

US EPA ARCHIVE DOCUMENT

Delaware

NONPOINT SOURCE PROGRAM ANNUAL REPORT

US EPA ARCHIVE DOCUMENT



2008

DELAWARE
DEPARTMENT OF
NATURAL RESOURCES
AND ENVIRONMENTAL
CONTROL

Nonpoint Source Program
89 Kings Highway
Dover, Delaware 19901

Phone: 302-739-9922
Fax: 302-739-8017
www.dnrec.delaware.gov





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.

Program Staff:

Robert Palmer, Program Manager
Sharon Webb, Environmental Scientist
Jen Nelson, Environmental Scientist
Mark Hogan, Planner
Brenda Zeiters, Administrative Specialist

Published and Distributed by the:

Delaware Nonpoint Source Program
DNREC Division of Soil & Water Conservation
89 Kings Highway
Dover, DE 19901
Telephone: (302) 739-9922
Fax: (302) 739-8017

Table of Contents

I.	The Delaware NPS Program	4
II.	NPS Program Funding	4
III.	Delaware NPS Issues	5
IV.	Vision and Mission	5
V.	Mission	5
VI.	Executive Summary	6
VII.	Highlighted Efforts	9
	<i>i. <u>Sussex County Conservation District – Conservation Planners</u></i>	9
	<i>ii. <u>Kent County Conservation District – Conservation Planners</u></i>	11
	<i>iii. <u>Nutrient Relocation Program</u></i>	15
	<i>iv. <u>SRF Agriculture Loan Program</u></i>	17
	<i>v. <u>Wetland and Stream Restoration Projects</u></i>	18
	<i>vi. <u>Stream & Corridor Enhancement Program</u></i>	19
	<i>vii. <u>Stream Monitoring and Assessment</u></i>	20
	<i>viii. <u>Shoreline Stabilization Cost Share</u></i>	21
	<i>ix. <u>Nanticoke Restoration Plan</u></i>	22
	<i>x. <u>Pollution Control Strategies – Project Implementation</u></i>	23
	<i>a. <u>Inland Bays Watershed</u></i>	24
	<i>b. <u>Appoquinimink Watershed</u></i>	26
	<i>c. <u>Broadkill Watershed</u></i>	27
	<i>d. <u>Upper Chesapeake Watershed</u></i>	27
	<i>e. <u>St. Jones Watershed</u></i>	28
	<i>f. <u>Christiana Watershed</u></i>	30
	<i>xi. <u>Delaware Clean Marina Program</u></i>	30
VIII.	Load Reductions	32
IX.	Future Changes and Challenges	35
X.	List of Partner Organizations/Committee Members	37

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 sources 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 agricultural BMPs placed in 2008 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 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 Soil and Water Conservation.

V. Executive Summary

This report documents the activities and highlights of the State of Delaware, Nonpoint Source (NPS) Program during the 2008 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.

Although Delaware's surface water quality may not have significantly changed over the past several years, through the Pollution Control Strategies development process, there have been many improvements made in watershed assessment and planning approaches and methodologies. Public support and involvement will prove the key in the successful implementation of any strategy that is developed. Delaware's Nonpoint Source Program will continue to work with our partners in 2009 and beyond to make progress towards meeting the State's water quality goals. Additionally, the NPS Program is evaluating measures to demonstrate success in lieu of improvements as steady state water quality certainly signifies levels of success in spite of an ever-changing Delaware setting.

In 2008, projects funded through the Delaware's NPS Program embarked on many water quality improvement activities including further support of the Delaware Clean Marina Program, stream

restoration projects, shoreline stabilization projects and agricultural BMP implementation projects.

Additionally, routine and ongoing projects made great strides during the year and proved, once again, successful NPS pollution reduction strategies. Examples of the routine funded activities include the Nutrient Relocation Program and the Kent and Sussex County Conservation - District Planners.

Projects highlighted in the 2008 NPS Annual Report include the following:

- Sussex County Conservation District – Conservation Planners

During the 2008 Calendar year, Sussex County Conservation District Planners worked with area farmers to encourage the installation of agriculture best management practices and partnered with the USDA's Natural Resources Conservation Service in developing conservation plans, nutrient management plans and Environmental Quality Incentive Program (EQIP) contracts. During 2008, the District planners made 998 contacts with farmers and landowners throughout Sussex County.

- Kent County Conservation District – Conservation Planners

During the 2008 Calendar year, Kent County Conservation District Planners worked with Kent County Farmers and provide nutrients management planning, conservation planning and encourage the installation and/or adoption of agricultural Best management practices. For the 2008, Conservation Planners in Kent County encouraged participation in the USDA EQIP Program in the amount of \$836,326 spent on the installation of agricultural BMPs.

- Nutrient Relocation Program

In 2008, the Nutrient Relocation Program accounted for the transportation of 6.2 million pounds of total nitrogen and 4.8 million pounds of phosphorus as phosphate out of Delaware's priority watersheds. If that tonnage had been applied to the source farm rather than relocated, significant nitrogen and phosphorus could have potentially made their way to Delaware's surface waters.

- SRF Agriculture Loan Program

In 2008, Delaware's agricultural producers received State Revolving Fund loans in the amount of \$451,018. These loans were provided for the installation of agricultural BMPs such as manure storage structures, poultry carcass composters, front end loaders, and heavy use area protection pads.

- Wetland and Stream Restoration Projects

In 2008, Wetland and Stream Restoration projects completed include the following:

- Lake Forest High School – a ½ acre wetland project located on Lake Forest High School Property.

- Dunning/Kauffman Wetland Restoration – a 2 acre wetland creation project completed across adjacent property owner lands.
- University Of Delaware – a 1 acre wetland restoration project completed on the University’s Newark farm property.

- Stream & Corridor Enhancement Program

In 2008, Stream and Riparian Corridor Enhancement Program projects included the following:

- Pike Creek – a 3,671 foot stream restoration project completed at the Independence School and three adjacent land owners.
- Pike Creek – a 3 acre wetland creation project located adjacent to Pike Creek on the Independence School property.

- Stream Monitoring and Assessment

In 2008, the Stream & Corridor Program embarked on a monitoring program to assess the work completed on the Pike Creek and Red Clay Creek main channels. Data will be reviewed and compared to 2005 data as well as sampling projects conducted in the future.

- Shoreline Stabilization Cost Share

During 2008, three new vegetative stabilization projects were completed. Combined, the projects will result in stabilizing 100 linear feet of shoreline. These projects are in the Inland Bays watershed. The projects involve the installation of coir logs with high marsh and low marsh wetland plantings. The projects are part of a larger “neighborhood” effort to stabilize the shoreline along the Salt Pond near Bethany Beach, DE.

- Nanticoke Restoration Plan

In 2008, the Nanticoke Restoration Plan was developed by a multi-disciplinary team to identify priority areas for restoration in the watershed. The working group established the goal of focusing restoration activities to improve and maintain the ecological integrity of species and habitats and the functions and services that they provide. The workgroup used the best available science and the diverse expertise of participants to identify conservation targets and locate these targets on the ground. Focusing the activities of the multiple groups that are working in the watershed on areas that are likely to have the greatest improvement on the health of the watershed will maximize the results of our collective efforts.

- Pollution Control Strategies – Project Implementation

In 2008, the PCS Project Implementation embarked on a wide array of water quality improvement projects. Many of the activities were targeted by the Tributary Action Teams (TAT) formed to draft and implement the Pollution Control Strategies being developed in response to the adopted total maximum daily loads. Funding of many *2008 Highlights* identified were made possible through NPS Program funding provided to DNREC’s Watershed Assessment Section.

- Delaware Clean Marina Program

The Delaware Department of Natural Resources and Environmental Control's Clean Marina Program offers marinas, boatyards and recreational boaters the opportunity to participate in efforts to protect Delaware's natural resources. In 2008, 6 additional marinas were certified as Clean Marinas.

VI. Highlighted Efforts

i. Sussex County Conservation District - Conservation Planners

Five Conservation Planners working for the Sussex County Conservation District are funded through a Section 319 Nonpoint Source Pollution grant and through base funding with the state of Delaware. The agricultural conservation staff works with the farming community providing nutrient management planning, cost-share funding for agricultural best management practices, and partnering with the USDA's Natural Resources Conservation Service in developing conservation plans and Environmental Quality Incentive Program (EQIP) contracts. During 2008, the District planners made 998 contacts with farmers and landowners throughout Sussex County. Sussex County has a high concentration of poultry operations and the District is challenged with keeping our groundwater clean. The District's client base is diverse with a large influx of Hispanics, Indians, and Asians to the area, with many raising poultry and proving to be excellent cooperators. The District also partners with Delaware's Department of Natural Resources and Environmental Control's (DNREC) Division of Soil and Water Conservation by providing important information about the conservation efforts throughout the county.

2008 Highlights:

- In 2008, the SCD expended over \$1.275 million in conservation cost-share funds. This included payments for cover crops, 3 poultry manure structures, 1 poultry composter, 2 animal waste system, 41 heavy use area protection pads, 3 poultry windbreaks, 3 vegetative shoreline stabilization projects, and 1 wildlife habitat pond.

