DELAWARE NONPOINT SOURCE PROGRAM
2014 ANNUAL REPORT

DELAWARE DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL

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The Delaware Nonpoint Source Program administers a competitive grant made possible through Section 319 of the Clean Water Act. 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 Delaware NPS Program is committed to addressing the issue through educational programs, publications, and partnerships with other organizations working to reduce NPS pollution in Delaware.

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Preface

The 2014 Delaware NPS Report is developed by the Delaware Department of Natural Resources and Environmental Control (DNREC) to meet a grant condition that appears in each annual 319(h) Grant award to the State of Delaware from the US Environmental Protection Agency. This programmatic condition in the award states:

The report shall contain the following:

- A brief summary of progress in meeting the schedule of milestones in the approved Management Program, and,
- Reductions in nonpoint source pollutant loading and improvements in water quality that has resulted from implementation of the Management Program.
- 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 percent achieved, supplemented by a short narrative that should give the reader a clear understanding of the actions being taken and the outputs and outcomes which are occurring from the actions. If monitoring was completed, a summary of that information should also be included. For example, if 1000 feet of streambank stabilization was completed, then how does that compare to the needs identified in the watershed based plan i.e. what percent of streambank stabilization was completed compared to the overall needs as identified by the plan. Similar comparisons should also be provided for each significant pollutant load reduction

What is Nonpoint Source Pollution?

Nonpoint source (NPS) pollution is defined as polluted stormwater runoff associated with rainfall, snowmelt or irrigation water moving over and through the ground. As this water moves, it picks up and carries pollutants with it, such as sediments, nutrients, toxics, and pathogens. These pollutants eventually reach lakes, rivers, wetlands, coastal waters and ground waters of Delaware

NPS pollution is associated with a variety of activities on the land including farming, logging, urban/construction runoff, onsite sewage systems, streambank degradation, shore erosion and others. For example, stormwater flowing off the land carries the nutrients nitrogen and phosphorus into local streams, rivers and ponds. Under natural conditions, this is beneficial up to a point. However, if excessive nutrients enter these water bodies they 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 Department of Natural Resources and Environmental Control (DNREC) – NPS Program to meet Clean Water Act, Section 319(h) Grant conditions and to demonstrate consistency with three essential elements:

1. EPA Strategic Plan Goal 2 – Protecting America's Waters
2. EPA Strategic Objective 2.2 – Protect and Restore Watersheds and Aquatic Ecosystems
3. Work plan commitments plus time frame (overall progress is reported in this document)

I. The Delaware NPS Program

As part of the Delaware Department of Natural Resources and Environmental Control, the Delaware NPS Program is committed to addressing the issue of nonpoint sources pollution as it affects Delaware's numerous waterbodies. Efforts will include grant funding, education, outreach, and partnerships with other organizations working together to reduce nonpoint source pollution in Delaware.

II. NPS Program Funding

Nonpoint Source (NPS) pollution constitutes the nation's largest source of water quality problems. Approximately 40 percent 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 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 August 4, 1988, Delaware's original (NPS) Program was approved by the Environmental Protection Agency (EPA) making it one of the first programs in the nation to comply with Section 319 of the CWA. Using CWA Section 319 funding, Delaware's NPS Program administers a competitive grant program. 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 best management practices (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 requested annually, reviewed, evaluated and prioritized, and those which are determined to meet specified requirements are eligible for funding. At least 40 percent of the overall project cost must be represented by non-federal matching funds.

III. Delaware NPS Issues

More than 90 percent of Delaware's waterways are considered impaired. The state's list of impaired waters, filed with the EPA, includes 377 bodies of water that suffer from 11 different impairments, the most common of which 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 become an even harder problem to solve. Due to the rate of groundwater travel through the system, many NPS pollutants entering the systems up to 30 years ago are just now entering surface water bodies today. 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 nonpoint sources of pollution is achieved through the incorporation or installation of specific best management practices (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 Clean Water Act. While this federal financial support has proven successful in complementing Delaware's NPS efforts, the NPS Program is currently seeking additional finances to expand our 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 agricultural State Revolving Fund Program, support for developing Pollution Control Strategies, and watershed plan development and/or coordination.

IV. Vision and Mission

The Department of Natural Resources and Environmental Control envisions a Delaware that offers a healthy environment where people include a commitment to the protection, enhancement and enjoyment of the environment in their daily lives; 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.

It's the mission of the Delaware Department of Natural Resources and Environmental Control 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 Nonpoint Source Management Program is a dynamic and open-ended program intended to facilitate and promote statewide efforts to manage nonpoint source pollution. The following priorities will guide this program:

1. The NPS Program will support the identification and quantification of those problems that are caused specifically by nonpoint source pollution through assessment updates.
2. The NPS Program will be implemented and updated to realistically reduce nonpoint source pollution in a cost-effective manner.
3. The NPS Program will address nonpoint source 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 a policy to realistically improve water quality in areas that do not meet these standards.
5. The NPS Program will continue to use the 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.
6. The NPS Program will support the development and implementation of Watershed Restoration Action Strategies (WRAS)/Pollution Control Strategies (PCS) for watersheds of identified impaired or threatened waters in accordance with the Unified Watershed Assessment List.

In Delaware, the lead agency for the development and implementation of the Nonpoint Source (NPS) 319 Program is the Department of Natural Resources and Environmental Control (DNREC), Division of Watershed Stewardship.

V. Executive Summary

This report documents the activities and highlights of the State of Delaware, Nonpoint Source (NPS) Program during the 2014 calendar year. The NPS Program administers a competitive grant made possible through Section 319 of the Clean Water Act. The grant provides funding for projects designed to reduce nonpoint source NPS pollution in Delaware. Reduction of NPS pollution is most often achieved through incorporation of specific best management practices (BMPs) into project workplans. Proposals are reviewed and evaluated, and those which are determined to meet specified requirements are eligible for funding. At least 40 percent of the overall project cost of all projects must be represented by non-federal matching funds.

In calendar year 2014, there have been notable successes and accomplishments:

- Projects funded through the Clean Water Act, section 319(h) Grant that were completed during calendar year reported implementing best management practices resulting in the following pollutant load reductions: nitrogen 640,272 pounds/year and phosphorus 20,945 pounds/year.

- In October 2014, the *Delaware NPS Management Plan* was submitted and approved by EPA. The *Delaware NPS Management Plan* is a statewide look at protecting Delaware's natural resources from nonpoint pollution. It is a collaborative effort of a wide range of entities. This plan reflects current efforts and creative, practical new ideas from all our partners and interested citizens. The recommendations focus on how we can improve existing efforts by stronger implementation, increased funding, or doing something new.

- Four watershed plans in Delaware, the *Upper Chesapeake Bay Watershed Management Plan*, the *Chester/Choptank Watershed Management Plan*, the *Pocomoke/Wicomico Watershed Management Plan*, the *Nanticoke Watershed Management Plan*, and the *Broadkill Watershed Management Plan*, were completed, reviewed and approved by EPA in 2014. To ensure that projects funded with CWA Section 319 dollars make progress towards restoring or protecting waters impaired by nonpoint source pollution, EPA requires watershed-based plans that are developed or implemented with Section 319 funds to address 303(d)-listed waters must include at least the elements listed below. Where the watershed-based plan is designed to implement a TMDL, these elements will help provide reasonable assurance that the nonpoint source load allocations identified in the NPS TMDL will be achieved.

