



Nonpoint Source Program

2025 Annual Report



DNREC Division of Watershed Stewardship

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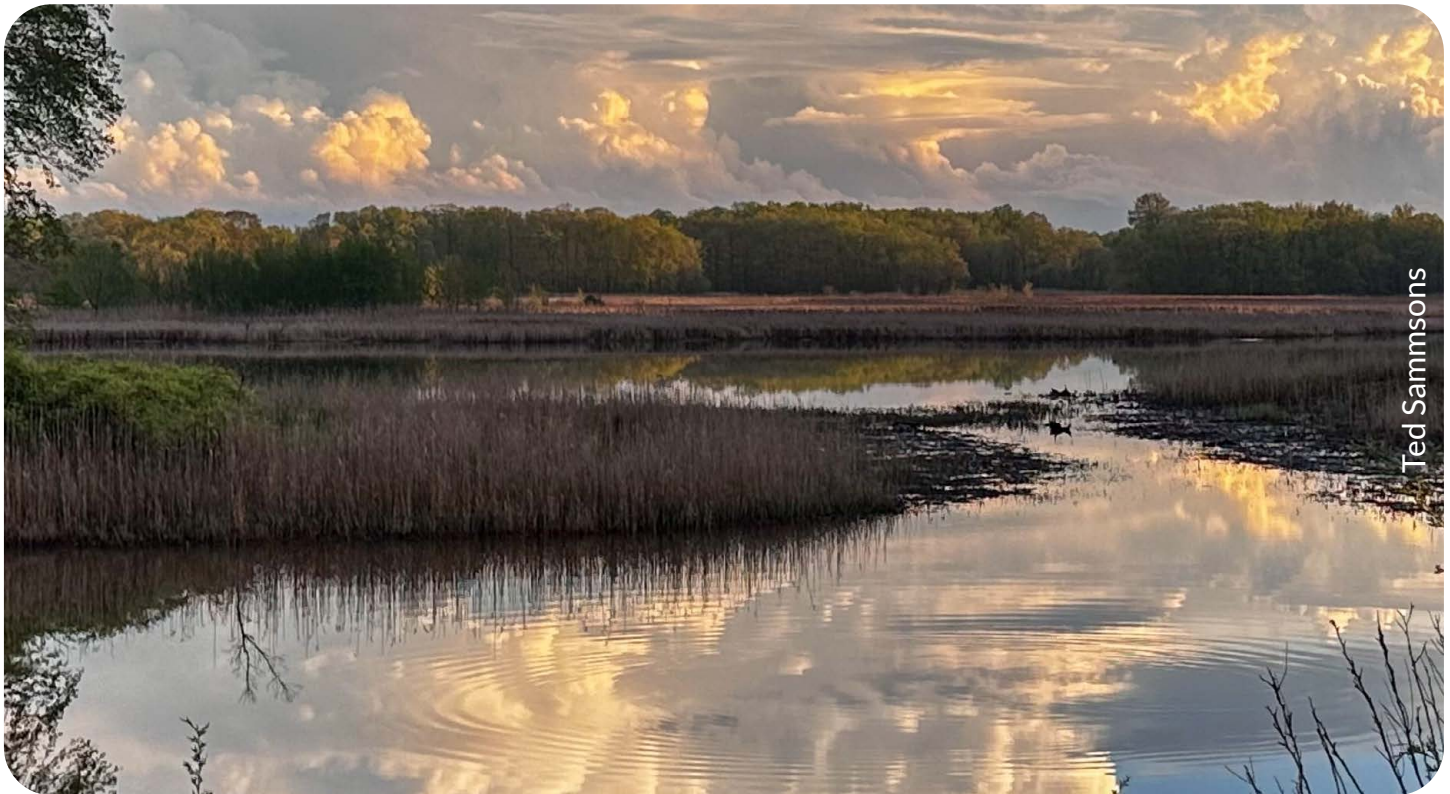
Steve Williams

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Preface

The 2025 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).



Ted Sammons

A scenic view of Bombay Hook watershed.

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 of 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 groundwaters of Delaware.



The winter snow melting at Brandywine.

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.

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.

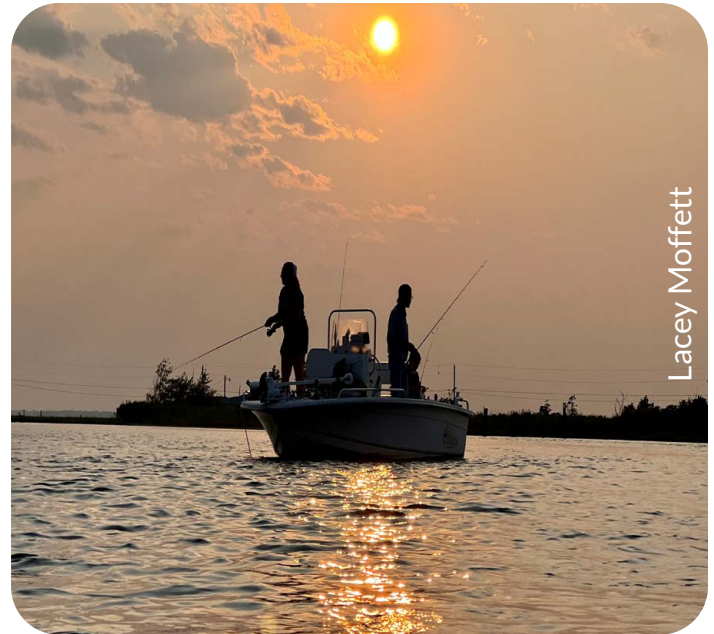
NPS Program Funding

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 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. The NPS Program submitted a draft Management Plan to EPA in 2025 for review. 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.



Lacey Moffett

Fishing at Mispillion Harbor.

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 grant applicants through an advertised request for proposal (RFP) process. These grant 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

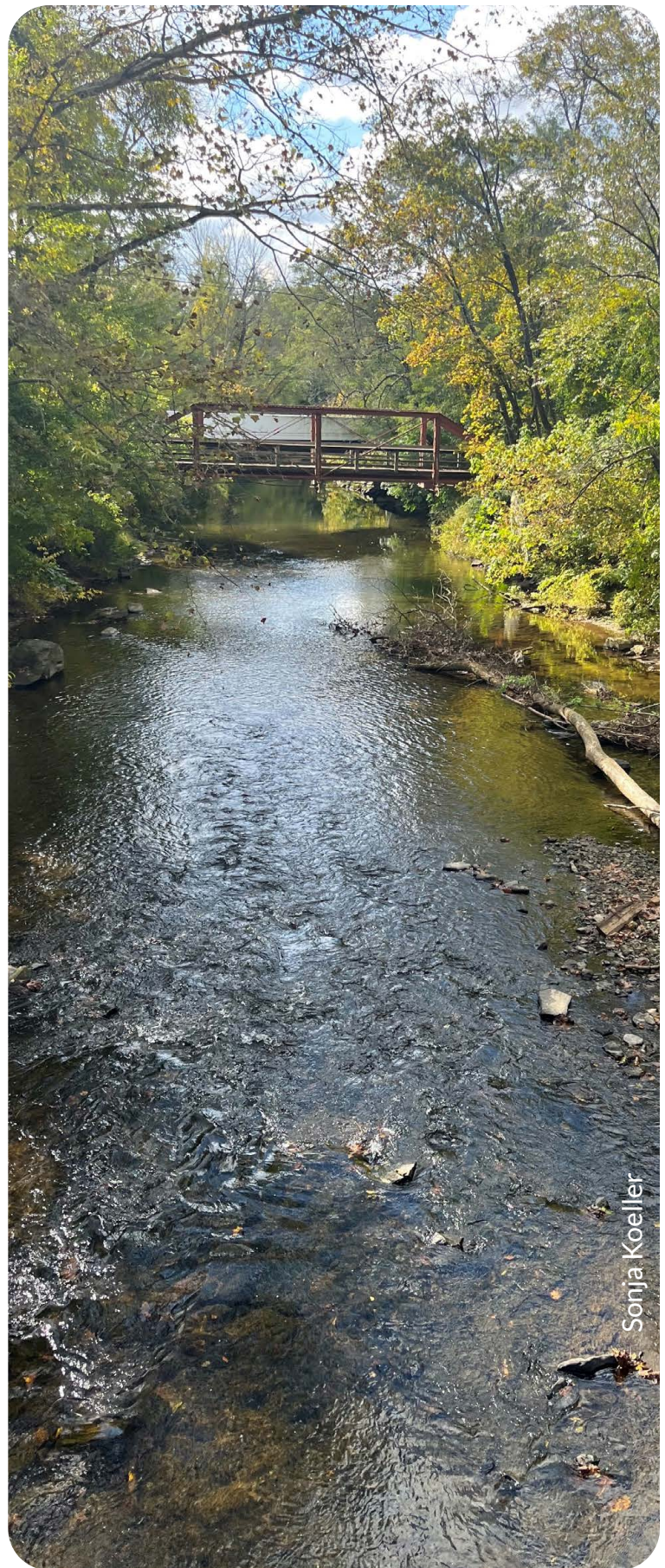
More than 90% of Delaware's waterways are considered impaired. The state's list of impaired waters in the most recently issued [2024 State of Delaware Combined Watershed Assessment Report \(305\(b\)\)](#) and Determination for the Clean Water Act Section 303(d) List of Waters Needing TMDLs, includes assessment units (waterbodies and stream segments) throughout the state with 10 different impairments. The most common impairments are NPS-related pollutants including pathogens, nitrogen, phosphorous and sediment.

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 waterbodies 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. Waters designated as impaired 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. Continued in 2025 from a 2024 initiative, included the leveraging capacity of \$1.2M in non-federal funding resources through the Conservation Cost-Share Program. These funds can be utilized as match resources to complement certain water quality BMP projects.