Cover Crop

The Sussex Conservation District provides cost-share assistance to farmers to plant a winter cover crop. In 2008 the District paid \$45 per acre for cover crop that was planted before October 1, and \$35 an acre for cover crop that was planted before October 31. Farmers/Landowners can plant rye, wheat, barley, oats, annual rye grass, triticale, clover, vetch, or rape. Farmers/Landowners are not allowed to apply commercial or animal fertilizer on a field that is intended to receive a cover crop incentive payment. Cover crop payments are divided up into two payments; half a payment is made to the farmer after the crop has been planted, and the other half is paid after the crop has been destroyed.

Farmers/landowners were allowed to harvest their cover crop. All restrictions for the regular program still apply. The farmer/landowner harvesting the crop will not receive a second payment on that acreage; however, they will not be required to repay the first payment.

Planting a cover crop has a very positive impact on the environment. The crop takes up excess nutrients, improves ground water, and helps prevent soil erosion.

2008 Highlights:

- Cover Crop sign-up this year was our biggest ever. The Sussex Conservation District enrolled over 108,600 acres requesting over \$1.6 million in cost-share assistance. Over 36,000 acres were planted which equals over \$1.1 million in cost-share. Actual acres planted increased by 2,144 acres - a 6.3% increase over the acres planted in 2007. This year SCD continued placing advertising signs in cover crop fields. The signs say “Delaware Cover Crop Participant, Protecting our Bays and Environment.” The signs are placed in fields along well traveled roads and have received a lot of positive feedback on the signs.

Presidedress Nitrogen Testing

The Sussex Conservation District provides pre-side dress nitrogen tests to local farmers free of charge. This test helps estimate the available nitrogen in the soil for manured soils. The estimate is used to make a nitrogen recommendation to the farmer for a realistic yield goal for his/her corn crop. PSNTs take into consideration many factors in determining the need for additional nitrogen. Some of the variables include yield goal, type, rate, and timing of manure application, prior fertilizer application, tillage method on the farm, and irrigation. With all of these factors combined it allows the grower to see how much additional nitrogen is needed to produce the targeted yield goal. In 2008 the Sussex Conservation District completed 172 tests on 6,713 acres.

As well as PSNTs, the Sussex Conservation District also provides soil sampling to local farmers as an integral part of their nutrient management plan. Samples are taken every three years. The planners take 15 to 20 cores per sample and the samples are sent to the University of Delaware Soils Lab. The results are reviewed with the farmer along with recommendations for nitrogen, phosphorus, potash, and lime. The recommendations are based on soil capability, use of animal manures, and a realistic yield goal for the crop. Soil sampling helps the farmer maintain his lime and nutrient levels which provides a more environmentally friendly method to farming.

2008 Results:

- SCD Conservation Planners tested 172 fields using pre-sidedress nitrogen tests, covering 6,713 acres in Sussex County. They also completed 32 nutrient management plans on 7,419 acres and 63 animal waste management plans.

2008 BMPs Installed

BMP's	District	EQIP	Total
Manure Shed	3	30	33
Composter	1	23	24
Poultry Windbreak	3	17	20
Ag Waste System	2	0	2
Irrigation System	0	29	29
HUAP	41	246	287
Poultry Litter Amendment	0	63	63

Rentars	0	0	0
Wildlife Ponds	1	0	1
Vegetative Shoreline	4	0	4

2008 SCD Activities

Activities	Total	Acres
Landowner Contacts	988	
Conservation Plans	58	7,818.8
Nutrient Management Plans	32	7,419.0
Animal Waste Plans	63	
FY07 Cover Crop Enrolled	179	86,878.0
FY07 Cover Crop Planted		33,982.6
FY08 Cover Crop Enrolled	185	108,624.1
FY08 Cover Crop Planted		36,126.7
Soil Samples	153	2,219.1
PSNT's	172	6,713
Manure Samples	41	N/A

2008 SCD Money Expended

Dollars Expended		
District	EQIP	Cover Crop
\$ 304,073	\$2,860,638	\$ 970,927

ii. Kent County Conservation District - Conservation Planners

Two Conservation Planners operating at the Kent County Conservation District are funded through a Section 319 Nonpoint Source Pollution grant and through base funding with the state of Delaware. The Conservation Planners work with the farming community providing nutrient management planning, cost-share funding for agricultural best management practices, and partnering with the USDA's Natural Resources Conservation Service in developing conservation plans and Environmental Quality Incentive Program (EQIP) contracts.

2008 Highlights:

- The State of Delaware General Assembly provided \$865,000 in cost share funds, which were utilized by different cooperating landowners. Projects implemented emphasized water quality, water management, and erosion/sediment control. Funds were allocated for the practices below:

2008 State Cost Share BMPs Installed

Poultry Heavy Use Area Protection	71	Pads
Poultry Manure Structures	5	Each
Dead Bird Composters	2	Each

Manure Spreaders	3	Each
Front-end Loaders	6	Each
Fish Composter	1	Sq. Feet
Cover Crops	10,930	Acres
Tile Drainage	7,285	Feet
Ditch Dipout	15,735	Feet
Dairy Manure Storage Tank	1	Each
Chicken House Demo	1	Each
Dairy Liquid Pump	0	Each
Horse Manure Dump Wagon	0	Each
Controlled Inlet Piping	0	Feet
Grassed Waterway	0	Feet

Conservationists completed a total of 568 inspections of installed practices (including drainage) to ensure the practices are working properly and do not need any maintenance.

Environmental Quality Incentive Program (EQIP)

The total amount of EQIP cost-share funds earned for the year was \$836,326. This money was used for the implementation of the water quality practices listed below:

2008 EQIP BMPs Installed

Access Road	0	Feet
Composters	2	Each
Comprehensive Nutrient Mmgt. Plans	7	Each
Fencing	1,380	Feet
Forage Harvest Management	72	Acres
Heavy Use Area Protection	38	Pads
Irrigation Sprinkler Systems	14	Each
Irrigation Water Conveyance Systems	2	Each
Irrigation Water Management Systems	60	Each
Micro-irrigation System	2	Each
Nutrient Management	21,147	Acres
Pasture and Hay Planting	72	Acres
Pest Management	16,856	Acres
Pipeline	1,906	Feet
Pumping Plant	5	Each
Residue Management	4,484	Acres
Waste Storage Facilities	4	Each
Water Wells	2	Each
Watering Facilities	11	Each
Windbreak / Shelterbelt	5,004	Feet
Residue Management	4,484	Acres

Nutrient Management Program

The District, in cooperation with the University of Delaware Cooperative Extension Service, continued to provide pre-side dress soil nitrate tests (PSNT) to all interested corn growers in Kent County. Use of this test can result in economic savings and reduce the chance of groundwater contamination by nitrates.

2008 Results:

- In 2008, a total of 226 samples were tested covering 8,990 acres. The District's conservationists also worked with cooperators in testing manure as well. Last year the following numbers of manure samples were tested: dairy - 6; poultry - 16; horse - 5; beef - 3; fish - 1; and sheep - 2. The conservationists also completed 9 animal waste plans and 29 nutrient management plans covering 3,437 acres.

Education Initiatives & Awards

Governor Ruth Ann Minner presented the 13th Annual Governor's Conservation Awards to winners from all three counties during a ceremony proclaiming Soil & Water Stewardship Week in Delaware.

2008 Highlights:

- The recipient of this award representing agricultural conservation in Kent County was the Busker Family Dairy. Chuck and Charmaine Busker started the dairy in Harrington in the 1970's. With the help of their children Phillip and Sarah, this once small dairy has grown to accommodate a herd of 200 holstein cows, 100 of which are currently milking. This past year the Busker's have completed a manure handling and storage facility that was cost shared on through Kent Conservation District (KCD) and Natural Resource Conservation Service (NRCS) Environmental Quality Incentive Program (EQIP). This system is comprised of 2 large liquid manure tanks, 1 reception pit, 2 pumping units, and a dry manure storage structure. The additional tank provides more storage for the increased herd size. The family tills 250 acres of forage and grain crops that they utilize on farm as feed for the cows. They practice minimal tillage and No-Till practices on all their cropland. They participate in the cover crop program through the District and have for many years. Their farms are also enrolled in the NRCS Conservation Security Program (CSP). The Busker's utilize an irrigation system to apply liquid manure on their cropland to reduce soil compaction and to distribute an even application. This irrigation system also improves agronomic timing and application and allows the manure to be better utilized as a nutrient which in turn saves on commercial fertilizer. They have recently finished construction of a covered dry cow facility. They have also installed 2 large Heavy Use Protection Area's (HUPA's) and several smaller ones throughout the farm to aid in manure handling. With the aid of District cost-share, the Busker's purchased a front-end loader and spreader to facilitate the manure management tasks of the operation. Due to the family's rich heritage in dairy farming, no additional training was needed to use the equipment necessary for the installed practices. The only cost of addressing these issues was the capital costs for construction. These and similar best management practices have been used statewide to address dairy manure management concerns. Any practice installed on such a farm is contributing to the quality of surface water runoff in their particular watershed.