Project Highlights:

Projects highlighted in the 2014 NPS Annual Report include the following:

☑ Sussex County Conservation District – Conservation Planners

Sussex County Conservation District Planners work with area farmers to encourage the installation of agriculture best management practices and partner with the USDA's Natural Resources Conservation Service in developing conservation plans, nutrient management plans and Environmental Quality Incentive Program (EQIP) contracts. Efforts are focused in priority watersheds that have approved Watershed Plans. In 2014, the SCD expended over $900,000 in conservation cost-share funds. These included payments for 17,555 acres of cover crops, 3,507 acres of nutrient management planning, and 155 acres of various CREP practices. The efforts of the SCD Planners are represented on a watershed scale in Section VII below.

☑ Kent County Conservation District – Conservation Planners

Kent County Conservation District Planners work with Kent County Farmers to provide nutrient management planning, conservation planning and encourage the installation and/or adoption of

agricultural best management practices. In 2014, the State of Delaware General Assembly provided $400,000 in cost share funds, which were utilized by different cooperating landowners. Projects implemented emphasized water quality, water management, and erosion/sediment control. These included payments for 12,825 acres of cover crops, 1,342 acres of nutrient management planning, and 49 acres of various CREP practices. The efforts of the KCD Planners are represented on a watershed scale in Section VII below.

☑ Nutrient Relocation Program

Statewide, the Nutrient Relocation Program accounted for the transportation of over 50,000 tons of poultry manure out of Delaware's priority watersheds in 2014. Of these total, the NPS Program supported $40,717 (approximately 3,531 tons) through CWA Section 319 funding. If that tonnage had been applied to the source farm rather than relocated**,** significant nitrogen and phosphorus could have potentially entered Delaware's surface waters. On a watershed scale, the tons of manure for each priority watershed are represented in Section VII below.

☑ Wetland and Stream Restoration Projects

In 2014, Wetland and Stream Restoration projects initiated and/or completed include the following:

- SGC Woodlands (Phase 2) – channel restoration with two water control structures
- Horsepen Arm (Vogel) – channel restoration with a water control structure
- Horsepen Arm (Strachar) – channel restoration with a water control structure
- Hrupsa - channel restoration with a water control structure
- Heron Ditch – channel restoration with three water control structure
- Haines V Ditch – wetland and channel restoration with two water control structures
- Hopeland/Midland – wetland restoration

☑ Stream & Corridor Enhancement Program

During 2014, approximately one half of the proposed 3,675 feet of stream restoration was completed along the upper Christina River located west of downtown Newark in the Timber Creek, West Branch and Christianstead subdivisions. Severe bank erosion is occurring along numerous properties adjacent to the stream channel. The banks are being undercut, causing mature trees to fall into the stream channel. Tremendous sediment loads are being released into the waterway with every storm event, impairing habitat and creating high turbidity conditions in the water column.

☑ Delaware Conservation Reserve and Enhancement Program (CREP)

During 2014, a total of 21 expiring CRP and CREP contracts were enrolled in the Conservation Reserve Enhancement Program in Delaware totaling 183 acres. In 2014, a total of 31 plans and contracts were developed for 218 acres.

In addition, the CREP coordinator conducted 28 field spot checks in 2014 representing over 205 acres of CREP contracts.

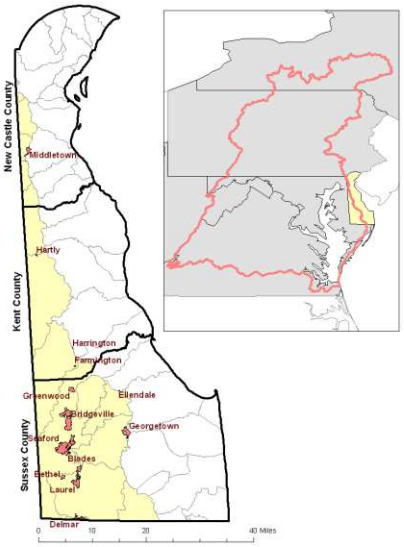
☑ **Rain Gardens for the Bays**

During 2014, the Rains Gardens for the Bays project completed the following rain gardens:

- Hillendale Elementary School
- Fenwick Municipal Building
- Grace Lutheran Church
- Goddard Park
- East Fallowfield Township Building
- Dover YMCA
- Greater Lewes Community Village
- Sanford School
- Limestone Presbyterian Church
- Bay Crossing Development

VI. Watersheds

a. Chesapeake Bay



Location: The Chesapeake Bay Watershed includes land area within Delaware, the District of Columbia, Maryland, New York, Pennsylvania, Virginia, and West Virginia. The portion of the Chesapeake Drainage within Delaware makes up about 1% of the land area within the entire Chesapeake Bay Watershed. The watersheds that make up the Chesapeake Drainage in Delaware encompass a 451,268 acre area of land in all three of Delaware's counties. The Chesapeake makes up approximately 10% of New Castle County, 33% of Kent County, and 50% of Sussex County.

The headwater streams and rivers that originate in Delaware all ultimately drain to the Eastern Shore of the Chesapeake. These streams include, from north to south: Elk Creek, Perch Creek, the C&D Canal, Bohemia Creek, Sassafras River, Chester River, Choptank River, Marshyhope Creek, Nanticoke River, Gum Branch, Gravelly Branch, Deep Creek, Broad Creek, Wicomico River, and Pocomoke River.

Goal: Current goals call for the increased implementation of numerous nonpoint source best management practices, especially in the agriculture sector (see below for a highlight of key numeric targets). The milestones allow jurisdictions the opportunity to adapt implementation strategies as necessary to meet the goals and achieve the Total Maximum Daily Load (TMDL) standard. Delaware's milestone commitments are to annually reduce nitrogen by 3,429,386 pounds, phosphorus by 283,228 pounds and sediment by 60,605,240 pounds by the end of 2017, compared to the 2009 baseline.

Impairment: TMDLs were developed by DNREC in response to data collected from water quality monitoring. The data indicated that numerous streams within the Chesapeake Bay Watershed were impaired; they do not meet Delaware's Water Quality Standards for dissolved oxygen, or meet target concentrations for nitrogen or phosphorus.

Implementation: The information presented within this section is drawn from Milestone reporting made available to the Chesapeake Bay Program for 2014. Where data is available, Section 319 specific information is provided as well (refer to Table 1). The Milestone data is necessary to demonstrate efforts and actions towards progress with the Phase II Chesapeake Bay Watershed Implementation Plan (WIP). As the WIP reporting criteria is more detailed and up to date, it's inclusion within this document is warranted.