Additional roles and responsibilities of the NPS Program include geospatial BMP tracking and reporting, assisting with the management of the [Chesapeake Bay Implementation Grant \(CBIG\)](#), 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.



Sonja Koeller

The Red River Creek flowing downstream under a bridge.

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.

DNREC's mission is to protect and manage the state's vital natural resources, protect public health and safety, provide quality outdoor recreation, and serve and educate the citizens of the First State about the wise use, conservation, and enhancement of Delaware's environment. In Delaware, DNREC is the lead agency for the development and implementation of the NPS 319 Program, through its Division of Watershed Stewardship.

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 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.

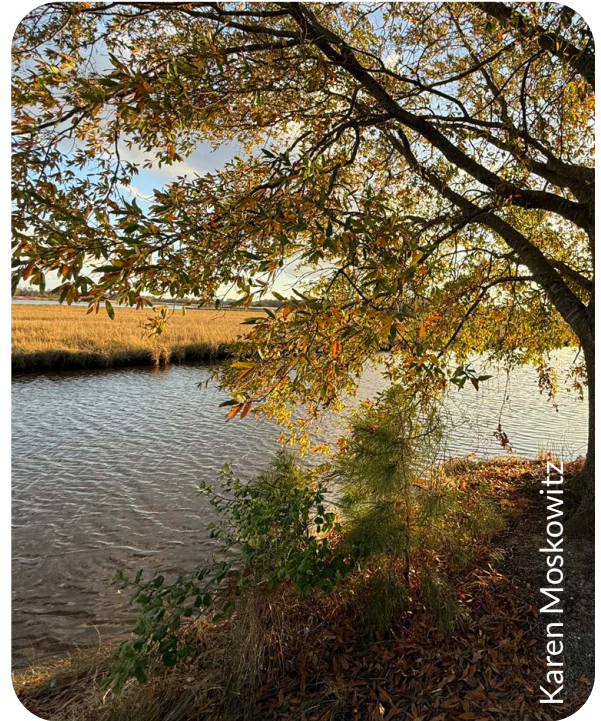
Executive Summary

The DNREC NPS Program has focused this annual report on 10 priority watersheds in Delaware: the Appoquinimink River, Broadkill River, Chester and Choptank River, Christina Basin, Inland Bays, Little Assawoman Bay, 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) 2024 (Oct. 1, 2023 to Sept. 30, 2024), the Delaware NPS Program received \$1,268,000 in federal Section 319(h) grant funds to focus on nonpoint source water pollution reduction efforts. Non-federal match provided by Delaware was \$852,000. For the overall grant award, \$421,266 was utilized as Program funds and \$846,734 as Project funds. For Federal FY25 (Oct. 1, 2024 to Sept. 30, 2025), the NPS Program was awarded \$1,283,809. Non-federal match provided by Delaware was \$855,873. For the overall grant award, \$461,877 was utilized as Program funds and \$819,832 as Project funds.

This annual report documents the activities and highlights of the DNREC NPS Program during the 2025 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 Delaware's NPS Program.

In 2025 the DNREC NPS Program continued to reduce water pollutant levels by working toward the achievement of milestone targets. Milestone targets are near-term or long-term commitments that promote a steady pace of progress toward water quality improvement. This report identifies accomplishments during the 2025 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 2025 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.



Day's end at Prime Hook.

- **Grant funding** – For Federal FY25 (Oct. 1, 2024 to Sept. 30, 2025), the DNREC NPS Program was awarded \$1,283,809 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 12](#). The Federal FY26 grant cycle began Oct. 1, 2025 and ends Sept. 30, 2030. The NPS Program submitted a federal Section 319(h) grant application to EPA in May 2025 for FY26.
- **Education and Outreach** – The COVID-19 pandemic caused major disruptions beginning in March 2020. In-person meetings, events, trainings, conferences and other workshops were either canceled, postponed indefinitely/and 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. Beginning in 2022, outreach events began to transition back into an in-person environment. By 2024, almost all outreach events were back to an in-person format and functioning as they were prior to the pandemic. 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 develop 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 and non-profit organizations to implement urban-focused BMPs. Periodic meetings with project implementation partners were conducted throughout the year to discuss possible BMP implementation projects. In 2025, the NPS Program collaborated with the Sussex Conservation District and their construction equipment program to explore wetland creation and restoration BMP projects in various priority watersheds with willing landowners.

- **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. The Division of Watershed Stewardship began a Riparian Forest Buffer pilot program in the Chesapeake Bay Program with a focus on climate resiliency. Several BMP projects that have received CWA Section 319 grant funding have carbon co-benefits including but not limited to urban tree planting, cover crops and vegetated filter strips. The Delaware Climate Action Plan identifies the increase in implementation of BMPs as specific actions that the State can take to achieve climate goals.

In 2023, the Delaware Community Conservation and Assistance Program (DECAP) was created to help implement smaller, homeowner-focused BMPs within the Chesapeake Bay watershed and can also support underserved communities. The DNREC Environmental Justice Office was established to guide the agency's work and embed environmental equity throughout the agency.

In 2024, the NPS Program participated in the DNREC Division of Climate, Coastal and Energy's (CCE) Climate Action Plan stakeholder meeting to provide feedback toward the development of the new plan. Staff also participated in the United States Climate Alliance Natural and Working Lands Climate Smart Agriculture and Forestry conference hosted in New Jersey in December 2024.

In 2025, the NPS Program increased participation in the Delaware Resilient and Sustainable Communities League (RASCL) including the Project Guidance Group and Community Planning Assistance Committee. This provided the NPS Program a platform to collaborate with personnel from different State agencies, NGOs, and the University of Delaware on possible future urban water quality BMP implementation projects. These meetings and committees allow NPS Program staff to be aware of BMP projects and allow the opportunity to possibly leverage funding resources.

Overall Pollution Load Reduction from BMP Implementation

Overall, the NPS Program leveraged funding with and/or directly funded projects that were completed during the calendar year in EPA-accepted watersheds. These load reductions include annual projects funded by the CWA Section 319 grant (e.g. Conservation Planners, Manure Relocation, and Nutrient Coordinator position support at the Delaware Department of Agriculture (DDA) provide BMP data that is not always confined to the priority watershed boundaries. This is the closest approach Delaware currently has that would be considered statewide load reductions. However, it is not a full enumeration on a statewide basis. Total nitrogen load reductions were 3,345,906 pounds, total phosphorous load reductions were 46,300 pounds and total sediment load reductions were 3,768 tons. (see table below for major BMP areas). Delaware continues to ensure that projects funded with CWA Section 319 dollars make progress toward restoring or protecting waters impaired by NPS pollution.

2025 Major BMP Areas		
Pollutant Controls, Practices and Actions	2025 Annual Progress	Unit
Cover Crop (traditional and commodity)	142,327	Acres
Nutrient Relocation (net export from watershed)	47,490	Tons
Nutrient Management Plan	359,123	Acres

Notes:

- 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.
- 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.
- 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



Sunset over Little Assawoman watershed.

Delaware has 10 “priority” watersheds that have EPA-accepted a-i, nine element watershed implementation plans (WIP) with 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 10 priority watersheds with EPA-accepted watershed implementation plans are listed below. Clicking on the watersheds will take you to the individual maps:

- [Appoquinimink River](#)
- [Broadkill River](#)
- [Chester River and Choptank River](#)
- [Christina Basin.](#)
- [Inland Bays](#)
- [Little Assawoman Bay](#)
- [Nanticoke River](#)
- [Pocomoke River and Wicomico River.](#)
- [St. Jones River](#)
- [Upper Chesapeake](#)

The BMP Progress Reporting Table found on each individual watershed's page are those BMPs funded with Section 319(h) grant funds through the Delaware NPS Program. The WIP goal is established by the accepted 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. Christina Basin consists of White Clay Creek, Red Clay Creek, Brandywine Creek and Christina River subwatersheds.
4. Upper Chesapeake includes Elk River, Bohemia River, Sassafras River and the C and D Canal.

Project Highlights

The Delaware Botanic Gardens (DBG) located in Dagsboro began the initial planning of the Gateway Garden concept in 2023. The DBG had an approximate 2-acre portion of their parcel where they wanted to incorporate additional parking for patrons but do so in an environmentally friendly way. The DBG has previously incorporated green stormwater approaches into their project designs and the Gateway Garden is no different.



