience to climate change impacts. Also in 2022, the Division of Watershed Stewardship began a Riparian Forest Buffer pilot program in the Chesapeake Bay Program with a focus on climate resiliency.

Overall Pollution Load Reduction from BMP Implementation

Overall, the NPS Program funded projects completed during the calendar year in EPA-accepted watersheds. Total nitrogen load reductions were 1,863,581.5 pounds and total phosphorous load reductions were 65,615.2 pounds (see table below for major BMP areas). Delaware continues to ensure that projects funded with **CWA Section 319** dollars make progress towards restoring or protecting waters impaired by NPS pollution.

Pollutant Controls, Practices and Actions	2022 Annual Progress	Unit
Cover Crop (traditional and commodity)	100,846	Acres
Nutrient Relocation (net export from watershed)	34,446	Tons
Nutrient Management Plans	335,709	Acres

Notes:

1. Cover crop acres are reported annually and can vary from year to year due to both financial and weather-related circumstances. This figure represents the total acres of cover crops that were directly funded by **Section 319** grant dollars as well as those acres where grant funded conservation planners provided technical assistance in the signup, implementation and destruction verification of those cover crops within the various priority watersheds.

2. Nutrient relocation (manure relocation) tonnage is reported annually and can vary from year to year due to various agriculture-related logistics, including weather and chicken house clean out schedules which are directed by the poultry integrator. Other logistical factors such as fuel cost can cause fluctuations of tonnage relocated annually.

3. Nutrient management acres are reported annually and can vary from year to year due to the duration and expiration dates of nutrient management plans. This figure represents the total nutrient management acres that were directly funded by **Section 319** grant dollars through conservation planners and the Delaware Department of Agriculture's Nutrient Management Program with both technical and financial assistance provided.

Watersheds

Delaware has nine priority watersheds a-i, with nine element watershed implementation plans (WIP) accepted by EPA, and BMP projects implemented utilizing CWA **Section 319**(h) funds. Each of the priority watersheds are represented individually within this section to highlight the watershed's characteristics and TMDL goals, and to reflect implementation progress (both annually and cumulative) of BMPs that are funded directly with CWA **Section 319**(h) funds.

Delaware's nine priority watersheds with EPA-approved watershed implementation plans are:

- Appoquinimink River
- Broadkill River
- Chester River and Choptank River
- Christina Basin
- Inland Bays
- Nanticoke River
- Pocomoke River and Wicomico River
- St. Jones River
- Upper Chesapeake

Appoquinimink River Watershed

The BMP Progress Reporting Table found on each individual watershed's page are those BMPs funded directly with Clean Water Act (CWA) **Section 319**(h) grant funds through the Delaware NPS Program. The BMPs reflected in the following watershed tables are a snapshot of the BMP universe and are not all inclusive. The WIP goal is established by the approved a-i, nine element watershed implementation plan and reflects the implementation necessary to achieve the required TMDL nutrient loading reductions.

Notes:

1. The Christina Basin a-i watershed plan does not identify a numerical cover crop acre implementation goal. Based on the identified 2,738 acres of grain production area within the watershed, a best professional judgement of 1,369 acres (50%) would be allocated as the goal due to anticipated cropping rotation practices.

2. The Christina Basin a-i watershed plan does not identify a numerical nutrient management implementation goal. Based on the identified 7,560.6 acres of total agricultural land use in the subwatersheds, and subtracting 322.4 acres of trees and wildlife, the identified goal is 7,238.2 acres which represents grain production and pasture and hay acreage across the subwatersheds.

3. The Delaware portion of the Chesapeake Bay watershed has an EPA approved Phase III Watershed Implementation Plan (WIP) that is as stringent as the nine-element WIPs.

Appoquinimink River

Watershed Description: The 16-mile Appoquinimink River meanders through farmlands and wetlands in southern New Castle County, Delaware, draining 47 square miles. The headwater drains mostly agricultural lands and feeds four major ponds. The tidal freshwater segment of the Appoquinimink is bound by the head of tide at Noxontown Pond and Silver Lake, and by Drawyer Creek's confluence with the Appoquinimink. The remainder of the watershed consists of a tidal marsh extending to the Delaware River. The Appoquinimink River system consists of five main tributaries: the Appoquinimink River main stem, Deep Creek, Dove Nest, Hangman's Run and Drawyer Creek. There are several shallow, human-made small lakes and ponds in the watershed: Wiggins Mill Pond, Noxontown Pond, Silver Lake and Shallcross Lake. The Appoquinimink River is tidal from the confluence with Delaware Bay to the dam at Noxontown Lake on the main stem, the dam at Silver Lake on Deep Creek, and the confluence with Drawyer Creek. Salinity intrusion from Delaware Bay typically reaches upstream to river kilometer 8.5, past the Drawyer Creek confluence.

Appoquinimink River Watershed

Goals: Total Maximum Daily Loads (TMDLs) were established for the entire Appoquinimink River in December 2003. These TMDLs called for 325,215 lbs/year and 8,578 lbs/year reductions in NPS nitrogen (N) and phosphorus (P), respectively. An implementation plan was developed by a diverse team of citizens and government agency staff and presented to DNREC for promulgation to reach the prescribed TMDLs. Load reductions will be achieved through the implementation of Best Management Practices in agriculture, development, wastewater and private stewardship. The strategy is designed to reduce nutrient loadings from current and future land practices. This combination of actions will lead to the achievement of the TMDL.

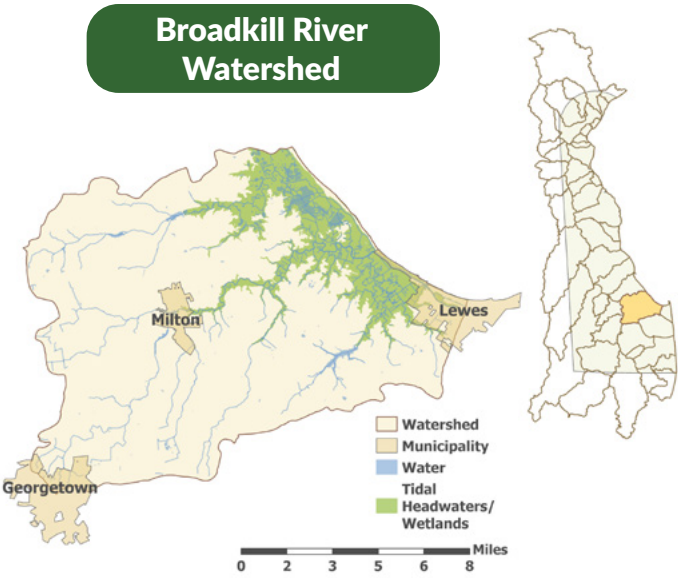
Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	0	Annual	3,460	0	0	0
Nutrient Relocation (net export from watershed)	Tons	0	Annual	N/A	0	0	0
Nutrient Management	Acres	13,529	Annual	12,584	107	45,326	2,178
Hardwood Tree Planting	Acres	17	29.23	N/A	100	1,525	30
Riparian Buffer (forest and vegetative)	Acres	0	36	6	600	1,832	35
Total Reduction						48,683	2,243
Watershed Implementation Plan (WIP) Load Reduction Goal						325,215	8,578
% Load Reduction Achieved						15	26

Broadkill River

Watershed Description: The Broadkill River Watershed is located in the east central portion of Sussex County, Delaware. It is bounded on the north by the Cedar Creek Watershed, on the west by the Gravelly Branch and Deep Creek watersheds, on the south by the Lewes-Rehoboth Canal, Rehoboth Bay and Indian River watersheds, and on the east by the Delaware Bay. The mainstem of the Broadkill River is approximately 25 miles long. The major watercourse in this segment is the Broadkill River, which originates at the Town of Milton, and discharges into the Roosevelt Inlet near Lewes. Major impoundments in the area are Waggamons and Diamond ponds located near Milton. The Broadkill River flows generally eastward until it approaches the coast where it turns abruptly and flows south to discharge into the Roosevelt Inlet. The flow of this stream is sluggish and the water is turbid. The watershed drains an area of 107 square miles.

Broadkill River Watershed



Goals: The established Total Maximum Daily Load (TMDL) requires a 40% reduction in NPS nitrogen (N) and phosphorous (P) from the 2002-2003 baseline levels of 1,353,055 lbs/yr (3,707 lbs/day) and 57,597 lbs/yr (157.8 lbs/day), respectively. The NPS-required nitrogen and phosphorous load reduction is 541,222 lbs/yr and 23,039 lbs/yr, respectively. As a result of land use changes from 2002-2007, the 2007 baseline NPS loads changed to total N of 2,891 lbs/day and P of 124.1 lbs/day. Total N reductions of 667.1 lbs/day (243,700 lbs/yr) and total P reductions of 29.4 lbs/day (10,740 lbs/yr) are required. This shall result in a yearly average total nitrogen and phosphorous load of 2,224.2 lbs/day (811,833 lbs/yr) and 94.7 lbs/day (34,565.5 lbs/yr), respectively, to achieve the 2025 TMDL.

Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	6,089	Annual	9,763.1	62	77,294	360
Nutrient Relocation (net export from watershed)	Tons	524	Annual	3,165	16	2,914	309
Nutrient Management	Acres	25,663	Annual	26,476	97	71,669	8,315
Hardwood Tree Planting	Acres	0	192.7	192	100.4	79.5	2.5
Rain Garden	Structure	0	5.4	N/A	100	108	3
Total Reduction						152,064.5	8,989.5
Watershed Implementation Plan (WIP) Load Reduction Goal						243,700	10,740
% Load Reduction Achieved						62	84

Chester and Choptank Rivers

Watershed Description: In Delaware, the majority of the Chester and Choptank watersheds are in Kent County, while a portion of the Chester River originates in New Castle County, Delaware. Both rivers drain into Maryland's Eastern Shore, including Kent County, Queen Anne's County, and Caroline County. The Chester and Choptank watersheds include 88,217.5 acres, or 137.8 square miles of land area. Chester River in Delaware includes a 40-square-mile drainage area with headwaters beginning at the divide between New Castle and Kent counties. Delaware headwater segments, including Cypress Branch, Sewell Branch and Gravelly Run, flow west into both Kent County and Queen Anne's County, Maryland. The Choptank River Watershed, located immediately south of the Chester River, includes 62,191 acres. Headwater tributaries to the Choptank River include Tappahanna Ditch, Culbreth Marsh Ditch and Cow Marsh Creek.

Chester and Choptank Rivers Watersheds

Goals: The TMDL established for the Chester and Choptank River Watersheds capped the nonpoint source nitrogen loads at the 2001 to 2003 baseline levels of 708 lbs/day (258,600 lbs/year) and 1,359 lbs/day (496,400 lbs/year), respectively. A phosphorus reduction goal of 40% is set from the 2001 to 2003 baseline levels for the Chester and Choptank watersheds, which equates to 12.3 lbs/day and 51.1 lbs/day, respectively. Baseline loads in the Chester and Choptank for phosphorus are 19,940 lbs/year and 46,390 lbs/year, with TMDL allocated loads set to 11,800 lbs/year and 27,720 lbs/year, respectively. Total phosphorous load reductions of 26,810 lbs/year are required for the Chester and Choptank.

Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	6,552	Annual	26,260.5	25	61,760	128
Nutrient Relocation (net export from watershed)	Tons	0	Annual	N/A	0	0	0
Nutrient Management	Acres	21,010	Annual	37,249.6	56	43,571	2,265
Hardwood Tree Planting	Acres	0	377	177.8	212	11,748	293
Water Control Structure	Acres	0	348	3,120.7	11.2	2,602	0
Stream Restoration	Feet	0	1,924	11,722	16.4	260	303
Wetlands Restoration	Acres	0	551	2,113.4	26.1	12,791	441
Total Reduction						132,732	3,430
Watershed Implementation Plan (WIP) Load Reduction Goal						755,000	26,810
% Load Reduction Achieved						18	13

Christina Basin

Watershed Description: The Christina Basin is a 565-square-mile basin contained in the larger Delaware River Basin. The Christina Basin, located in New Castle County in northern Delaware, includes four sub-watersheds:

- Brandywine Creek, 325 square miles
- Red Clay Creek, 54 square miles
- White Clay Creek, 107 square miles
- Christina River, 78 square miles

Although a small portion can be found within Maryland, the Christina Basin falls principally within two states which includes Pennsylvania to the north and Delaware to the south. The Pennsylvania portion is characterized by more open space including agricultural land and forests, while the more urban, southerly portion in Delaware tends to be more residential.

Christina Basin Watershed

The Watershed Implementation Plan development for the Christina Basin Watershed was approved by the EPA in spring 2013.

Goals: The EPA TMDL bases its required reductions on a subwatershed basis. Delaware collects data on a watershed wide level basis. An estimate of nitrogen (N) and phosphorous (P) reduction loads from a subwatershed level basis were added together to make a total of estimated reductions that are required on a watershed wide level basis to achieve the TMDL. Estimated total nitrogen and phosphorous load reductions required to achieve TMDL requirements are 343.54 lbs/day (125,392.10 lbs/year) and 43.08 lbs/day (15,724.20 lbs/year), respectively.

Best Management Practices (BMP) Progress 2022

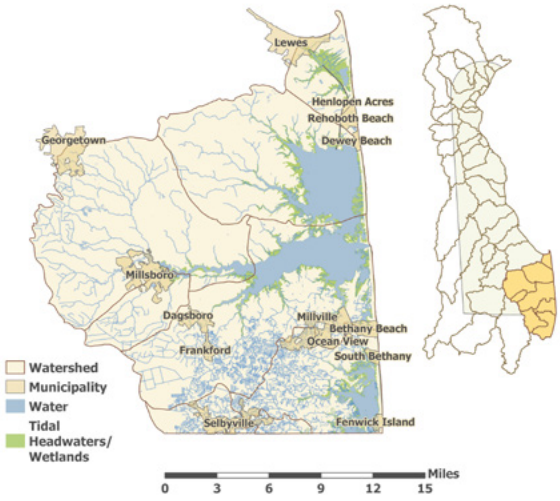
BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	0	Annual	1,369	0	0	0
Nutrient Management	Tons	188	Annual	7,238.2	3	628	30
Rain Garden	Structure	0	36	N/A	N/A	539	0
Stream Restoration	Feet	450	4,265	N/A	N/A	110.5	26
Hardwood Tree Planting	Acres	0	0.8	N/A	N/A	41	0
Total Reduction						1,318.5	56
Watershed Implementation Plan (WIP) Load Reduction Goal						125,392	15,724
% Load Reduction Achieved						1	0.3

Inland Bays

Watershed Description: The Inland Bays/Atlantic Ocean Basin comprises approximately 313 square miles of eastern Sussex County, Delaware. Starting at Lewes and Cape Henlopen State Park at the southern edge of the entrance to Delaware Bay, the area extends southward approximately 24 miles along the Atlantic shoreline to the Maryland State Line. It includes the coastal towns of Rehoboth Beach, Dewey Beach, Bethany Beach, South Bethany Beach and Fenwick Island. State Route 1 (SR 1) extends parallel to the shoreline and connects the towns.

The three inland bays (Rehoboth Bay, Indian River Bay, and Little Assawoman Bay) are located just landward of the Atlantic Ocean shoreline. Rehoboth Bay contains the Lewes-Rehoboth Canal and Rehoboth Bay Watershed; the Indian River Bay contains the Indian River, Iron Branch and Indian River Bay watersheds; and the sub-watersheds of Dirickson Creek, Miller Creek, and the remainder of the area that drains to the Delaware portion of the Assawoman Canal.

Inland Bays Watershed



Goals: Goals call for the increased implementation of numerous NPS best management practices (BMPs), especially in the agriculture sector. The approved watershed plan calls for a reduction in NPS total nitrogen loading of 3,764 lbs/day (1,373,860 lbs/year) and total phosphorous loading of 133 lbs/day (48,545 lbs/year). The goals are those that were presented by Inland Bays Pollution Control Strategy (PCS), which is also an approved EPA watershed plan. The PCS involves many strategies to reduce nitrogen (N) and phosphorous (P) to meet the TMDL, but presented here are initiatives of the 319 program.

Best Management Practices (BMP) Progress 2022

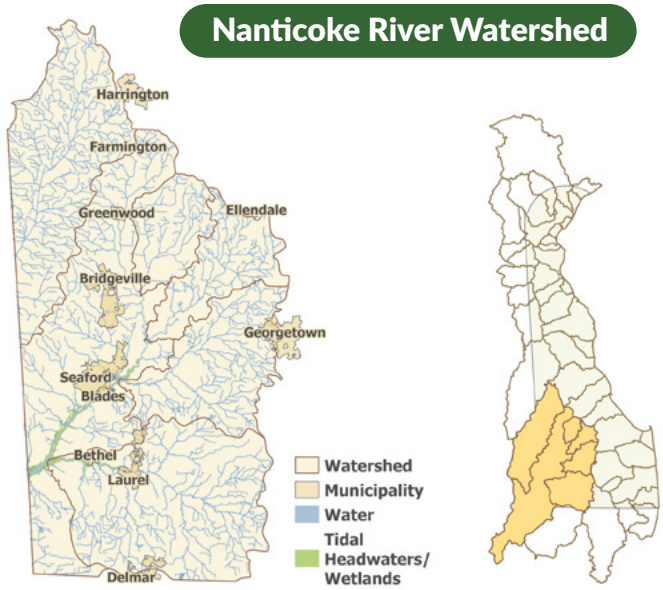
BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	13,422	Annual	37,637	36	171,578	526
Nutrient Relocation (net export from watershed)	Tons	12,863	Annual	20,909	62	72,026	5,061
Nutrient Management	Acres	37,942	Annual	53,827	70	106,170	8,196
Riparian Buffer (forest and vegetative)	Acres	0	289.1	3,246	9	12,170	404.5
Wetland Restoration	Acres	0	29	4,175	0.7	913	47
Grass Buffers (CREP CP21)	Feet	0	70.2	1,772	4	1,958	66
Rain Garden	Structure	0	1	3	33.3	15	0
Total Reduction						364,830	14,300.5
Watershed Implementation Plan (WIP) Load Reduction Goal						1,373,860	48,545
% Load Reduction Achieved						27	29

Nanticoke River

Watershed Description: The Nanticoke River Watershed includes the Middle Nanticoke and Upper Nanticoke rivers. The majority of the two rivers originate in Sussex County, Delaware, while a portion of the Middle and Upper Nanticoke rivers originate in Kent County, Delaware. Both rivers drain to the southwest into Maryland's Eastern Shore, including Caroline County, Dorchester County and Wicomico County. The Nanticoke encompasses 315,890.7 acres, or 493.6 square miles, of land area.

The Middle Nanticoke River refers to the Marshyhope Creek. Headwater tributaries to the Upper Nanticoke River include Gum Branch, Gravelly Branch, Deep Creek and Broad Creek.

Nanticoke River Watershed



Goals: Current goals call for the increased implementation of numerous NPS best management practices (BMPs), especially in the agriculture sector. The milestones allow jurisdictions the opportunity to adapt implementation strategies as necessary to meet the goals and achieve the TMDL standard. According to the approved Nanticoke River Watershed Plan, total nitrogen (N) and phosphorous (P) load reductions of 736,508 lbs/year and 33,941 lbs/year, respectively, are required to achieve the 2025 TDML load allocations.