The recipient of this award representing urban conservation in Kent County was Mr. Joseph Petrosky. The Sonic Restaurant at the Gateway South Shopping Center on Route 10 in Dover was proposed in June of 2006. The small lot, approximately 1.16 acres, would be converted from grass to largely impervious cover posing many challenges in terms of the water quality runoff from the site. The engineering firm for the site (Becker, Morgan Group) explored the options of a wet or dry pond design; however the engineering and construction of the facility would have been a difficult task given the limited area available for the stormwater facility. In a collaborative effort between the engineers, the property owner Mr. Petrosky, and the Kent Conservation District it was suggested that a new concept be implemented on the project; Green Technology, specifically two (2) bio-retention cells. At the time bio-retention was a relatively new, untested technology, but Mr. Petrosky made the decision to take a chance on the idea.

Outreach Efforts

The District participated in the following activities in our continuing effort to promote environmental awareness:

- distributed Soil and Water Stewardship Week materials to local churches, schools and libraries
- staffed the Delaware Conservation Partnership display at the Delaware State Fair
- provided news releases announcing the NACD Annual Photo Contest
- participated in the Science Alliance's "What in the World" career awareness program at six elementary schools
- sponsored an environmental poster contest
- participated on the planning committee and provided volunteers for DNREC's Make-a-Splash water festival
- participated in South Dover Elementary School's Super Science Day by giving a presentation on conservation practices and soils

2008 Highlights:

- The District again supported the Envirothon, a problem-solving, natural resource education program for high school students. The competitive nature of the program motivates students to expand their knowledge of natural resources and realize their responsibility as stewards of our natural resources. The students answer written questions and conduct hands-on investigations of environmental issues in five categories: aquatic ecology, soils/land use, forestry, wildlife, and a current environmental issue which was recreational impacts to natural resources.

Fourteen teams competed in the competition. Kent County teams included Polytech High School Team A and Team FFA and Kent County 4-H. Honors for the Kent County teams included the following:

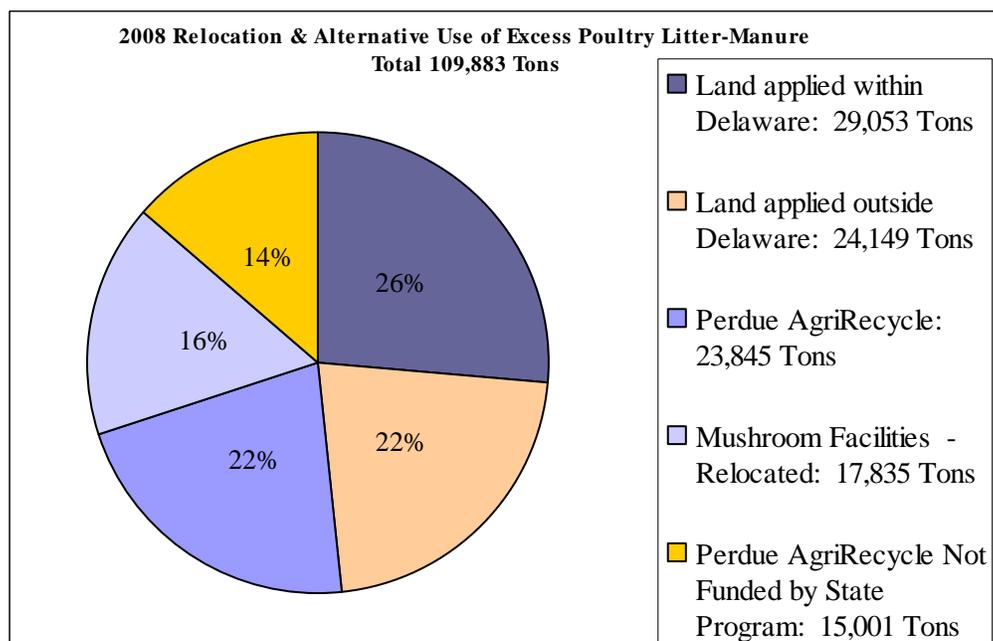
- ✓ Kent County 4-H: 2nd Place - Wildlife; 2nd Place – Public Speaking
- ✓ Polytech High School Team A: 3rd Place - Overall; 2nd Place –Soils/Land Use; 3rd Place -Aquatic Ecology; 3rd Place - Forestry; and 3rd Place - Wildlife

- ✓ Polytech High School Team FFA: 4th Place -Overall; 2nd Place - Aquatic Ecology and 3rd Place – Recreational Impacts

iii. Nutrient Relocation Program

The Relocation Program provides financial reimbursement to farmers, brokers, and trucking businesses for the transportation cost of relocating litter from a Delaware farm to an alternative use project or another farm for land application. The application process validates eligible senders, receivers, truckers, and alternative use projects. Excess litter continues to be transported for land application throughout Delaware as well as Maryland, New Jersey, and Virginia. Alternative use projects are also essential for managing excess poultry litter.

Application of poultry litter to these farms is regulated by limiting phosphorus applications to the amount that can satisfy crop needs, creating a surplus of poultry litter on those farms which must be disposed of. Many farmers who demonstrate insufficient land or high soil phosphorous levels must find alternative uses for poultry litter. Many businesses have surfaced over the past few years to help manage excess litter. The Relocation Program is an effective solution to excess litter generated in Delaware.



The 2008 relocated tons represents an estimated 6.2 million pounds of total nitrogen and 4.8 million pounds of phosphorus as phosphate. If that tonnage had been applied to the source farm rather than relocated, significant nitrogen and phosphorus could have potentially made their way to Delaware's surface waters. This represents a major load reduction and a bargain from a cost-benefit analysis perspective!

2008 Highlights:

- In 2008, 109,883 tons of excess poultry litter were relocated, an eight year total of over a 560,000 tons. Over 50% of the excess litter goes to alternative use projects such as the Perdue AgriRecycle fertilizer plant in Blades DE. The plant processed over 65,000 tons in 2008, 38,846 tons being Delaware-generated.

Nutrient Management Planning

A nutrient management plan is a farmer's "business plan" for nutrients. The more efficient fertilizers are used on the farm, the fewer nutrients escape to waterways. A plan is developed by a certified nutrient consultant and includes contents such as maps, soil analysis, manure analysis, crop yield goals and a budget for nutrients.

The NPS Program continues the partnership with Nutrient Management Commission and Conservation districts in providing nutrient management plans to farmers. They depend on private and public nutrient consultants.

2008 Highlights:

In 2008, 184 farms, 1 school, and 3 golf courses representing 141,650 acres were reimbursed at a capped rate for a plan developed by a private consultant. Kent and Sussex Conservation Districts assisted 49 farms representing 11,944 acres in the development of nutrient management plans. Also, 47 farms were assisted with an animal waste management plan. During 2007, a total of 153,594 acres were provided with nutrient management plans that are valid until 2010.

Delaware Environmental Stewardship Program

The NPS Program assisted in a Commission partnership with three poultry integrators to select and recognize the 2008 environmental stewards. Allen's Family Food Inc., Mountaire Farms Inc. and Perdue Farms, Inc. and Delaware Maryland Agri-Business Association funded the 2008 stewardship program. The Environmental Stewardship program was established in 2001 to recognize farmers whose stewardship and general farm practices contribute to the conservation of the environment, water quality and farmland. The program recognized growers by evaluating nutrient management, best management practices, farm management, innovation, biodiversity and wildlife management.

2008 Highlights:

- The 2008 Delaware Environmental Stewardship was awarded to one poultry operation and one non-agricultural entity. Joe Bauer and family were awarded the 2008 environmental steward received a cash award of \$1,000, a plaque and a lane sign.



Left to right: Mike Levengood, Perdue Farms, Inc.; Diane Bauer; Joe Bauer; Dianne Vrem; Stacey Vrem; Jeff Smith, Perdue Farms, Inc.

iv. SRF Agriculture Loan Program

The State Revolving Fund (SRF) Loan program provides Delaware poultry and dairy producers a way to benefit from a 3% loan while encouraging them to install best management practices (BMPs), which will reduce NPS pollution, on their farms.

Since the inception of the program loans have totaled over \$6.2 million for poultry producers and \$900,739 for dairy producers.