Aerial Drone Photo of Gateway Garden – Spring 2025

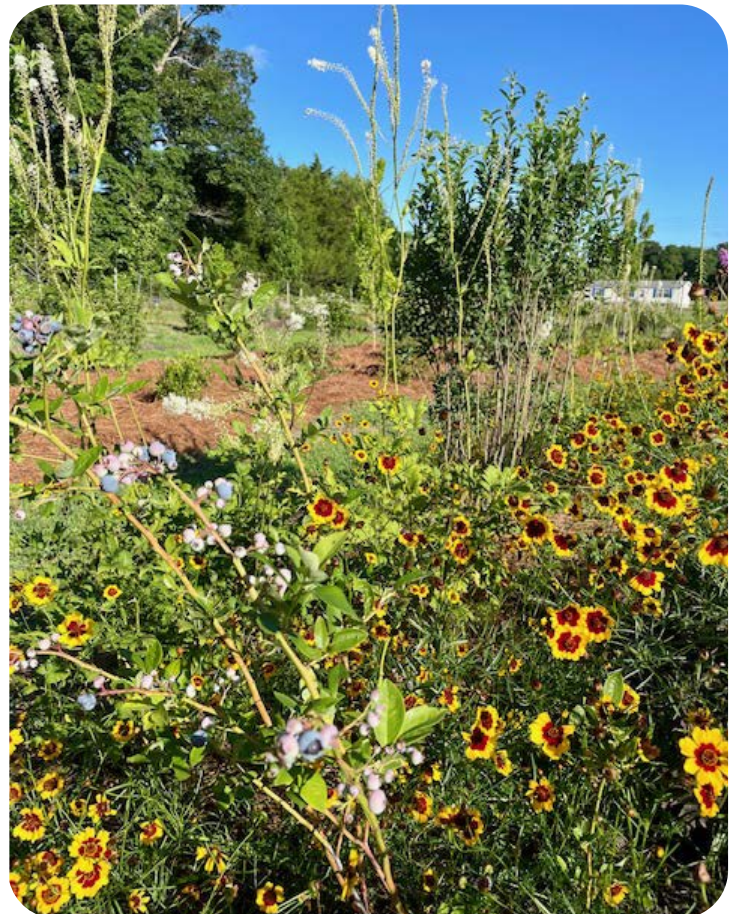
Utilizing the natural solutions approach, DBG wanted to incorporate as many environmentally friendly methods to address stormwater runoff and nonpoint source pollution as possible in their design and planning phase. This resulted in the installation of permeable pavers planted with pollinator-friendly species in a created overflow parking area for buses and other large vehicles. This was an alternative approach to making additional impervious surface areas with stone, millings or asphalt.

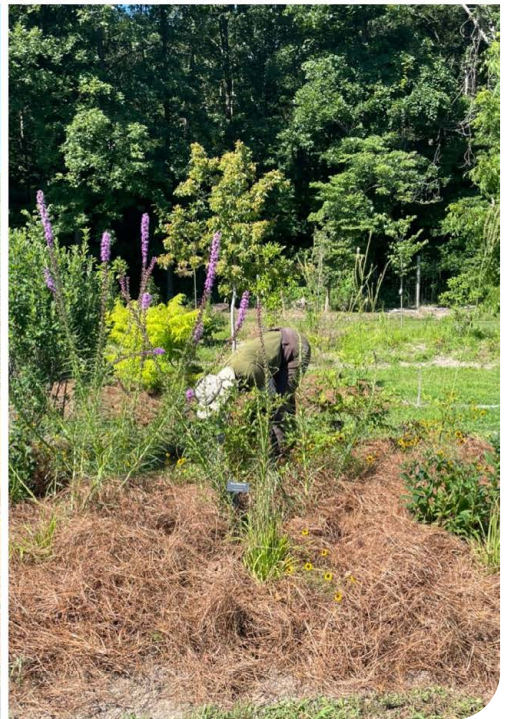


Planted hedgerow showing the trees, shrubs and perennials that create the dense habitat.

The surrounding areas of the additional parking lot were planted in native trees and shrubs. These plantings help to further filter stormwater runoff that carry nonpoint source pollutants before reaching the drainage network that eventually outflows to Pepper Creek in the Indian River watershed of the Inland Bays. By September 2025, all plantings were completed and the entire project was fully implemented.

Fruiting bushes, trees and wildflowers planting in dense edge habitats, creating a hedgerow filled with diversity.





Volunteers working on the Hedgerow Garden Late spring/summer 2025

The DBG incorporated an educational component into their Gateway Garden project. Signage posted at the project site provides the public with information concerning the environmental and habitat benefits including the various plant, tree and shrub species implemented. The DBG also utilized volunteer labor to provide services including the planting of trees and shrubs and general maintenance such as weeding for site preparation.

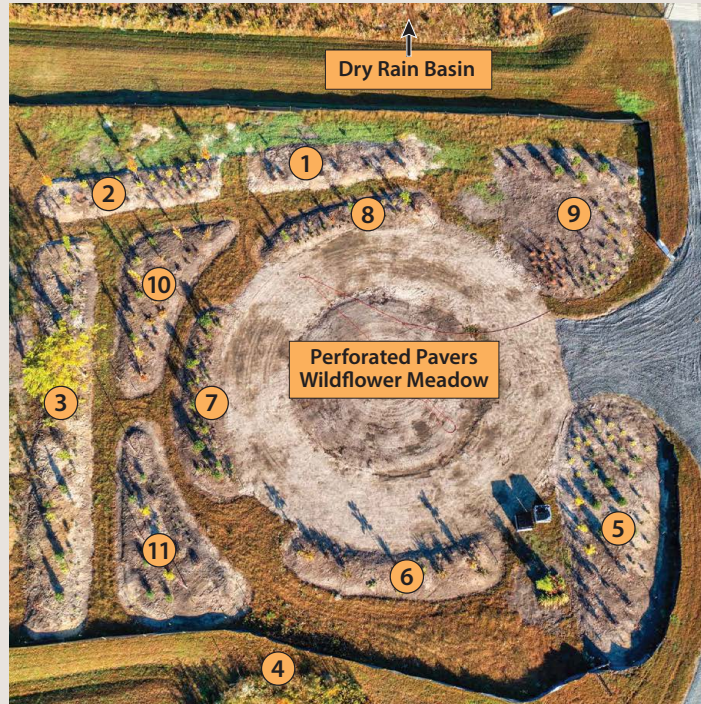


DELAWARE
BOTANIC
GARDENS
AT PEPPER CREEK

Hedgerow Garden

Featured Hedgerow's Planting Scheme—Layered Diversity Across 11 Garden Beds

- 1 *Betula heritage* (River Birch)
Rhus Tigers Eye (Sumac)
Agastache (Anise Hyssop)
- 2 *Schizachyrium* (Little Bluestem)
Acer rubrum (Armstrong Gold)
Achillea millefolium (Yarrow)
- 3 *Crataegus* (Hawthorn)
Ilex (Holly)
Rosa palustris (Wild Rose)
Sambucus canadensis (Elderberry)
- 4 *Taxodium* (Swamp Cypress)
Asclepias incarnata (Milkweed)
Cephalanthus (Buttonbush)
- 5 *Yucca 'Color Guard'* (Adam's needle)
Symphytotrichum (Aster)
Fothergilla (Witch Alder)
- 6 *Cercis canadensis* (Redbud)
Callicarpa americana (Beautyberry)
Asclepias tuberosa (Milkweed)



- 7 *Amelanchier canadensis* (Serviceberry)
Liatris spicata (Blazing Star)
Chelone (Turtlehead Flower)
- 8 *Hamamelis mollis* (Witch Hazel)
Hypericum prolificum
Magnolia virginiana
- 9 *Yucca* (Adam's Needle)
Amsonia (Blue Ice)
Fothergilla gardenii
- 10 *Celtis occidentalis*
Ergrostris (Love Grass)
Deutzia (Honeysuckle Bush)
- 11 *Symphoricarpus* (Snowberry)
Cornus alba 'Sibirica'
Fothergilla (Witch Alder)



A DNREC-funded stormwater management project.
Naming rights by Ron Bass and George Robbins.

Educational signage detailing the different species planted.

DBG aims to create sustainable public gardens that inspire and educate. This project enhanced the treatment of stormwater runoff coming from the visitor parking lot and improved water quality in the Inland Bays watershed. Native flowers and trees planted for this project will attract pollinators, enhance habitat and increase biodiversity. School groups and the public can access this project, which provides the additional benefit of educational opportunities.



DELAWARE
BOTANIC
GARDENS
AT PEPPER CREEK

Hedgerow Garden

Hedges— Layered Corridors of Life

The Hedgerow Garden at the Delaware Botanic Gardens is both a tribute to tradition and a vision for the future. For centuries, hedgerows have lined fields and pathways, creating living boundaries that sheltered wildlife, protected the soil, and provided seasonal harvests.

At DBG, we renew that legacy using native trees, shrubs, and groundcovers to build a layered corridor of life. In every season, the hedgerow provides food and shelter for birds, butterflies, and pollinators, while acting as a natural windbreak that reduces erosion and enriches the soil.

The hedgerow's dense structure links meadows and woodland, creating safe passageways for small mammals and insects, and restoring habitat continuity often lost to development. More than a border, the Hedgerow Garden is a working landscape, beautiful, resilient, and vital to biodiversity along Pepper Creek.



A DNREC-funded stormwater management project.
Naming rights by Ron Bass and George Robbins.



The Hedgerow Garden built and phase one planting by Deltech students



Long-season interest



Pollinator habitat



Coastal hedgerows



Fruiting Shrubs



Eco-regional natives

Native Hedges Offer Shelter and Sanctuary

The Hedgerow Garden restores the centuries-old tradition of living fences, sustaining life through layers of shrubs, trees, ferns, grasses, and perennials. It provides for wildlife, protects the land, connects, and strengthens the garden's entry landscape with diversity and resilience.

- Provides food and shelter for birds, pollinators, and small mammals.
- Acts as a natural windbreak, filtering air and protecting soil.
- Enhances biodiversity along the garden's entry landscape.

Planting a diverse range of trees, shrubs, and perennials will attract pollinators and wildlife, encouraging a native balance and natural pest control for your garden.

Educational signage explaining the environmental benefits of the plantings.

Load Reductions

In 2025, the DNREC NPS Program load reductions were calculated for projects implemented on a watershed scale. The load reductions are calculated using guidance established during the pollution control strategy development process and the current EPA-accepted DNREC model.



A little green heron hunting for prey in a watershed.