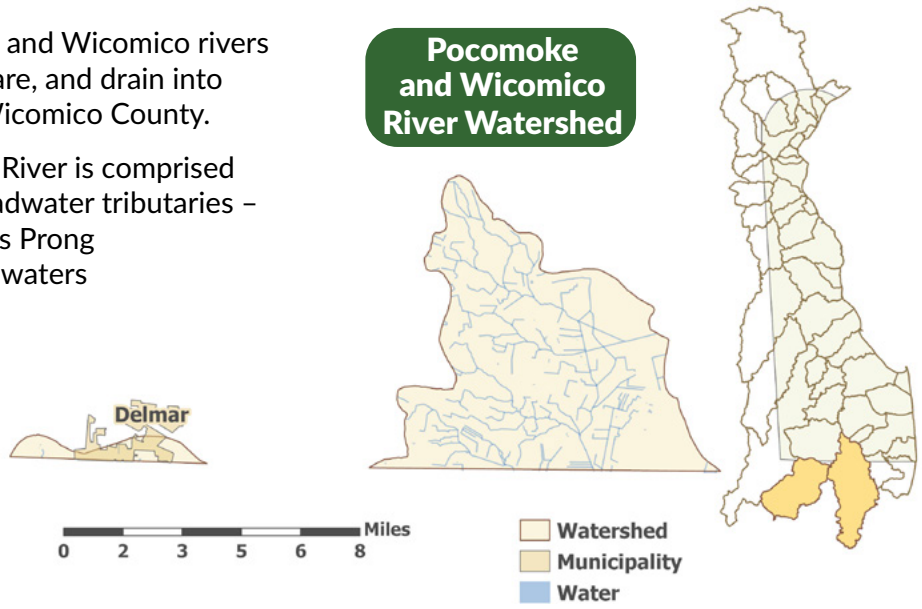
Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	40,810	Annual	43,343	94	568,915	1,579
Nutrient Relocation (net export from watershed)	Tons	14,146	Annual	Maximum Available	-	85,397	5,565
Nutrient Management	Acres	94,504	Annual	143,647	66	268,523	18,266
Hardwood Tree Planting	Acres	0	746	157	475	34,306	1,071
Water Control Structures	Acres	0	1,219	2,394	50.9	9,106	0
Stream Restoration	Miles	0	1.3	465	0.3	911	1,060
Wetland Restoration	Acres	0	1,935.5	74,043	2.6	65,731	3,110
Total Reduction						1,032,889	30,651
Watershed Implementation Plan (WIP) Load Reduction Goal						736,508	33,941
% Load Reduction Achieved						140	90

Pocomoke and Wicomico River

Watershed Description: The Pocomoke and Wicomico rivers both originate in Sussex County, Delaware, and drain into Maryland's eastern shore, primarily in Wicomico County.

The Delaware portion of the Pocomoke River is comprised of 35 square miles and includes four headwater tributaries – Bald Cypress Branch, Gum Branch, Lewis Prong and North Fork Green Branch. The headwaters for the Wicomico River begin at the Delaware-Maryland divide, with the Delaware portion contributing only 2.1 square miles. Four very small stream segments of the Wicomico watershed are located in Delaware, accounting for just 0.7 stream miles.



Goals: A TMDL was established in 2005 for the Pocomoke River. The Pocomoke nitrogen and phosphorous load allocations are 102.75 lbs/day (37,256 lbs/year) and 6.1 lbs/day (2,228 lbs/year), respectively. The Wicomico nitrogen and phosphorus load allocations are 9,103 lbs/year and 708 lbs/year, respectively. The combined total nitrogen (N) and phosphorous (P) load reductions needed to achieve the 2025 TMDL in the Pocomoke and Wicomico watersheds are 49,060 lbs/year and 3,047 lbs/year, respectively.

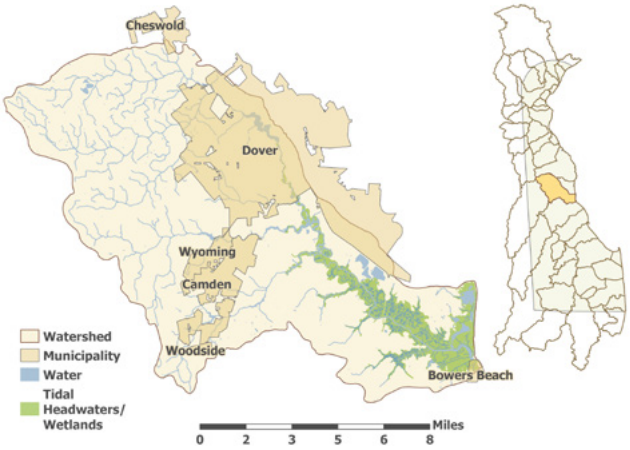
Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	3,586	Annual	2,217.48	161	25,353	141
Nutrient Relocation (net export from watershed)	Tons	2,004	Annual	Maximum Available	-	6,206	789
Nutrient Management	Acres	11,259	Annual	10,067.57	112	17,564	2,432
Hardwood Tree Planting	Acres	0	49.3	23.9	206.3	1,047	71
Water Control Structure	Acres	0	87	189.24	45.9	650	0
Stream Restoration	Feet	0	481	1,712.5	28.1	65	76
Wetlands Restoration	Acres	0	138	153.62	89.8	2,403	222
Total Reduction						53,288	3,731
Watershed Implementation Plan (WIP) Load Reduction Goal						49,060	3,047
% Load Reduction Achieved						108	122

St. Jones River

Watershed Description: The St. Jones River Watershed is approximately 25.9 square miles (16,576 acres) and is located in the central portion of Kent County, Delaware. It drains 90 square miles of land. The major watercourse in the watershed is the St. Jones River, which has its headwaters in the western part of the county, about 22 miles upstream from the Delaware Bay. Significant ponds in the watershed are Silver Lake, Moores Lake and Wyoming Mill Pond. Flat wetlands, usually forested, exist mostly in the upper portion of the watershed and eventually drain into creeks and streams. Non-tidal riverine wetlands and tidal wetlands line the banks of the river, sometimes up to a half-mile wide toward the mouth of the river. Wetlands comprise 9,669 acres of the watershed and provide critical services such as nutrient removal, erosion control, habitat for plants and wildlife, flood reduction and storm water storage to the citizens of Delaware.

St. Jones River Watershed



The St. Jones Watershed has 5,236 acres of protected lands, including 3,750 acres preserved in the St. Jones River Reserve, a component of the Delaware National Estuarine Research Reserve (DNERR).

Goals: Reduce the overall levels of nitrogen (N) and phosphorus (P) in the waterway by 40% from the 2002-2003 baseline loads, or 869.5 lbs/day (317,368 lbs/year) and 63.4 lbs/day (23,141 lbs/year), respectively. NPS specific nitrogen and phosphorous load reductions of 838.5 lbs/day (306,053 lbs/ year) and 52.93 lbs/ day (19,309 lbs/ year) are required. The TMDL also calls for a nitrogen and phosphorous reduction from its stormwater (MS4) discharges of 21.8 lbs/day (7,957 lbs/year) and 3.4 lbs/day (1,241 lbs/year), respectively.

Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	3,698	Annual	6,246.31	59	11,335	12
Nutrient Relocation (net export form watershed)	Tons	253	Annual	6,480.12	4	338	8
Nutrient Management	Acres	13,757	Annual	35,849	49	9,277	249
Hardwood Tree Planting	Acres	0	1.7	N/A	100	16	0.2
Grass Buffers (CREP CP21)	Acres	0	8.5	1,174	0.7	5.5	1
Riparian Buffers	Acres	0	7	1,161	0.61	65	1
Total Reduction						21,036.5	271.2
Watershed Implementation Plan (WIP) Load Reduction Goal						317,368	23,141
% Load Reduction Achieved						7	1

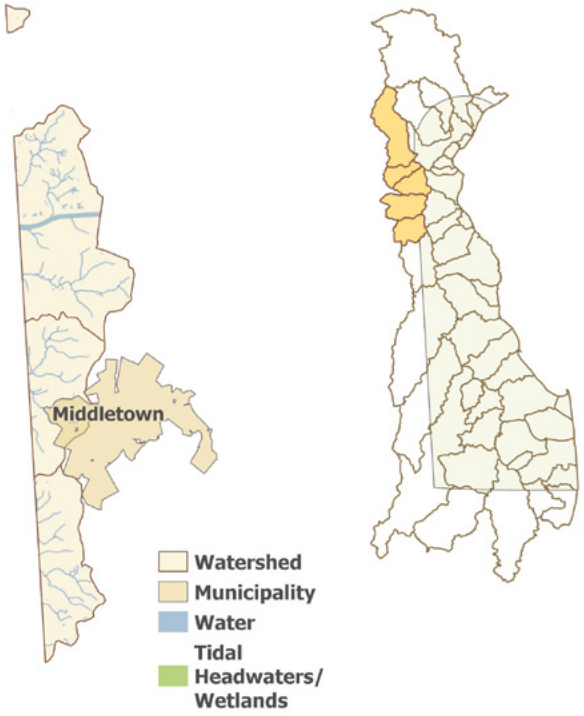
Upper Chesapeake

Watershed Description: The Upper Chesapeake Watershed includes the Elk, Bohemia and Sassafras Rivers and the C&D Canal, all of which originate in New Castle County, Delaware, and drain to the west into Maryland's upper Eastern Shore primarily in Cecil County. The Upper Chesapeake includes 23,351.7 acres or 36.5 square miles of land area.