2008 Highlights:

- In 2008, producers received SRF funding for the following BMPs:

2008 SRF Loans

<i>Poultry BMPs</i>	<i>#</i>	<i>Amount</i>
Manure Structures	20	\$ 216,429
Poultry Carcass Composters	13	\$ 29,100
Dead bird incinerators	0	0
Front-end loaders	5	\$ 44,080
Calibratable spinner manure spreaders	1	\$ 7,000
Heavy use area protection pads	92	\$ 154,409
<i>Dairy BMPs</i>	<i>#</i>	<i>Amount</i>
Dairy Waste Management System	0	0

2008 Highlights:

- A Poultry Windbreak is a new BMP that has been approved by EPA to be eligible to receive SRF funding. This practice will allow poultry producers to demonstrate their continued commitment to voluntarily implement a program to be a good neighbor and environmental steward. An important aspect of a poultry windbreak is the trees ability to filter odor, dust, feathers, and noise emitted from poultry operations. In addition, to the leaves' ability to capture various gases, the roots of trees are effective in absorbing nutrients that might escape the proximity of the poultry farm. Trees aid in filtering nutrients in the runoff of groundwater. A growing windbreak can take up 200-300 pounds of nitrogen per acre per year from ground water.

v. **Wetland and Stream Restoration Projects**

Rehabilitation of Lake Forest High School Wetland

The Lake Forest High School Wetland (approximately ½ acre) is located southeast of Felton, Kent County, Delaware and is within the Delaware Bay watershed. This wetland project involved rehabilitating a shallow water pond which was created on the Lake Forest High School Property in 2005. The Lake Forest High School campus is located on well drained sandy soils, which is not conducive to wetland restoration projects. The Drainage Program hauled three ten-wheeler dump truck loads of clay material from a restoration project on Delaware State Forest property (Taber Tract) to assist with the original project. Unfortunately this was not enough clay material to seal the shallow pond. In the summer of 2007, twenty-five additional loads of clay were brought to the site to line the shallow pond completely. The shallow open water pond was enhanced with microtopographic features. Organic matter and coarse woody debris were added to jump start the wetland system and create a diverse wetland ecosystem. Students will plant the wetland with native vegetation which will include trees, shrubs, and grasses.

2008 Highlights:

- As a result of this project, surface water runoff from adjacent athletic fields and parking lots are filtered through the new wetland system before making its way to an adjacent forest. The Lake Forest High School Environmental Science Program is currently utilizing the site as an outdoor classroom, advancing the students knowledge of wetland ecology.



Dunning/Kauffman Wetland Restoration

The Division of Soil and Water Conservation, Drainage Program, in conjunction with the Kent Conservation District completed a wetland restoration project in late August 2008. The wetland restoration project was constructed in an agricultural field (landowner Jeff Dunning) with a portion of the project constructed in a backyard (landowner Isaac Kauffman). The project is located 5 miles west of Kenton (Pearson's Grove) in Kent County and is 2 acres in size.

University of Delaware Wetland Restoration

A wetland restoration project was constructed for the University of Delaware in a Dairy Pasture at the Ag complex just north of Worrilow Hall in Newark, New Castle County. The wetland receives runoff from the dairy barns, milking parlor, pasture, adjacent parking lots and roads. The wetland is 1 acre in size and was completed by the Division of Soil and Water Conservation, Drainage Program, in conjunction with the Kent Conservation District. Planting of this project with native trees, shrubs, grasses and sedges took place from October 14 - 17, 2008 by students and faculty. This site is highly visible and has generated enthusiasm from all at the college.

2008 Highlights:

- During the time period of 4/25/08 to 5/2/08 the Drainage Program staff coordinated the planting of approximately 1,200 native trees, shrubs, and grasses. The plants were

distributed among four wetland and stream restoration projects including Polytech High School (Wetland Restoration), Lake Forest High School (Wetland Restoration), Haines farm (Stream and Wetland Restoration), and Heron Drain Tax Ditch (Stream and Wetland Restoration). Volunteers who assisted with the plantings came from various agencies including students from Polytech and Lake Forest High Schools, the Division of Water Resources (Wetland and Subaqueous Lands Section), the Division of Soil and Water Conservation (Shoreline and Waterway Management Section), and the Department of Agriculture (Nutrient Management Section). All four events were a complete success!



vi. **Stream & Riparian Corridor Enhancement Program**

Pike Creek at The Independence School & Private Landowners Stream and Wetland Restoration Project

The Division of Soil and Water Conservation's Stream Restoration & Riparian Corridor Enhancement Program, in a partnership with the Independence School and three landowners south of the school, completed a stream and wetland restoration project along Pike Creek in March 2008.

This was the third major stream restoration project in the upper Pike Creek Watershed (previous projects have been completed at Three Little Bakers Golf Course to the south and the Meadowdale development to the north). The Independence School and private landowner sites along Pike Creek were excellent candidates for stream restoration because of their unique environmental and other related features:

- part of the White Clay Creek watershed - a designated National Wild & Scenic River System;
- serves as a source for public drinking water;
- one of only six trout put-and-take stocked streams in the State;
- provides a habitat corridor in an area of dense development;
- potential migration corridor for the endangered bog turtle; and
- landowners very interested and willing to participate in a restoration project.

The work done at the Independence School was entirely funded by the Delaware River & Bay Authority (DRBA) using funds received from the Federal Aviation Administration. The DRBA funded this project because the restoration work will serve as mitigation for stream and wetland impacts resulting from the New Castle County Airport runway expansion project. The DRBA was unable to find an area to restore near the airport because the area is so densely developed. The U.S. Army Corps of Engineers agreed that this would serve as an excellent mitigation site. The total funding provided by the DRBA for the work done at the Independence School was \$641,361. The cost of the restoration work done on the three private properties immediately south of the school was \$299,675 which was funded by DNREC's Ecological Restoration Fund along with funds from the following Environmental Protection Agency grants: Watershed Initiative; Nonpoint Source; and Non-regulatory Wetlands.

2008 Highlights:

- Approximately 3,175 linear feet of Pike Creek (main stem) along with 496 feet of an unnamed tributary to the main stream channel and adjacent banks were restored using state-of-the-art restoration techniques.

The restoration project also included the creation of 3.8 acres of wooded and emergent wetlands on the school property. The planting of over 4,800 native trees and shrubs in the wetland areas and along the stream was done to create a stream-side buffer which will improve water quality and provide wildlife habitat.

vii. Stream Monitoring and Assessment

Pike Creek In-Stream Environmental Monitoring

A private consultant performed pre- and post-restoration macroinvertebrate sampling in October 2006 at several sites along Pike Creek. Benthic macroinvertebrates served as biotic indicators of stream health to assess the effectiveness of stream restoration along Pike Creek. Four stream reaches were sampled; three in the restoration area and one from a regional reference stream. The methods used for pre and post restoration sampling were the same as those used for pre-restoration data collected in 2002 at the Three Little Bakers site. The first section of stream sampled was a 5,000 linear foot restored reach located at the Three Little Bakers Golf Course in Newark, Delaware. This area was sampled to assess one-year post-restoration effects. Data have been compared to baseline data collected prior to the restoration in 2002 by scientists from the Delaware Department of Natural Resources and Environmental Control (DNREC), Division of Water Resources, Environmental Laboratory Section. The second stream reach is an approximately 3,200 linear feet area located upstream of the restored section near Independence School. It was sampled to establish baseline data prior to restoration efforts which began in the summer 2007. The third reach was an approximately 500 linear feet reach located near the development of Meadowdale and was also sampled to establish pre-restoration baseline data. The fourth reach was the regional reference site at Middle Run, located within the same watershed (i.e., White Clay Creek).

Fish monitoring (pre- and/or post-restoration) was also done at these same sites by staff from the Division of Fish and Wildlife. Pre- and post-restoration monitoring was done to evaluate species size and types to determine the effectiveness of restoration efforts and collect baseline data prior to restoration. The results of these studies were finalized and are contained in the separate reports entitled: *Biological Assessment of Pike Creek (Macroinvertebrate and Habitat Survey)*; *Pike Creek Stream Restoration – 2006 Fish Monitoring Report*; and a *Summary of a Pre-restoration Fish Survey of Pike Creek in 2004*.

Additional sampling at these localities began in the fall 2008 and will continue to be used to evaluate the effectiveness of the restoration efforts along Pike Creek which began in 2005.

2008 Load Reduction:

- Based on research conducted by Land Studies in their August 2005 publication entitled “Stream Bank erosion as a Source of Pollution: Research Report,” for Piedmont streams in southeastern Pennsylvania, load reductions have been calculated for the stream

restoration projects completed within the Christina Basin drainage basin. The following table shows sediment, phosphorus and nitrogen load reductions using averaged load reduction rates derived from the report prepared by Land Studies.

Annual Load Reductions Based on Land Studies' Research* on Piedmont Streams in Penna.

