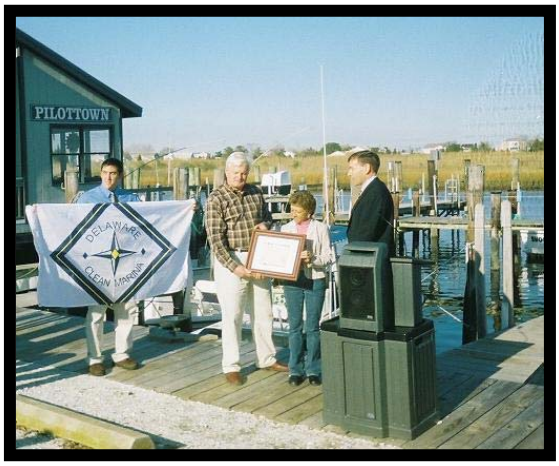
Delaware

NONPOINT SOURCE PROGRAM ANNUAL REPORT

2006

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL



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DELAWARE NPS NONPOINT SOURCE PROGRAM

INTRODUCTION

This publication represents the State of Delaware's Nonpoint Source Program 2006 Annual Report. Section 319 of the Clean Water Act requires each State to report annually on progress in meeting nonpoint source management program milestones, and to report available information on reductions in nonpoint source loadings and improvements in water quality.

The Delaware Nonpoint Source (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 2006, 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 stbilzation 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 Conservation District Planners. Details of each of these activities will be found in the pages that follow.

New to Delaware's Annual Report process is the inclusion of several targeted watersheds and NPS related activities occurring therein. For 2006, we have chosen to highlight an update for the Three Little Bakers Stream Restoration in the Pike Creek Watershed and the Perkin Runs Stream Restoration Project in the Perkins Run Watershed. As you will read, some exciting and progressive NPS strategies and activities are being pursued in these areas of Delaware!

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 2007 and beyond to make progress towards meeting the State's water quality goals.

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AGRICULTURE

Delaware's Conservation Reserve Enhancement Program

The Delaware Conservation Reserve Enhancement Program (CREP) was established in Delaware in 1999 with a designated goal of improving water quality and enhancing wildlife habitat in the coastal plain geographic areas of the Delaware, Chesapeake, and Inland Bays watersheds. The Delaware CREP Program is a voluntary, incentive-based federal program that pays farmers and landowners' attractive incentives for putting their least productive lands under a 10 or 15 year contract that requires the land to be put into the conservation practice the landowner chooses. Landowners can establish forest, native warm-season grasses, or cool season grasses. In return the landowner receives cost-share, annual rental payments, and generous bonus payments.

A recently installed Permanent Wildlife Habitat planting (CP4D).

Agencies cooperating for Delaware include: the Department of Natural Resources and Environmental Control, Division of Soil & Water Conservation, and the Delaware Department of Agriculture, Forestry Division. In addition, the CREP Program is assisted by the three conservation districts in Delaware as well as the USDA Natural Resources Conservation Service, the U.S. Fish and Wildlife Service, and The University of Delaware. In order to coordinate and maximize assistance provided to voluntary cooperating landowners, a full-time CREP Coordinator was hired with funds provided by Section 319 of the Clean Water Act.

The goals established by the Delaware CREP program are as follows:

- Reduce nutrient and sediment loadings to impaired streams;
- Meet water temperature and dissolved oxygen criteria necessary to support biology and wildlife;
- Increase upland wildlife habitat and create wildlife corridors.

The following CRP practices were selected in Delaware to achieve these goals:

- CP21 Grassed Filter Strips
- CP22 Riparian Buffers
- CP23 Wetlands Restoration
- CP3A Hardwood Tree Planting
- CP4D Permanent Wildlife Habitat

Delaware initially set a goal of establishing 6,000 acres of selected practices to meet the goals of the CREP Program. To date over 5,000 acres have been installed under contracts of ten and fifteen year terms. Since the Program's

inception, the NPS Program has utilized CWA Section 319 funding for the Delaware CREP Coordinator position. Dale Churchey, the current CREP Coordinator, is tasked with promoting the Program and implementing the eligible practices. Enrollment continues to rise as Dale identifies practice needs on eligible properties and assists landowners through the enrollment process.

Currently, the USDA Farm Service Agency pays 50% of installation costs for CREP practices and the State of Delaware pays 37.5% of the costs. On practices CP21 and CP4D FSA pays 64% of the incentive payments and Delaware pays 36%. On practices CP22, CP23 and CP3A FSA pays 73% and Delaware pays 27%.

The cumulative CREP reductions in nitrogen, phosphorus, and sediment loads have been estimated using calculations developed through the Delaware's - Inland Bays Pollution Control Strategy process. These reductions are estimated as follows:

Pollutant	***Reduction Units***
Nitrogen	185,209 Pounds/year
Phosphorus	8,263 Pounds/year
Sediment	33,071 Tons/year

These figures are estimates of the amount of each pollutant that does not reach surface and ground waters as a result of CREP vegetative buffers. Load reductions have been incorporated into the TMDL process, both for loads credited as already reduced and for future reductions from additional implementation.

The CREP Program continues to face a wide array of programmatic challenges. For example, Delaware has experienced a recent population explosion resulting in inflated land values. As a result farm land owners have been reluctant to enter into long term contracts for fear that they might not be able to accept lucrative offers from developers. Another result of this phenomenon is stiffer competition between farm operators for the remaining agricultural land which has driven up farm land rental prices further competing with CREP as an alternative land use.

A newly installed Shallow Water Acreage for Wildlife (CP9).

To provide additional incentives for participation, the partners recently proposed revisions to the Delaware CREP Agreement. The following list of proposed changes was requested in order to expand the program and improve it's viability to participants:

1. Add practice CP23A Wetland Restoration (non- floodplain)

2. Add practice CP9 Shallow Wildlife Pond

3. Modify practice CP4D to increase acreage allowable per Farm Tract to Ten acres or ten percent of cropland instead of the current five acres or five percent.

4. Add an area of coastal plain in eastern Kent County previously not included in program area.

5. Increase total CREP acreage to 10,000 acres.

For more details, please refer to Appendixes A through C.

Highlight

One outstanding highlight for the year was Mr. and Mrs. Frank Fleetwood devoted the majority of their cropland to hardwood tree planting (CP3A) under the Delaware CREP Program.

Tree planting on the Fleetwood Farm.

The remainder of their cropland will be established in wildlife food plots installed using their own funds. These conservation practices will protect the headwaters of Morgan Branch, a tributary of the Nanticoke River, while greatly enhancing the areas wildlife habitat. This land is located near US Route 13 and adjacent to a major commercial enterprise.

Sussex Conservation District Agricultural Conservation Planners

The Sussex Conservation District continues their Equipment and Sediment and Stormwater Programs, and Conservation Planning Activities. The 319 Program continues to fund SCD's Conservation Planners and Compliance Inspector and realizes great environmental benefits from their activities.

Calibrated manure spreader ready for the field.

Some of the services provided by the Conservation Planners include soil sampling and nutrient management, phosphorus site index analysis, manure spreader calibrations to ensure accurate application of manure to crop fields and pre-sidedress nitrate testing (PSNT) of corn. This year, PSNTs alone resulted in a reduction of 72,082 pounds of nitrogen

applied to crop fields, compared to planned application rates in the absence of the test. The SCD also participated in a number of outreach events to educate the public on soil conservation practices and the availability of technical and cost-share assistance available to landowners to implement BMPs on their property. They staffed an informative and interactive exhibit along with other partners in the Delaware Conservation Partnership at the Delaware State Fair. They also participated in the Ecowalk Earth Day Celebration and Coast Day at the University of Delaware in Lewes. Additionally, the SCD held the Tax Ditch Breakfast on December 7th, allowing the District the opportunity to commend landowners on their participation in the District's Programs.

The following is a summary of Planner Activities for 2006:

Planning Activities and Mgmt. BMPs:

	Number	Acreage
Landowner Contacts	1,633	
Conservation Plans		31,075
Nutrient Mgmt. Plans	32	8,166
Animal Waste Plans	22	NA
FY06 Cover Crops Enrolled	117	39,651
FY06 Cover Crops Planted		25,241
FY07 Cover Crops Enrolled	158	60,903
FY07 Cover Crops Planted		29,477
Soil Samples	220	5,291
PSNTs	151	7,512
Manure Samples	30	NA

Sussex County Cover crop nitrogen load reductions are demonstrated in Appendix D.

Structural BMPs and Equipment:

	District	EQIP	Total
Manure Shed	13	21	34
Composter	13	12	25
Poultry Windbreak	2	5	7
Ag Waste System	1	0	1
Irrigation System	0	10	10
Heavy Use Protection Area	48	239	287
Poultry Litter Amendments	0	37	37
Rentar Fuel Catalysts	60	0	60
Vegetative Shoreline Stabilization	3	0	3

Dollars Expended:

District Cost-Share	$ 859,026
EQIP	$ 2,564,539
Cover Crop	$ 597,779

Kent Conservation District Agricultural Conservation Planners

The Kent Conservation District Planners continued their work this year with agricultural landowners to install best management practices, write nutrient management plans and educate the public on soil conservation and other environmental issues.

Planning Activities and Mgmt. BMPs:

	Number	Acreage
Landowner Contacts	203	
Conservation Plans		22,262
Nutrient Mgmt. Plans	31	7,431
Animal Waste Plans	31	NA
Cover Crops	71	10,738
Soil Samples	287	7,345
PSNTs	206	8,438
Manure Samples	25	NA
Pasture & Hay Planting	1	10
Pest Management		18,541
Residue Management		533
Waste Utilization		208

Structural BMPs and Equipment:

	District	EQIP	Total
Manure Shed	9	9	18
Composter	5	9	14
Incinerators	0	1	1
Manure Transfer System	0	3	3
Nut. Mgt. Technologies	0	21,809 Ac	21,809 Ac
Poultry Windbreak	0	1,000’	1,000’
Ag Waste System	3	3	6
Microirrigation	0	3	3
Irrigation Sprinkler System	0	406 Ac	406 Ac
Irrigation Water Conveyance	0	425 Ac	425 Ac
Irrigation Water Management	0	3,755 Ac	3,755 Ac
Heavy Use Protection Area	98	19	117
Dairy Heavy Use Area	2,659 sq.ft.	0	2,659 sq.ft.
Farm Drainage (ft)	10,030’	0	10,030’
Tile Drainage (ft)	7,151’	0	7,151’
Manure Spreaders	1	0	1
Front-end Loaders	12	0	12
Poultry Litter Amendments	0	4	4
Water Control Structure Impoundment	2	0	2
Water Wells	0	3	3
Rotational Grazing Fencing	3,420’	0	3,420’

Dollars Expended:

District Cost-Share	$ 835,637
EQIP	$2,366,695
Cover Crop	$ 330,034

KCD Planner, Paula Long, collecting soil samples.