Table 1. Section 319 Activity within the Chesapeake Bay Watershed

319 Projects	Grant Year	Status	319 Funds
Ecological Restoration	FY2010	Complete	$15,785
Nutrient Management Planning	FY2011	Complete	$152,289
Nutrient Relocation	FY2011	Complete	$17,915
CREP Acres (Salary for Coordinator)	FY2012	Complete	$60,000 (statewide)

Table 2. 2014 Milestone Data

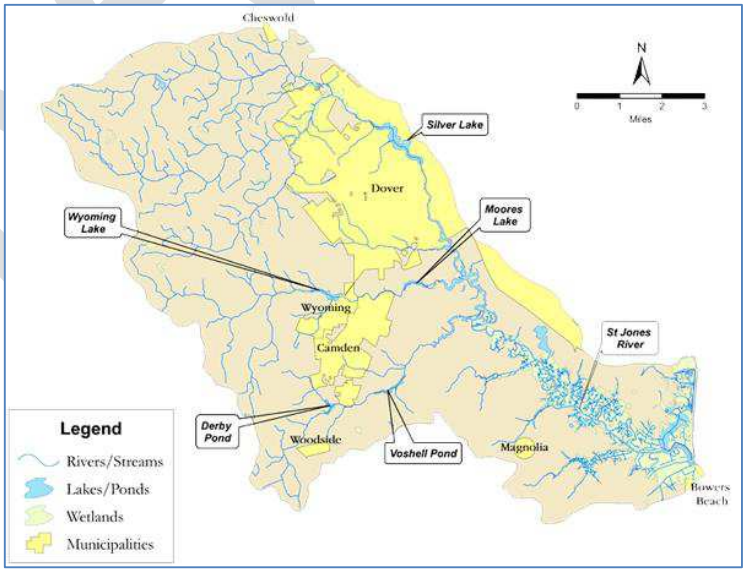
Pollutant Controls, Practices, and Actions	2014 NPS Funded Activity	2015 Watershed Plan Goal
Cover Crops	10,128 acres	36,809 acres
Nutrient Relocation	1,589 tons	40,000 tons
Nutrient Management	2,658.2 acres	163,500 acres
Tree Planting	154.5 acres	520 acres
Windbreak/Shelterbelt	3,389 feet	NA

Table 3. Chesapeake Bay Load Reductions based upon direct funding or leveraged funding associated with the NPS Program.

Practice	Load Reductions N	Load Reductions P
Cover Crops	134,508 lbs/yr	737 lbs/yr
Nutrient Relocation	148,528 lbs/yr	7,050 lbs/yr
Nutrient Management	8,061 lbs/yr	574 lbs/yr
Tree Planting	7,099 lbs/yr	222 lbs/yr
BioretentionWindbreak/Shelterbelt	113,852 lbs/yr	4,423 lbs/yr
Total	**412,048 lbs/yr**	**13,006 lbs/yr**

b. St. Jones River

Location: The St. Jones River Watershed is approximately 25.9 square mile (16,576 acres) and is located in the central portion of Kent County. It is bounded on the south by the Murderkill River Watershed, on the east by the Delaware Bay, on the north and northeast by the Leipsic River and Little Creek Watersheds, and on the west by the Choptank River Watersheds. 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 Lake. Flat wetlands, usually forested, exist mostly in the upper portion of the watershed and eventually drain into creeks and streams. Nontidal riverine wetlands and tidal wetlands line the banks of the river, sometimes up to 1/2 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. The extent to which wetlands can perform these functions and thrive in the future depends on their health.



The St. Jones Watershed has the largest percentage of protected lands 5,236 acres with the River Reserve totaling approximately 3,750 acres of the protected lands. The watershed land use is dominated by agriculture (33%), followed by wetlands (25.5%), and residential lands (17.4%). The impervious cover in the watershed is approximately 9.8% with a possible future impervious

cover of 23%. Between 2002 and 2007 agricultural lands decreased by 4% and residential lands increased by 2.1%. Wetland slightly decreased by 0.7% as did forested land by 0.1%.

Goal: Limit pollutants to levels at or below the Total Maximum Daily Load (TMDL) values specified in the regulation, i.e., an overall reduction of nitrogen and phosphorus in the waterways by 40%, or 869.5 lbs per day for nitrogen and 63.4 pounds per day for phosphorus. Nonpoint sources, must reduce total nitrogen from 838.5 lbs per day and total phosphorus from 52.9 lbs per day (refer to Table 3). The TMDL also calls for 21.8 lbs per day reduction of nitrogen and 3.4 lbs per day from its stormwater (MS4) discharges. The designated uses for the St. Jones River include primary recreation, secondary recreation, fish, aquatic life and wildlife, industrial water supply, and agricultural water supply in freshwater segments.

Impairment: Delaware studies reviewed indicate the current condition of the watershed is of degraded quality. Water quality samples have shown that the impairments (parameters) affect approximately 35.6 miles of streams and 208 acres of ponds. These impairments are primarily caused by nonpoint sources. Silver Lake and Moores Lake, both within the watershed, have been impaired by planktonic algae. To date, data has not been provided for Wyoming Pond. Most, if not all of the St. Jones River segments were listed as impaired by pollutants on Delaware's 303(d) list. Impairments include dissolved oxygen (DO), nutrients, and bacteria. Land use impairments for the St. Jones River are found below:

Source	TN (lbs/acre/yr)	TP (lbs/acre/yr)	TN (lbs/yr)	TP (lbs/yr)	Area
Urban	10.24	1.25	196,596.15	23,998.55	19,198.40
Agriculture	13.19	1.25	284,740.78	26,984.53	21,587.63
Forest	6.51	0.05	31,611.88	242.79	4,855.89
Wetland	0.00	0.00	0.00	0.00	8,685.97
Water	0.00	0.00	0.00	0.00	1,550.99
Range	7.50	0.45	2,403.58	144.21	320.48
Other	7.50	0.45	10,642.90	638.57	1,419.05

Implementation: Projects that are implementing watershed plan goals are summarized below. Most of the projects using 319 Grant funds in 2014 have been in Silver Lake and Wyoming Pond portion of the St. Jones River Watershed.

Table 1. Section 319 Activity within the St. Jones River Watershed

319 Projects	Grant Year	Status	319 Funds
Nutrient Management Planning	FY2013, project 06	Complete	$7,102

Table 2. 2014 St. Jones watershed Milestone Data

Pollutant Controls, Practices, and Actions	2014 NPS Funded Activity	5 Year Watershed Plan Goal
Cover Crops	1,799 acres	6,132 acres
Nutrient Management Planning	89 acres	NA
CD Nutrient Management	325 acres	NA
Intertidal Wetland	0.25 acres	NA

Table 3. St. Jones Watershed Load Reductions

Practice	Load Reductions N	Load Reductions P
Cover Crops	5,515 lbs/yr	6 lbs/yr
Nutrient Management Planning	60 lbs/yr	2 lbs/yr
CD Nutrient Management Planning	292 lbs/yr	9 lbs/yr
Intertidal Wetland	59 lbs/yr	2 lbs/year
Total	**5,926 lbs/yr**	**19 lbs/yr**

Table 4: Water quality data collected in the St. Jones Watershed from 2004 to present show the following trends:

Location	N Trend	P trend	TSS Trend
Barkers Landing	down	flat	down
Rt. 10 Bridge near DAFB	down	flat	down

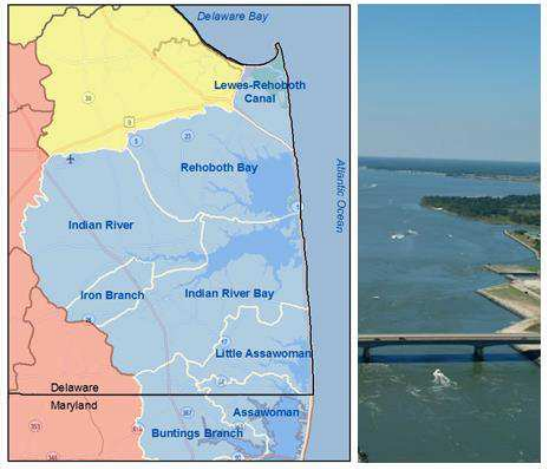
Progress Highlights: The following are specific examples of NPS Program funded projects that occurred or finalized in 2014:

1. *Mirror Lake* – The Mirror Lake project, finalized in December of 2013, involves dewatering Mirror Lake, mixing activated carbon into the sediments to bind contaminants, and constructing fringing wetlands to cap the contaminants. The project reach is approximately 1,500 linear feet and lies within the park-like setting that borders the St. Jones River. The restoration project will focus on the creation of a stable conveyance and improved ecological diversity within Mirror Lake and along the banks of the St. Jones.

   The construction phase of the Mirror Lake Remediation & Restoration Project,

Watershed Remediation Hazardous Substance Release Site in Dover, ended December 5, ahead of schedule and under budget. In all, 79 tons of SediMite (activated carbon pellets) were applied to five (5) acres of lake and channel sediments in 10 days. Nine hundred sixty-seven (967) cubic yards (1,325 tons) of sand were placed in Mirror Lake to create the intertidal wetland; 62 tons of stone were placed in Mirror Lake to create two (2) rock vane hydraulic control structures; and 760 linear feet of 16-inch diameter coir log, double stacked, were place on the west bank of the lake to prevent erosion. Sixty-seven (67) volunteers helped on the project. The Boot Camp Program, AmeriCorps, and the Homeless Shelter contributed 770 hours of volunteer labor; and DNREC staff contributed 511 hours of labor. Sincere thanks go out to all volunteers, especially the Shoreline and Waterways crew, for help with heavy equipment and bulk material transfer. The remainder of the plantings, paid for by DE NPS program, on the new ¼ acre intertidal wetland concluded in the spring 2014.

c. *Inland Bays*



Location: 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 are located just landward of the Atlantic Ocean shoreline. From north to south, these are Rehoboth Bay, Indian River Bay, and Little Assawoman Bay. 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 Little Assawoman Bay contains the Little Assawoman, Assawoman, and Buntings Branch Watersheds.

Goal: Current goals call for the increased implementation of numerous nonpoint source best management practices, especially in the agriculture sector (see below for a highlight of key numeric targets). The goals are those that were presented by Inland Bays Pollution Control Strategies (PCS) and an approved EPA watershed plan. The PCS involves many strategies to reduce nitrogen and phosphorous to meet the TMDL, but what is presented here are initiatives of the 319 program.

Table1. Progress toward goals within the Inland Bays Watershed

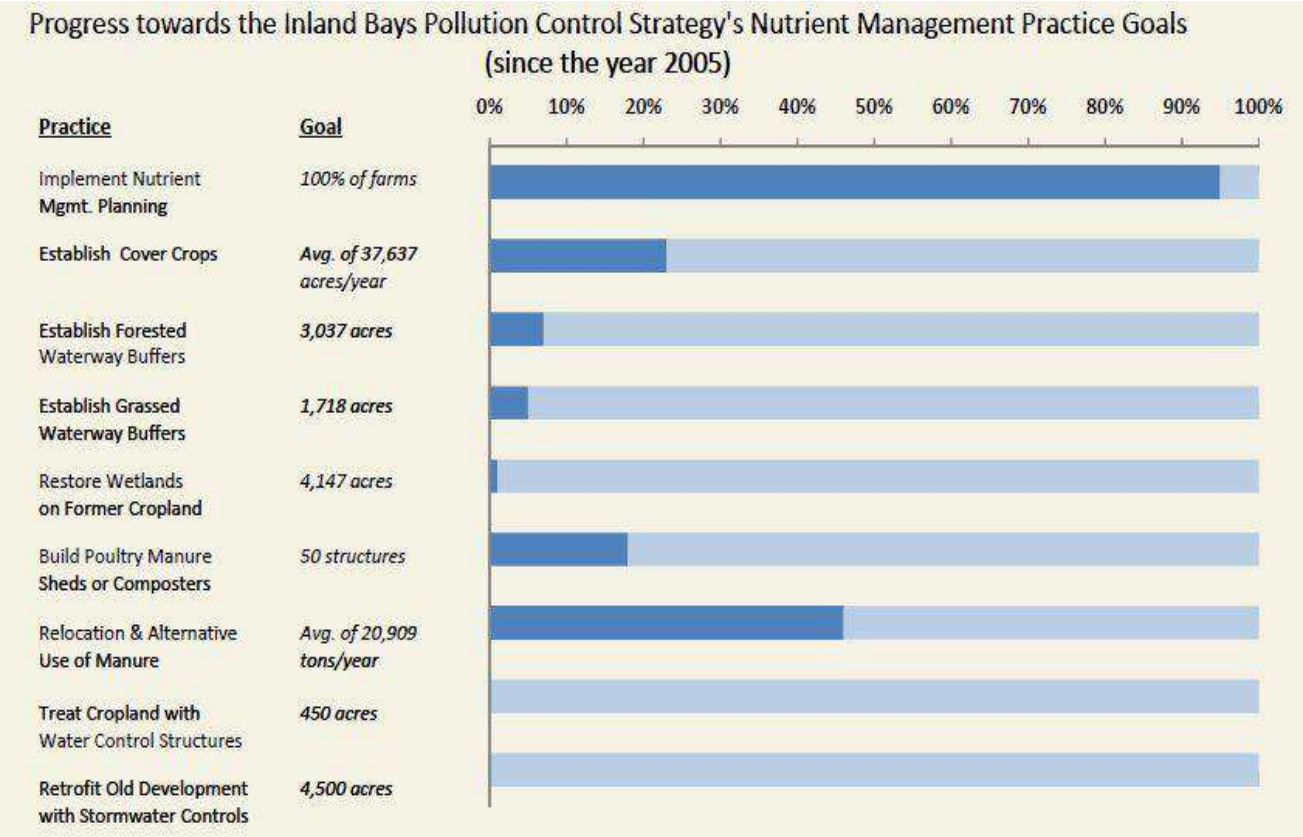


Table 2. Section 319 Activity within the Inland Bays Watershed

319 Projects	Grant Year	Status	319 Funds
Nutrient Management Planning	FY2011	Complete	$27,929
Nutrient Relocation	FY2011	Complete	$52,555
CREP Acres (salary for Coordinator)	FY2012	Complete	$60,000 (statewide)