2025 Project Load Reductions/Year by Watershed

Project Watershed	Nitrogen (lbs.)	Phosphorus - TP (lbs.)	Sediment - TSS (tons)
Appoquinimink River	41,783	445	47
Broadkill River	277,800	2,564	319
Chester and Choptank Rivers	249,107	2,748.5	435
Christina Basin	17,343	185.4	1
Inland Bays	660,350	9,888	694
Little Assawoman Bay	106,089	2,721	189
Nanticoke River	1,695,691	2,136	1,687
Pocomoke and Wicomico Rivers	137,616	3,383	97
St. Jones River	119,129	1,145	218
Upper Chesapeake Bay	40,998	1,085	81
Total	3,345,906	446,300.9	3,768

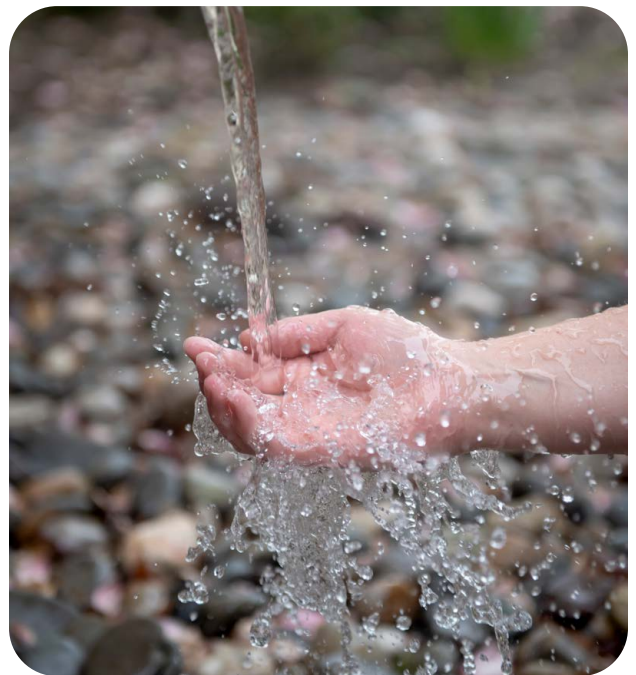
The following three tables can be viewed by clicking on this link below :

- [Total Nitrogen \(TN\) Load Reductions \(LRs\) by Watershed.](#)
- [Total Phosphorous \(TP\) Load Reductions \(LRs\) by Watershed.](#)
- [Total Sediment \(TSS\) Load Reductions \(LRs\) by Watershed.](#)

Future Changes and Challenges

Delaware has developed this report to highlight accomplishments made in 2025 to reduce nitrogen, phosphorus and sediment nonpoint source pollution. Link to the charts above 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 and subsequent draft. These milestones describe the outcomes and key actions expected over a determined time frame.

The NPS Management Plan includes objectives that address nonpoint sources of surface and groundwater 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. Updates to the NPS Milestones can be found in [Appendix A.](#)



Clean drinking water is an important goal.

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.

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 and cover crop transect surveys were tested in 2023 with new GIS technology. Both surveys were conducted successfully in 2024 with upgraded GIS technology and continued for 2025. 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, voluntarily implemented cover crop acres established by farmers that would otherwise function in reducing nutrient and sediment losses but not be reported and credited as such. The transect surveys are back to pre-pandemic procedures and are being conducted annually as originally intended. The NPS Program has collaborated with the Chesapeake Bay Implementation Program (ChIP) staff who specialize in GIS technology to improve the functionality of the data collection interface and the subsequent analyses and reporting processes.

Funding for cover crop cost share programs has increased farmer participation and allowed the state to increase cover crop BMP implementation acres. The financial investment in cover crops from the Delaware State Legislature has fluctuated over time since FY20, but in recent fiscal years it has been trending upward. 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 FY24 budget appropriated \$5.2 million as demand for cover crop implementation by farmers increased throughout the state. The FY25 budget appropriation was maintained at approximately \$5.2M. For FY26, the State Legislature increased the cover crop appropriation to approximately \$6.4M reaffirming financial commitments toward increasing BMP implementation. The state budget situation is ever evolving, so there are possibilities where funding amounts fluctuate in fiscal years depending on the budgetary climate.

In 2025, the NPS Program began administering Conservation Cost Share (CCS) funds appropriated by the State Legislature. The CCS funds can be used statewide and not limited to certain watersheds. These non-federal funds have epilogue language where they must be used for water quality BMP implementation projects. The intent of these funds is to also leverage with the federal water quality grant programs (e.g. CWA Section 319 and CBIG) to help satisfy minimum match requirements.

Through the FY25 RFP for both the CBIG and CWA Section 319 grants, grant applicants had the opportunity to submit requests to obtain CCS funds for water quality BMP implementation projects where non-federal match funds were a primary limiting factor that would otherwise result in those grant applications to be submitted.

In 2025, the CCS funds were leveraged with wetland restoration projects in the Chesapeake Bay watershed in collaboration with the ShoreRivers and the Sussex Conservation District. Other wetland restoration projects were implemented in watersheds outside of the geographical coverage of the CBIG and CWA Section 319 grants. So, in those cases, the CCS funds were the primary funding source.

In terms of regulations, Delaware promulgated new Onsite Wastewater Regulations in 2013 to help the state 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 1 acre that require National Pollutant Discharge Elimination System (NPDES) permit coverage. Delaware's new CGP went into effect March 11, 2021. The current CGP expires in March 2026, at which time Delaware will need to update the permit for the next coverage period.

DNREC's NPS Program underwent several internal reorganizations over the last couple of years, which previously 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) in addition to the CWA Section 319 grant. It also administers a portion of the CCS program funds specifically for water quality BMP implementation projects and leveraging capacity with federal grants.

The Chesapeake Bay Implementation Team since 2023 has increased staffing levels and formed an independent Chesapeake Bay Program within the Division of Watershed Stewardship. This program directly manages the Chesapeake Bay Implementation Grant (CBIG), the Chesapeake Bay Infrastructure Investment and Jobs Act (IIJA) Grant, the Delaware Riparian Buffer Incentive Program, and the Delaware Community Conservation Assistance Program (DECAP). The NPS Program works closely with the Chesapeake Bay Team as both programs share the same goals of enhancing water quality by addressing NPS pollution. In 2024, and continued into 2025, the Riparian Buffer Program was expanded to allow the implementation of agricultural and urban grass buffers.

A future goal of the Chesapeake Bay Implementation Program and NPS Program is to further enhance the Chesapeake Bay Implementation Program'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. These efforts are ongoing. However, there are challenges on how certain data is submitted at geographic scales. Some of these challenges are linked to landowner privacy protections. As of 2025, the BMP Tracker Tool has functionality for statewide BMP data, however, it is not a full enumeration of all BMPs implemented within the State as the data is received from partner organizations on a voluntary basis.

The Division of Watershed Stewardship's Watershed Assessment and Management Section (WAMS) led the effort to develop, through contractor assistance, a BMP planning and tracking tool called the Delaware Targeting and Planning Tool (DTAP), which works in conjunction with the BMP Tracker tool. The DTAP helps 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. In 2023, DTAP was tested internally by Division of Watershed Stewardship staff to provide user feedback to the contractor. The DTAP is functional for nutrient load reduction modeling. Sometimes, there are case-by-case modeling scenarios being troubleshooted for specific BMP load reduction modeling since this is still a newly implemented tool. Beginning in 2024 and through present date, the NPS Program utilizes the DTAP for calculating estimated load reductions as the primary modeling tool.

There are challenges with implementing strategies and initiatives to help achieve water quality. The NPS Program works with various partner organizations in the agriculture and urban sectors to identify and implement appropriate water quality BMP projects that maximize load reduction and monetary investment efficiencies. Typical challenges include inflationary pressures that increase project costs and the capacity of partner organizations to achieve grant match requirements. 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.

Over the last several years, Delaware has experienced increased development pressure transitioning agricultural land to urban landscapes. Some watersheds have experienced more growth than others, but overall, the State continues to lose agricultural land to development and other land use changes. This rapid development has somewhat changed the origin of nonpoint source pollution from agricultural to urban. These rapid land use changes led to changes in how the DDA DNMC regulates nutrients from an urban perspective. There has always been a challenge regulating nutrient applications from smaller acreage areas, since many residential turf areas are much less than the traditional 10-acre threshold. The DNMC predominately regulated the agricultural industry for nutrient management compliance.

However, the DDA DNMC is in the process of enacting its own turf nutrient management regulations <https://archive.regulations.delaware.gov/AdminCode/title3/1200/1204.shtml>. This is to help address nonpoint source pollution originating from residential areas and specifically turf management. Major highlights of the turf regulations include; mandatory nutrient management certification requirement for individuals to become Commercial Nutrient Handlers (CNH) when applying nutrients to turf areas one-quarter acre or larger in size, an annual ban on nitrogen and phosphorous based fertilizers from December 7th to February 14th, a no application fertilizer zone of 10 to 15 feet when adjacent to waterways, etc. This regulatory change, in combination with non-regulatory approaches through outreach and education, and water quality BMP implementation through grants and conservation programs will help address challenges associated with increased development throughout the State.

More recent challenges included the federal government shutdown in late 2025 and continued funding uncertainties. This caused some of the NGOs that typically submit grant proposals to not do so during the most recent Request for Proposals (RFP). Staffing cuts, position turnover, and the overall funding uncertainty created logistical issues for these organizations to feel comfortable in implementing larger scale projects.

List of Partners and Organizations

The hard work and many hours of agency staff members, organization members and private individuals who have partnered with the NPS Program in 2025 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.