Kent County Cover crop nitrogen load reductions are demonstrated in Appendix E.

This year, the KCD Planners helped to staff a booth at the Delaware State Fair representing Delaware’s Conservation Partnership that included an interactive soils display. Additionally, the Planners gave a soils presentation to Smyrna Elementary School, and participated in the Envirothon and Make-A-Splash Water Festival. KCD’s commitment to the Envirothon included hosting the 9th Annual Barn Dance, a fundraising event that raised $17,884.75 for the Envirothon.

The Planners themselves attend continuing education events to ensure that they are up date on conservation issues. They attended the Mid Atlantic Crop Management School, a Pest Management Resistance Workshop and the University of Delaware Agronomy

Days at the State Fairgrounds. They also held and attended events with other conservation professionals, including the Delaware Association of Conservation Districts Annual Meeting, two Soil and Water Conservation Society Meetings and the Delaware Conservation Districts Employees Association Meeting.

Conservation Partnership display at the Delaware State Fair.

Nutrient Management Coordinator

Using 319 funds, the NPS Program supports nutrient management in Delaware through a hired Nutrient Management Coordinator at the Delaware Department of Agriculture.

The primary emphasis of the Nutrient Management Coordinator is on program implementation, in order to facilitate planning priorities and to take a lead role in the coordination of the Nutrient Management Planning Reimbursement Program. Responsibilities include, but are not limited to the following:

- Participate in outreach, education and marketing events to promote nutrient management planning;
- Assist in the financial management and analysis of the Nutrient Management Planning Reimbursement Program;
- Assist farmers, consultants and others in the overall integration of nutrient planning and other nutrient management related activities on the farm, by watershed, county and state;
- Assist farmers with the implementation of the nutrient management standards.

Nutrient Management Coordinator activities for 2006 include the following:

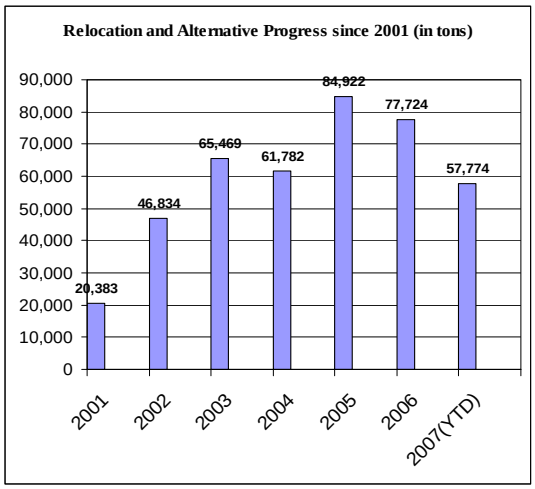
- Attend four Nutrient Management conferences
- Speak four community and professional groups
- Meet with 50 farm owners/operators
- Conduct 25 Nutrient Management farm audits

Nutrient Management Relocation Program

Broiler production continues to be a vital industry on the Delmarva Peninsula. Delaware annually produces approximately 241 million broilers, ranking tenth in the nation among broiler production. Application of broiler litter to cropland in Delaware has been an important source of crop nutrients over the years, but has also contributed to elevated phosphorus levels in the soil.

Manure loading equipment.

Application of poultry litter to these farms is often limited to an 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 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. In 2006, 77,724 tons of excess poultry litter were relocated, a six year total of nearly 400,000 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 a total of 57,200 tons in 2006, 32,400 tons being Delaware-generated. Also, Perdue AgriRecycle relocated 24,000 tons of raw poultry litter to land owners for crop production.

Since the Program's inception, over 400,000 tons of poultry litter have been relocated, containing an estimated 25 million pounds of nitrogen and 16 million pounds of phosphorus. If that tonnage had been applied to the source farm rather than relocated, 1,982,922 pounds of nitrogen and 194,294 pounds of phosphorus would have potentially made their way to Delaware's surface waters. This represents a significant load reduction and a bargain from a cost-benefit analysis perspective!

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 less 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 partners and the Nutrient Management Commission depends on private and public nutrient consultants to develop nutrient management plans. In 2006, 126 farm businesses representing 82,053 acres were reimbursed at a capped rate for a plan developed by a private consultant. Kent and Sussex Conservation Districts assisted 68 farms representing 13,000 acres in the development of nutrient management plans, and/or animal waste management plans. During 2006, a total of 95,053 acres were provided with nutrient management plan. A break down of nutrient management planning on a watershed level is found in Appendix F.

Delaware Environmental Stewardship Program

The NPS Program assisted in a Commission partnership with three poultry integrators to select and recognize the 2006 environmental stewards. Allen's Family Food Inc., Mountaire Farms Inc. and Perdue Farms, Inc. funded the 2006 stewardship program, which was designed to recognize smaller poultry farms. 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. The 2006 Delaware Environmental Stewardship was awarded to three farm families during the 2007 Governor's Conference on Agriculture.

Guy and Nancy Phillips were awarded the top award for 2006 and received a cash award of $2,500, a plaque and a lane sign. Richard and Joyce Morris and Joseph and Denise Calhoun were 2006 finalists and were awarded $250 and a lane sign and a plaque.

Guy and Nancy Phillips with Memebers of the Nutrient Management Commission

State Revolving Fund Loan Program

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

Since the inception of the program poultry loans have totaled over $5.4million and $825,000 in dairy loans.

Following is a breakdown of BMPs that received SRF funding in 2006:

Poultry BMPs	***#***	***Amount***
Manure Structures	26	$ 280,466
Poultry Carcass Composters	10	$ 30,118
Dead bird incinerators	4	$ 20,404
Front-end loaders	8	$ 85,544
Calibratable spinner manure spreaders	1	$ 12,700
Heavy use area protection pads	128	$ 203,035
Dairy BMPs	***#***	***Amount***
Dairy Waste Management Systems	4	$ 81,395

Eligible practices for poultry loans include:

- Manure storage structures
- Poultry carcass composters
- Front-end loaders to facilitate dead bird composting
- Bucket attachments
- Dead bird incinerators (with permit)
- Heavy use area protection pads
- Calibratable spinner manure spreader

Eligible practices for dairy loans include:

- Dairy waste management systems
- Liquid manure application, transfer, and agitating equipment.
- Front-end loaders
- Manure spreaders
- Irrigation equipment for spray irrigating wastes

SILVICULTURE

Urban and Community Forestry Tree Planting Program

The Delaware Forest Service (DFS) Urban & Community Forestry (U&CF) Program received NPS funding to supplement its annual non-industrial private landowner assistance programs and the community forestry grant program to enhance the state's water quality and diverse forest resources.

Existing riparian buffers, along with adjoining uplands, were planted in private urban/suburban public owned areas throughout the state. These projects improve water quality by establishing and improving forested buffers in riparian areas, utilizing trees and forested stands to manage storm water, stabilizing stream banks and waterways, and reducing sediment and nutrient loading to impaired waterways. Similar projects were funded in FY02 and FY03 for both rural and urban/suburban areas and only urban forestry activities were funded for FY04 and FY05. For FY06 the DFS again funded only the urban/community forestry activities.

The DFS reviewed the project applications and awarded funds to projects of merit with special consideration given to watersheds identified with TMDL pollution loading concerns. The U&CF Grant Program utilized funds to establish trees on publicly owned lands within communities as part of a long-term comprehensive forest management plan with an objective of not only establishing immediate plantings, but eventually expanding forested areas and connecting existing ones. Recipients provided 50 percent funding for the projects, or in the case of some communities, provided 50 percent in-kind match for establishing the planting projects. The DFS then reimbursed the landowners and communities based on the actual cost of the trees and the planting.

Please refer to Appendix G and H for 2006 U&CF Program projects funded using CWA 319 resources.

The DFS U&CF Program recognizes the importance of trees within Delaware's communities. Efforts to plant trees throughout the state result in the following benefits:

- ***A reduction of water run-off***. Trees can reduce the impact of a storm event resulting in less run-off and erosion. This allows for recharge of natural water supplies and decreases the amount of impervious service within a community. In addition, trees & wooded areas lessen the movement of sediments, nutrients, and chemicals into the regions water resources.

  Studies have shown that riparian forest buffers significantly reduce the delivery of nitrogen, phosphorus, and sediment to surface waters, capture energy from rainfall events, and provide thermoregulation of water bodies. In comparison to other types of vegetative buffers, forested

buffers remain effective for extended periods of time with little to no maintenance.

It is anticipated that the establishment of forested areas will result in denitrification rates of potentially 50 pounds per acre, per year. Additionally, delivery of sediment and phosphorus to adjacent watercourses could potentially be reduced by 70 percent as a result of these projects.

- ***A measurable increase in the number of trees found within an identified community.*** Many of Delaware's newly formed sub-divisions are void of trees. By replanting forest resources in the community, property values will increase and the quality of life will be improved for Delaware residents.

- ***A reduction in community energy costs.*** By planting properly placed trees around a home or building, air conditioning needs can be reduced by 30 percent and can reduce heating costs by nearly 50 percent.

- ***Re-establish wildlife habitat and biodiversity.*** The planting of trees can reduce the number of trees lost annually to development within the state. The creation of this new habitat will increase plant and wildlife diversity.

- ***Reduction in air pollutants.*** Trees can improve air quality by trapping dust particles that can be harmful to the state's population. One acre of trees can provide oxygen for 18 people and absorb the amount of carbon dioxide each year equivalent to that produced by a car driven 26,000 miles.

OTHER ACTIVITIES

Delaware Clean Marina Program

The Delaware Clean Marina Program, launched in 2003, is a voluntary effort that enlists marina operators and boaters in reducing pollution of the state's waterways. It is a partnership between the University of Delaware Sea Grant College Program, the Department of Natural Resources, the Boat US Foundation for Boating Safety and Clean Water, and the U.S. Coast Guard Auxiliary.

Highlights: Three New Clean Marinas in 2006

Steamboat Landing Marina

On August 4, 2006, Steamboat Landing became a Delaware Clean Marina. Steamboat Landing Marina, located north of Lewes on the Broadkill River, is the first commercial marina to gain certification.