Table 3. 2014 Milestone Data

Pollutant Controls, Practices, and Actions	2014
Cover Crops	6,779 acres
Heavy Use Area Protection	3 pads
Nutrient Relocation	12,774 tons
Nutrient Management	7,053 acres
PSNT	200 acres

Table 3. Inland Bays Load Reductions

Practice	Load Reductions N	Load Reductions P
Cover Crops	86,657 lbs/yr	267 lbs/yr
Nutrient Relocation	71,527 lbs/yr	5,026 lbs/yr
Nutrient Management	19,962 lbs/yr	1,533 lbs/yr
Total	**178,146 lbs/yr**	**6,826 lbs/yr**

Table 4: Water quality data collected in the Inland Bays from 2004 to present show the following trends:

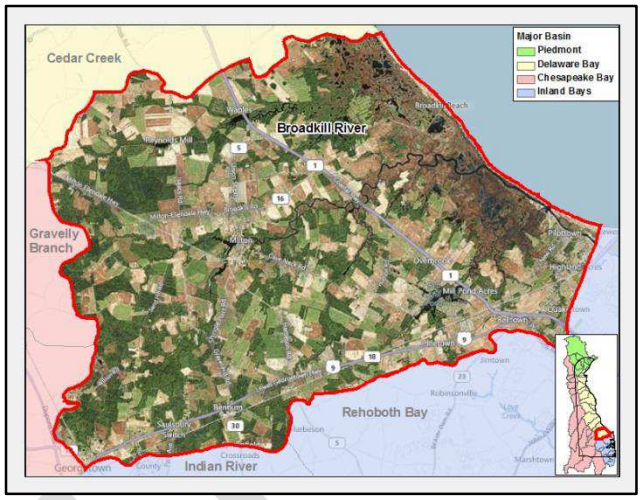
Location	N Trend	P trend	TSS Trend
Buoy 20, Indian River Bay	flat	Up	down
Buoy 7, Rehoboth Bay	flat	Flat	down
Little Assawoman Mid-Bay	down	flat	down

Progress Highlights/Partners: NPS pollution in Delaware is a shared responsibility among numerous local, state and federal agencies, organizations and individuals (Partners). As such, Delaware has established an extensive partnership to assist in the effort of water quality improvement. Successful partnerships are one of the most important keys to implementing NPS Program goals to restore or protect Delaware's water quality. Initially, watershed planning projects often provide an important mechanism for partnership development at the local watershed level.

The Center for The Inland Bays is a NPS watershed partner active in the Inland Bays watershed that helps to restore and protect water quality within the Inland Bays drainage area. CIB works independently with the common interest of reducing NPS pollutants to waters of the Inland Bays. The NPS Program assists in the implementation of CIB programs by offering guidance and technical assistance at a programmatic level. The CIB 2014 Annual Report can be viewed at **http://www.inlandbays.org/wp-content/documents/Final_CIB_Annual_Report_2014.pdf.**

d. Broadkill River

Location: The Broadkill River Watershed is located in the east central portion of Sussex County. 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 Pond and Diamond Pond 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.



Goal: The established TMDL requires in terms of daily nonpoint nutrient loads, a 40% reduction in nitrogen (baseline 1,675 lbs/day) would require a reduction of 670 lbs/day to reach the target load. A 40% reduction in phosphorus (baseline 69.3 lbs/day) would require a 27.7 lbs/day reduction to reach the target load.

Impairment: Water quality monitoring performed by the Department of Natural Resources and Environmental Control (DNREC) has shown that waters of the Broadkill River and several of its tributaries and ponds are impaired by high levels of bacteria and elevated levels of nitrogen and phosphorous, and that the designated uses are not fully supported due to levels of these pollutants in these waterways. Total Maximum Daily Loads (TMDLs) were established for the Broadkill River Watershed in December 2006.

Implementation: Where data is available, Section 319 specific information is provided (refer to Table 1). The Milestone data is necessary to demonstrate efforts and actions towards progress within the Broadkill River Watershed.

In 2014, Delaware contracted with KCI Technologies, Inc. to develop an approved Watershed Plan for the Broadkill River Watershed. A final watershed plan was developed and submitted to EPA for final approval in late 2014. Delaware received notice the plan is approved shortly thereafter.

Table 1. Section 319 Activity within the Broadkill River Watershed

319 Projects	Grant Year	Status	319 Funds
Nutrient Management Planning	FY2013, project 06	Complete	$745
Nutrient Relocation	FY2013, project 05	Complete	$1,845
Cover Crop	FY2010, project 10	Complete	$43,495

Table 2. 2014 Milestone Data

Pollutant Controls, Practices, and Actions	2014 NPS Activity	2025 Watershed Plan Goal
Cover Crops	13,504 acres	5,200 acres
Heavy Use Area Protection	2 unit	NA
Nutrient Relocation	341 tons	1,900 tons
Nutrient Management	699 acres	26,476 acres
CD Nutrient Management	524 acres	NA

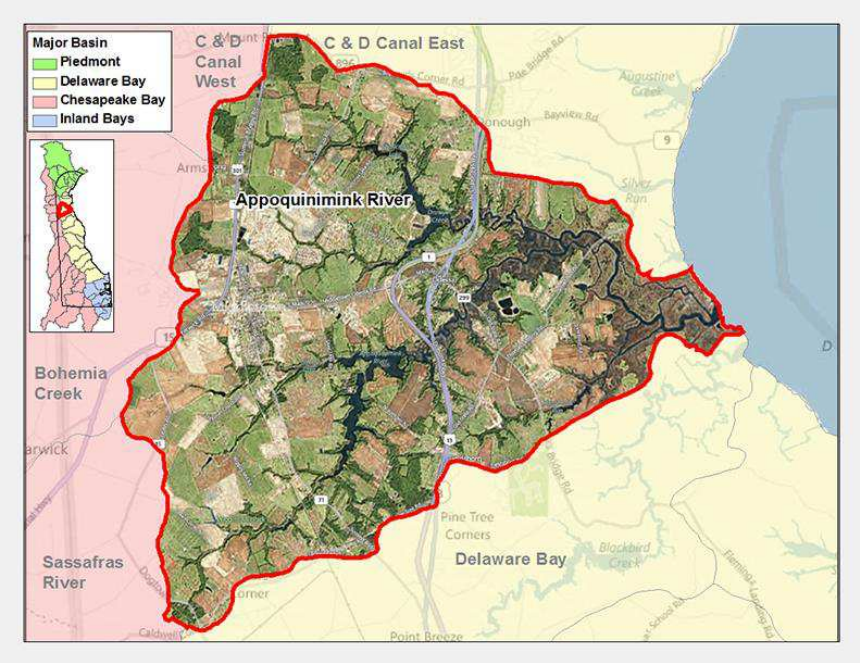
Table 3. Broadkill River Load Reductions based upon direct funding or leveraged funding associated with the NPS Program.