	Length of Stream (feet)	Annual Sediment Load (tons/yr)	Annual Total P Load (lbs/yr)	Annual Total N Load (lbs/yr)
Pike Creek - Independence School	3,671	1,946	1,762	4,699
Pike Creek - Three Little Bakers	5,000	2,650	2,400	6,400
Pike Creek - Meadowdale	500	265	240	640
Red Clay - Hickory Spring Road	350	186	168	448
TOTALS	9,521	5,047	4,570	12,187

* 'Stream Bank Erosion as a Source of Pollution: Research Report' prepared by Land Studies, August 2005

Predicted annual load reduction rates for restored Piedmont streams in the Christina Basin.

viii. Shoreline Stabilization Cost Share

During this period, seven new vegetative stabilization projects were approved. Combined, the projects will result in stabilizing more than 675 linear feet of shoreline. Four of the projects are in the Inland Bays watershed, one project was constructed in the Broadkill River watershed on Red Mill Pond and the other two projects are in the Nanticoke watershed. Three of the projects involved construction of marsh toe sills totaling 470 linear feet of shoreline. The remaining four projects which are completed are in the involved installation of coir logs vegetation plantings. All of the FY 05 funds have been spent. One more project (see Robert and Mary Williams below) should be finished this year. Additionally, a letter was sent in December by the Section Manager of the Wetlands and Subaqueous Lands Section, Laura Herr, to cost share recipients thanking them for participating in the program. A short summary of the new projects along with their locations including latitude/longitude coordinate locations is as follows:

2008 Results:

- During this period, three new vegetative stabilization projects were completed. Combined, the projects will result in stabilizing 100 linear feet of shoreline. These projects are in the Inland Bays watershed. The projects involve the installation of coir logs with high marsh and low marsh wetland plantings. The projects are part of a larger “neighborhood” effort to stabilize the shoreline along the Salt Pond near Bethany Beach, DE.
- ✓ Lloyd and Linda Woodall – 31342 Point Drive, Lewes, DE – 105 linear feet of coir log with native herbaceous plantings along Red Mill Pond.
- ✓ Glenn and Susan Strohm - 13 Jeremy’s Branch, Schooner Village, Bethany Beach, DE - 40 linear feet of coir log with wetland vegetation plantings along the Salt Pond and including Phragmites control.
- ✓ Herbert Stouffer – 25269 Riverside Drive Ext., Seaford, DE – 270 linear feet of coir log, backfilled with 10.8 cubic yards of dredge material and planted with *Peltandra virginica*, *Pontederia cordata*, and *Sagittaria latifolia* to create a freshwater marsh shoreline along an unnamed lagoon connected to the Nanticoke River.
- ✓ William Johnson – 23710 Old Meadow Road, Seaford, DE – 180 linear feet of rock sill and coir log and 1440 square feet of marsh plantings including herbaceous and shrub native species along the Nanticoke River.
- ✓ Jennifer Anemone – Tax Parcel 2-34-17-33, Sloan Road, Pinewater Farms, Harbeson, DE – 120 linear feet of marsh toe sill constructed with a low profile rock sill and 1,700 square feet of low (*Spartina alterniflora*) and high marsh(*Spartina patens*) plantings in Burton Prong of Herring Creek.
- ✓ Mark Caraccia – 2 Jeremy’s Branch, Building A, Schooner Village, Bethany Beach, DE – 30 linear feet of coir log with wetland vegetation plantings (*S. patens* & *S. alterniflora*) along the Salt Pond and including Phragmites control.
- ✓ Richard Regester – 14 Jeremy’s Branch, Schooner Village, Bethany Beach, DE – 30 linear feet of coir log with wetland vegetation plantings (*S. patens* & *S. alterniflora*) along the Salt Pond and including Phragmites control.
- ✓ Robert and Mary Ellen Williams – 432 Canal Way East, The Salt Pond, Bethany Beach, DE – 133 linear feet (665 sq. ft.) of *Spartina alterniflora* vegetative stabilization in the Salt Pond.

ix. Nanticoke Restoration Plan

The Nanticoke Restoration Plan was developed by a multi-disciplinary team to identify priority areas for restoration in the watershed. The working group established the goal of focusing restoration activities to improve and maintain the ecological integrity of species and habitats and

the functions and services that they provide. The workgroup used the best available science and the diverse expertise of participants to identify conservation targets and locate these targets on the ground. Focusing the activities of the multiple groups that are working in the watershed on areas that are likely to have the greatest improvement on the health of the watershed will maximize the results of our collective efforts. This plan provides the scientific and ecological framework for targeting restoration activities based on three conservation goals: habitat restoration, water quality improvement, and stream biology/habitat improvement. This plan will be used to perform outreach, market restoration opportunities, and gain resources.

Implementation has begun by mailing out over three-hundred letters to landowners in cooperation with The Nature Conservancy and the letters will be followed with phone calls soon. We have also received funds for a coordinator position and on the ground restoration projects through the Chesapeake Bay Program. The funds will be available in the Summer of 2009. We have also begun working with conservation partners to bring match funds and implementation assistance.

A 1997 federal court case required Delaware to set pollution limits, or Total Maximum Daily Loads (TMDLs) for our waterways. Setting pollution limits is just the first step toward improving water quality. The important next step is the development of pollution control or reduction strategies. To develop these strategies, Delaware formed Tributary Action Teams (TATs) and tasked them with the specific responsibility of drafting formal documents titled, *Pollution Control Strategies*, which include numerous ways to reduce pollution levels. The Pollution Control Strategy (PCS) includes a combination of more than one pollution-reducing method. The PCS objectives are to:

- assist implementation of structural Best Management Practices (BMPs) in TMDL watersheds based on preliminary findings and recommendations of the Whole Basin Teams assigned by the Department of Natural Resources and Environmental Control for agricultural and urban activities;
- implement projects to support the development of TMDLs and accomplish objectives and milestones in Delaware's NPS §319 Management Plan; and
- determine watershed appropriate pollution control strategies for TMDL implementation.

x. ***Pollution Control Strategies – 2008 Project Implementation***

This section details the activities that occurred in the prioritized watersheds of Delaware during the 2008 calendar year. Many of the activities were targeted by the Tributary Action Teams (TAT) formed to draft and implement the Pollution Control Strategies being developed in response to the adopted total maximum daily loads. Funding of many *2008 Highlights* below is made possible through NPS Program funding provided to DNRECs Watershed Assessment Section.

Inland Bays Watershed

After 6 years of deliberation with a diverse group of watershed interests, DNREC proposed a draft Inland Bays PCS in early 2005. Based on comments received during three public workshops and other meetings with stakeholders, a second draft was presented at three additional workshops in May 2005. As a result of significant concerns raised by the development community, the Department met with developers and their consultants on technical issues and other matters related to the proposed regulations. This group met on the first and third Thursdays of each month through the fall of 2006. The Department committed to providing the House and Senate Natural Resource Committee members and the Sussex County Delegation an opportunity to review the final draft PCS before proceeding with the rulemaking process. However, the public was made aware of modifications in the PCS in areas of buffering, which resulted in several legislators asking the Department to revisit the buffering issue with the Center for the Inland Bays. The Department was hopeful that this review could occur in early 2007. However, it became apparent that consensus could not be reached in a short period of time. Therefore, the buffer portion of the Inland Bays strategy regulation was reserved and the Department committed to a Sussex County-wide buffer regulation by fall 2007. Public hearings were held for the regulations of the Inland Bays strategy on June 13th and 14th, 2007 and the public comment period closed June 29th. However, Senate Concurrent Resolution No. 18 was issued, requesting DNREC “not to implement the provisions” of the regulation in its present form. DNREC’s Secretary Hughes committed to provide a complete regulation, including a buffer provision, on or about October 1, 2007. As of that date, potential buffer provisions were still under discussion. Nevertheless, on June 1, 2008, the regulations were proposed in the Delaware Register of Regulations, opening a month-long public comment period.

A public hearing, attended by more than 400 interested individuals, was held on June 23, 2008 at the CHEER Center in Georgetown. A wide range of comments were received, with some in opposition to the proposed regulations, some in support of the regulations as written, and some requesting additional regulatory actions. The majority of comments focused on the proposed buffer and onsite wastewater treatment and disposal system provisions. The hearing officer reviewed all comments received on the proposed PCS regulation, and the Department's response to comments and reported to Secretary Hughes, who then signed the regulation October 15, 2008 and on November 1, 2008 the PCS became effective. The Department, however, now faces a legal challenge to the regulation from Sussex County and the outcome of this potential litigation may impact future PCSs especially in Sussex County. The Department decided to postpone moving forward with the Broadkill and Nanticoke Watersheds’ PCSs until these issues in the neighboring Inland Bays Watershed are resolved. However, Watershed Assessment Section is very slowly moving forward with available staff to promulgate the PCS for the St. Jones, Murderkill and Appoquinimink watersheds.