In addition to implementing nonpoint source pollution controls, Steamboat Landing Marina updated its Operation and Maintenance Plan to include best management practice that reduce pollution, implemented a Spill, Prevention, Control and Countermeasure (SPCC) Plan, and developed policies which prohibit the use of toxic chemicals at the marina. Steamboat Landing received $750 in cost share assistance through the Delaware Clean Marina Program to develop their SPCC plan.

Pilottown Marina

Pilottown Marina in Lewes became a Delaware Clean Marina on November 17, 2006. The Lewes-Rehoboth Canal, where Pilottown Marina is located, has served as an important waterway to the Delaware Bay for generations of commercial fisherman and recreational boaters. With Pilottown Marina's new pollution control practices, water quality in the canal will certainly improve.

Pilottown Marina ownesr accept the Clean Marina Certification plaque form Division Director Robert Baldwin.

Pilottown Marina received $18,750 in cost-share funds through the Clean Marina Program to purchase a new sewage pump out system. This system replaced their old deteriorating one. The marina's Operation and Maintenance Plan was also updated to require boater patrons to follow strict marina guidelines regarding the maintenance of vessels in the marina basin. The marina also maintains oil and gas clean-up material on-site in case a spill occurs.

Indian Riverview Marina

Indian Riverview Marina in Dagsboro became a Clean Marina in October 2006. Indian Riverview Marina also utilized cost-share funds through the Delaware Clean Marina Program to aid in certification. Indian Riverview was awarded a Pollution Prevention (P2) mini-grant in the amount of $960. This grant was used to purchase containment booms and help implement a boater education program at the marina. The boater education program includes distributing bilge oil-absorbent sheets and informative brochures to slip holders.

The marina's Operation and Maintenance plan was also updated and a copy of the Marina Rules and Regulations, which now include best management practices, are distributed to all slip holders. Indian Riverview also began providing recycling opportunities at the marina.

Education and Outreach

Delaware Envirothon

The 2006 Delaware Envirothon was held May 4 at the St. Jones Reserve in Dover, with 18 teams of high school students from the First State vying for prizes and places in a challenging environmental competition.

Each team answered questions, reviewed specimens and took measurements in topics dealing with aquatic ecology, soils/land-use, wildlife, forestry and managing cultural landscapes, as well as giving an oral presentation. After more than three hours of testing, the Charter School of Wilmington Team A was crowned as state champions.

Each team member from the first place team was rewarded with a $4,000 per-year renewable academic scholarship from Wesley College and a $500 scholarship from the Delaware Envirothon. The winning team also

received an award plaque.

Kent County 4-H placed second in the competition and received the $300 Ernest J. Zimmerman award for use towards an environmental education project at their school. Charter School of Wilmington Team B won third place and received the $150 Dean Belt award, and Polytech FFA was awarded $100 for placing fourth.

The state champions will now train for the 2006 Canon Envirothon to be held July 23-29, 2006, in Winnipeg, Manitoba, Canada.

Delaware State Fair

NPS staff participated in the Delaware State Fair, again this year. With over 280,000 people in attendance, the fair provides a great opportunity to interact and educate children and adults on the sources of NPS pollution. A trivia game titled "Environmental Jeopardy" was designed to test people's knowledge about NPS pollution and inform them on what they can do to reduce NPS pollution around their homes.

The 2006 theme for the DNREC building was "Leave No Trace," a nationally-recognized outdoor skills and environmental awareness program. DNREC's education building at the Delaware State Fair in Harrington is located on East Rider Road on the fairgrounds and was open 10 a.m. until 8 p.m. everyday during the Delaware State Fair Week (July 21-29).

The "Leave No Trace" exhibit encourages Delawareans to reduce their impact on the environment and respect the rights of users of the outdoors, as well as future generations. According to DNREC's graphic designer, Christy Shaffer, the exhibit was designed to instill an awareness of the "Leave No Trace" principles and an appreciation of nature. "Visitors can explore a rustic campsite and discover how sharing our natural environment with other people and wildlife protects it from overuse and abuse," she said.

Along the same theme, the Fish and Wildlife exhibit featured a live fawn for people to view. Visitors were encouraged to respect wildlife, including deer, and allow wild animals to remain in their natural habitat. The exhibit, always a family favorite, included an array of native fish and wildlife to view up close.

In addition, the DNREC building featured 15 displays on the Department's various environmental programs. The Delaware Energy Office's exhibit provided ideas on easy ways homeowners can save money on energy costs. A new mosquito control exhibit highlighted how to reduce pesky mosquitoes in your own backyard. The new Water Resources exhibit engaged all ages and tested their knowledge on the various programs that protect water resources in our state. Information on Delaware's air quality, the harmful effects of ozone, and the ways people

can safeguard their health was included in the air quality exhibit.

DNREC's displays and exhibits are designed to encourage public participation in the learning process through hands-on activities and educational games that appeal to both adults and children. Visitors speak one-on-one with DNREC's scientists and educators, who are not only dedicated to preserving the environment but are committed to protecting human health, ecosystems, and the beauty of Delaware's environment.

The NPS display focused on a backyard habitat project that was funded usinf CWA Section 319 funding. In which, before and after photos of a streambank planting along approximately 500' of a stream in New Castle County provided a great visual aid which allowed landowners to see first hand why mowing to the edge of a stream can degrade the bank. Brochures were also available at the display that provided information on using beneficial plants, conservation landscaping, basinscapes, and basinscapes for wildlife habitat.

Coast Day

Coast Day is another wonderful event for the NPS staff to interact with the public and inform them about NPS pollution.

The University of Delaware, College of Marine and Earth Studies and the Delaware Sea Grant College Program have organized this special day to celebrate Delaware's ocean and coastal resources and showcase the University's efforts in marine research and education. The 2006 event was a particularly special occasion since the University is celebrating the 30th anniversary of our designation as the Delaware Sea Grant College Program and marking our 30th Coast Day event. Sea Grant is a partnership between the federal government –through the National Oceanic and Atmospheric Administration (NOAA)–the State of Delaware, and the University aimed at addressing coastal challenges through research, education, and outreach. Over the years, Delaware Sea Grant has helped to address complex issues ranging from shoreline erosion to seafood safety, fisheries decline to the economics of beaches.

The theme of this year Coast Day is "Delaware's Coastal Heritage," and there was a wide variety of fun, educational activities to help underscore the importance of the ocean and coast. There were more than 100 activities to choose from, ranging from seafood seminars, research demonstrations, exhibits, and ship tours, to marine critter tanks, a crab cake cook-off, and much more.

Coast Day is coordinated by the University of Delaware's Sea Grant Marine Advisory Service and Marine Public Education Office, who work

hand-in-hand with a host of organizations. This partnership has resulted in a unique Delaware event that has won state and national awards for environmental education.

A special thanks is extended to the area businesses that have helped bring this celebration of the sea to the public, including the DuPont Company, the Delaware River and Bay Authority, the Delaware River and Bay Lighthouse Foundation, Delmarva Power, Maritrans Operating Company, the National Oceanic and Atmospheric Administration, Sunoco, Inc., The Partnership for the Delaware Estuary, Delaware Water Resources Agency and the Cape Gazette.

Make A Splash with Project Wet

In October of 2006 approximately 760 area school children and teachers learned how to be good water resource stewards at the Seventh annual "Make a Splash with Project WET" festival. The nationwide event was celebrated locally at Brecknock Park in Camden, Delaware.

Students participated in interactive exhibits that teach water education, facts about water resources and water conservation. Brecknock Park provided a wonderful avenue for the students to relate historical water issues to present water resource issues and technology.

Students participate in hands on learning activities.

Nestlé Waters North America supports the Make A Splash festivals, the largest water education event in the country. "We encourage stewardship of our nation's water resources and protecting them is important for future generations," said Kim Jeffery, president & chief executive officer of Nestle Waters North America. "This water education day provides programs and tools to get youngsters excited about conserving water and treating it with care all their lives."

These "hands-on" festivals bring together parents, students, teachers, government officials, and enthusiasts of all kinds for one cause: to raise awareness of the need for water education and draw attention to the vital role this precious resource plays in our everyday lives. Established in 1984, Project WET (Water Education for Teachers) is an international water science and education program dedicated to teaching children around the world about water stewardship and conservation.

"The quality of water in ground water and springs is often a reflection of the health of a watershed," said Dennis

Nelson, Project WET's founder and executive director. "A healthy watershed is no accident. Our festivals encourage teachers and children to be good watershed neighbors."

Annual NPS Advisory Meeting

The 5th annual NPS advisory committee meeting was held on February 15, 2007 at the Delaware National Estuarine Research Reserve in Dover. The purpose of the meeting is for information exchange of nonpoint issues as related to the 319 and 6217 programs.

The meeting was well attended by representatives from EPA, NOAA, DNREC, Del-Dot, University of Delaware, Delaware Nature Society, Delaware Forest Service, NRCS, Center for Inland Bays, Conservation Districts, and New Castle County.

Topics for discussion included:

- Water Quality Trends in Delaware
- Delaware Department of Transportation Wetland Mitigation
- Creating an Outdoor Classroom
- Expanding Partnerships for Greater Environmental Gains
- Restoring and Maintaining an Urban Farm
- South Wilmington Special Projects Area
- Sudden Wetland Dieback in Delaware's Inland Bays
- Program/Project Updates for 2006 Activities

Positive feedback from attendee's evaluations indicated that the meeting was informative and well worth their time. We have also had requests from individuals outside of the committee to be invited to the meeting.

Pollution Control Strategies – Project Implementation

A 1997 federal court case required Delaware to set pollution limits or 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 that are tasked with the specific responsibility of drafting formal document titled *Pollution Control Strategies* that includes numerous ways to reduce pollution levels. The Pollution Control Strategy (often abbreviated PCS) includes a combination of more than one pollution-reducing method. The PCS objectives are to:

- assist implementation of structural Best Management Practices (BMPs) practices 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.

After 6 years of deliberations with a diverse group of watershed interests, DNREC proposed a draft 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 has 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 is committed to providing 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, due to actions of the Center for Inland Bays, the public was made aware of the modifications in the PCS in areas of buffering which resulted in several legislators asking the Department to revisit the buffering issue with the Center. The Department is still hopeful that this review can occur in early 2007.