Practice	Load Reductions N	Load Reductions P
Cover Crops	31,243 lbs/yr	145 lbs/yr
Nutrient Relocation	1,910 lbs/yr	191 lbs/yr
Nutrient Management	1,952 lbs/yr	226 lbs/yr
CD Nutrient Management	1,463 lbs/yr	170 lbs/yr
Total	**36,568 lbs/yr**	**732 lbs/yr**

Table 4: Water quality data collected in the Broadkill River Watershed from 2004 to present show the following trends:

Location	N Trend	P trend	TSS Trend
Rt. 1 Bridge (Mainstem)	down	flat	flat
Broadkill River, 0.10 Miles From Mouth	flat	flat	flat

e. Appoquinimink River



Location: The 16-mile Appoquinimink River meanders through farmlands and wetlands in southern New Castle County, 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 Drawyers 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, man-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 past the Drawyer Creek confluence at river kilometer (Rkm) 8.5.

Goal: Total Maximum Daily Loads (TMDLs) were established for the entire Appoquinimink River in December, 2003. These TMDLs called for a 60% reduction in nonpoint nitrogen and phosphorus loading. An implementation plan, or a Pollution Control Strategy, was to be developed by a Tributary Action Team, a diverse group of citizens and government agency personnel presented to the Department for promulgation to reach the prescribed TMDLs. Load reductions will be achieved through the implementation of BMP's 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.

Impairment: The Appoquinimink River Watershed has historic water quality problems with respect to nutrient and low dissolved oxygen concentrations. A Total Maximum Daily Load for

nutrients and bacteria has been established requiring a 60% reduction in nitrogen and phosphorus loads and a bacteria reduction of between 11-15% in freshwater areas and 72-73% in marine areas.

Implementation: Where data is available, Section 319 specific information is provided (refer to Table 1). The Milestone data is necessary to demonstrate efforts and actions towards progress within the Appoquinimink River Watershed.

Table 1. Section 319 Activity within the Appoquinimink River Watershed

319 Projects	Grant Year	Status	319 Funds
Nutrient Management Planning	FY2014	Complete	$ 6,545
CREP Acres (salary for Coordinator)	FY2014	Complete	$ 60,000 (statewide)

Table 2. 2014 Milestone Data

Pollutant Controls, Practices, and Actions	2014 NPS Activity	Watershed Plan Goals
Nutrient Management	2,263 acres	NA

Table 3. Appoquinimink River Load Reductions

Practice	Load Reductions N	Load Reductions P
Nutrient Management	7,582 lbs/yr	365 lbs/yr

Table 4.

Water Quality data collected in the Appoquinmink River from 2000 to the present show the following trends:

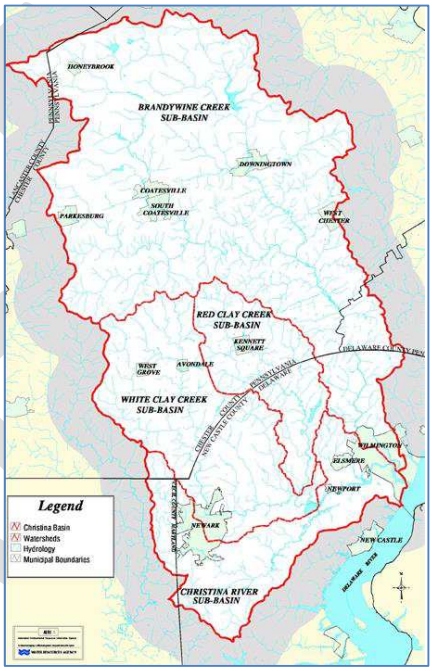
Location	N Trend	P trend	TSS Trend
Rt. 9 Bridge (East)	down	flat	down
MOT Gut (Appo. Gut)- West Bank	down	flat	flat

Progress Highlights: All sectors have taken steps to improve water quality through the implementation of laws, regulations, and voluntary BMPs. Analysis using a basic land use loading rate model shows that, to date, nonpoint sources of TN and TP have been reduced by 109% and 111%, respectively, from the TMDL baseline levels. There is still a need for further reductions in areas that are currently lacking such as wastewater and stormwater.

f. Christina Basin

Location: 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 sq. mi.
- Red Clay Creek 54 sq. mi.
- White Clay Creek 107 sq. mi.
- Christina River 78 sq. mi.



Although a small portion can be found within Maryland, the Christina Basin falls principally within two states, 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 have more built-up land.

Goal: Delaware's goal is to reduce pollutant loadings from current and future land use practices with an effort to achieve the TMDL. The effort for the Delaware portion of the Christina Basin will be implemented through the work of numerous organizations and individuals and will be coordinated with the ongoing pollution reduction efforts in the Pennsylvania portion of the Christina Basin. The level of pollution reductions necessary to achieve the designated uses in the streams of the Delaware portion of the Christina Basin vary significantly. For example, bacteria levels need to be reduced as much as 95 percent in some areas, nitrogen levels need to be reduced as much as 50 percent in some areas, and phosphorus levels need to be reduced as much as 89 percent in some areas. In contrast, other areas of the Christina Basin are relatively free of excess nitrogen, phosphorus, and bacteria and simply need to be protected in their current state. Figure 3.21 shows the subwatersheds that were used to determine the TMDLs for the Christina Basin. Figures 3.22–3.25 graphically represent the pollution reductions as mandated by the USEPA for the Brandywine Creek, Red Clay, and White Clay Creeks, and the Christina River.

Impairment: The streams of the Christina Basin in Delaware suffer from impaired water quality due to the following problems:

- *Nutrients*: One hundred and thirty stream miles have higher than desired nitrogen and phosphorus loads, which could cause low dissolved oxygen (DO) levels.

- *Bacteria* (pathogens): Concentrations along 134.2 miles of stream frequently exceed the primary recreation standards for swimming of 100 colonies per 100 milliliters.
- *Sediment*: The streams are degraded by high sediment loads that range between 311 and 975 pounds per acre annually, depending on the subwatershed.
- *Stream Habitat*: While biological diversity of the streams has been improving, 39 percent of the nontidal streams in the Piedmont have poor habitat due to the increased frequency and rate of runoff from urban/suburban development and rural activities (Shaver et al., 1995).
- *Contaminated Waste Sites:* Contaminated waste sites are situated throughout the watershed.
- *Fish Consumption Advisories*: Health warnings advising against the consumption of fish have been posted along 82.2 stream miles due to PCB contaminated sediment and high PCB levels in fish tissue.

Implementation: The Watershed Implementation Plan development for the Christina Watershed was approved by EPA in the Spring of 2013.

Progress Highlights: The following are specific examples of NPS Program funded projects that occurred or finalized in 2014:

1. *Upper Christina Stream Restoration* - Approximately 3,675 feet of stream restoration will be implemented along the upper Christina River located west of Newark in the Timber Creek, West Branch and Christianstead subdivisions. Severe bank erosion is occurring along numerous properties adjacent to the stream channel. The banks are being undercut, causing mature trees to fall into the stream channel. Tremendous sediment loads are being released into the waterway with every storm event, impairing habitat and creating high turbidity conditions in the water column.