The Upper Chesapeake as a whole is made up of a mixture of land uses, primarily including agriculture, forest and developed lands. Over two-thirds of the Upper Chesapeake is agricultural use (38.6%) or developed land (34.2%) with the remaining land use largely comprised of forest (27.2%).

Goals: The watershed plan for the Upper Chesapeake states that load reductions proposed meet the allocations for the Upper Chesapeake in the Bay TMDL. By targeting the most effective best management practices (BMPs) to the critical areas with the greatest recovery potential, the total nitrogen (TN) agriculture load can be decreased from 112,510 to 60,365 lbs/year. The agricultural total phosphorous (TP) loads can be reduced from 19,235 to 6,134 lbs/year. The TN urban load is the second largest load and can be reduced from 67,790 to 60,138 lbs/year. Urban TP loads can be reduced from 4,332 to 3,668 lbs/year. The TN from septic systems can be reduced from 32,709 to 29,722 lbs/year.

Upper Chesapeake Watershed



Best Management Practices (BMP) Progress 2022

BMP Name	Units	2022 Progress	Cumulative Progress	WIP Goal	% Achieved	TN Load Reductions (lbs/year)	TP Load Reductions (lbs/year)
Cover Crop (traditional and commodity)	Acres	1,986	Annual	7,439.1	27	18,721	39
Nutrient Relocation (net export from watershed)	Tons	510	Annual	Maximum Available	0	2,106	100
Nutrient Management	Acres	14,683	Annual	14,279.8	103	30,450	1,580
Hardwood Tree Planting	Acres	0	49.55	N/A	100	1,544	38
Water Control Structure	Acres	0	87	155.4	56.0	650	0
Stream Restoration	Feet	0	481	2,732	17.6	65	76
Wetlands Restoration	Structure	0	138	247	55.9	3,204	110
Total Reduction						56,740	1,943
Watershed Implementation Plan (WIP) Load Reduction Goal						62,784	13,765
% Load Reduction Achieved						90	14

Project Highlights

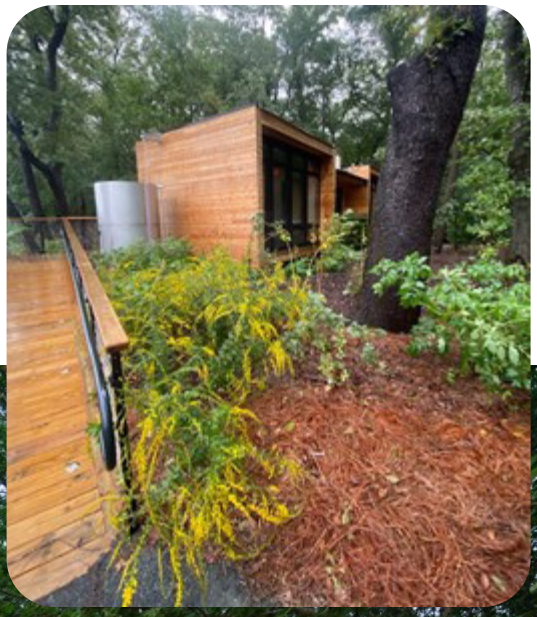
Delaware Botanic Gardens – Green Technology BMPs

Rain Chains Directing Roofoff to Living Wall for Stormwater Recycling

The **Delaware Botanic Gardens** (DBG) at Pepper Creek utilized NPS Section 319 grant funds to implement green technology BMPs to address stormwater runoff and improve water quality on their newly-implemented restroom facility in 2022. The DBG is situated on 37 acres along Pepper Creek, which flows into the Indian River Bay Watershed, one of Delaware's three Inland Bays. The DBG incorporated green infrastructure BMPs as part of the restroom facility design to include capturing and recycling stormwater roof runoff.

Living Wall with Native Grasses

The first BMP was installing a system of rain chains, gutters, and scuppers to help direct roof runoff directly into a living wall designed as part of the restroom facility. This living wall included over 200 ferns and grasses. The excess runoff is directed into a 1,000 gallon cistern installed directly adjacent to the restroom facility. This stormwater runoff-capturing and recycling approach allows for that stormwater to be reused on the living wall. The design of these BMPs greatly reduces the volume of stormwater runoff that would otherwise discharge into the surrounding landscape and likely transport various nonpoint source pollutants.



Cistern & Adjacent Rain Garden

DBG Restroom Facility with Living Wall and Stormwater Capture System

River Rock Channel Directing Stormwater Runoff to Vernal Pool

The second BMP was incorporating rain garden designs into the overall stormwater management process. The DBG implemented a river rock channel with surrounding native fern plantings to transport any uncaptured stormwater runoff from the restroom facility to be directed to a vernal pool area downslope. A rain garden was implemented adjacent to the cistern to help filter pollutants. Overall, the two rain garden designs included approximately 105 shrubs, and 1,200 ferns, grasses, and other assorted plants.

The third BMP included an outreach and education component to the BMP implementation projects for the general public. Educational signage was developed to explain the implementation of these various green technology BMPs with the hopes that some of these practices could be further implemented by the general public. The DBG also has volunteers that provide tours of the facility to showcase and explain the BMPs and how they help improve overall water quality.

Base of River Rock Channel – Vernal Pool with Native Fern Plantings

Green Technology BMP Interpretative Sign

Rain Garden and Dry Creek Beds Interpretative Sign

Sussex Conservation District – Bridgeville Branch Stream Restoration Project

The Sussex Conservation District (SCD) coordinated a stream restoration project on a segment of the Bridgeville Branch Tax Ditch in Bridgeville, Delaware, in 2022. This project involved restoration activities on approximately 650 linear feet of tax ditch within the town limits of Bridgeville. Matching funds were provided by Sussex County.

Bridgeville Branch Tax Ditch Prior to Restoration – Visible Bank Erosion & Sediment Deposits in Channel

Bridgeville Branch Tax Ditch Prior to Restoration – Visible Bank Erosion & Sediment Deposits in Channel

Channel and Floodplain Widening

Over time, the banks of the Bridgeville Branch tax ditch had become eroded and began filling the bottom of the channel with sediment deposits which decreased the capacity of the ditch to handle storm events. This was leading to a high loss of nitrogen, phosphorous, and sediment which can degrade water quality. The Bridgeville Branch tax ditch is located in the headwaters of the Chesapeake Bay in the Nanticoke River watershed. The drainage area for Bridgeville Branch encompasses approximately 5,500 acres (8.6 square miles) of mostly agricultural lands in Sussex County and the northern portion of the Town of Bridgeville. Bridgeville Branch also serves as the discharge point for the Town's wastewater treatment plant.

Completed Restoration – Floodplain Expansion, Stabilization, and Channel Bottom Dip Out (Looking West)

Completed Restoration – Floodplain Expansion, Stabilization and Channel Bottom Dip Out (Looking East)

The watershed implementation plan for Nanticoke River identified restoration of channelized streams as a water quality goal. A primary goal of this project was to reverse stream channelization through the installation of in-line stream restoration techniques along with the installation of BMPs on the top of ditch banks. Letters of support from Sussex County pledging non-federal matching funds and the Bridgeville Branch Tax Ditch manager to work with Sussex Conservation District (SCD) on continued maintenance of the tax ditch segment after project completion was obtained. This project was funded by the Chesapeake Bay Implementation Grant which is administered within the NPS Program. Staff from the NPS Program worked with SCD and helped to coordinate the grant agreement documentation necessary for funding consideration and execution.

Completed Restoration – Floodplain Expansion, Stabilization and Channel Bottom Dip Out (Looking West)

Load Reductions

In 2022, the DNREC NPS Program load reductions were calculated for Section 319-funded projects implemented on a watershed scale. The load reductions are calculated using guidance established during the pollution control strategy development process.

Great blue heron flying over Trap Pond.

2022 Project Load Reductions/Year by Watershed

Project	Nitrogen (lbs.)	Phosphorus (lbs.)
Appoquinimink River	48,683	2,243
Broadkill River	152,064.5	8,989.5
Chester and Choptank Watersheds	132,732	3,430
Christina Basin	1,318.5	56
Inland Bays	364,830	14,300.5
Nanticoke River Watershed	1,032,889	30,651
Pocomoke and Wicomico Watersheds	53,288	3,731
St. Jones River	21,036.5	271.2
Upper Chesapeake Bay Watershed	56,740	1,943
Total	1,863,581.5	65,615.2

2022 Annual BMP Nutrient Reductions
Nitrogen (N) and Phosphorous (P)

Total Nitrogen (N) Load Reductions by Watershed

Nitrogen Load Reductions (lbs./year)	Appoquinimink River	Broadkill River	Chester Choptank	Christina Basin	Inland Bays	Nanticoke	Pocomoke Wicomico	St. Jones River	Upper Chesapeake	Total N (lbs./years)
Cover Crops	0	77,294	61,760	0	171,578	568,915	25,353	11,335	18,721	934,506
Nutrient Relocation	0	2,914	0	0	72,026	85,397	6,206	338	2,106	168,987
Nutrient Management	45,326	71,669	43,571	628	106,170	268,523	17,564	9,277	30,450	593,178
Hardwood Tree Planting	1,525	79.5	11,748	41	0	34,306	1,047	16	1,544	50,306.5
Riparian Buffer	1,832	0	0	0	12,170	0	0	65	0	14,067
Grass Buffer	0	0	0	0	1,958	0	0	5.5	0	1,963.5
Water Control Structures	0	0	2,602	0	0	9,106	650	0	650	13,008
Stream Restoration	0	0	260	110.5	0	911	65	0	65	1,411.5
Wetland Restoration	0	0	12,791	0	913	65,731	2,403	0	3,204	85,042
Rain Garden	0	108	0	539	15	0	0	0	0	662
Total Nitrogen Reductions	**48,683**	**152,064.5**	**132,732**	**1,318.5**	**364,830**	**1,032,889**	**53,288**	**21,036.5**	**56,740**	**1,863,581.5**