PCSs have additionally been drafted for the Appoquinimink River, Nanticoke River and Broad Creek, and the Murderkill River. The Appoquinimink River and Nanticoke River and Broad Creek Tributary Action Teams submitted final recommendations to the Department in the fall of 2004. The Nanticoke River and Broad Creek PCS will also address additional actions that will be needed for Delaware to achieve its nitrogen, phosphorus, and sediment load reduction commitments as part of the Chesapeake Bay Program. The Department anticipates scheduling public workshops for these draft PCSs in fall of 2007, but not before Inland Bays PCS issues are successfully negotiated.

Four new Tributary Action Teams are in various stages of developing PCSs for the Broadkill River, Christina Basin, St. Jones River, and Upper Chesapeake watersheds. The Christina Basin and St Jones Tributary Action Teams are in the process of submitting their recommendations into the Department by early 2007. The Department expects that the Broadkill River and Upper Chesapeake Teams to present their PCS recommendations in the late fall of 2007.

In support of the existing Teams, an annual Delaware Tributary Action Teams Conference is held at a central location within the state. The purpose of the conference is to provide a forum for Team building and an opportunity to share achievements and lessons learned during the process as well as give the Department an opportunity to get feedback from the community and Teams in a different setting. The conference typically includes an update of Tributary Action Team progress and activities, a poster session, keynote speaker, and a speaker panel with representatives from various agencies and organizations invited to provide education to team members about ongoing issues, science and activities. To date, Tributary Action Teams have documented 2,772 pounds per day of total nitrogen and 227 pounds per day of total phosphorus reduction to Delaware's surface waters and their proposed Pollution Control Strategies propose to reduce an additional 8,040 pounds per day of total nitrogen and reduced 133

ponds per day of total phosphorus. These measurable reductions will have significant impact on Delaware's surface water quality.

Inland Bays Watershed

The following activities have occurred during the reporting period for the Inland Bays Watershed:

Nutrient Protocol Development - One of the recommendations made by the Inland Bays Tributary Action Team in their draft Pollution Control Strategy to the Department indicated that "the entire Inland Bays watershed shall be designated as a 'Critical Environmental Area' within which all land use activities shall be managed for nutrient reductions consistent with TMDL load reductions, or, reductions attributed to 'best available technologies' (BATs) where TMDL load reductions are not feasible." The Pollution Control Strategy regulations proposed for the Inland Bays will likely require each development to be managed for nutrients such that it will have minimal impact to the waters of the Inland Bays. Consequently, the Department developed a nutrient protocol whereby a consistent methodology can be used to calculate nutrient budgets for each proposed development such that each developer will know what is expected of them for that proposed development.

Appoquinimink Watershed

TRIBUTARY ACTION TEAM
Appoquinimink Watershed

The following activities have occurred during the reporting period for the Appoquinimink Watershed:

Appoquinimink BMP Implementation - The project objectives 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.

Appoquinimink Watershed Implementation Plan - To development a watershed implementation plan for the Appoquinimink River, Delaware consisting of four main tasks: Perform a Baseline Watershed Assessment, Identify Stormwater Retrofit, Upland Pollution Prevention, Conservation Area, and Stream Corridor Restoration Opportunities, Craft a Watershed Management Plan to Guide Pollution Control Strategy Implementation, and

Implementation of Demonstration Projects.

Behavior Study - To adequately educate residents of the Appoquinimink Watershed, it is important to know what detrimental behaviors they engage in and why they continue to participate in them. Thus, the Appoquinimink River Association (ARA) conducted a telephone survey of residents in the area to identify what issues residents are concerned about, what prevents them from engaging in activities that protect the watershed, and their level of interest in getting involved in protection, preservation, and enhancement actions.

Design and Construct Corrective Stormwater Measures for Village Brook Project - Through the Departments sampling of the Appoquinimink Watershed for TMDL development, the Dove Nest Branch sampling station demonstrated that this small watershed could account for a significant portion of the total nitrogen and phosphorus load of the Appoquinimink Watershed. The entire Dove Nest Branch was walked with the help of the Appoquinimink Tributary Action Team and students from a St. Andrews' Environmental Education class and demonstrated that there were over 100 stormwater impacts to the Branch. Many of these impacts were direct discharge to stream via storm water discharge pipes. Village Brook Mobile Home Park had many direct stormwater discharges. A subsequent visit to the park with staff from the Department's Sediment and Stormwater Program showed that adequate open space existed adjacent to the these pipes such that stormwater retro-fit structures could be constructed on the property to reduce the nutrient and sediment loads of the stormwater.

Pet Waste Collection Project - It is the Appoquinimink River Association's goal to provide Dogipots to communities that were identified as high priority areas in the Implementation Plan and the ARA is requesting funding for the purchase of 20 each of the following materials: Dogipot containers, cases of biodegradable bags, signs, and posts for the project. By supplying communities that were identified as being a priority for outreach with Dogipots and educating the residents on the impact pet waste has on waterways, the ARA seeks to reduce current bacteria concentration levels in the watershed in accordance to the proposed bacteria TMDL.

Rain Garden - A rain garden is a strategically located low area with plants that intercepts runoff. It slows the water down in order to prevent erosion and allows it to be absorbed into the ground. In many cases, the plants are chosen for their ability to remove pollution and toxins, and it's best to use native plants as well. Some benefits of rain gardens include that they help increase the amount of water that filters into the ground recharging local and regional aquifers, protect communities from flooding and drainage problems, and protect streams and lakes from pollutants carried by urban stormwater – lawn fertilizers and pesticides, oil and other fluids that leak from cars, and numerous harmful substances that wash off roofs and paved areas. The garden is dry between rain falls, and the water drains within 48 hours after a rainfall which prevents mosquito hatching. A rain garden can be any size or shape and needs relatively little maintenance.

Thus, the grant paid for producing and publishing brochures to encourage the construction of more rain gardens within the Appoquinimink watershed.

Rain barrel.

Riparian Buffer Mapping and Ordinance Creation - GIS software was used to identify 100 foot wide buffers around rivers, streams, and creeks in the Appoquinimink Watershed, which was then categorized into areas of adequate forest buffer, deficient forested buffer on one or both sides of the waterbody, and no buffer on either side of water body. Then, the Appoquinimink River Association presented this GIS information when working with the towns of Middletown, Odessa, and Townsend to draft and implement riparian buffer ordinances within their jurisdictions.

Riparian Buffer Planting - The Appoquinimink River Association (ARA) worked with landowners to reforest 20 acres of riparian buffer in the Appoquinimink Watershed and educated all landowners with riparian buffers on or adjacent to their land on the benefits of installing buffers.

Salary for Coordinator of Appoquinimink River Association - As part of the Pollution Control Strategy recommendations submitted by the Appoquinimink Tributary Action Team to DNREC, the Team strongly recommended the hiring of a watershed coordinator dedicated to the Appoquinimink Watershed. The watershed coordinator would facilitate the reduction of nutrient loadings in the Appoquinimink by implementing BMPs, developing aggressive BMP outreach and educational programs, and securing funding for BMPs implementation.

Smartyards - Smartyards is conducted in partnership with the National Wildlife Federation, the Delaware Department of Natural Resources and Environmental Control, the University of Delaware – Water Resources Agency, the Gateway Garden Center, and Wild Birds Unlimited. The program provides official certification for properties where owners meet the four criteria necessary for wildlife habitat: food, cover, water, and places for wildlife to raise young. Certified habitats may range from those meeting the minimum requirements, such as a small balcony or rooftop, to extensive naturalized areas that meet a variety of wildlife needs. By adopting practices beneficial to wildlife such as planting native species and limiting the use of chemical fertilizers and pesticides, participants also help to improve local water quality by reducing their reliance on products that contribute to nonpoint source pollution.

Stormwater Retrofit and Stream Restoration - The goals of the Appoquinimink Watershed Riparian Buffer Analysis, Restoration, and Protection Project are threefold: to

provide a riparian buffer assessment of the watershed including detailed maps showing impacted buffer areas and detailed listings of locations for future riparian buffer plantings; to develop a riparian buffer ordinance for the Town of Middletown; and to reforest riparian buffer areas that are severely impacted in the watershed for the Appoquinimink River Association and its partners so that they can learn the status of this natural resource in the watershed, and in turn will be able to implement protective and restorative measures to decrease water pollution reaching the Appoquinimink River and create habitat for its organisms.

Water Quality Sampling on Dove Nest Branch for Village Brook Project - Stream water samples were collected every two weeks above and below Village Brook (52 total samples). These samples serve as baseline loads before a stormwater collection facility is constructed within the Village Brook Development. This data will allow calculation of nutrient load reductions from this new BMP for TMDL compliance.

Upper Chesapeake Bay Watershed

The following activities have occurred during the reporting period for the Upper Chesapeake Bay Watershed:

Facilitator for Upper Chesapeake Tributary Action Team - Nutrient TMDLs for these watersheds went into effect January 2006. In order for these TMDLs to be achieved, pollution control strategies (PCS) which serve as the implementation plan for the TMDLs must be developed. Over the past years, the Department of Natural Resources and Environmental Control (DNREC) has been sponsoring Tributary Action Teams to address polluted waterways throughout the state. The goal of these teams is to build a group of committed individuals, representing various local interests, to develop strategies to improve water quality in a specific watershed. In order to build a team to achieve this goal, a team facilitator is needed. The role of the facilitator is to act as a neutral third party who is not biased by any personal association with the parties represented. Furthermore, this individual is charged with leading the group through the Tributary Action Team (TAT) process to achieve the desired end results while ensuring the team members maintain ownership of the meetings and its results.

St. Jones Watershed

The following activities have occurred during the reporting period for the St. Jones Watershed:

Convener for St. Jones Tributary Action Team - The convener identifies interested stakeholders and citizens, whom represent various interests groups for appointment/membership in the St. Jones Tributary Action Team, serves as a neutral convening organization for the Team, provides correspondence for the Team, manages meetings, assists in coordination of any needed trips or tours, and discusses Team concerns to the Department.

Facilitator for St Jones Tributary Action Team - Nutrient TMDLs for this watershed went into effect December 2006. In order for these TMDLs to be achieved, pollution control strategies (PCS) which serve as the implementation plan for the TMDLs must be developed. Over the past years, the Department of Natural Resources and Environmental Control (DNREC) has been sponsoring Tributary Action Teams to address polluted waterways throughout the state. The goal of these teams is to build a group of committed individuals, representing various local interests, to develop strategies to improve water quality in a specific watershed. In order to build a team to achieve this goal, a team facilitator is needed. The role of the facilitator is to act as a neutral third party who is not biased by any personal association with the parties represented. Furthermore, this individual is charged with leading the group through the Tributary Action Team (TAT) process to achieve the desired end results while ensuring the team members maintain ownership of the meetings and its results.