   Beginning in 2010, several property owners have contacted the Division of Watershed Stewardship and expressed their concerns about the loss of trees and property with no apparent end in sight. They have requested assistance from the Division of Watershed Stewardship to rectify the problems exacerbated by upstream development and increased amounts of impervious surface throughout the watershed.

   Implementing the appropriate stream restoration techniques will help stabilize the stream banks resulting in reduced sediment and nutrient loading to the Christina, improvements to habitat and water quality, and will allow the channel to be resized for the flow volumes that pass through the systems during average storm events. Bank-toe boulder protection and vegetative plantings, along with other stream restoration construction techniques, will be utilized to stabilize the degrading stream banks and improve habitat and water quality and reduce the loss of property.

2. *Limestone Presbyterian Church Rain Garden*: As a continuation of the creation of a rain garden at the Limestone Presbyterian Church rain garden, 2014 brought both training and plant replacement to this area of the White Clay Creek Watershed. This 1600 sq. ft. garden uses parking lot islands to drain 2.6 acres of parking lot and upland areas. Volunteers

participated in 3 hours of on the ground training held by Red Tail Restoration & Land Management to learn about invasive species removal and plant identification in the rain garden. Also, 172 native plants were planted in the garden to replace species that did not thrive. Species included wild pink, blue flag iris, marsh marigold, buttonbush, New York ironweed, alumroot, cardinal flower and viburnum. Costs for 2014 paid by the Nonpoint Source Program totaled $1,005.25.

3. *Hillendale Elementary School Rain Garden:* Begun in 2013, the five rain gardens at Hillendale Elementary School in Chadds Ford, PA were finished in 2014 with the planting of thousands of native plant plugs by the volunteers of the Brandywine Valley Association. Eventually the rain gardens will be integrated into the school's curriculum and will be maintained by school staff and volunteers. Costs for 2014 paid by the Nonpoint Source Program totaled $1,947.

4. *Goddard Park Rain Garden:* Led by the White Clay Wild and Scenic Program, two rain gardens were created in Goddard Park, West Grove, PA in the White Clay Creek Watershed. The two gardens were retrofitted in two basins (approximately 3,400 sq. ft. total) that drained parking lots and overland flow. Over 70 volunteers participated in the creation of the rain gardens including plant selection, augering holes, applying leaf mulch and planting thousands of native plugs. This truly was a multi-municipality, bi-state effort. In addition, these gardens have been used for in-class and hands-on workshops on maintenance and creation of rain gardens. Costs for 2014 paid by the Nonpoint Source Program totaled $4,706.33 and $1,469.88 was paid for by United Water Delaware.

5. *East Fallowfield Township Rain Garden:* The Brandwine Valley Association working with the East Fallowfield Township installed a rain garden at the East Fallowfield Township building that drains the office and public works building. Working together, these two groups created, installed and planted this rain garden to help deal with their stormwater runoff, and to teach township staff for future projects. Costs for 2014 paid by the Nonpoint Source Program totaled $2,014.87.

Table 1. Christina River Load Reductions

Practice	Load Reductions N	Load Reductions P
Rain Garden Installation	2 lbs/yr	1.5 lbs/yr

Table 2.

Water Quality data collected in the Christina River from 2000 to the present show the following trends:

Location	N Trend	P trend	TSS Trend
Rt. 141 Drawbridge, Newport (USGS tide gage 01480065)	down	flat	down
Conrail Bridge (USGS tide gage 01481602) Up river from Port of Wilmington	down	flat	flat

Additional NPS Activity in the Christina Watershed:

1. *Community Water Quality Improvement Grant* - The purpose of the Community Water Quality Improvement Grant Program (CWQIG) is to provide financial assistance to eligible entities to facilitate projects that will support water quality improvement in impaired Delaware watersheds. The CWQIG is administered by DNREC, Nonpoint Source Program. The goals of the program are to support projects that focus on the developed landscape that will help improve water quality. Funding for the following projects is available as a result of the interest earned from the State Revolving Fund Loan Program.

Project Name	CWQIG Award	319 Funds Leveraged	Quantity	Watershed
Upper Christina River Stream Restoration Project	$150,000	150,000	1	Christina

2. *City of Newark Community Wildlife Habitat Certification:* In 2014, the City of Newark became the 78th community in the country and the 2nd in the State of Delaware to be designated an NWF Community Wildlife Habitat. To reach this goal, the City and partners helped to create and certify multiple habitat areas in schools, businesses, backyards, parks and other spaces and to educate residents about the benefits of habitat creation to our environment. Costs for 2014 paid by the Nonpoint Source Program totaled $500.

3. *Citizen Attitudes about a Clean Water Fee Survey (Statewide):* The Delaware Nature Society commissioned a representative statewide survey and three regional focus groups to gauge the level of support or opposition for a proposed clean water fee in Delaware. The poll of 400 randomly-selected adult Delaware residents was conducted by telephone, using trained and supervised live interviewers. Focus groups were also conducted in each of the state's three counties among a cross-section of area residents. Costs for 2014 paid by the Nonpoint Source Program totaled $2,000.

VII. Load Reductions

In 2014, the Delaware NPS Program load reductions were calculated for many of the 319 funded projects implemented on a watershed scale. The load reductions are calculated using guidance established during the Pollution Control Strategy development process.

2014 Project Load Reductions/Year by Watershed

Project	Nitrogen (lbs)	Phosphorus (lbs)
Chesapeake Bay	412,048	13,006
St. Jones River	5,926	19
Inland Bays	178,146	6,826
Broadkill River	36,568	732
Appoquinimink River	7,582	365
Christina Basin	2	1.5
TOTAL	**640,272**	**20,945**

VIII. Future Changes and Challenges

Programmatic Changes

From 1989 to 1997, the NPS Program relied on the development and implementation of Best Management Practices, identification of key partners, establishing agreements for interagency cooperation and funding many successful education, protection and restoration projects. This early period of NPS management in Delaware served to foster a keen understanding of the value of collaboration, consensus and community involvement in water quality management.

From 1997 to the present, efforts were made to fund implementation programs or activities that address the priority NPS contaminant sources such as agriculture, forestry, urban runoff, hydro modification, land disposal and various other miscellaneous sources. Examples of past activities include funding Kent and Sussex County Conservation District planner positions, stream restoration, and septic system pump-out, repair and/or replacement. These activities were prioritized based upon contaminate category and tended to establish BMP implementation on a geographic wide scale throughout Delaware. This broad approach served to successfully educate various sectors of the positive outcomes from BMP implementation and fostered a high rate of acceptance within each of the respective implementation groups.

While these and similar projects are expected to continue, a prioritized approach will be established to assure NPS activities are focused in stream reach drainages with the highest potential for contaminant delisting and/or re-establishing designated uses. In short, Delaware's

NPS focus will target watersheds with accepted Watershed Plans meeting the a) through i) criteria.