Jayme Arthurs USDA – NRCS State Office

David Baird Sussex Conservation District

Jesse Baird DNREC Drainage Program

Ashley Barnett DNREC Sediment and Stormwater Program

Carol Bason Delaware Botanic Gardens

Kerri Batrowny DNREC Parks and Recreation

Mike Bott DNREC Watershed Assessment and Management Section

Kesha Braunskill United States Forestry Service

Lori Brown DNREC Watershed Assessment and Management

Tyler Brown DNREC Division of Watershed Stewardship

Debbie Cahall Sussex Conservation District

Michael Case DNREC Drainage Program

Mike Clendaniel New Castle County Department of Public Works

Kimberly Cole DNREC Climate Coastal Programs

Ben Coverdale DNREC Nonpoint Source Program

Taryn Davidson Delaware Department of Agriculture Forestry Program

Kevin Donnelly New Castle Conservation District

Sara Esposito Delaware Department of Transportation

Meghan Noe-Fellows Center for the Inland Bays

Marcia Fox Delaware Wild Lands

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Virginia Grimm Kent Conservation District

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Jennifer Nelson Delaware Association of Conservation Districts
Holly Porter Delmarva Chicken Association
Stephen Pryce-Lea Delaware Botanic Gardens
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Jim Sullivan DNREC Nonpoint Source Program
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Stephanie Walt Kent Conservation District
Liz Warren Delmarva Chicken Association
Jessica Watson Sussex Conservation District Stormwater Program
Brigham Whitman Delaware Wild Lands
Lisa Wool Nanticoke Watershed Alliance
Kerry Wilson Delaware Nature Society
Steve Williams DNREC Division of Watershed Stewardship
Sara Wozniak DNREC Watershed Assessment and Management

Appendices

Appendix A – 2025 Milestones

Type: Short Term

Timeline: FY19 to FY24

Milestone: Increase number of outreach and education interactions by 10% over FY 2018 baseline (approximately 8,500 and 3,500 interactions, respectively).

Comments/Status Updates: 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 2024, the NPS Program had a total of approximately 5,337 interactions (4,270 in-person and 1,067 virtual). In 2025, the NPS Program had a total of 11,673 interactions (9,970 in-person and 1,703 virtual). Since 2019, there have been a total of 55,064 outreach and education interactions, an average of 7,866 total interactions per FY.

Type: Short Term

Timeline: FY19 to FY24

Milestone: 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.

Comments/Status Updates: Due to formatting and collection differences between the Grant Reporting and Tracking System (GRTS) 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 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. As of 2025, the BMP Tracker Tool is being utilized to account for statewide BMP data as partner organizations submit BMP progress to the Chesapeake Bay Implementation Program (ChIP). The limiting factor is there can not be certainty that all statewide BMP data is being reported by partners since it is a voluntary process and technically only the BMPs the water quality grants help to fund can be required from those organizations.

Based on load reductions calculated for all priority watersheds with the DNREC load reduction tool and the DTAP Tool, the following observations were leveraged and/or noted when comparing to 2024 estimated load reduction data across priority watersheds. Nutrient load reductions in non-Chesapeake Bay watersheds did not increase by at least 5% in 2025 as compared to 2024. Estimated Load reductions decreased by 3.37% in 2025 as compared to 2024. Nutrient load reductions in Chesapeake Bay watersheds did not increase by at least 20% in 2025 as compared to 2024. Estimated load reductions increased by 4.5% in 2025 as compared to 2024.

Since DNREC transitioned from the existing load reduction modeling tool to the DTAP tool, it was expected that calculated load reduction values/efficiencies may differ between the two for present vs. historical data. The 2024 load reduction calculations fully utilized the DTAP model. Thus, it should be noted that load reduction calculations compared between 2024 and 2023 data were derived using two different modeling tools. The DTAP is utilizing the most current nutrient reduction efficiencies when calculating estimated load reductions. Comparisons between 2025 and 2024 BMP data were modeled with the DTAP.

Type: Short Term

Timeline: FY19 to FY24

Milestone: 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.

Comments/Status Updates: The currently accepted 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 and Management Section for all priority watersheds within the NPS Program. Revaluation of baseline loads is at the discretion of WAMS. The WAMS oversees water quality monitoring stations throughout the State and the associated water quality monitoring data can be accessed at cema.udel.edu/applications/waterquality/.

Type: Short Term

Timeline: FY19 to FY24

Milestone: 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.

Comments/Status Updates: Delaware maintains a General Assessment Monitoring Network (GAMN) of approximately 137 stations. Twenty-two of the stations are monitored monthly and the remaining stations are monitored either six or 12 times per year on a rotating cycle. 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 uploaded into EPA's Water Quality Exchange (WQX) and publicly accessible through the National Water Quality Monitoring Council's Water Quality Portal (WQP) waterqualitydata.us/ 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 cema.udel.edu/applications/waterquality/.

Trend Analysis for Nitrogen and Phosphorus at 11 Freshwater Stream Sites:

The following information was utilized from the Integrated 303(d) and 305(b) Report, where nutrient trend analyses were conducted at selected monitoring sites throughout the state. For total nitrogen concentrations, trends have been detected from nine out of the 11 sites; an upward trend has been detected from three sites in Nanticoke River, Marshyhope Creek and Deep Creek Branch, and a downward trend from six 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 eight out of the 11 sites; an upward trend has been detected from three sites in Beaverdam Ditch, Silver Lake of St. Jones River and Deep Creek Branch, and a downward trend from five sites in Nanticoke River, Red Clay Creek, White Clay Creek, Brandywine River and Christina River.

Type: Short Term

Timeline: FY19 to FY24

Milestone: Remove an identified impairment from a Land River Segment currently included on Delaware's list of impaired waterways.

Comments/Status Updates: A 4.82 mile segment of the Upper Broadkill River watershed (Attains ID DE060-003) was removed from Delaware's list of impaired waters for phosphorous according to the state's 303(d), 305(b) integrated report. This success story was submitted to the by EPA in 2025 for review. Although the milestone goal is to remove one segment within the established FY timeframe, the NPS Program is ambitiously attempting to identify a water body delisting each year.

Type: Long Term

Timeline: FY19 to FY24

Milestone: Show significant progress towards completion of implementation activities for all Delaware's priority watersheds with approved nine element watershed plans.

Comments/Status Updates: 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 2023, an update to the Little Assawoman Bay watershed plan was completed through an environmental consultant. In late 2023 and continuing through 2025, the NPS Program is working with a consultant to update three more existing watershed plans. The Christina Basin, St. Jones River and Appoquinimink River watershed plans are scheduled to be updated. A draft Christina Basin watershed plan update was developed in late 2024 and officially submitted to EPA for review in April 2025. A draft Appoquinimink River watershed plan was also submitted to EPA in 2025 for review. Cover crop implementation acres continue to be a strong point for Delaware priority watersheds as increased financial investments have occurred to encourage more adoption with support from the Delaware State Legislature.

Type: Long Term

Timeline: FY19 to FY24

Milestone: Demonstrate water quality improvement in 20% or more of the priority and monitored priority watersheds as reported in the NPS Annual Report.

Comments/Status Updates: Long term nitrogen and phosphorous data has been collected and analyzed by DNREC WAMS for 11 freshwater stream sites. As of the most current 2024 Integrated Report, not all priority watersheds funded by the CWA 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. One-third (three out of nine) 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.

Type: Long Term

Timeline: Annually through FY30

Milestone: Show annual increases in funding and quantities of BMPs implemented in priority watersheds.

Comments/Status Updates: In 2025, the State FY26 budget appropriated approximately \$6.4 million in state general funds toward cover crop implementation efforts. This appropriation was a \$1.2M increase from the FY25 budget. 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. The CWA Section 319 grant has historically provided funding toward cover crops to the County Conservation Districts. However, in 2025, uncertain FY26 CWA Section 319 grant funding may result in lower financial investments for cover crop implementation from the grant until stability returns.

In 2023, the Conservation Programs Section fully implemented a State Riparian Forest Buffer Program in the Chesapeake Bay watershed as well as a Community Conservation Assistance Program (DECAP) which provides funding to implement homeowner urban BMPs. In 2024, the Riparian Forest Buffer Program was expanded to allow the implementation of grass buffers in agricultural and urban settings. As of 2025, the Riparian Buffer Program has utilized its dedicated funding allocation for project implementation.

In 2024 and 2025, the Conservation Programs Section (CPS) secured \$1.2M in non-federal funding that can be utilized for water quality BMP implementation projects. Future funding appropriations are highly variable and subject to the overall economic climate of the State.

Type: Long Term

Timeline: Annually through FY30

Milestone: Remove one water body currently listed for nutrient pollutants from the 303(d) List.

Comments/Status Updates: According to the most current 2024 Integrated Report, there were multiple water segments delisted throughout the state for nutrients (nitrogen and/or phosphorous). This included 24 water segments delisted for phosphorous, two for nitrogen and 10 for both nitrogen and phosphorous. Thirty-six of these water segments were in priority watersheds, including one in the Appoquinimink River, six in the Broadkill River, one in the Choptank River, 16 in the Inland Bays, eight in the Nanticoke River, one in the St. Jones River and three in the Christina Basin watersheds. 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 1,37 stations. Twenty-two of the stations are monitored monthly and the remaining stations are monitored either six or 12 times per year on a rotating cycle. 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 publicly accessible through the National Water Quality Monitoring Council's Water Quality Portal (WQP) (waterqualitydata.us/) 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 (cema.udel.edu/applications/waterquality/).

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 (cema.udel.edu/applications/waterquality/).

The DNREC Watershed Assessment and Management Section develops and publishes water quality trend data as part of their Integrated 303(d) and 305(b) Report every even numbered year. Longer term trend analyses constitute numerous years' worth of water quality monitoring data. The NPS Program utilizes the WAMS trend data that is published in the Integrated Reports. Although trend analyses are not necessarily published every Integrated Report cycle, interested parties can still access current water quality monitoring station data through the resources detailed above.

Trends Analysis for Surface Waters:

As an integral part of tracking watershed progress toward achieving TMDL targets, trend analysis of nutrient condition (concentration and load) has been performed at various locations throughout the State. The estimation of the direction and magnitude of trends in TN and TP concentrations as well as the associated certainties are presented.