Other Activities

The following DNREC sponsored activities have occurred during the reporting period to support the PCS development process:

Development of Performance Standards for OWTDS - The Department hired a contractor to develop

a comprehensive list of on-site wastewater pre-treatment technologies (prior to soil dispersal) that can reduce nutrient loads to ground and surface waters. From the developed list, the contractor then used best professional judgment to develop a nutrient reduction rate that can routinely be achieved under normal operating conditions, and then from available published data sources define the ranges for nutrient reductions that can be achieved from the pre-treatment technologies. From this data, the contractor developed statewide performance standards for pre-treatment systems for use in Delaware watersheds.

Comcast TV Advertisement - Public outreach is essential to a successful pollution control strategy. The Tributary Action Teams related public outreach includes running a series of public service announcements for urban nonpoint source pollution prevention BMPs. To achieve this object, Comcast broadcast public service announcements on septic tank pump-outs, lawn fertilization, public forum dates, and stormwater runoff according to a specified schedule.

WBOC TV Advertisements and Public Service Announcements - The Tributary Action Team(s) related public outreach includes running a series of public service announcements for urban nonpoint source pollution prevention BMPs. To achieve this object, WBOC produced and broadcast three public service announcements on septic tank pump-outs, lawn fertilization, and stormwater runof and broadcast a 30 minute program on water quality, all according to a specified schedule.

Inland Bays and Nanticoke Issue Booklet - The Department hired a contractor to provide editing and writing services to assist with the development of outreach and educational materials for the Inland Bays and Nanticoke Tributary Action Teams. The contractor provided text and design advice for an Issue Brief and Issue Book to develop public outreach for the pollution control strategies for both watersheds.

Agricultural Land use Character Assessment and Implementation Planning for Kent County Watersheds - This project developed a detailed and proactive desktop implementation plans that: characterized the current agricultural watershed conditions including the identification of watershed pastures, animal operations, and cropland and the spatial identification of existing agricultural BMP and conservation practices in the watershed; developed a land use conversion study that projects land use changes, predominately from agriculture to residential, over an extended twenty year planning period; prioritized subwatershed areas where future urbanization impacts are expected to be the most pronounced; estimated future nutrient loads in the two subwatershed areas where residential development is expected to have its greatest impact. Load estimate derivations included the use and non-use of recommended stormwater urban and agricultural treatment options; and then prioritized farm fields for agricultural BMP and conservation practice implementation.

Stream Side Fencing to Remove Cattle - This BMP and farm improvement project involved the installation of fencing to remove direct livestock access

to the streams that enter McColley's Pond, the addition of water troughs to provide water for the cattle in place of the streams, and a manure storage shed. These improvements and BMPs will eliminate direct fecal deposition (bacteria and pathogens) and minimize run-off containing sediment and nutrients into the streams.

Walnut Shade Area Temporary Holding Tank Program - This program repaired faulty septic systems and kept existing systems functional in the Walnut Shade Area. The project focused on 52 mobile homes that were located around Woodville and Terry Drives within the Walnut Shade community. Most of the mobile are very old and not in good condition and many residents rely on outdated and unsafe septic system equipment, such as steel septic tanks, which often do not have caps and tend to leak, allowing untreated waste to spill into the soil and groundwater. Through this project, all 52 mobile homes will be connected to county sewer and 4 of the worst systems were installed with a temporary holding tank until sewer becomes available within a few years.

Tributary Action Team Process Video - A video for Delaware's residents on the Clean Water Act law suit pertaining to EPA's noncompliance to the Clean Water Act and the consent decree affecting Delaware was developed. The video describes Delaware's response to the decree and discusses the Tributary Action Team process for residents of Delaware.

Holding Tank Inspection Program - This project initiated a Holding Tank Inspection Project by allocating funds to hire the individual to inspect holding tanks. The Holding Tank Inspection Project included the following components: photographing and recording via global positioning system (GPS), the exact holding tank location for geographic information system (GIS) reference; conducting both scheduled and random inspections (weekday and weekends) for annual inspection purposes and occupant verification; and locating and identifying any illegal practices and enforce compliance with contracts. As part of the holding tank inspection program, a record-keeping system was initiated that demonstrated compliance by the permit holder. This program increased holding tank compliance rate from 51% to 97%. Besides increase compliance, a recommendation was put forth that property deeds must indicate that the property was served by a permanent holding tank.

Pollution Control Strategy Web Site - The goal of the project was to develop an easy-to-understand Website that assists the public in evaluating Pollution Control Strategies (PCS) and the process to develop those strategies and provide DNREC with a means for rapidly communicating the actions and decisions of TATs to the public at-large. The Website provides a framework for reporting important aspects with respect to the Clean Water Act, in support of the ongoing development of TMDLs and PCS management strategies. By providing a central location for the distribution of pertinent information, this information will assist both DNREC and the diverse stakeholder groups who interact during the development of management strategies to address water quality issues.

Spread Sheet Development of Best Management Practices Reduction Rates - Develop an annotated bibliography and spreadsheet of urban BMPs (riparian buffers, stormwater retention/detention ponds, constructed wetlands, bio-retention facilities, conservation designed of subdivision, alternatively-designed septic systems, diffuse stormwater amangement and etc.) that is used as elements of PCSs to achieve the nutrient reductions needed to meet TMDLs for the Christina, Inland Bays, Nanticoke, Appoquinimink, and Murderkill Watersheds. The bibliography contains citations regarding research on BMPs that have been used or are being used throughout the country and which have been shown to effectively reduce pollution loading to surface and groundwater. The spreadsheet contains anticipated load (lbs/ac or percentage) reductions and location of information--North Carolina, Maryland and etc., if particular BMP is implemented, The sheet indicated if results were extrapolated or measured directly thru scientific study. Both bibliography and spreadsheet is being used to help develop models for Delaware that will assess the effectiveness of each BMP. This information will also be used during regulation development to scientifically substantiate the PSC.

Telephone Survey of Environmental Practices within Delaware - A contractor conducted research for DNREC via focus groups and administered a telephone survey to determine Delaware's residents attitudes, opinions, and behaviors on a variety of environmental issues.

Urban Nutrient Planner – Using NPS Grant funding, the Department contractually hired for one fiscal year an urban nutrient planner to establish an urban nutrient planning presence within the state. Plans will be developed and implemented in compliance with State standards and specifications. Follow-up on plans will be conducted semi-annually or more frequently as needed to promote full implementation of the plan. Planner will complete a monthly workload analysis which will be submitted to the NPS Program on a quarterly basis. Reporting forms will be provided. All plans are to be entered into the District's GIS system. Comprehensive basin maps are to be provided quarterly to show where plans and best management practices have been completed and implemented.

Total Maximum Daily Load

Total Maximum Daily Loads (TMDLs)

TMDL stands for Total Maximum Daily Load, which is the maximum daily amount of a pollutant that a body of water can absorb without violating water quality standards. A non-scientific definition for TMDL could be "pollution limit." DNREC is on schedule with the establishment of TMDLs required by a federal consent decree. TMDLs covering 658,925 watershed acres have been established; a total of 1,210,331 acres require TMDLs.

Pollutants in Delaware waters are often chemicals, such as nitrogen and phosphorus from fertilizer runoff, but

TMDLs could also be set for such other pollutants as bacteria, sediments, or even heat --- anything that can injure a waterway's natural health. Pollutants can come from specific "point" sources, such as sewage treatment plants, or from "nonpoint" sources, such as runoff from lawns, farms, parking lots and golf courses.

The deadline for finalizing TMDLs for all of Delaware's impaired waterways is 2007.

Bacteria Total Maximum Daily Loads – Due dates were set for each of the State's four basins. In the Piedmont Basin, bacteria TMDLs due in 2004 and 2005 are virtually complete. The high flow Christina TMDL was adopted in April, 2005 and the balance of the basin – the Shellpot and Naamans Creek watersheds – was established in December 2006.

Chesapeake Basin TMDLs, which were due in 2005 and 2006, are in various stages of completion. Public workshops for the Pocomoke, Chester, Choptank, and Marshyhope watersheds have been held. The computer model used to develop the Nanticoke and Broad Creek nutrient TMDLs (promulgated in 1998), is being updated to include bacteria.

In order to determine the sources of bacteria, DNREC, with support from EPA, has set up a laboratory to employ genetic (DNA) techniques. An intensive monitoring program was completed in the Piedmont Basin and is currently

underway in the Chesapeake Basin. This data will allow the Department to assign lower risk levels to non-human sources of bacteria and focus pollution control efforts on those sources which negatively affect human health.

Nutrient TMDLs - Nutrient TMDLs for the Broadkill watershed went into effect December 2006. The remaining nutrient TMDLs for Delaware's watersheds were due for completion by late 2006. In order for these TMDLs to be achieved, pollution control strategies (PCS) which serve as the implementation plan for the TMDLs must be developed. Over the past years, the Department of Natural Resources and Environmental Control (DNREC) has been sponsoring Tributary Action Teams to address polluted waterways throughout the state. The goal of these teams is to build a group of committed individuals, representing various local interests, to develop strategies to improve water quality in a

specific watershed. In order to build a team to achieve this goal, a team facilitator is needed. The role of the facilitator is to act as a neutral third party who is not biased by any personal association with the parties represented. Furthermore, this individual is charged with leading the group through the Tributary Action Team (TAT) process to achieve the desired end results while ensuring the team members maintain ownership of the meetings and its results.

TMDL Modeling - The Department is in various stages of developing new hydrodynamic and water quality computer models for those watersheds with TMDLs due in 2006. They include the following:

- St. Jones River
- Broadkill River
- Delaware River (DRBC Zone 5)
- Mispillion River
- Cedar Creek
- Little Creek
- Leipsic River
- Smyrna River
- Blackbird Creek
- Dragon Run Creek
- Red Lion Creek
- Army Creek

Intensive Basin Monitoring - The Division of Water Resources continues its comprehensive monitoring of surface waters of the State. Elements of the monitoring effort include General Assessment Monitoring, TMDL-Related Monitoring, Toxics in Biota Monitoring, and Biological Assessment Monitoring. These programs are conducted in all of the State's watersheds.