Total Phosphorous (P) Load Reductions by Watershed

Phosphorous Load Reductions (lbs./year)	Appoquinimink River	Broadkill River	Chester Choptank	Christina Basin	Inland Bays	Nanticoke	Pocomoke Wicomico	St. Jones River	Upper Chesapeake	Total P (lbs./years)
Cover Crops	0	360	128	0	526	1,579	141	12	39	2,785
Nutrient Relocation	0	309	0	0	5,061	5,565	789	8	100	11,832
Nutrient Management	2,178	8,315	2,265	30	8,196	18,266	2,432	249	1,580	43,511
Hardwood Tree Planting	30	2.5	293	0	0	1,071	71	0.2	38	1,505.7
Riparian Buffer	35	0	0	0	404.5	0	0	1	0	440.5
Grass Buffer	0	0	0	0	66	0	0	1	0	67
Water Control Structures	0	0	0	0	0	0	0	0	0	0
Stream Restoration	0	0	303	26	0	1,060	76	0	76	1,541
Wetland Restoration	0	0	441	0	47	3,110	222	0	110	3,930
Rain Garden	0	3	0	0	0	0	0	0	0	3
Total Phosphorous Reductions	**2,243**	**8,989.5**	**3,430**	**56**	**14,300.5**	**30,651**	**3,731**	**271.2**	**1,943**	**65,615.2**

Future Changes and Challenges

Delaware has developed this report to highlight accomplishments made in 2022 to reduce nitrogen and phosphorus nonpoint source pollution. The charts and tables on pages 28 to 30 signify the continued progress in reducing loads to impaired watersheds. Additional commitments were made by DNREC and EPA with the development of annual milestones identified in Delaware's 2019 NPS Management Plan. These milestones describe the outcomes and key actions expected over a determined timeframe. Updates to the NPS Milestones can be found in Appendix A.

Aerial View of Broadkill River Watershed

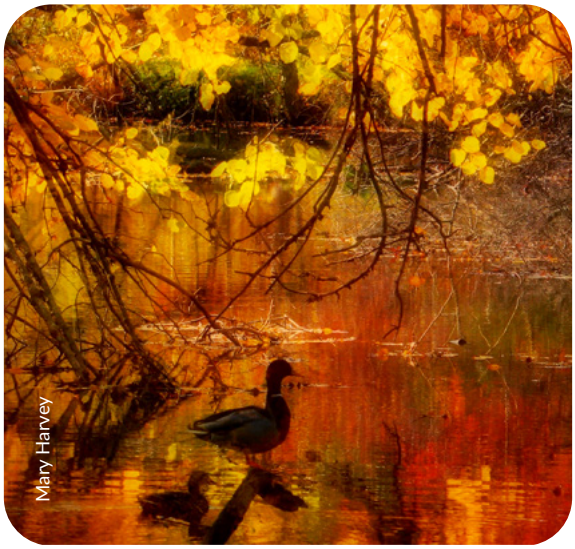
The NPS Management Plan includes objectives that address nonpoint sources of surface and ground water pollution including drinking water sources, in alignment with the goals of the CWA. Objectives of the plan include both implementation and how results will be tracked (e.g., water quality improvements or load reductions). Additionally, long-term goals and short-term milestones are integrated with other key environmental and natural resource programs. The program's goals and objectives are periodically revised to reflect progress or problems encountered, develop strategies to make progress towards achieving the goals, and develop indicators to measure progress.

Delaware continues to make progress toward meeting water quality goals with continued commitments of funding implementation activities to address the agricultural and urban sectors. The DNREC NPS Program continues to develop new working relationships with BMP implementation partner organizations to further water quality enhancement efforts.

For example, many of the key personnel working within the Delaware Conservation Districts help to write nutrient management plans, install agriculture BMPs and help farmers to identify and address resource concerns. Additional DNREC staff work with private landowners on buffers, wetland and stream restoration projects, as well as septic system pump-outs, repairs, and/or replacements.

The Delaware Department of Agriculture staff works with farmers and the agricultural community to continue the implementation and enforcement of the Nutrient Management Law and Regulations. The Delaware NPS Program continues to provide funding to the Department of Agriculture's Nutrient Management Program toward manure relocation efforts and personnel to help implement the nutrient management program, assist with nutrient management plan cost share practices, and help track and report agricultural BMP practices that are inspected by the program.

While some goals have yet to be reached, Delaware has continued to make substantial progress and has invested significant effort into programmatic changes, such as regulations, permits and reorganizing programs. Although these additional efforts improve accountability, they do not necessarily have an immediate impact on nutrient reductions. Delaware's agricultural community works every day to conserve and protect our water resources, with many of our farmers implementing BMPs that are not accounted for or reported. The program has captured some of the previously unreported BMP data through statewide transect surveys and Chesapeake Bay-related verification efforts.



Chester and Choptank Watershed

The cropland residue and cover crop transect surveys were established in 2014 and continued on an annual basis until the COVID-19 pandemic disrupted the survey in 2020. The cropland residue transect survey is on schedule to commence in spring 2023. The cropland surveys help quantify the amount of residue cover remaining on the field after the commencement of planting in the spring so farmers can get credit for conservation tillage practices. The cover crop surveys conducted throughout the state help capture any additional, non-cost share funded, cover crop implementation acres established by farmers that would otherwise function in reducing nutrient and sediment losses but not be reported and credited as such.

These transect surveys were conducted over a five-year period (2014 to 2019), providing a five-year period of baseline data. This baseline data could be used to make statistical projections of cropland residue associated with conservation tillage and cover crop acreage in subsequent years for all three counties in the state.

Funding for cover crop cost share programs has increased farmer participation and allowed the state to increase cover crop BMP implementation acreages. In 2019, an additional $2.9 million in state FY20 funds was allocated for conservation cost share practices specifically designated for cover crops. As a result of this increased funding, implementation of cover crop acres across all counties in Delaware increased. However, the COVID-19 pandemic in 2020 caused budgetary hardships at the state level. The additional $2.9 million in state funds that was awarded in 2019 dropped to $1 million in 2020 for state FY21. Improved budgetary outlooks for state FY22 resulted in an appropriation of $3.2 million. In FY23, the program sustained funding at $3.2 million. The state budget situation is ever evolving, so there are possibilities of funding amounts fluctuating across fiscal years dependent upon the budgetary climate.

In terms of regulations, Delaware promulgated new Onsite Wastewater Regulations in 2013, to help Delaware to meet future nutrient reduction goals for septic connections, pump-outs, and advanced treatment systems. In February 2019, the Delaware Sediment and Stormwater Regulations were updated and implemented, covering all land-disturbing activities greater than 5,000 square feet. Also, in 2019, the Sediment and Stormwater Program drafted, submitted and received approval for a new Construction General Permit (CGP). The CGP is required for any land-disturbing activities greater than one acre that require National Pollutant Discharge Elimination System (NPDES) permit coverage. Delaware's new CGP went into effect March 11, 2021.

Sunset on the edge of the bay

DNREC's NPS Program in recent years has undergone an internal reorganization which aligned the following programs: 319 NPS program, Chesapeake Bay Implementation Program and the Conservation Reserve Enhancement Program (CREP), as well as additional funding and resources through Delaware's Water Infrastructure Advisory Council (WIAC). The NPS Program now manages and administers two grants under the WIAC umbrella, including the Surface Water Matching Planning Grant (SWMPG) and the Community Water Quality Improvement Grant (CWQIG). The NPS Program also manages the Chesapeake Bay Implementation Grant (CBIG) for water quality BMP implementation within the Chesapeake Bay Watershed. The reorganized NPS Program has proven its efficiency by centralizing and reducing data reporting requirements while increasing grant funding availability and leveraging capacity for federal grants while expanding partnerships.

A future goal of the NPS Program is to further enhance the Chesapeake Bay Implementation Team's BMP Tracker database to store statewide BMP data instead of just Chesapeake Bay watershed-specific data. Established in late 2019, the new database still needs work to merge historical data from an older database before hopefully expanding it to encompass statewide BMP data. A contractor was hired in 2021 to assist with the historical data migration to the BMP Tracker Tool.

The Division of Watershed Stewardship's Watershed Assessment and Management Section (WAMS) is leading the effort to develop, through contractor assistance, a BMP planning and tracking tool called the Delaware Targeting and Planning Tool (DTAP), which will eventually work in conjunction with the BMP Tracker tool. The DTAP will help users with the planning process to identify, target and more efficiently position BMPs within watersheds to maximize the financial capacity of various grants that provide funding toward those implementation efforts.

Looking forward, DNREC's NPS Program will continue to make progress toward its goals and will work to align funding with water quality priorities. Although Delaware faces many challenges, DNREC remains committed to working with partners at the state, local and federal levels to reduce NPS pollution entering our waterbodies.

List of Partner Organizations/Committee Members

The hard work and many hours of agency staff members, organization members and private individuals who have partnered with the **NPS Program** in 2022 to address, reduce, identify and/or measure NPS pollution in Delaware is greatly appreciated. It is a credit to our partners as they have cooperated in the face of many challenges to help support the initiatives of the NPS Program.