2008 Highlights:

- ***Pollution Control Strategy Implementation***

On the Pollution Control Strategy (PCS) front, the Watershed Assessment Section must unfortunately report that in 2008 the Watershed PCS team lost four support staff members due to moves, other career opportunities, and budget cuts. On the brighter side, in December 2008, the first watershed coordinator was hired for Southern New Castle

County. The position's primary duties are to administer to the Appoquinimink River Association, to act as a mentor for future coordinators and to facilitate implementation of the Appoquinimink Tributary Action Team recommendations for the Appoquinimink watershed. This position was first established in 2004 with a New Castle Conservation District employee occupying the position for the last three years. Funding for the position was provided by the Department, DelDOT, New Castle County, and several grants obtained by the nonprofit organization. Due to Departmental policies, this position could not be maintained. The Board of Directors of the Appoquinimink River Association requested a position be established through the State of Delaware General Assembly. The General Assembly created the position at the end of fiscal year 2008 and included funding

- ***Nutrient Management Planner***

On March 15, 2008 the urban Nutrient Management Planner resigned from a full-time position with the Kent Conservation District and then worked part-time until June 30, 2008. During the months between October 2007 and April 2008, the Urban Nutrient Management Planner worked on the following projects:

- A rain garden and outlet structure was constructed for a stormwater pond in Marydel, DE at the Immaculate Conception Church located in the Upper Chesapeake Watershed. The rain garden and improved outlet reduced nutrient and other pollutant runoff from the road and parking lots surrounding the pond. The project design awaited final approval from the Maryland Department of Transportation. On Wednesday June 3, staff from the 319nPS program and Watershed Assessment participated in the planting the "raingarden" and vegetative buffer adjacent to a stormwater pond owned by the Immaculate Conception Church in Marydel. A local parishioner of the church (Mr. Webb) also participated. Later in the summer of 2008, the pond had sediment removed and transported nearby to a parishioner's property. Additional plantings were done in the raingarden in late October, 2008. The purpose of the raingarden and buffer is to reduce nutrient runoff into the stormwater pond and help achieve TMDL nutrient reductions prescribed for the Chesapeake Bay. Funding for the project was provided by a grant from the Chesapeake Bay program.
- Two wetland projects, also known as Schoolyard Habitats, were designed for an elementary school and high school in Sussex County, Delaware. The plants and wetland workshops were contracted out to Environmental Concern. On April 29th, the Indian River High School wetland was completed, and 900 students, science teachers, and about 20 AARP volunteers planted the wetland. The Center for the Inland Bays organized the workshops and helped bring in volunteers from the community. The students worked very hard planting the wetland. At Indian River High School, wetland science has been added to their curriculum, and the materials and information for the curriculum was presented to the teachers and students in two separate workshops. The East Millsboro Elementary School wetland was completed in June of 2008 with the help of students and teachers.

rient management, stormwater runoff, and native plants. A buffer was completed in November of 2007 around the parking lot that drains to a tax ditch a few feet away. The second phase, a raingarden and installation of two rain barrels, was completed on May 7th, 2008 with the help of several volunteers from the town of Millville and the Center for the Inlands Bays. See attached Inland Bays Journal for additional information on the two above projects.

Appoquinimink Watershed

The project objectives for 2008 were to: assist implementation of structural Best Management Practices (BMPs) in TMDL watersheds based on preliminary findings and recommendations of the Whole Basin Teams assigned by the Department of Natural Resources and Environmental Control (Department) for agricultural and urban activities; implement projects to support the development of TMDLs and accomplish objectives and milestones in Delaware's NPS §319 Management Plan; determine watershed appropriate Pollution Control Strategies for TMDL implementation.

2008 Highlights:

- ***Jean Birch MOT Senior Center Raingarden Retrofit***
Two years after the creation of the raingarden from a dry pond stormwater management area, the Appoquinimink River Association (ARA) is still taking the lead on maintaining the area for the town of Middletown. Maintenance during 2008 included weed control, mulching, invasive control and the addition of more native plants to the area. Plans were devised to move toward a more maintenance-free upland area by making it strictly a meadow. Sediment and erosion control structures that were created by DNREC engineers were implemented.
- ***Riparian Buffer Revegetation***
The ARA worked with St. Andrews School to plan an 11.5 acre riparian reforestation project around Noxontown Pond in Middletown. Invasive species were removed and the site was prepared by mowing. The area was planted with over 2,500 native trees and shrubs of various sizes and was surrounded by plastic and electric deer fencing. All planting was accomplished by volunteers over a two week time period.
- ***Watershed Newsletter***
There was a continuation of sending over 300 residents of the watershed and surrounding area newsletters in the spring and fall. Topics that were covered included wetlands, the water cycle, community habitats, water conservation, Blackbird Creek Reserve and the Forestry Stewardship Council.
- ***Community Wildlife Habitats***
Working with the Delaware Nature Society and the town of Townsend, the ARA continued the process to make Townsend the first Community Wildlife Habitat in the

state of Delaware. As a part of this project, workshops were developed to discuss how to create rain barrels, backyard conservation and composting.

- ***Rain Barrel Brochure***

As a result of the rain barrel workshops, the ARA created and developed an educational brochure discussing step-by-step procedure to create a rain barrel for your home.

- ***Middletown Stream Restoration***

Using the Center for Watershed Protection's Appoquinimink Implementation Plan, the ARA visited several high priority stream restoration projects throughout the watershed. An urban stormwater drainage channel draining into a stream that leads to Silver Lake was chosen as the final project. Biological and chemical monitoring plans were developed and started in order to get water quality data pre-construction. Biohabitats was contracted by co-partner DNREC to develop the design of the project.

Broadkill Watershed

In October of 2007 a watershed-wide stream assessment in partnership with Duffield Associates was done to identify potential projects that will be implemented throughout the watershed. DNREC, Duffield Associates and the Center for Watershed Protection are working together to organize teams of local volunteers to collect basic stream quality/habitat data for the assessment, which will be used to help identify problems and improve water quality. Duffield will analyze data gathered by the volunteers and will return to the Broadkill Tributary Team to suggest potential solutions to problems identified during the assessment.

In addition in the watershed-wide assessment, in December of 2007 the Center for Watershed Protection conducted a stormwater retrofit inventory and upland assessment to identify restoration and pollution prevention opportunities using protocols described in the Center's Small Urban Watershed Restoration Manual Series, *Stormwater Retrofit Practices* (Schuler et al., 2007) and *Unified Subwatershed and Site Reconnaissance User's Guide* (Wright et al., 2004), respectively. These assessments concentrated within the towns of Georgetown, Milton and Lewes but also covered institutional and other commercial areas throughout the watersheds. These assessments did not target agricultural areas already participating in nutrient management planning. During the stormwater retrofit inventory, field teams looked for opportunities to install new stormwater practices or retrofit existing facilities (e.g. dry ponds) to better meet TMDL nutrient load reductions, enhance adjacent stream/wetland restoration projects, and to increase tree canopy cover. The center also visited sites where there was a large amount of untreated impervious cover (parking lots), municipal or public properties that may serve as good demonstration sites (schools and town halls). The project was completed in late 2008 and results were present to the Broadkill Tributary Action Team in early December.

Upper Chesapeake Bay Watershed

The Upper Chesapeake Tributary Action Team has been meeting since April, 2006. The team is working as part of the larger Chesapeake Bay Basin and will make recommendations to reduce

excess nutrients in the Chester and Choptank Rivers in Delaware. The team gave its PCS recommendation to Secretary Hughes in February 2008.

In April 2008 members of the Tributary Action Team formed into the Upper Chesapeake Watershed Tributary Action Team's Task Force and hope to meet quarterly. The Task force will focus on tax ditch, the PCS recommendations, and development/landuse concerns.

St. Jones Watershed

In November of 2007 a watershed-wide stream assessment in partnership with Duffield Associates was done to identify potential projects that will be implemented throughout the watershed. DNREC, Duffield Associates and the Center for Watershed Protection are working together to organize teams of local volunteers to collect basic stream quality/habitat data for the assessment, which will be used to help identify problems and improve water quality. Volunteers looked for aquatic life such as insects and fish, stability of stream banks, and their ability handle storm events. The teams also inspected areas where streams maybe clogged with soil or debris. Based on the observations and data gathered by volunteers, Duffield staff returned to the St. Jones to identify potential solutions to address the problems discovered.

The Center for Watershed Protection also conducted a stormwater retrofit inventory and upland assessment to identify restoration and pollution prevention opportunities for the St Jones watershed. Similar to the Broadkill, the assessment concentrated within the towns of Dover, Camden, and Wyoming but also covered institutional and other commercial areas throughout the St Jones. These assessments did not target agricultural areas already participating in nutrient management planning. As with the Broadkill, during the stormwater retrofit inventory opportunities to install new stormwater practices or retrofit existing facilities (i.e. dry ponds) to better meet TMDL nutrient load reductions, enhance adjacent stream/wetland restoration projects, and to increase tree canopy cover were identified. The project was completed in late 2008 and results were present to the St Jones Tributary Action Team in early December.

2008 Highlights:

- **Silver Lake Revitalization Project**

Through a cooperative effort amongst DNREC's Watershed Assessment Section, 319 Nonpoint Source Program, Division of Parks and Recreation Environmental, DELDOT's Environmental Program, City of Dover, the Silver Lake Commission, and Polytech High School, improvements to Silver Lake Park occurred over the spring and summer of 2008. The cooperative effort used various forms of public input and discussion amongst themselves to establish the goals and work plan for the Silver Lake Revitization project. The easiest parts of the buffer project were done first, establishing a tree buffer south of the Silver Lake dam and across from the bridge on Loockerman Street. For this initial native tree buffer planting, the City of Dover through Bill Cooper (Grounds Superintendent) took the lead and Watershed Assessment assisted with publicity and outreach for the event. Over 100 trees were planted by over 50 volunteers. Watershed Assessment also assisted the City of Dover by watering the trees and plants over this dry summer. To supply some of the herbaceous plant stock for the buffer project, Watershed Assessment purchased native plant seeds using federal 319 Nonpoint Source Grant funds

and worked with the help of Sue Wujtewicz (a Polytech Environment Science Teacher). Ms. Wujtewicz plus her environmental science students grew over 5000 native plants. The students were so successful in their cultivation of native plants that they were planted all over Kent County in other habitat improvement projects.