Perkin Run Stream Restoration Project

Perkins Run, originally identified as a stream corridor restoration site in 2003, consists of 1500 feet of the lower reach of Perkins Run that runs through the rear yards of a residential housing development and a county park in Northern New Castle County, Delaware. In this reach Perkins Run was previously straight and significantly incised most likely as a result of relocation and channelization during construction of the surrounding residential community, and increased flood flows. This reach was selected due to its location at the lower end of the stream just upstream of tidal influence. This is a logical place to begin restoration of the stream channel and reestablishment of the riparian buffer. The intent of the restoration project is to continue the stream corridor restoration upstream for the length of the stream and its tributaries as funds become available.

In this reach the incised channel was restored to natural and stable step pool channel using a series of flow vane structures. In addition, a small floodplain was reestablished to convey greater than bank-full flows.

The project, as designed, is part of a larger water quality strategy to improve water quality in the Perkins Run watershed. The site is based on its location in the watershed and in the stream. The approach to stream corridor restoration is intended to be applied on a watershed basis. Studies performed by DNREC (DNREC 1992, "1992 Delaware Water Quality Inventory

305(b) Report") has shown that the impaired biological condition in this stream is associated with nitrogen, phosphorus and dissolved oxygen levels as well as physical habitat impairment. Watershed studies performed by the New Castle Conservation District in the late 1990's confirmed these findings.

The stream corridor restoration project is designed to address the problems identified in these studies by restoring the physical habitat to a natural and stable (no degradation or aggradation) condition using fluvial geomorphic design techniques (establishment of riffles that provide aeration and spawning habitat, pools and snags that provide protective cover and feeding habitat). In addition, the development of riparian buffers provide additional water quality improvements through the removal of nutrients either through plant uptake or biological activities in the soil, placement of a physical barrier between the stream and potential water quality concerns, and shading of the stream to reduce thermal impacts.

Pike Creek at Three Little Bakers Stream Restoration Project

The Delaware Department of Natural Resources and Environmental Control (DNREC) completed a 5,000 feet stream restoration project in the fall of 2005 along Pike Creek in northern New Castle County. The stream channel and adjacent banks were restored using a host of restoration techniques (e.g., rock toe and log toe protection, cross vanes, log vanes, root wads, riffle and pool sequences, and random bolder placement). This method of stream restoration measures the watershed inputs and valley type (e.g., size of drainage area, topographic relief, overland runoff) and provides a means to change the stream's pattern, profile and dimension to accommodate for the effects caused from urbanization and restore stability, sediment transport and biological functions. The restoration project also included the creation of 3 acres of wetlands and the planting of streamside vegetation that will further protect the banks, improve and maintain water quality and provide wildlife habitat. Approximately 5-acres of the riparian corridor were enhanced with the planting of native trees and shrubs.

The Three Little Bakers site along Pike Creek was an excellent candidate for stream restoration because of its 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
- a single landowner that was very interested and willing to participate in a restoration project.

The goals that were accomplished by implementing this project include:

- stabilization of the stream banks to reduce erosion;

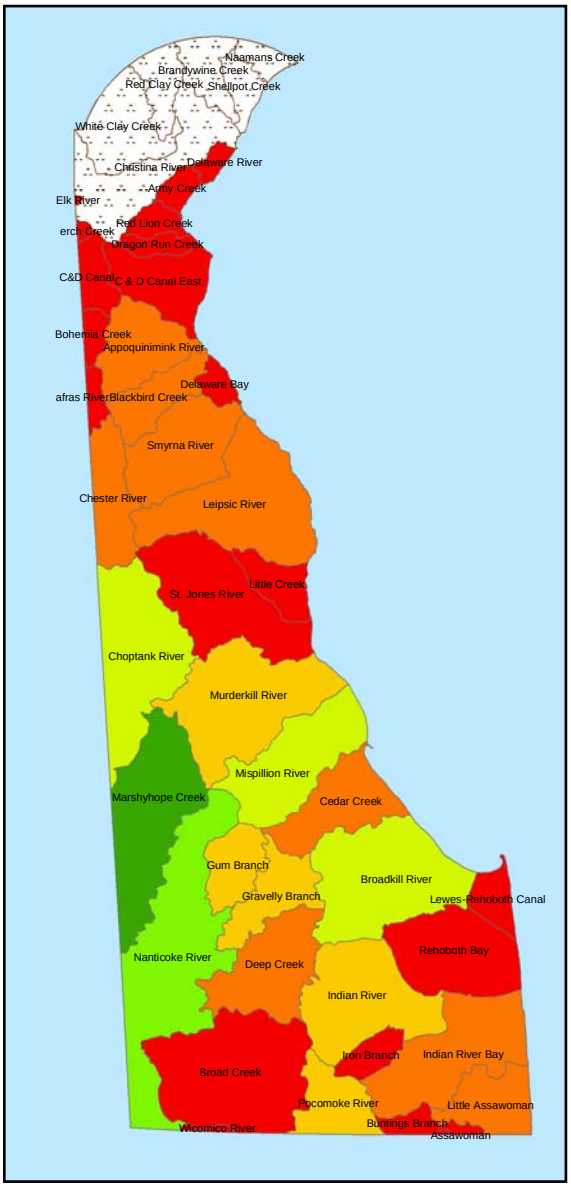
- creation of habitat – putting in sequences of riffles and pools in the stream channel and planting the banks with a large number of trees and shrubs;
- improvements to water quality;
- reduction in the number of out-of-bank flooding events; and
- maintaining the natural look of the stream as nature would dictate.

A series of meander bends were introduced to the existing stream channel which will help reduce the flow velocity and return the stream to a more natural state. Several stream-side wetlands were also constructed. Construction work started in early March, 2005; work (construction and riparian corridor planting) was completed by mid-October. Partners in this project responsible for providing funding and other resources included: Three Little Bakers, Christina Basin Clean Water Partnership, EPA, DelDOT, USDA Natural Resources Conservation Service, New Castle Conservation District, the Partnership for the Delaware Estuary, and DNREC.

This project is serving as an excellent "outdoor classroom" as numerous site tours have been conducted with students, garden clubs, members of the general public, and a wide array of environmental professionals from the tri-state region. The project was also a topic in a series of environmental short-courses offered by the Delaware Nature Society on April 25, 2006. The site was also featured at the Red Clay Valley Association's annual meeting on April 27, 2006 where site tours were offered throughout the evening.

The NPS Program is pleased to announce that in October 2006 Mr. John VanStan, leader, and his 4-H group sponsored by the University of Delaware's Cooperative Extension, adopted the wetland site at Three Little Bakers through the Department's Adopt-A-Wetland Program. Mr. VanStan also agreed to have his group monitor the stream through the Stream Watch Program overseen by the Delaware Nature Society. Pre- and post-biological monitoring is a component of this project; biologists from DNREC and a private environmental consulting firm performed post-restoration studies of macro-invertebrates and fish populations in October 2006.

Appendix A
CREP Acres by Watershed



CREP Acres by Watershed

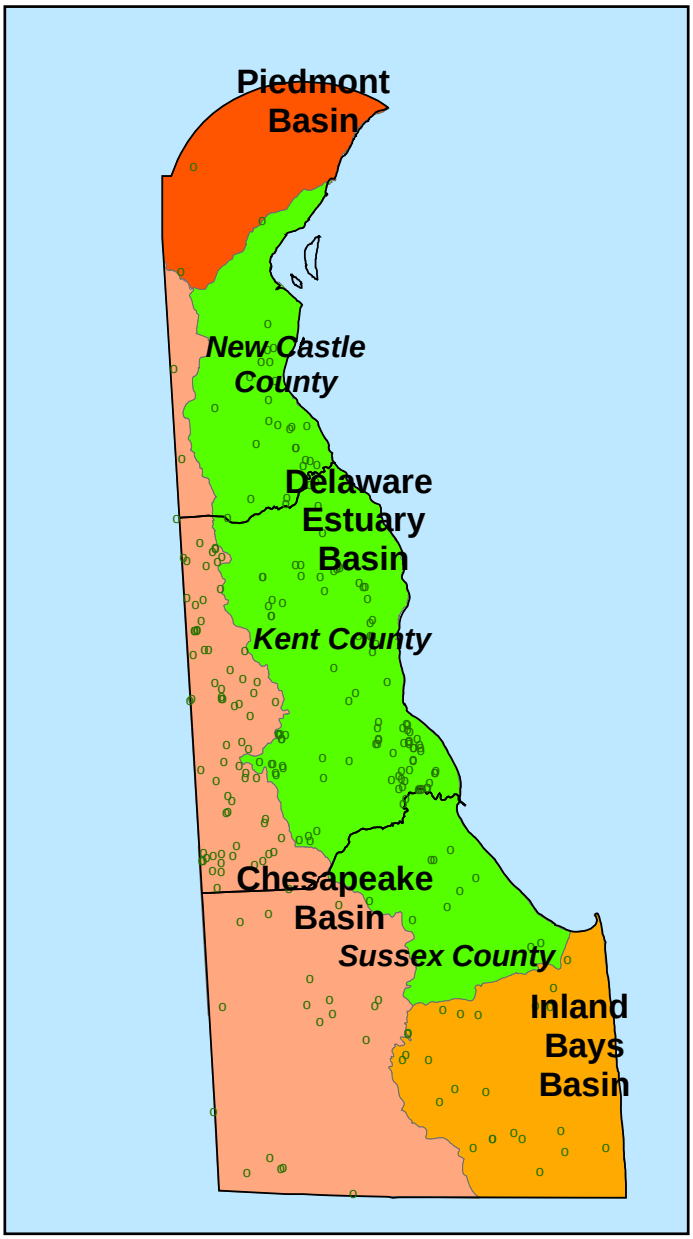
- 0 - 31
- 32 - 117
- 118 - 286
- 287 - 485
- 486 - 867
- 868 - 12044
- Areas ineligible for CREP funding

0 3 6 12 18 24 Miles

"