Current activity will be summarized and accounted for during the *2014 Delaware NPS Management Plan* development process. A first draft was submitted to EPA in late 2014. Comments were received and will be addressed during the next revision. A final approved plan will be developed by September 2014 that identifies the NPS Program's long-term goals reflecting a strategically focused state NPS management program designed to achieve and maintain water quality standards and to maximize water quality benefits.

Annual milestones in the *2014 Delaware NPS Management Plan* will describe outcomes and key actions expected each year. The Plan will include objectives that address nonpoint sources of surface water and ground water pollution as appropriate (including sources of drinking water) in alignment with the goals of the Clean Water Act. The objectives include both implementation steps and how results will be tracked (e.g., water quality improvements or load reductions). The Plan will include long-term goals and shorter-term (e.g., three- to five-year) objectives that are well integrated with other key environmental and natural resource programs. The program goals and objectives will be periodically revised as necessary to reflect progress or problems encountered, strategies to make progress towards achieving the goals, and indicators to measure progress.

Shortfalls

While we have met or exceeded our overall load reduction expectations within the targeted watersheds, the NPS Program did not achieve a few specific implementation goals we have set for ourselves. The exact goals for early/standard/late cover crops were not achieved, but cost share programs have been modified to emphasize early plantings and this acreage is expected to increase in the future. Forest buffer acreage did not increase and members of the agriculture community have indicated that current market prices of crops do not support land conversion for buffers at this time. A collaborative group plans to examine how much of an additional cost share incentive is needed to encourage additional enrollment in buffer programs. The tons of poultry litter transported has decreased in recent years; Delaware believes in general that the total volume of litter has decreased as has the nutrient content of the litter and staff are working with the CBP Ag Workgroup to assess the data and make necessary model modifications. Finally, the onsite pump out goal was not achieved, but regulations have been proposed requiring a pump-out and inspection at the time of property sale or transfer and will also require reporting when inspections occur; both requirements are expected to increase the number of pump-outs reported each year.

Land Use Changes/Challenges

Ed Ratledge, Director of the Center for Applied Demography and Survey Research at the University of Delaware says the number of acres of farmland is decreasing. Delaware had approximately 900,000 acres of farmland in 1920. Currently, we have about 580,000 acres in the state. Farmland acres are projected to continue to decrease until we reach about 380,000 acres by 2030.

The NPS program must address land use changes and trends for the next five years and beyond. As water runs over the landscape it picks up pollutants. These pollutants are either discharged into surface waters through runoff or seep through the soils into groundwater. The polluted groundwater eventually gets into the surface waters. As the landscape changes, so too does the funding demands of the NPS Program. Because of this fact, looking at land use will give the NPS Program goals, objectives and funding needs in which to focus the various resources the NPS Program receives. Agriculture BMPs, historically, have given the NPS Program the biggest return of nutrient uptake per dollar spent.

The trend of land use from agriculture to urban in the future could also mean a trend for the NPS program to spend more money on technologies and initiatives to reduce non-point source pollution. When land is developed nutrient loadings come from multiple sources, such as yard maintenance, wastewater disposal, stormwater runoff, soil erosion, and increases in impervious cover. Delaware is the 9th fastest growing state according to the U.S. Census Bureau. The fast rate of growth in Delaware means an increase in urban/residential areas. An increase in urban/residential areas nutrient loads from these land uses must be dealt with without relinquishing our efforts in agriculture.

IX. 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 2014 to address, reduce, identify and/or measure NPS pollution in Delaware is greatly appreciated. This NPS pollution control and prevention program has been very active, well received and effective. It is a credit to our partners as they have cooperated in the face of many conflicts to make this program what it is today.

Al Rizzo	**U.S. Fish and Wildlife Service**	**John Barndt**	**DNREC/Water Resources**
Ann Marie Townshend	**City of Dover Planning Office**	**John Schneider**	**DNREC/Watershed Stewardship**
Austin Short	**DE Department of Agriculture**	**Kevin Donnelly**	**New Castle Conservation District**
Bob Coleman	**Delaware Nutrient Management Program**	**Kimberly Cole**	**DNREC/Delaware Coastal Program**
Brenda Zeiters	**DNREC/NPS Program**	**Kip Foskey**	**Sussex Conservation District**
Brian Bloch	**DNREC/ Watershed Stewardship**	**Lyle Jones**	**DNREC/Watershed Stewardship**
Bryan Hall	**State of Delaware Planning Office**	**Lara Allison**	**DNREC/NPS Program**
Chuck Williams	**DNREC/Shoreline**	**Larry Towle**	**DE Department of Agriculture**
Brittany Sturgis	**DNREC/ Watershed Stewardship**	**Lynn Mangus**	**Farm Service Agency/State Office**
Chris Bason	**Center for the Inland Bays**	**Marcia Fox**	**DNREC/Watershed Stewardship**
Dale Churchey	**Delaware CREP Program**	**Marianne Walch**	**DE Department of Transportation**
Debbie Absher	**Sussex Conservation District**	**Mark Biddle**	**DNREC/Watershed Stewardship**
Dave Schepens	**DNREC/Groundwater Discharges**	**Mark Davis**	**DE Department of Agriculture**
E.J. Chalabala	**Center for the Inland Bays**	**Mark Hogan**	**DNREC/NPS Program**
Ed Lewandoski	**University of Delaware**	**Paul Petrichenko**	**NRCS State Office**
Eric Beuhl	**Center for the Inland Bays**	**Randy Cole**	**DE Department of Transportation**
Frank Piorko	**DNREC/Watershed Stewardship**	**Robert Baldwin**	**DNREC/Watershed Stewardship**
Fred Suffian	**US EPA**	**Robert Palmer**	**DNREC/NPS Program**
Gordon Johnson	**University of Delaware**	**Russel Morgan**	**USDA/NRCS**
Greg Moore	**DNREC/Fish&Wildlife**	**Sally Boswell**	**Center for the Inland Bays**
Jamie Rutherford	**DNREC/Sediment & Stormwater**	**Sally Kepfer**	**NRCS State Office**
Jen Walls	**DNREC/Watershed Stewardship**	**Sara Esposito**	**DNREC/ Watershed Stewardship**
Jen Gochenauer	**Delaware Nature Society**	**Sara Wosniak**	**DNREC/ Watershed Stewardship**
Jenn Volk	**University of Delaware**	**Sharon Webb**	**DNREC/ NPS Program**
Jerry Kauffman	**Water Resources Agency**	**Shelley Tovell**	**DNREC/Fish&Wildlife**
Jessica Watson	**Sussex Conservation District**	**Steve Williams**	**DNREC/ Watershed Stewardship**
Jim Cassidy	**DNREC/Groundwater Discharges**	**Sue McDowell**	**US EPA**
Jim Chaconas	**DNREC/Wetlands & Subaqueous Lands**	**Tiana Blount**	**US EPA**
Jim Short	**DNREC/Solid Waste**	**Tim Garrahan**	**NRCS State Office**
Joe Farrell	**University of Delaware**	**Tim Riley**	**Kent Conservation District**
Jim Sullivan	**DNREC/Watershed Stewardship**	**Tom Barthelmeh**	**DNREC/Watershed Stewardship**