Eleven C1 monitoring sites throughout the state provided long-term nitrogen and phosphorus data to be analyzed for trends using the Weighted Regressions on Time, Discharge and Season (WRTDS) method. For total nitrogen concentrations, trends have been detected from nine out of the 11 sites; an upward trend has been detected from three sites in Nanticoke River, Marshyhope Creek and Deep Creek Branch, and a downward trend from six 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 eight out of the 11 sites; an upward trend has been detected from three sites in Beaverdam Ditch, Silver Lake of St. Jones River, Deep Creek Branch, and a downward trend from five sites in Nanticoke River, Red Clay Creek, White Clay Creek, Brandywine River and Christina River.

The Generalized Additive Model (GAM) was used to analyze long term (1998–2019)¹ TN and TP trends in the 14 tidal stations of Inland Bays. TN concentrations were decreasing in most of the stations except in station 306181 at Swan Creek. Decreasing trends of TN and TP in tidal stations of the Inland Bays can be attributed to full implementation of the requirements of the Inland Bays TMDLs for point sources and its partial implementation for the nonpoint sources. Even though TN concentration were decreasing, four of the stations' concentration were higher than the target value of 1 mg/L in Inland Bays, whereas some of the stations' recent years concentrations were higher than target value.

The trend of TP concentration followed the flow pattern. TP concentrations in most of the stations were higher during peak flow, thus were cyclic in nature following flow events throughout the twenty years. Similar to TN concentrations, TP concentrations in recent years in some of the stations were higher than the target value of 0.1 mg/L. Linear regression modeling techniques are more frequently used to identify long term trends in the water quality data, which sometime miss the temporal cycling trend or temporal changes in the data. GAM analysis of tidal stations data with the inclusion of smooth functions allow the model shapes from linear to nonlinear, including patterns that changes direction over time, thus helped to identify changes of concentration over time in the Inland Bays.

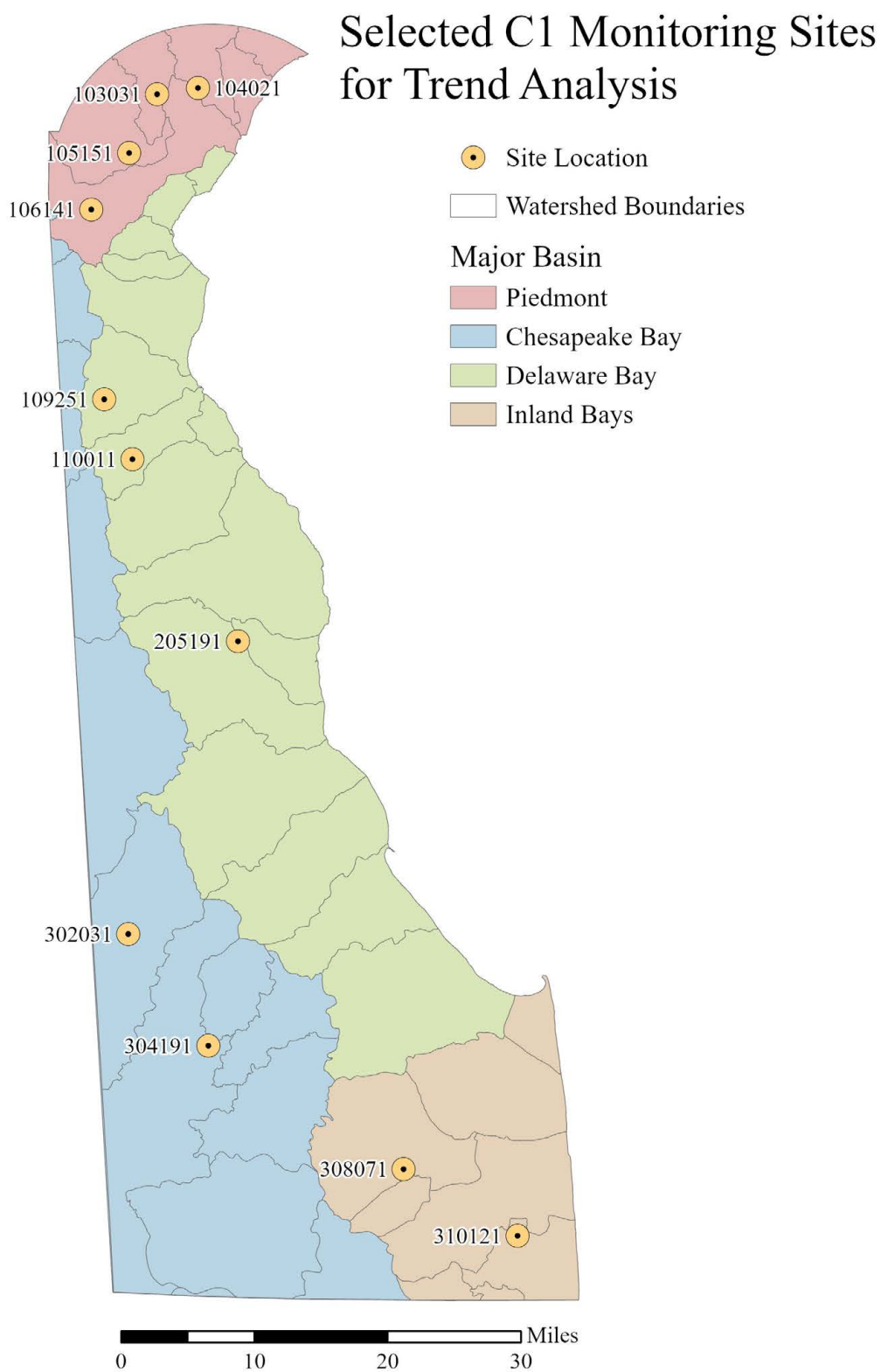
¹ The DNREC WAMS has discretion when longer term trend analyses are conducted based on staff and financial resources. Individual water quality monitoring station data can be accessed using the Delaware Water Quality Portal (cema.udel.edu/applications/waterquality/).

Long Term Changes in Water Quality Parameters:

The abstract from Paudel and Brown's 2022 paper "Long Term (1998–2019) Changes in Water Quality Parameters as a Function of Freshwater Inflow in a River–Bay Continuum" highlights a study conducted to understand long-term changes in water quality as a function of freshwater inflow in Inland Bays. For the full manuscript and analysis follow this URL: <https://doi.org/10.3390/hydrology9080138>.

"Freshwater inflow is important in transporting nutrients to a bay. We hypothesized that freshwater inflow was transporting dissolved nitrogen and phosphorus to the Delaware's Inland Bays. We analyzed long term (1998-2019) water quality data collected from Indian River, Indian River Bay, Lewes-Rehoboth Canal, Little Assawoman Bay and Rehoboth Bay watersheds. Freshwater inflow altered nitrite+nitrate (N-NO₂_3) concentrations in all but Lewes-Rehoboth Canal watershed, whereas phosphate (P-PO₄) concentrations in all watersheds were altered by freshwater inflow and metabolic processes in the water. The average N-NO₂_3 and P-PO₄ were higher than the standard (0.14 and 0.01 mg/L for N-NO₂_3+NH₄-N and P-PO₄, respectively) for growing seasons (March-October) i.e., 0.83±0.14 & 0.09 mg/L in Indian River; 0.79±0.10 & 0.06 mg/L in Indian River Bay; 0.21±0.15 & 0.09 mg/L in Lewes-Rehoboth Canal; 0.49±0.10 & 0.11 mg/L in Little Assawoman Bay; 1.0±0.08 & 0.06 mg/L in Rehoboth Bay. Average total suspended solids in the Indian River (33 mg/L), Indian River Bay (22 mg/L) and Lewes-Rehoboth Canal (31 mg/L) were higher than the standard concentrations, i.e., 20 mg/L for the Inland Bays. With the evidence of higher dissolved nutrients and low dissolved oxygen concentrations, the need for nutrient load reduction and water quality monitoring are paramount for the sustainable management of the Inland Bays."

Table 1: Selected C1 Monitoring Sites and Their Co-located USGS Stream Gage Sites



Map and most recent trend analyses info below are referenced from 2020 Delaware 303(d) and 305(b) Integrated Report.