DELAWARE NONPOINT SOURCE PROGRAM

Appendix B
Statewide CREP Projects



BASIN

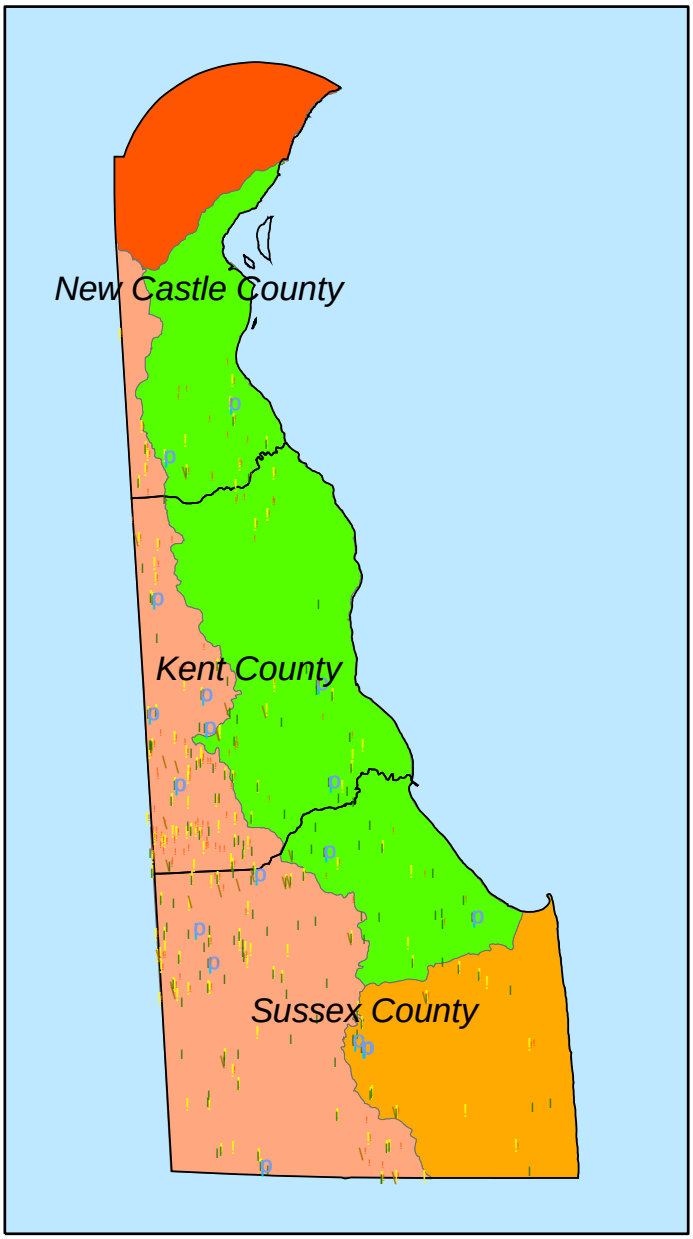
- Chesapeake Basin
- Delaware Estuary Basin
- Inland Bays Basin
- Piedmont Basin
- CRP Implementation Site

0 5 10 20 Miles

"

DELAWARE NONPOINT SOURCE PROGRAM

Appendix C
Cumulative CREP Projects



BASIN

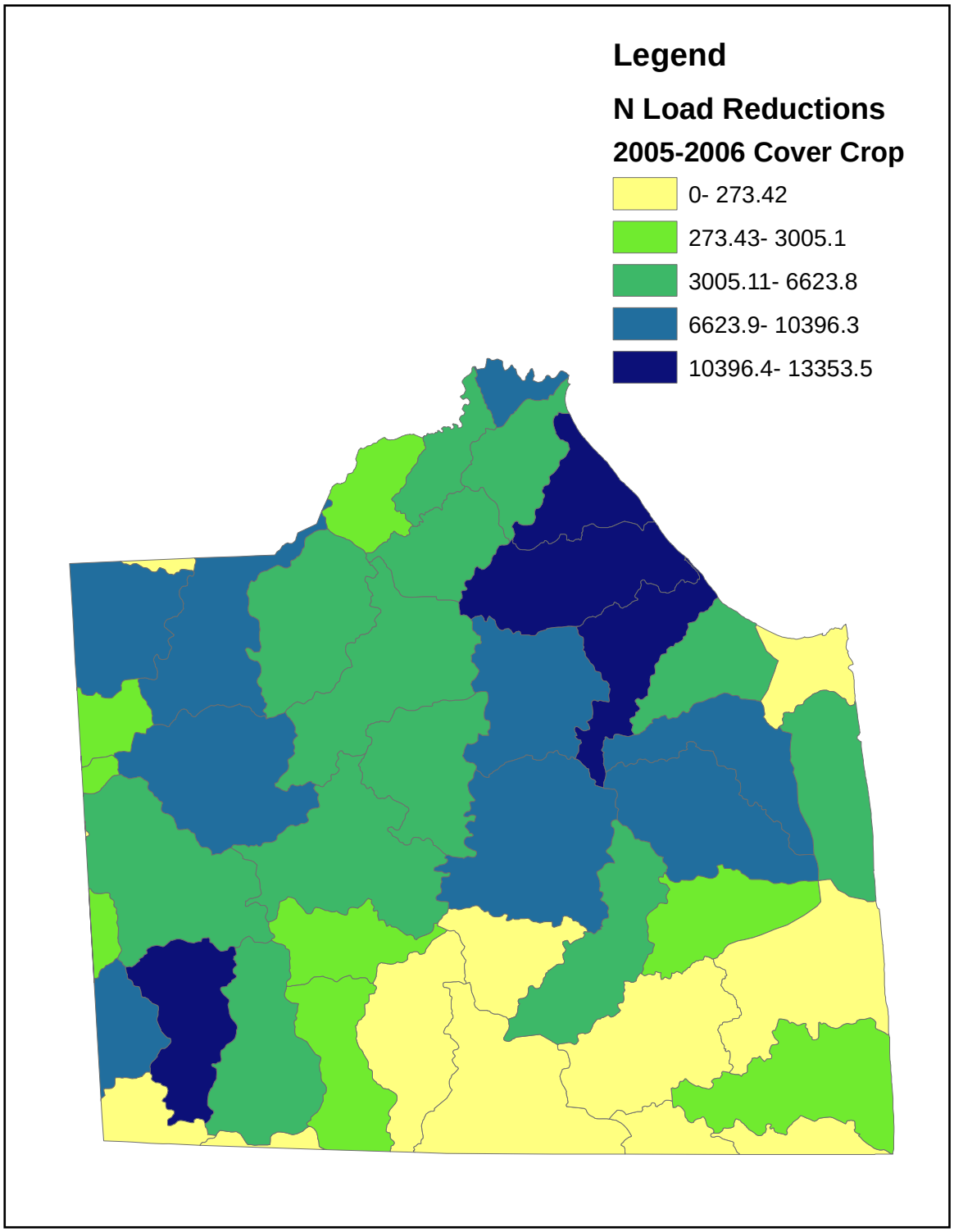
- Delaware Estuary
- Piedmont (not a CREP area)
- Inland Bays
- Chesapeake Bay
- CP23 (Wetland Restoration)
- CP3A (Hardwood Trees)
- CP21 (Grassed Filter Strip)
- CP22 (Riparian Buffer)
- CP4D (Wildlife Habitat)

0 5 10 20 Miles

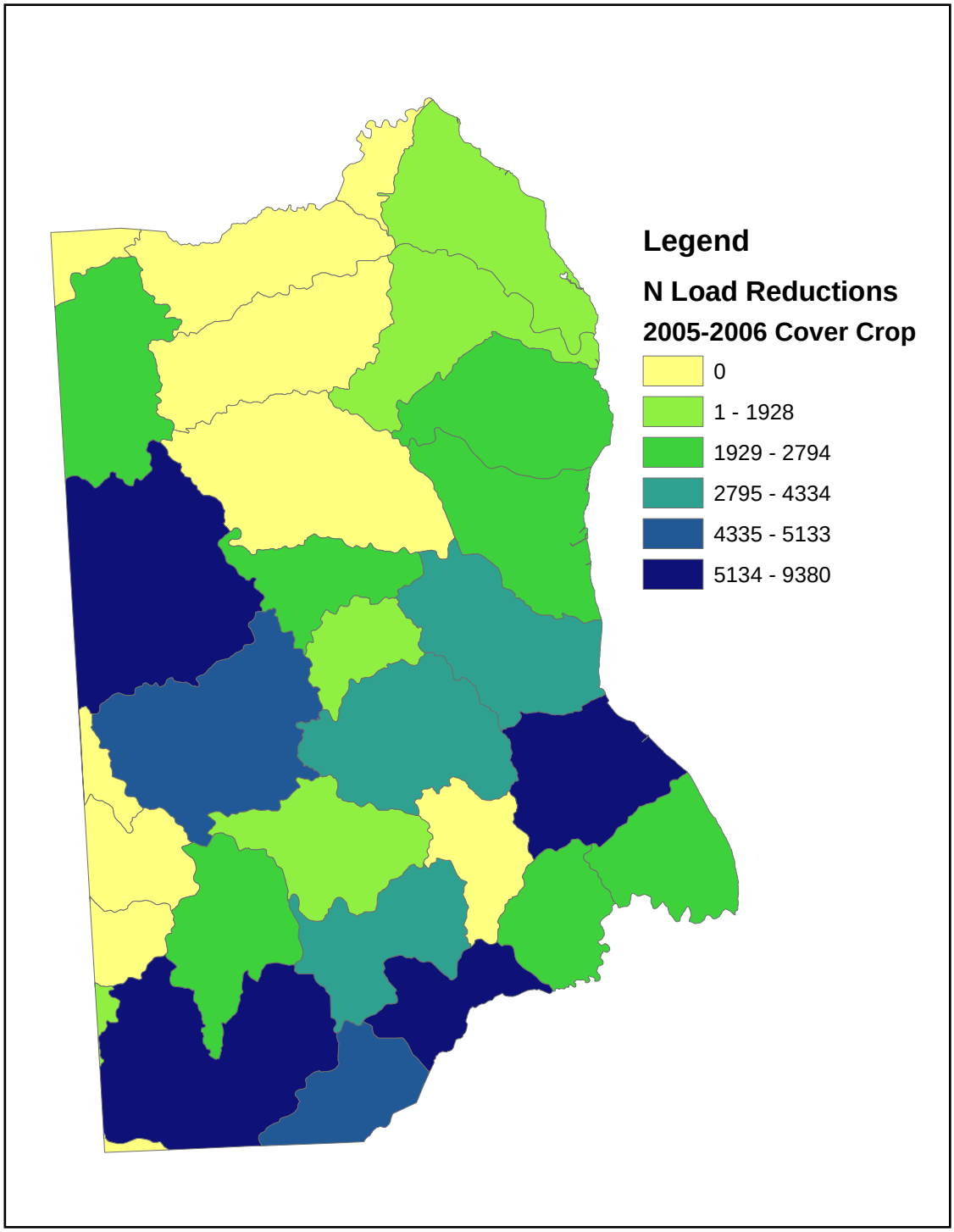
This map displays all CREP contracts authorized through 12/31/06. Some plantings may not be installed until the 2007 season.