Debbie Absher
Sussex Conservation District

Jaime Argo
Farm Service Agency

Bonnie Arvay
DNREC Sediment and Stormwater Program

Jayme Arthurs
USDA - NRCS State Office

David Baird
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Carol Bason
Delaware Botanic Gardens

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Ashley Barnett
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Heather Beaven
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Mark Biddle
DNREC Watershed Assessment and Management Section

Kesha Braunskill
Delaware Department of Agriculture Forestry Program

Chris Brosch
Delaware Department of Agriculture Nutrient Management Program

Lori Brown
DNREC Watershed Assessment and Management Section

Tyler Brown
DNREC Drainage Program

Michael Case
DNREC Drainage Program

Kimberly Cole
DNREC Climate Coastal and Energy

Bob Coleman
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Steve Williams
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Holly Walker
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Sara Wozniak
DNREC Watershed Assessment and Management Section

Brenda Zeiters
DNREC Nonpoint Source Program

Appendices

Appendix A - 2022 Milestones

Type	Timeline	Milestone	Comments/Status Updates
Short Term	FY19 to FY24	Increase number of outreach and education interactions by 10% over FY 2018 baseline (approx. 8,500 and 3,500 interactions, respectively)	A 10% increase in the number of outreach and education interactions over the FY18 baseline of 8,500 and 3,500 interactions during FY19 to FY24 respectively, would be a combined total of 13,200 outreach and education interactions over the FY19 to FY24 timeframe. In 2019, the NPS Program staff had a total of 7,500 interactions. In 2020, the NPS Program staff had a total of 1,637 interactions. In 2021, the NPS Program staff had a total of 11,199 interactions (4,316 in-person and 6,883 virtual). In 2022, the NPS Program staff had a total of 6,842 interactions (5,182 in-person and 1,660 virtual). Since 2019 there have been a total of 27,178 outreach and education interactions. The 2019, 2020, 2021, and 2022 total interactions represent 206% of the interaction goal during this measured timeframe of FY19 through FY24.
Short Term	FY19 to FY24	Increase estimated nutrient load reductions from implementation of NPS BMPs in non-Chesapeake Bay and Chesapeake Bay priority watersheds by at least 5% and 20%, respectively. The modeling tools used for the Chesapeake Bay will be used for all watersheds to assess progress from the determined 2002-baseline year. Using the Chesapeake Assessment Scenario Tool, loads will be assessed to enumerate progress in the Management Plan.	Due to formatting and collection differences between the Grant Reporting and Tracking System (GRTS) GRTS is an online data management system through the EPA where states can track and report grant funded projects including BMP data, budgets, etc. submission and CB Program Progress submission, it is difficult to standardize data for a CAST analysis outside of the CB Watershed. GRTS is an online data management system through the EPA where states can track and report grant funded projects including BMP data, budgets, etc. Through use of Chesapeake Bay Regulatory and Accountability Program grant (CBRAP) funding, the program has developed a new BMP Tracking and Reporting Tool which was used for CB watershed progress beginning in 2019. In the future, the plan is to further develop the BMP Tracker Tool to handle statewide BMP data and utilize a new targeting and planning tool that hopefully can calculate statewide load reductions. Currently, until these new platforms are fully functional, an EPA approved load reduction spreadsheet model is being utilized for load reduction calculations. Based on load reductions calculated for all priority watersheds with the DNREC load reduction tool, the following observations were noted when comparing to 2021 estimated load reduction data across priority watersheds where Section 319 grant funds were utilized for BMP implementation. Nutrient load reductions in non-Chesapeake Bay watersheds increased by greater than 5% in 2022 as compared to 2021. Nutrient load reductions in Chesapeake Bay watersheds did not increase by at least 20% in 2022 as compared to 2021.

Type	Timeline	Milestone	Comments/Status Updates
Short Term	FY19 to FY24	Characterize baseline conditions and establish timeframe for subsequent monitoring following BMP implementation in priority watersheds that do not have established baselines and re-evaluate old baselines.	The currently approved a-i watershed implementation plans (WIP) have WIP reduction goals included in the individual watershed progress report for all identified priority watersheds. BMP implementation and reporting to the NPS program is calculated and compared to the established WIP goals for each priority watershed. NPS baseline loads have been established by the DNREC Watershed Assessment & Management Section (WAMS) for all priority watersheds within the NPS Program. Revaluation of baseline loads is at the discretion of WAMS. There are no major updates for 2022 and there are not quantifiable updates.
Short Term	FY19 to FY24	Demonstrate stable or improving water quality trends for the sub-watersheds of the Inland Bays and Chesapeake Bay relative to data established from 1990 to present.	Delaware maintains a General Assessment Monitoring Network (GAMN) of approximately 139 stations. Twenty-three of the stations are monitored monthly and the remaining stations are monitored either six or 12 times per year. Each station is monitored for conventional parameters such as nutrients, bacteria, dissolved oxygen, pH, alkalinity and hardness. Some stations are monitored for dissolved metals. The data from this monitoring is entered into Water Quality Exchange (WQX) and Water Quality Portal (WQP) databases and used for the State of Delaware Combined Watershed Assessment (305(b)) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs Report and other uses by interested parties. More information about Delaware's Water Quality monitoring is available online at: **dnrec.alpha.delaware.gov/watershed-stewardship/assessment/water-quality-monitoring/** In addition to uploading data to WQX and WQP, the Department also works in cooperation with the University of Delaware to share available water quality data in a more user-friendly format in the Delaware Water Quality Portal at this URL: **demac.udel.edu/waterquality** **Trend Analysis for Nitrogen and Phosphorus at 11 Freshwater Sites:** The following information was utilized from the the most recent 2022 Integrated 303(d) and 305(b) Report. Long-term nitrogen and phosphorus data collected from eleven C1 monitoring sites throughout the State have been analyzed for trend using the Weighted Regressions on Time, Discharge, and Season (WRTDS) method. For total nitrogen concentrations, trends have been detected from 9 out of the 11 sites; an upward trend has been detected from 3 sites in Nanticoke River, Marshyhope Creek and Deep Creek Branch, and a downward trend from 6 sites in Beaverdam Ditch, Millsboro Pond, Blackbird Creek, Brandywine Creek, White Clay Creek and the Christina River. For total phosphorus concentrations, trends have been detected from 8 out of the 11 sites; an upward trend has been detected from 3 sites in Beaverdam Ditch, Silver Lake of St. Jones River, Deep Creek Branch, and a downward trend from 5 sites in the Nanticoke River, Red Clay Creek, White Clay Creek, Brandywine River and Christina River.

Type	Timeline	Milestone	Comments/Status Updates
Short Term	FY19 to FY24	Remove an identified impairment from a Land River Segment currently included on Delaware's list of impaired waterways annually.	The 7.5 mile segment of Tappahanna Ditch (DE-110-001-00) in the Choptank River watershed was removed from Delaware's list of impaired waters for bacteria according to the state's 303(d), 305(b) integrated report. This Success Story was finalized by EPA in 2022.
Long Term	FY19 to FY24	Show significant progress towards completion of implementation activities for all Delaware's priority watersheds with approved Nine Element Watershed Plans.	This progress is continually assessed and tracked through BMP data submissions to the NPS Program. Progress is reported in the GRTS system and reflected holistically in the NPS Program Annual Reports. In 2021, the NPS Program contracted with an environmental consulting firm to update the Little Assawoman Bay watershed implementation plan. Anticipated completion is in 2022. As of late 2022, the contractor is working to develop a draft plan while also utilizing the DTAP as the load reduction model. The same contractor is developing both the DTAP and the watershed plan, so those projects are closely tied with associated completion timeframes.
Long Term	FY19 to FY24	Demonstrate water quality improvement in 20% or more of the priority and monitored priority watersheds as reported in the NPS Annual Report.	Long term nitrogen and phosphorous data has been collected and analyzed by DNREC WAMS for 11 freshwater stream sites. As of the 2022 Integrated Report development, not all priority watersheds funded by the NPS Section 319 grant were analyzed for trends. However, a downward trend in nitrogen was noted at two sites in the Inland Bays and three sites in the Christina Basin watershed. A downward trend in phosphorous was noted at a site in the Nanticoke River, and four sites in the Christina Basin. 33% (3 of 9) of the priority watersheds showed improved water quality via downward nitrogen and/or phosphorous trends. Water quality monitoring and trend data are maintained by the DNREC WAMS.
Long Term	Annually through FY30	Show annual increases in funding and quantities of BMPs implemented in priority watersheds.	In 2022, the state FY23 budget appropriated $3.2 million in state general funds towards cover crop implementation efforts. This appropriation matched the previous FY22 appropriation. Delaware has made the commitment to provide financial resources to increased BMP implementation. These cover crop funds have preliminarily resulted in increased cover crop acre adoption by farmers when compared to historical years. Funding through the Chesapeake Bay Implementation Grant has been utilized since 2020 to implement cover crops in Most Effective Basins (MEB) within the Chesapeake Bay watershed. Approximately $364,540 per year, contingent upon EPA funding, is made available for BMP implementation in priority watersheds. Also, in 2022, the Conservation Programs Section in the Division of Watershed Stewardship is developing a riparian forest buffer pilot project where non-federal funds will be utilized to provide incentive to landowners to implement buffers.

Type	Timeline	Milestone	Comments/Status Updates
Long Term	Annually through FY30	Remove one water body currently listed for nutrient pollutants from the 303(d) List.	According to the most recent 2022 Integrated Report, there were 10 water segments delisted throughout the state for nutrients. Six of these water segments were in priority watersheds including: two in the Little Assawoman Bay (Inland Bays), one in the Choptank River, one in the Broadkill River, one in the Nanticoke River, and one in the Christina Basin (Brandywine Creek watershed). DNREC WAMS continuously monitors water quality trends throughout the various WQX and WQP monitoring stations in the state. As continued BMP implementation is funded by grant efforts, and water quality monitoring trends are analyzed, any water body delisting for nutrients will be reflected in this report.