Table 2: Trend Analysis Results for TN and TP Concentrations at C1 Monitoring Sites				
C1 Site ID	Location Description	USGS Stream Gage ID	USGS Stream Gage Name	Drainage Area (mi ²)
103031	Red Clay at Lancaster Pike (Rt. 48)	1480000	Red Clay Creek at Wooddale,	47.0
104021	Brandywine Creek at New Bridge Rd. (Rd. 279)	1481500	Brandywine Creek at Wilmington,	314.0
105151	White Clay Creek at Delaware Park Blvd.	1479000	White Clay Creek near Newark,	89.1
106141	Christina River at Sunset Lake Rd. (Rt. 72)	1478000	Christina River at Coochs Bridge,	20.5
109251	Appoquinimink River trib., Deep Creek Br. at Summit Bridget Rd. (Rt.71)	1483155	Silver Lake Tributary at Middletown,	1.7
110011	Blackbird Creek at Blackbird Station Rd. (Rd. 463)	1483200	Blackbird Creek at Blackbird,	4.1
205191	St. Jones River, Silver Lake at Spillway (Dover City Park)	1483700	St. Jones River at Dover,	31.9
302034	Marshyhope Creek at Fishers Bridge (Rd. 308)	1488500	Marshyhope Creek Near Adamsville,	46.8
304191	Nanticoke River, at Rifle Range Rd (Rt. 545)	1487000	Nanticoke River Near Bridgeville,	75.4
308071	Indian River, Millsboro Pond outlet at John Williams Hwy. (Rt. 24)	1484525	Millsboro Pond Outlet at Millsboro,	61.7
310121	Little Assawoman Bay, Beaver Dam Ditch at Beaver Dam Rd. (Rd. 368)	1484695	Beaverdam Ditch Near Millville,	2.2

Table 3: Trend Analysis Results for TN and TP Concentrations at C1 Monitoring Sites

C1 Site ID	Location Description	Period (Water Year)	Estimated TN Change (mg/l)	Estimated TP Change (mg/l)	TN Trend*	TP Trend*
103031	Red Clay at Lancaster Pike (Rt. 48)	1999 - 2019	-0.07	-0.177		
104021	Brandywine Creek at New Bridge Rd. (Rd. 279)	1999 - 2019	-0.19	-0.070		
105151	White Clay Creek at Delaware Park Blvd.	1999 - 2019	-0.63	-0.142		
106141	Christina River at Sunset Lake Rd. (Rt. 72)	1999 - 2019	-0.83	-0.026		
109251	Appoquinimink River trib., Deep Creek Br. at Summit Bridge Rd. (Rt.71)	2008 - 2019	0.45	0.005		
110011	Blackbird Creek at Blackbird Station Rd. (Rd. 463)	2002 - 2019	-0.67	-0.003		
205191	St. Jones River, Silver Lake at Spillway (Dover City Park)	1999 - 2019	0.00	0.012		
302034	Marshyhope Creek at Fishers Bridge (Rd. 308)	1998 - 2019	2.02	0.006		
304191	Nanticoke River, at Rifle Range Rd. (Rt. 545)	1998 - 2019	1.67	-0.029		
308071	Indian River, Millsboro Pond outlet at John Williams Hwy. (Rt. 24)	1998 - 2019	-0.46	0.002		
310121	Little Assawoman Bay, Beaver Dam Ditch at Beaver Dam Rd. (Rd. 368)	1999 - 2019	-2.85	0.059		

* Dark green triangle for highly/very likely downward trend Light green triangle for likely downward trend
 Orange triangle for highly/very likely upward trend Yellow triangle for likely upward trend Dark blue line for no trend

Figure 2: TN Trend Directions at the Selected Monitoring Site

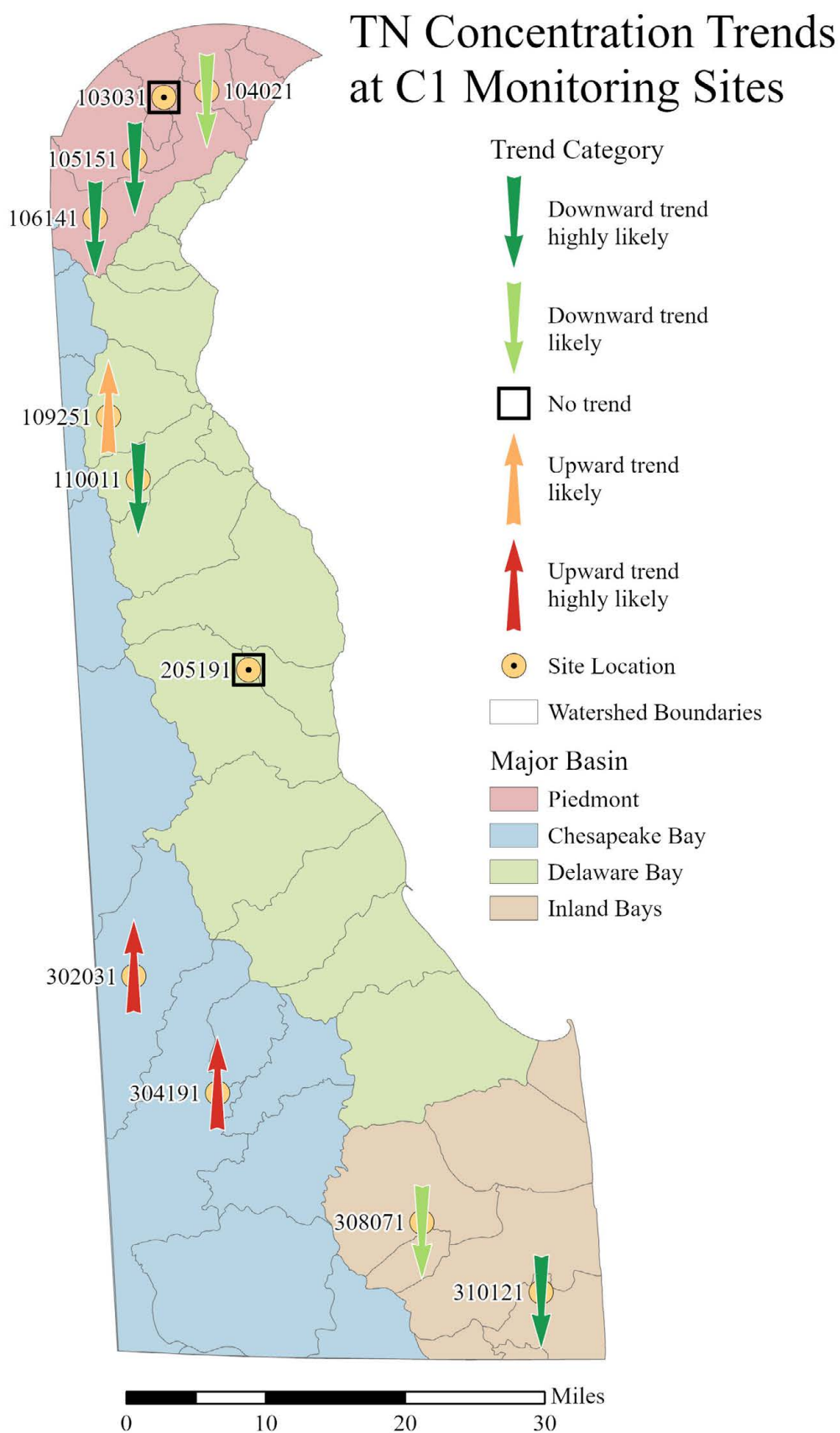
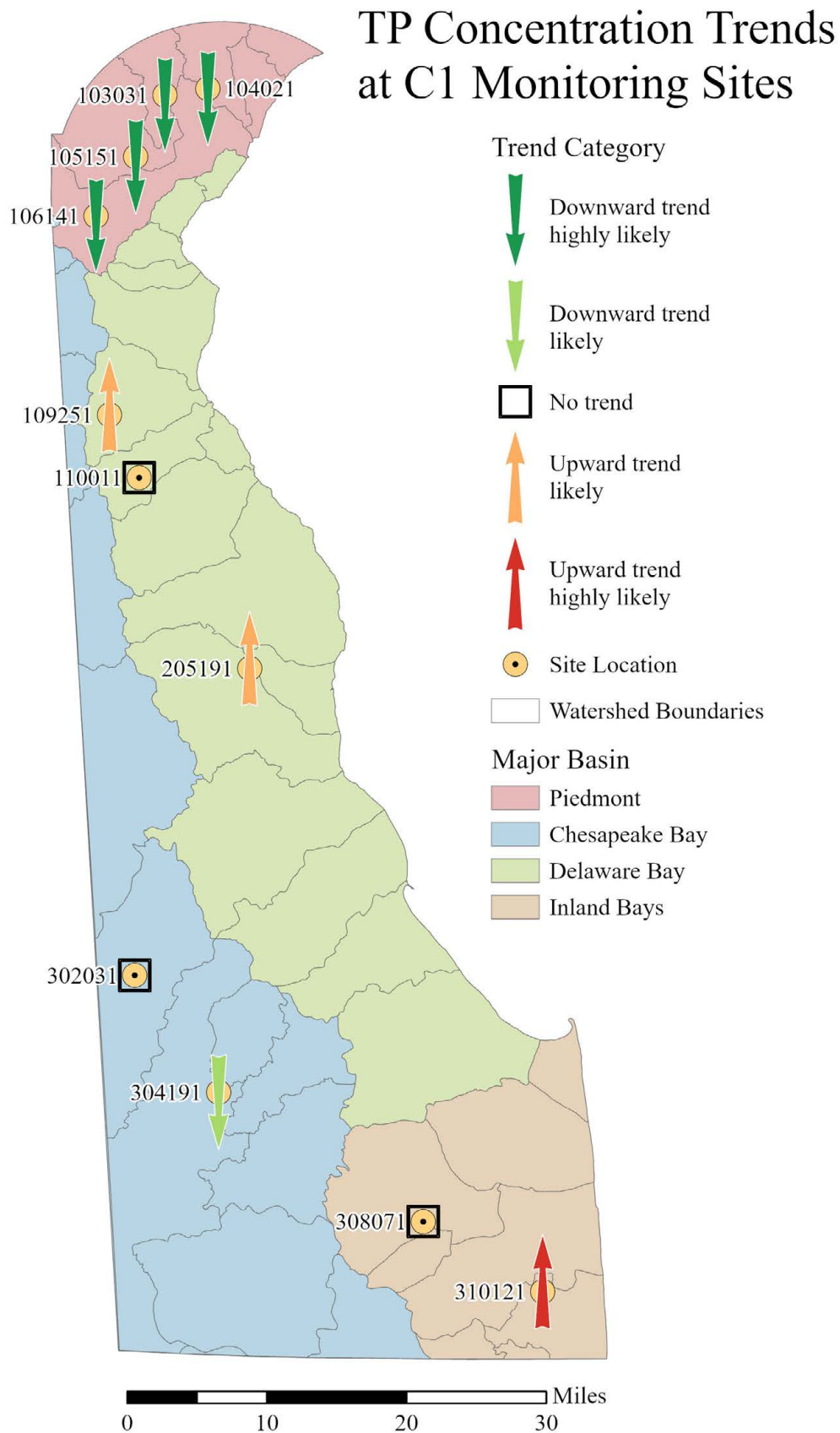


Figure 3: TP Trend Directions at the Selected Monitoring Sites



Appendix C – Education and Outreach Events

The DNREC Nonpoint Source Program has hosted and participated in a series of events, workshops and presentations designed to promote and support improvements to the quality of Delaware's waterways.