In order to move into another phase of the revitalization project, invasive plants near the dam of Silver Lake had to be removed. Watershed Assessment contacted Rob Line and Glenn Stubbolo both with the Division of Parks and Recreation to remove the invasive plants. Glenn obtained a team of Americorps volunteers located in Maryland to assist with the plant removal. Rob Line and his environmental stewardship group gave on-the-ground assistance as well as the supply of herbicide used to kill porcelain berry, english ivy, multiflora rose, and phragmites. The stewardship plant group also removed invasive plant material from Central Middle School property. The school would like to develop an outdoor classroom on the banks of the St Jones River and is eager to establish a native plant buffer along the river as part of the Silver Revitalization project. The plans are to finish the initial buffer planting this fall and to start working on the stormwater improvement aspects of the project. In fact, Randy Cole with DELDOT's Environmental Program provided their stormdrain video equipment truck and crew to video the stormdrains on Kings Highway to look for potential improvements.

On November 1st, 2008, the volunteers plan to plant over 50 trees and nearly 600 shrubs along the banks of the St. Jones River in Dover. The 50 native trees were purchased with funds donated by NRG Energy. In addition almost 600 native shrubs purchased with 319NPS grant. The project will continue in 2009 with some stormwater improvements and perhaps some stream restoration near the dam.

- **Fallen Leaf Removal Project**

Watershed Assessment met with Tony Deprima (Dover City Manager), Scott Koenig, (Dover City Engineer) and Zack Carter (Dover Parks and Recreation) about the grant and obtaining an area of Dover streets to be used as a trial area to remove fallen leaves. Watershed also discussed the project with the Silver Lake Commission. A farmer (Webber Farm, Inc.) was willing to use his bailer for the removal project and on December 12 in Fox Hal area leaves were bailed. The bailer left too much on the street and the grant was not large enough to attempt the modifications on the bailer for this project.

- **Rain barrels**

In an effort to implement a comprehensive water conservation plan, the Department of Natural Resources and Environmental Control's Nonpoint Source Program offered a cost-share program providing rain barrels to residents living in the St. Jones River Watershed and the City of Dover. These barrels, which typically cost over \$100, were available for purchase for only \$35 through the program. The barrels were available for pickup on September 30th to October 2nd (from 11 am to 7 pm) at the City of Dover Grounds Division off Water Street.

Christina Watershed

The Christina Basin Tributary Action Team submitted their final Pollution Control Strategy (PCS) to DNREC in November 2007. The Christina Basin PCS includes specific recommendations that will reduce nonpoint source nutrient and bacteria loadings throughout the Delaware portion of the watershed. The PCS contains a total of 40 voluntary and regulatory recommendations which are divided into five key areas: wastewater, open space, stormwater, agriculture, and education. For each recommendation the PCS outlines the type of recommendation (voluntary or regulatory), estimated nutrient and bacteria reductions, implementing organizations, cost, source of funding, and priority location for implementation.

The Team is currently working to implement and track the progress of the 40 recommendations outlined in the PCS. Most recently the Team compiled a list of site specific projects to achieve the nutrient and bacteria reductions required by the TMDLs. The Team is coordinating this list of projects and the overall implementation of the PCS with the Christina Basin Clean Water Partnership. The Christina Basin Clean Water Partnership is comprised of government, private groups, and academia, formed in 1995 with the role of coordinating a scientific approach to improve the water quality in the basin and meet the region's water needs. The Tributary Action Team's coordination with the bistate Christina Basin Clean Water Partnership ensures that the efforts throughout the basin are being implemented in a coordinated, efficient, and watershed approach.

The stormwater database from the New Castle County lacked the drainage area of stormwater structure. This particular information is critical to calculate nutrient reduction from stormwater structures. After much deliberation, an employee of the Water Resource Agency and a DNREC seasonal employee developed a GIS model to calculate drainage areas of each stormwater structure. Once the area was calculated, nutrient reduction from stormwater structures were computed. Based on this work, a report was developed on the "Analysis of Stormwater BMPs in reducing Nutrient Loads in Delaware's portion of Christina Basin." This project should be finished by early 2009. The Christina Tributary Action Team has established working committees to begin implementing some of the PCS recommendations.

xi. Delaware Clean Marina Program

The Delaware Department of Natural Resources and Environmental Control's Clean Marina Program offers marinas, boatyards and recreational boaters the opportunity to participate in efforts to protect Delaware's natural resources.

The Delaware Clean Marina Program recognizes and promotes marinas, boatyards and yacht clubs of any size that meet legal requirements and voluntarily adopt pollution prevention practices. We aim to certify at least 35 percent of Delaware's estimated 100 marinas as Clean Marinas. The program was developed as an alternative to additional regulations on the marina industry and all marinas and boatyards are encouraged to participate!

2008 Results:

There were six marinas certified to be Delaware Clean Marinas in 2008:

- Bay Colony Community Yacht Club

- Rehoboth Bay Marina
- Creek's End Marina
- Pier Point Marina
- Nanticoke River Marine Park
- Delaware City Marina

This brings the total of Delaware Cleans Marinas to twelve.

2008 Highlights:

- Delaware's first "Clean Marina Expo" was held in April 2008 at the Delaware Technical Community College in Georgetown. The Expo greeted over 30 representatives from 17 different marinas in the state. The attendees had access to exhibitors whose businesses and/or organizations provide environmentally-sound products and services, and also to DNREC personnel charged with protecting and preserving the environment.
- The Clean Marina Program sponsored training by DNREC's Emergency Response Branch in September 2008 at the Rehoboth Bay Marina. Over 30 people attended the training and learned ways to prevent, recognize and react to a fuel or sewage release on Delaware's waterways. A demonstration of equipment and clean-up techniques provided information of how to develop a spill response plan.

The same training was also held at Delaware City Marina in November 2008. The training was conducted by the Pollution Prevention Program. There were 15 attendees.

Funding

Grant money is occasionally available for marinas that have pledged to become a Delaware Clean Marina. This money has been used to install pollution reducing equipment, educational signage, and to develop emergency plans for fuel and oil spill containment. This money is offered as a cost-share with the Clean Marina Program (CMP) paying between 50-75% of the costs for each item. The Delaware Clean Marina program administers this funding.

2008 Highlights:

- Pumpouts (new & reconditioned): 18; funds from CMP \$245,448
- Spill Prevention, Control and Countermeasure Plans: 4; funds from CMP \$3,000
- Educational Signage: 3 sets; funds from CMP \$5,315
- Oil Spill Kits & Pads: 9; total funds from CMP \$2,650
- Other (safety & waste equip.): 4; total funds from CMP \$1,055
- Pumpout cost-share (75/25): \$70,000

VII. Load Reductions

In 2008, load reductions were calculated for many of the projects completed. Load reductions are calculated using guidance established during the Inland Bays Tributary Action Teams' development of the Inland Bays Pollution Control Strategy.

2008 Project Load Reductions by Project

Project	Nitrogen	Phosphorus	Sediment
Nutrient Management Relocation	81,451.98	8,145.19	NA
KCD Planners	328,238.00	3,084.00	NA
SCD Planners	328,208.23	1,735.98	NA
Inland Bays PCS BMPs	111,144.60	NA	NA
CREP	10,827.30	357.30	NA
Stream Restoration	12,187	4,570	5,047

2008 Project Load Reductions by Watershed

Nutrient Relocation – Nitrogen & Phosphorus

Watershed Name	N	P
Upper Saint Jones River	463	46
Issac Branch	180	18
Tidbury Creek	119	11
Lower Saint Jones River	328	32
Browns Branch	675	67
Spring Branch-Murderkill River	770	77
Spring Creek	879	87
Ash Gut-Murderkill River	429	42
Murderkill River-Town of South Bowers	761	76
Upper Mispillion River	307	30
Upper Cedar Creek	826	82
Middle Mispillion River	277	27
Lower Missipillion River	249	24
Slaughter Creek	831	83
Lower Cedar Creek	732	73
Round Pole Branch-Broadkill River	914	91
Primehook Creek	833	83
Beaverdam Creek-Broadkill River	622	62
Canary Creek-Broadkill River	625	62
Cow Bridge Branch-Indian River	3,450	345
Long Drain Ditch-Betts Pond	1,403	140
Vines Creek-Indian River	1,352	135
Swan Creek-Indian River	1,057	105
Indian River Bay-Indian River Inlet	1,217	121
White Creek-Indian River Bay	1,341	134
North Prong Wicomico River	1,385	138
Careytown Branch-Pocomoke River	4,681	468
Assawoman Bay	270	27
Little Assawoman Bay	1,706	170
Headwaters Nanticoke River	4,632	463
Gum Branch	2,189	218
Clear Brook-Nanticoke River	4,190	419
Upper Deep Creek	1,041	104