Appendix B – Water Quality Trend Data

Delaware maintains a General Assessment Monitoring Network (GAMN) of approximately 139 stations. Twenty-three of the stations are monitored monthly and the remaining stations are monitored either six or 12 times per year. Each station is monitored for conventional parameters such as nutrients, bacteria, dissolved oxygen, pH, alkalinity, and hardness. Some stations are monitored for dissolved metals. The data from this monitoring is entered into EPA's Water Quality Exchange (WQX) and Water Quality Portal (WQP) databases and used for the State of Delaware Combined Watershed Assessment (305(b)) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs Report and other uses by interested parties. More information about Delaware's Water Quality monitoring is available online at: **dnrec.alpha.delaware.gov/watershed-stewardship/assessment/water-quality-monitoring.**

In addition to uploading data to WQX and WQP, the Department also works in cooperation with the University of Delaware to share available water quality data in a more user-friendly format in the Delaware Water Quality Portal at: **demac.udel.edu/waterquality**.

The Department's Watershed Assessment and Management Section (WAMS) periodically conducts a statewide water quality trend assessment. Based on the one-time statewide assessment conducted in 2015, the following graphics provide a visual indicator of water quality trends in Delaware's priority watersheds for total nitrogen (TN), total phosphorous (TP) and total suspended solids (TSS). Thumbs up indicate improving water quality trends while thumbs down represent negative water quality trends for the identified nutrients and sediment.

Water Quality Trends for Priority Watersheds

Watershed	Total Nitrogen (TN)	Total Phosphorous (TP)	Total Suspended Solids (TSS)
Appoquinimink River			
Broadkill River			
Chester and Choptank			
Christina Basin			
Inlands Bays			
Nanticoke River			
Pocomoke and Wicomico River			
St. Jones River			
Upper Chesapeake			

The water quality trend visualization graphics displayed are the result of the most recently conducted statewide water quality trend analysis in 2015.

Trend Analysis for Surface Waters (Nitrogen and Phosphorous):

As part of the 2018 Integrated Report, trend analysis for total nitrogen (TN), and total phosphorus (TP) was performed to assess water quality changes in Delaware surface waters. This trend analysis also tracked progress made toward achieving nutrient target loads established for various watersheds in Delaware as the result of the Total Maximum Daily Load (TMDL) Program. For this analysis, flow-normalized concentrations and loads, and their changes over a 10-year period (2008-2017), was estimated using an R statistical package called "Exploration and Graphics for RivEr Trends (EGRET)", (Hirsch and DeCicco, 2015). This statistical package uses a multiple regression method called "Weighted Regressions on Time, Discharge, and Season (WRTDS)", (Hirsch and others, 2010). As the name indicates, WRTDS method estimates daily concentration by establishing a regression relationship between concentration, stream flow, and time of the year (season). "Flow-normalized" concentration refers to concentration during normal flow condition. Using flow-normalized concentration would eliminate the impact of flow variations on nutrient concentrations and loads and would allow investigating water quality changes that are occurring as the result of management actions.

The WRTDS method has been widely used by many agencies for conducting trend analysis. For example, the United States Geological Survey (USGS) is relying on this method to assess water quality changes in non-tidal tributaries of the entire Chesapeake Bay Watershed. To perform trend analysis for Delaware surface waters based on WRTDS method, daily mean stream flow and nutrients concentration for the 11 monitoring sites in Delaware that are collocated with a USGS stream gauging stations (C1 sites) were retrieved from the USGS website at: **maps.waterdata.usgs.gov/mapper/index.html** and from the Environmental Protection Agency's modernized STORET website at: **waterqualitydata.us**.

Figure 1 (page 41) shows the location of the C1 monitoring sites used for this analysis and Table 1 and Table 2 (page 42) provides information about the location of these 11 monitoring sites and the collocated USGS stream gaging station as well as the drainage area above the stream gaging station.

Figure 1: Location of C1 Monitoring Sites for Trend Analysis

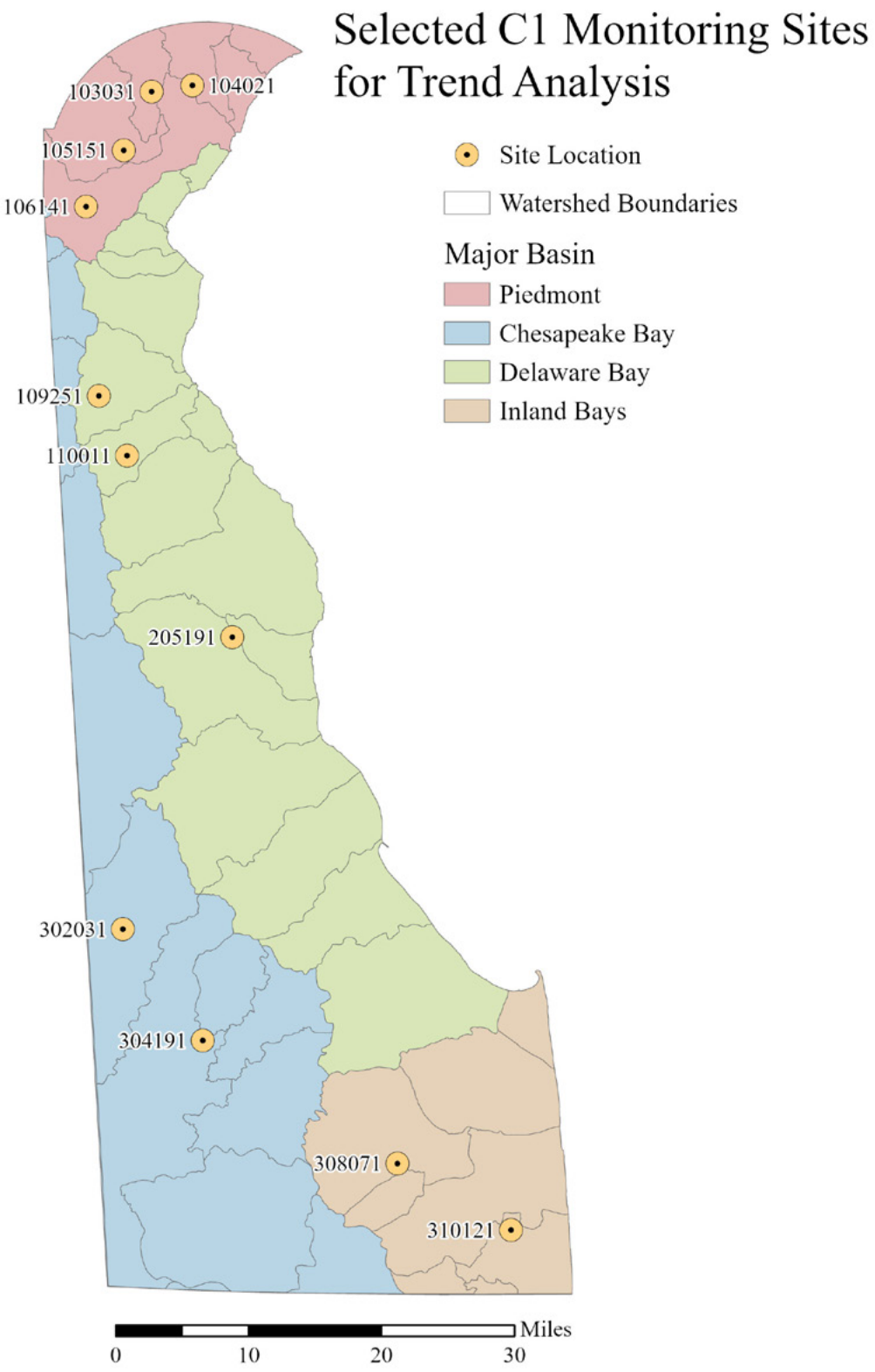

Table 1 summarizes the trend analyses for Total Nitrogen TN. TN is improving at nine sites and worsening at two sites (Nanticoke River and Marshyhope Creek). Table 2 shows Total Phosphorous TP concentration is improving at five sites and worsening at six sites on page 42.

Table 1: Total Nitrogen (TN) Trend Analysis Summary 2008 – 2017

Monitoring Site ID	Site Description	Data used start year	Data used end year	Concentration change from 2008-2017 (mg/l)	Improving/ Worsening Trend
103031	Red Clay at Lancaster Pike (Rt. 48)	1999	2017	-0.43	Improving
104021	Brandywine Creek at New Bridge Rd. (Rd. 279)	1999	2017	-0.53	Improving
105151	White Clay Creek at Delaware Park Blvd.	1999	2017	-0.50	Improving
106141	Christina River at Sunset Lake Rd. (Rt. 72)	1999	2017	-0.47	Improving
109251	Appoquinimink River trib., Deep Creek Br. at Summit Bridget Rd. (Rt.71)	2008	2017	-0.87	Improving
110011	Blackbird Creek at Blackbird Station Rd. (Rd. 463)	2002	2017	-0.43	Improving
205191	St. Jones River, Silver Lake at Spillway (Dover City Park)	1999	2017	-0.26	Improving
302034	Marshyhope Creek at Fishers Bridge (Rd. 308)	1998	2017	0.42	Worsening
304191	Nanticoke River, at Rifle Range Rd. (Rt. 545)	1989	2017	0.23	Worsening
308071	Indian River, Millsboro Pond outlet at John Williams Hwy. (Rt. 24)	1998	2017	-0.45	Improving
310121	Little Assawoman Bay, Beaver Dam Ditch at Beaver Dam Rd. (Rd. 368)	1999	2017	-1.50	Improving