Delaware Agriculture Week (Jan. 13-16, 2025)

The Conservation Programs Section participated in the Delaware Agriculture Week event, hosted by the University of Delaware in Harrington. During the event, industry experts led sessions exploring the latest and most valuable innovations in agronomy, fruits and vegetables, woodland management, soil health, animal science and more. With exhibitors and vendors in attendance, the event provides opportunities to network with local and national organizations, agricultural businesses and allied partners. Section staff attended with an exhibit providing information on practices that reduce nonpoint source pollution entering waterways.



Youth Environmental Summit (Feb. 28, 2025)

The Nonpoint Source Program participated in the Youth Environmental Summit (YES!) at the Chase Center in Wilmington. YES! is a statewide summit for all Delaware high school students with an interest in protecting the earth. Program staff attended with an exhibit focused on reducing nutrient and sediment pollution by adopting home-based practices, such as planting native trees, creating pollinator habitat, installing rain barrels and more.



Beach Grass Planting (March 15, 2025)

The Nonpoint Source Program participated in DNREC's annual Beach Grass Planting at North Indian River Inlet. Every spring since 1990, except when pandemic conditions prevented it, dedicated volunteers have stabilized Delaware's sand dunes by planting more than 5 million stems of Cape American beach grass along ocean and bay beaches.



Concord Pond Cleanup (April 5, 2025)

The Nonpoint Source Program participated in the Concord Pond Cleanup in Seaford, where volunteers removed over half a ton of trash around the pond and Deep Creek. The annual event, in celebration of Earth Month, is hosted by the Division of Watershed Stewardship and the Nanticoke Watershed Alliance.



Delaware Envirothon (April 10, 2025)

The Nonpoint Source Program participated in the Delaware Envirothon at the Blackbird Creek Reserve. The Delaware Envirothon is a problem-solving natural resource education program for high school students. The event provides students with an integrated approach to exploring six natural resource categories and it tests their creativity, analytical thinking and team building skills in a competitive format. The Envirothon is sponsored, in part, by DNREC.



Christina River Watershed Cleanup (April 12, 2025)

The Nonpoint Source Program volunteered at the Christina River Watershed Cleanup in New Castle County. The Christina River Watershed Cleanup's mission is to remove man-made debris from within the watershed while raising public awareness for pollution prevention. Since the Cleanup began in 1992, more than 360 tons of tires, appliances, household items and other trash have been cleared from within the watershed.



Make a Splash (April 15, 2025)

The Conservation Programs Section participated in the Make a Splash event in Kitts Hummock at the St. Jones Reserve. The annual event invites elementary school students to learn about Delaware's water resources and estuaries. The section provided an exhibit presenting information on nonpoint source pollution and led a hands-on activity which introduced students to actions that can be taken at home to help improve the health of waterways.



Trap Pond Nature Festival (April 19, 2025)

The Nonpoint Source Program participated in the Trap Pond Nature Festival in Laurel. The program provided an exhibit focused on practices that can be used to help reduce nutrient and sediment pollution entering local waterways. All proceeds from the event are used for improvements to Trap Pond State Park.



Dover Stormwater Day (April 24, 2025)

The Conservation Programs Section participated in the Dover Stormwater Day event at Silver Lake Park in Dover. The section provided an exhibit highlighting practices that reduce nutrient and sediment pollution entering local waterways through stormwater runoff.



Water Family Fest (May 3, 2025)

The Nonpoint Source Program participated in the Water Family Fest in Ocean View, hosted by the Division of Watershed Stewardship and the Delaware Center for the Inland Bays. The exhibit focused on techniques used to reduce nutrient and sediment pollution entering local waterways and included a hands-on "mini rain garden" planting activity.



Plant Sale and Pollinator Workshop (May 10, 2025)

The Nonpoint Source Program participated in a Native Plant Sale and Pollinator Workshop hosted by the Nanticoke Watershed Alliance at the Seaford Public Library. The exhibit consisted of information on conservation programs and home-based practices that improve water quality.



World Environment Day (June 5, 2025)

The Conservation Programs Section participated in the Delaware River and Bay Authority's World Environment Day event in New Castle. The exhibit consisted of information on conservation programs, nonpoint source pollution and actions that can be taken to help reduce nutrient and sediment pollution entering waterways.



Home Stormwater Workshop (June 10, 2025)

The Nonpoint Source Program and University of Delaware Cooperative Extension hosted a Home Stormwater Workshop at the UD Paradee Center in Dover. The workshop included presentations on techniques used for managing excess stormwater, as well as grants and available funding through DNREC's Conservation Programs Section. Twenty 55-gallon rain barrels were distributed during the event.



Delaware State Fair (July 17-26, 2025)

The Division of Watershed Stewardship participated in the annual Delaware State Fair in Harrington. The division's exhibit consisted of information on conservation programs, nonpoint source pollution, freshwater mussels, tax ditches, sediment and stormwater training, and more. Visitors to the exhibit saw a demonstration on freshwater mussel's filtering capabilities and were able to sign up to receive information and assistance related to practices that improve water quality.



Rehoboth Art League Native Plant Sale (Sept. 13, 2025)

The Nonpoint Source Program provided an exhibit for the Rehoboth Art League Native Plant Sale which offered opportunities to purchase native plants grown by local nurseries. Attendees spent the day learning about the benefits of planting native species and the beauty of garden design. In addition to the plant sale, the day featured a series of workshops and tours offering more information on gardening and native species.



Coastal Cleanup at Sorooptimist Park (Sept. 13, 2025)

The Nonpoint Source Program staffed an exhibit and participated in a cleanup at Sorooptimist Park in Seaford, hosted by the Nanticoke Watershed Alliance in coordination with DNREC's annual Coastal Cleanup event. Volunteers removed trash from the park, banks of Williams Pond, and surrounding area. The NPS exhibit provided participants with information on actions that will help improve local water quality.



Downtown Seaford Fall Harvest Festival (Sept. 27, 2025)

On Sept. 27, the Conservation Programs Section (CPS) staffed an exhibit at the Downtown Seaford Fall Festival. The event, organized by the Downtown Seaford Association, featured live music, food trucks, local vendors and family-friendly activities. The CPS exhibit consisted of information on actions that reduce nonpoint source pollution, improving the health of local watersheds.



DNREC DeCAP Rain Barrel Workshop (Oct. 2, 2025)

The Nonpoint Source Program staffed an exhibit at a rain barrel workshop hosted by the DNREC Delaware Community Conservation Assistance Program and Nanticoke Watershed Alliance, located at the Bridgeville Public Library. Attendees learned about the benefits of rain barrels and their use in slowing down stormwater runoff while improving local water quality. Participants received a free rain barrel to install at home and the NPS exhibit offered additional resources on actions that reduce nutrient and sediment pollution entering waterways.



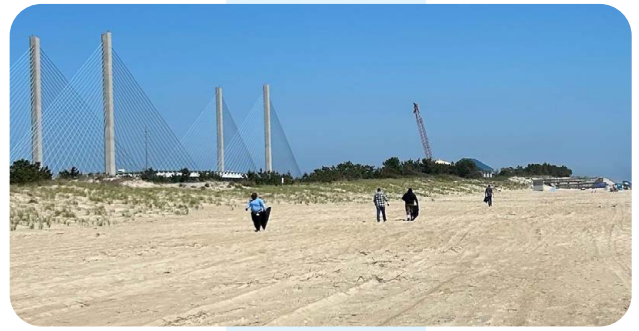
Coast Day (Oct. 5, 2025)

The Conservation Programs Section staffed an exhibit at the University of Delaware Coast Day event in Lewes. Coast Day highlights the many ways we're working together to understand our rich environmental resources and better serve local communities through marine, coastal, and environmental education and outreach. The CPS exhibit consisted of information on actions that improve the health of Delaware's waterways along with a hands-on activity, giving attendees an opportunity to learn about stormwater runoff by creating mini rain gardens to take home and plant in the spring.



Fall Beach Cleanup (Oct. 7, 2025)

The Nonpoint Source Program participated in the DNREC Conservation Programs Section Fall Beach Cleanup at Indian River Inlet in Bethany. DNREC's Adopt-A-Beach program is a partnership between the Department and Delaware volunteers, working in tandem to protect and enhance Delaware's beaches.



Apple Scrapple Festival (Oct. 11, 2025)

The Conservation Programs Section staffed an exhibit at the annual Apple Scrapple event in Bridgeville. 2025 marked the 33rd holding of the festival which promotes the town and the agriculture industry that is so prevalent in western Sussex County. The CPS exhibit consisted of information on actions that improve the health of local waterways.



Blackbird Creek Fall Festival (Oct. 18, 2025)

The Nonpoint Source Program staffed an exhibit at the annual Blackbird Creek Fall Festival, which fosters stewardship of the Delaware Bayshore by celebrating the richness of estuaries and Delaware's cultural traditions at the Delaware National Estuarine Research Reserve. The NPS exhibit consisted of information on actions that improve local water quality and included a hands-on activity giving participants an opportunity to learn about the benefits of rain gardens and plant a mini version to take home.



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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Cynthia Zollman

Hibiscus at Trussum Pond
in Broad Creek watershed.

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