Lower Deep Creek	1,663	166
Butler Mill Branch-Nanticoke River	5,062	506
Gales Creek-Nanticoke River	1,622	162
Hitch Pond Branch	5,745	574
Elliott Pond Branch	3,386	338
James Branch	4,573	457
Little Creek-Broad Creek	6,633	663
Tussocky Branch-Broad Creek	4,695	469
Headwaters Marshyhope Creek	1,327	132
Saulsbury Creek-Marshyhope Creek	2,780	278
Tommy Wright Branch-Marshyhope Creek	1,540	154
Sullivan Branch-Marshyhope Creek	645	64
Barren Creek-Nanticoke River	1,023	102

KCD Planners – Nitrogen & Phosphorus

Watersged	N	P
Duck Creek	4,650	59
Smryna River	435	7
Upper Leipsic River	15,309	101
Duck Creek-Delaware Bay	3,144	50
Lower Lepsic River	6,641	94
Simons River-Delaware Bay	14,895	132
Little River-Delaware Bay	7,285	24
Upper Saint Jones River	472	7
Issac Branch	5,089	21
Tidbury Creek	11,296	84
Lower Saint Jones River	9,296	102
Browns Branch	18,186	109
Spring Branch-Murderkill River	16,462	111
Spring Creek	2,228	22
Ash Gut-Murderkill River	12,739	125
Murderkill River-Town of South Bowers	17,980	74
Upper Mispillion River	6,893	61
Middle Mispillion River	11,954	87
Lower Missipillion River	5,045	27
Andover Branch	13,300	193
Cypress Branch	231	130
Tappahanna Ditch-Choptank River	17,074	326
Cow Marsh Creek	25,078	17
Gravelly Branch-Choptank River	708	52
Chapel Branch-Choptank River	3,060	32
Fowling Creek-Choptank River	3,720	113
Headwaters Nanticoke River	11,801	273
Headwaters Marshyhope Creek	27,796	654
Saulsbury Creek-Marshyhope Creek	54,794	4
Tommy Wright Branch-Marshyhope Creek	677	59

SCD Planners – Nitrogen & Phosphorus

Watershed	N	P
Upper Mispillion River	7,559	9
Upper Cedar Creek	11,440	1
Middle Mispillion River	6,942	221
Lower Mispillion River	9,109	18
Slaughter Creek	12,713	7
Lower Cedar Creek	10,143	0.5
Round Pole Branch-Broadkill River	7,245	329
Primehook Creek	16,770	57
Beaverdam Creek-Broadkill River	11,667	94
Canary Creek-Broadkill River	12,083	61
Vines Creek-Indian River	8,772	34
Swan Creek-Indian River	724	7
White Creek-Indian River Bay	278	17
North Prong Wicomico River	56	42
Careytown Branch-Pocomoke River	14,759	246
Assawoman Bay	1,713	24
Little Assawoman Bay	2,279	130
St. Martin River	6,538	161
Headwaters Nanticoke River	17,327	57
Gum Branch	14,032	1
Gravelly Branch	16,834	53
Clear Brook-Nanticoke River	13,092	105
Upper Deep Creek	10,609	54
Lower Deep Creek	8,290	9
Butler Mill Branch-Nanticoke River	22,090	1
Hitch Pond Branch	12,566	220
Elliott Pond Branch	2,484	18
James Branch	8,480	7
Little Creek-Broad Creek	10,960	0.5
Tussocky Branch-Broad Creek	14,161	329
Saulsbury Creek-Marshyhope Creek	900	57
Tommy Wright Branch-Marshyhope Creek	15,607	94
Sullivan Branch-Marshyhope Creek	2,557	61
Faulkner Branch-Marshyhope Creek	1,575	34
Gales Creek-Nanticoke River	12,403	7
Barren Creek-Nanticoke River	3,434	17

CREP – Nitrogen & Phosphorus

Watershed	N	P
Smryna River	379	14
Upper Saint Jones River	185	7
Lower Saint Jones River	339	13
Murderkill River-Town of South Bowers	5,015	167
Upper Cedar Creek	132	4
Lower Mispillion River	431	16
Upper Sassafra River	69	2

Andover Branch	58	2
Andover Branch	182	7
Careytown Branch-Pocomoke River	640	21
Butler Mill Branch-Nanticoke River	719	24
Little Creek-Broad Creek	987	33
Tussocky Branch-Broad Creek	416	14
Headwaters Marshyhope Creek	503	16
Barren Creek-Nanticoke River	765	25

Cover Crop – Nitrogen

Watershed	N
Wolfe Glade-Rehoboth Canal	29,358
Herring Creek-Rehoboth Bay	19,013
Rehoboth Canal-Rehoboth Bay	3,250
Cow Bridge Branch-Indian River	22,302
Long Drain Ditch-Betts Pond	2,746
Vines Creek-Indian River	10,231
Swan Creek-Indian River	17,236
Indian River Bay-Indian River Inlet	4,989
White Creek-Indian River Bay	88
Little Assawoman Bay	1,927

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 center on impaired waters of the state when applicable.

Using geospatial data coverage, areas of Delaware will be identified as high priority for NPS activities. This delineation will assist the NPS Program during the review and ranking of submitted annual 319 grant project proposals. Highest priority will be designated in impaired water drainages or sub-drainages that have the highest rate of NPS control BMPs, activities or projects. As EPA has mandated 319 Grant expenditures should be focused on impaired waters with an approved Watershed Plan and/or a defined Pollution Control Strategy, assessment and establishment of priority drainages are scheduled first these areas or Delaware first.

Land Use Changes

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 around 900,000 acres of farmland in 1920. Now 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.

Land Use Challenges

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 2008 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	Jim Cassidy	DNREC/Groundwater Discharges
Alan Jones	Governor's Council on Forestry	Jim Chaconas	DNREC/Wetlands & Subaqueous Lands
Ann Marie Townshend	Kent County Planning Office	Jim Short	DNREC/Solid Waste
Austin Short	Delaware Department of Agriculture/Forestry	Joe Farrell	University of Delaware, Sea Grant
Betsy Frey	DNREC/Air & Waste	Kathy Bunting-Howarth	DNREC/Water Resources
Bill Rohrer	Delaware Nutrient Management Program	Kim Finch	DNREC/Small Businesses Ombudsman
Bob Coleman	Delaware Nutrient Management Program	Kimberly Cole	DNREC/Delaware Coastal Program
Bob Moore	Delaware Department of Agriculture	Kip Foskey	Sussex Conservation District
Bonnie Willis	DNREC/Delaware Coastal Program	Laurie Janeka	New Castle Conservation District
Brenda Zeiters	DNREC/NPS Program	Lyle Jones	DNREC/Watershed Assessment
Brian Hall	State of Delaware Planning Office	Lynn Mangus	Farm Service Agency (State Office)
Bud Malone	University of Delaware, Cooperative Extension	Marianne Walch	DE Department of Transportation
Carl Solberg	Kent County	Mark Biddle	DNREC/Watershed Assessment
Chuck Williams	DNREC/Shoreline	Mark Hogan	DNREC/NPS Program
Dale Churchey	Delaware CREP Program	Mike Brown	DNREC/ District Operations
Dave Chapman	University of Delaware, Sea Grant	Paul Evans	DNREC/Sediment & Stormwater
Dave Hansen	University of Delaware, Cooperative Extension	Randy Cole	DE Department of Transportation
Dave Schepens	DNREC/Groundwater Discharges	Ric Kautz	County Planning Offices
Derby Walker	University of Delaware, Cooperative Extension	Robert Baldwin	DNREC/Soil & Water Conservation
E.J. Chalavala	Center for the Inland Bays	Robert Palmer	DNREC/NPS Program
Ed Lewandoski	CIB Center for the Inland Bays	Rodney Morehart	Kent Conservation District
Eric Beuhl	Center for the Inland Bays	Sally Kepfer	NRCS (State Office)
Frank Piorko	DNREC/Sediment & Stormwater	Sam Myoda	DNREC/Watershed Assessment
Glenn Gladders	Delaware Department of Agriculture/Forestry	Sara Wosniak	Appoquinimink Watershed Coordinator
Gordon Johnson	University of Delaware, Cooperative Extension	Scott Blaier	DE Department of Agriculture
Greg Moore	DNREC/Fish&Wildlife	Sharon Webb	DNREC/ NPS Program
Jen Campagnini	DNREC/Office of the Secretary	Shelley Tovell	DNREC/Fish&Wildlife
Jen Gochenauer	Delaware Nature Society	Steve Ditmer	Glatfelter Pulp Wood Company
Jen Nelson	DNREC/NPS Program	Steve Williams	DNREC/Soil & Water Conservation
Jerry Kauffman	Water Resources Agency	Tim Garrahan	NRCS State Office
Jessica Watson	Sussex Conservation District	Tim Riley	Kent Conservation District