Table 2: Total Phosphorous (TP) Trend Analysis Summary 2008 – 2017

Monitoring Site ID	Site Description	Data used start year	Data used end year	Concentration change from 2008-2017 (mg/l)	Improving/ Worsening Trend
103031	Red Clay at Lancaster Pike (Rt. 48)	1999	2017	-0.0270	Improving
104021	Brandywine Creek at New Bridge Rd. (Rd. 279)	1999	2017	0.0004	Worsening
105151	White Clay Creek at Delaware Park Blvd.	1999	2017	-0.0057	Improving
106141	Christina River at Sunset Lake Rd. (Rt. 72)	1999	2017	0.0059	Worsening
109251	Appoquinimink River trib., Deep Creek Br. at Summit Bridget Rd. (Rt.71)	2008	2017	0.0082	Worsening
110011	Blackbird Creek at Blackbird Station Rd. (Rd. 463)	2002	2017	-0.0077	Improving
205191	St. Jones River, Silver Lake at Spillway (Dover City Park)	1999	2017	-0.0096	Improving
302034	Marshyhope Creek at Fishers Bridge (Rd. 308)	1998	2017	0.0500	Worsening
304191	Nanticoke River, at Rifle Range Rd. (Rt. 545)	1989	2017	-0.0058	Improving
308071	Indian River, Millsboro Pond outlet at John Williams Hwy. (Rt. 24)	1998	2017	0.0080	Worsening
310121	Little Assawoman Bay, Beaver Dam Ditch at Beaver Dam Rd. (Rd. 368)	1999	2017	0.0620	Worsening

Appendix C - Education and Outreach Events

Despite the prior logistical challenges posed by the pandemic, the **DNREC NPS Program** remained active in outreach events in both a virtual and in-person format. A breakdown of some of the events and initiatives:

On March 17, 2022, NPS Program staff attended the Delaware Botanic Gardens Green Technology BMP Ribbon Cutting Event. Ben Coverdale spoke of behalf of the NPS Program highlighting the grant funded project and collaboration between the DBG and the Program.

On March 19, 2022, the NPS Program participated in a beach grass planting event at the Delaware Seashore State Park. This is an annual shoreline stabilization project hosted by the DNREC Division of Watershed Stewardship. Every spring, except for when the pandemic prevented it, dedicated volunteers have stabilized Delaware's sand dunes by planting stems of Cape American beach grass along ocean and bay beaches. Sixty-two volunteers participated at this location during this event.

On April 9, 2022, the NPS Program hosted the Rain Barrel Building Workshop in Blades, Delaware. As part of Earth Month and the Reclaim Our River Program (ROR), the NPS Program hosted a workshop for homeowners living in certain watersheds who received 55-gallon drums and kits to be converted into rain barrels. Participants learned about the benefits of using rain barrels as well as construction, maintenance, and installation. Other best management practices were also shared. This event supported the ROR program goals which include bringing water quality related events, workshops, and recreational opportunities to the Nanticoke River watershed. Thirty people attended this event.

On April 13, 2022, the NPS Program assisted with the Make-A-Splash event at St. Jones Reserve and John Dickinson Plantation in Dover, Delaware. The NPS Program staffed this educational event for fourth and fifth grade students to learn about the diversity of estuary life and the historical and cultural importance of Delaware's water resources. Participating in the event were 439 students from five elementary schools.

On April 22, 2022, Earth Day, the NPS Program assisted the Division of Watershed Stewardship with a social media outreach campaign on Facebook, engaging 489 people. The campaign offered a variety of activities and ideas to improve our planet. This year's Earth Day theme, Invest in Our Planet, spoke to a goal of building prosperous and equitable future.

On April 28, 2022, the NPS Program staffed the annual Envirothon event at the St. Jones Reserve in Dover, Delaware. The event engages high school teams from throughout the state who study and compete in environmental topics to earn prizes and a chance at competing at the National Envirothon level. Ten teams with four to five members each (approximately 40 to 50 students) competed.

On April 30, 2022, the NPS Program exhibited at the "A Year in the Pollinator Garden" workshop, hosted by the Nanticoke Watershed Alliance in Laurel, Delaware. Participants learned about the changes in pollinator gardens from winter to autumn and how to create and manage a sustainable community in their yards. The workshop also provided native plants to participants and the NPS Program shared additional information on improving local water quality. Fifty-five people attended.

From May 9 to 13, 2022 the Division of Watershed Stewardship assisted with a social media campaign (Facebook) to inform residents about flood risk, likelihood of flooding from extreme weather events brought on by climate change, the importance of having a flood insurance policy, and flood remediation for property damage or loss. Fifty residents were engaged.

On May 14, 2022, the Water Family Festival and Native Plant Sale in Ocean View, Delaware, was hosted by Delaware Center for the Inland Bays and Division of Watershed Stewardship. The event brought residents from throughout Delaware and highlighted the work DNREC, CIB and other organizations do to improve Delaware's wetlands, water and recreational shorelines. Local nurseries attended to answer questions on native species and had a variety of native plants for sale to the public. The NPS Program exhibited with various hands-on activities and spoke to 106 attendees.

On June 1, 2022, the NPS Program staff exhibited at the Delaware River and Bay Authority's World Environmental Day in New Castle County. Representatives from federal, state and local governments, environmental service organizations and private industry attended the event, sharing information on programs designed to improve the environment. More than 120 people visited the NPS exhibit.

From June 4 to 7, 2022, the NPS Program staff attended the River Network's River Rally in Washington, D.C., the largest annual conference for water professionals in the nation. The conference had professional development opportunities including various networking sessions as well as sessions on addressing waterways and unique economic, social and environmental characteristics of the Mid-Atlantic region, climate-resilient communities, and agriculture.

From June 6 to 8, 2022, the NPS Program staff attended the Chesapeake Community Research Symposium in Annapolis, MD. The conference brought together representatives from universities, state and governmental agencies, and the Chesapeake Bay Program to meet and discuss progress and future challenges in Bay research and restoration. Some topics discussed were climate change and resilience, environmental justice, effective communication about nonpoint source pollution, and citizen science research in the Chesapeake Bay and watershed.

From June 4 to 12, 2022, the Division of Watershed Stewardship participated in Chesapeake Bay Awareness Week, an annual event that celebrates the culture, history and natural beauty of the nation's largest estuary. Daily information was shared through social media, highlighting activities that will improve the health of the Chesapeake Bay Watershed and Bay itself. Sixty-one people were engaged.

On June 26, 2022, NPS Program staff exhibited at the Smithsonian Folklife Festival in Washington, D.C. The theme of the event was "Connected through Water." The Chesapeake Bay Program and various jurisdictions in the Chesapeake Bay Watershed worked together to celebrate and promote earth optimism, coastal connections, and the various ways cultures within our jurisdictions conserve and restore the bay watershed. The NPS Program exhibited with demonstrations and activities, and shared information on ways to reduce nutrient and sediment pollution. More than 500 people were engaged.

From July 20 to 29, NPS Program staff worked at the DNREC building at the Delaware State Fair in Harrington, Delaware. Visitors learned about the science behind the work of DNREC and its partners to protect the environment and public health through displays and hands-on activities.

On Aug. 9, 2022, NPS Program staff exhibited at the Greenwood Night Out event, hosted by the Greenwood Police Department. More than 100 people visited the exhibit featuring practices that support healthy watersheds.

On Sept. 24, 2022, the NPS Program exhibited at the Trap Pond Nature Festival in Laurel, Delaware. The event focused on "everything all about nature, the environment, and the great outdoors." NPS Program staff exhibited with demonstrations and activities and shared information on ways to reduce nutrient and sediment pollution. More than 200 people visited the exhibit.

On Oct. 15, 2022,
NPS Program staff exhibited at the Blackbird Creek Fall Festival in Townsend, Delaware, with information and activities that supported healthy watersheds. The event fosters stewardship of the Delaware Bayshore by celebrating the richness of estuaries and Delaware's cultural traditions at the Delaware National Estuarine Research Reserve. More than 300 people visited the exhibit.

On Nov. 3 and 4, 2022, NPS Program staff attended the Delaware River Watershed Forum. Hosted by the Coalition of the Delaware River Watershed, the forum served as an opportunity for water professionals, volunteers and students to convene and collaborate on protecting the Delaware River Watershed. The working conference provided a platform to brainstorm solutions, identify gaps, improve skills and build relationships to advance shared goals. The forum offered more than 25 different sessions on leading-edge keynote topics including community engagement and diversity, equity, inclusion, and justice.

In May 2021, the NPS Program hosted the Delaware Nonpoint Source Advisory Committee meeting in a virtual format that brought together various stakeholders from the state, federal and local governments, academia and non-governmental organizations. With approximately 50 attendees, this event highlighted BMP project implementation funded by the program's various water quality grants and discussed opportunities and challenges moving forward. Planning for the next event commenced in late 2022 for an in-person meeting to be hosted tentatively in spring 2023.

The NPS Program continues to participate in a monthly "Luncheon Learn," which shifted back to a hybrid (in-person and virtual format) in 2022. These monthly sessions bring together partner organizations including the University of Delaware, County Conservation Districts, the Farm Service Agency, the Natural Resources Conservation Service, the Delaware Department of Agriculture and the Delaware Association of Conservation Districts to discuss opportunities to improve, enhance, and leverage various programs to address resource concerns throughout the state.

DNREC's **Nonpoint Source Program** administers a competitive grant made possible through **Section 319** of the Clean Water Act (CWA). The grant provides funding for projects designed to reduce nonpoint source (NPS) pollution in Delaware. NPS pollution may be defined as any pollution that originates from a diffuse source (such as an open field or a road) and is transported to surface or ground waters through leaching or runoff. Reduction of NPS pollution may often be achieved through incorporation of specific best management practices (BMPs) into project workplans. Projects may target any source of NPS pollution, but most frequently involve agriculture, silviculture, construction, marinas, septic systems, and hydromodification activities.

In addition to funding projects that achieve reductions in NPS pollution, the DNREC NPS Program is committed to addressing these issues through educational programs, publications, and partnerships with other organizations working to reduce NPS pollution in Delaware.

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