DELAWARE NONPOINT SOURCE PROGRAM

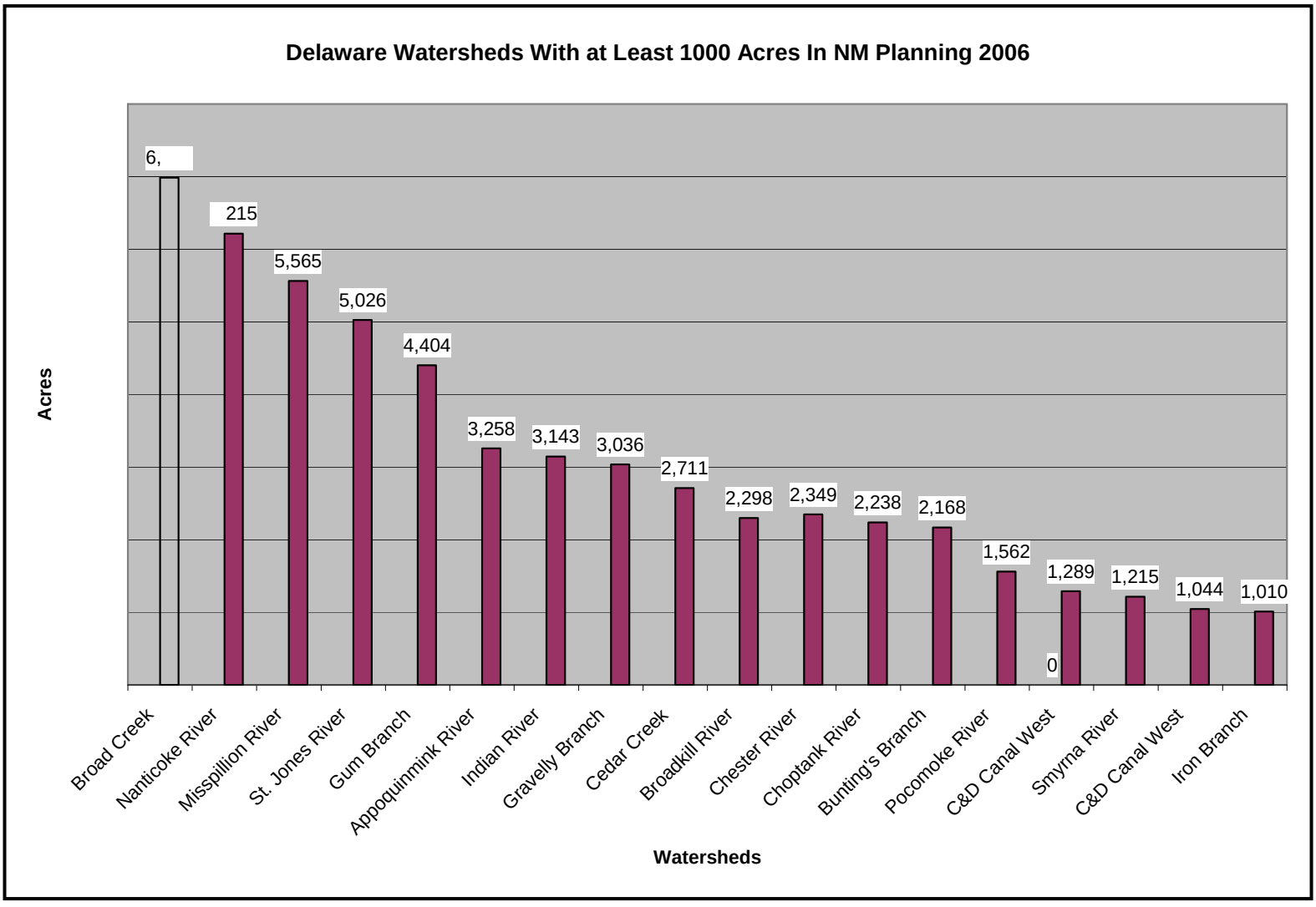
Appendix D
Sussex County - Cover Crop
2006



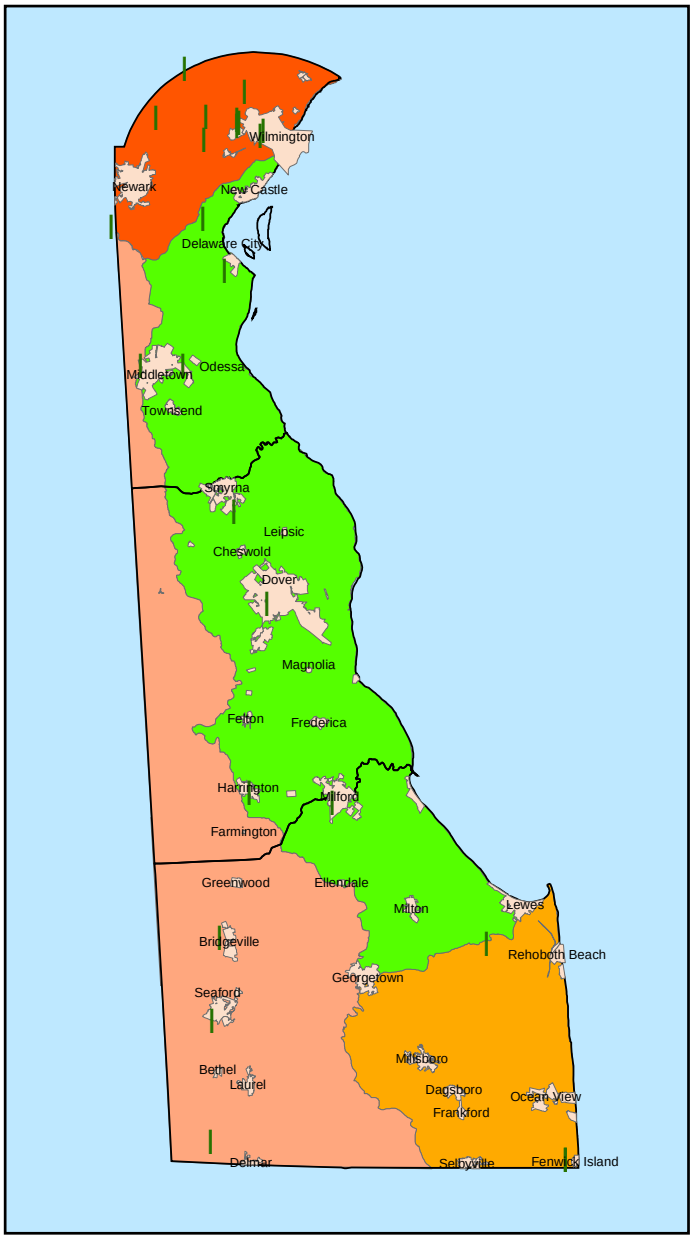
Appendix E
Kent County Cover Crop
2006



Appendix F
Nutrient Management Planning
2006



Appendix G
Urban Tree Planting Projects
2006



Legend

- Urban Tree Planting
- Municipal Areas

BASIN

- Chesapeake Basin
- Delaware Estuary Basin
- Inland Bays Basin
- Piedmont Basin

10 5 0 10 Miles

DELAWARE NONPOINT SOURCE PROGRAM

Appendix H
Urban Tree Planting Cost Share
2006

Community Name	Watersheds	Trees
Meadows at Villages of Old Landing HOA	Inland Bays	36
Village of Ardentown	Shellpot Creek	60
North Star Landscape Committee	White Clay Creek	8
Goodstay Gardens	Christina River	10
City of Lewes	Inland Bays	10
Town of Odessa	Appoquinimink	15
Kennett Pike Association	Brandywine Creek	10
Gilpin Hall	Christina River	32
Brennan Estates	C&D Canal	40
Hockessin Greene	White Clay Creek	12
Hockessin Chase	White Clay Creek	15
Westover Hills Section A	Christina River	10
City of Dover	St. Jones	62
Alapocas	Brandywine Creek	7
Town of Bridgeville	Nanticoke	15
Middletown Village	Appoquinimink	38

2006 NONPOINT SOURCE PROGRAM – PROPOSED PROJECTS

Project Budgets and Descriptions

Proj. No.	Title	Federal	Non-Federal	Total
06-01	Program Administration- To support 319 staff to manage, track, and report on grants; build and maintain Geographic Information System (GIS) databases of Best Management Practice (BMP) implementation; watershed planning environmental assessment; and outreach and education coordination.	$350,573	$255,691	$606,264
06-02	Kent County Agricultural Conservation Planners- Funds will cover salaries for two conservation planners through the Kent Conservation District to establish conservation plans for farmers, follow up on implementation, assist farmers in acquiring financial assistance for BMP implementation and promote water quality BMPs.	$60,000	$40,000	$100,000
06-03	CREP Implementation- Funds will be used to fund a position to facilitate the administration of the Delaware CREP. This individual works with landowners to design projects and develop contracts, then carries the contract through the administrative process and also oversees installation of the various CREP conservation practices.	$60,200	$0	$60,200
06-04	Nutrient Management Relocation- Continued funding through the Nutrient Management Commission for cost-sharing manure transport from areas of excess to areas where it can be better utilized, such as alternative use sites and out-of-state farmland. NPS funds will not be used for farm-to-farm transport within Delaware.	$200,000	$133,334	$333,334
06-05	Sussex County Agricultural Conservation Planners- Funds will be used for salaries for conservation planners through the Sussex Conservation District to establish conservation plans for farmers, follow up on implementation, assist farmers in acquiring financial assistance for BMP implementation and promote water-quality BMPs such as cover crop and pre-sidedress nitrate testing.	$200,000	$120,000	$320,000
06-06	Nutrient Management Coordinator- The coordinator will approve nutrient management planning cost-share approvals and ensure efficient management of Delaware's Nutrient Management Program.	$60,000	$40,020	$100,020

06-07	Statewide Water Quality Improvements Through Greater Sediment Removal- This project proposes to exceed the minimum compliance requirements for sediment control during construction and post-construction phases by setting a goal of greater than 80 % reductions of soil loss by ensuring greater compliance. The strategy will include the following efforts: providing greater inspection frequency and accuracy on active construction sites throughout the targeted watershed; assisting communities with stormwater maintenance issues; and, working closely with key partners to provide greater technical expertise and training in an effort to improve water quality in the targeted watersheds.	$39,300	$26,200	$65,500
06-08	Developing Pollution Control Strategies for TMDL Implementation through Public Processes- Develop Pollution Control Strategies for TMDL Implementation through Public Processes. Three new Tributary Action Teams will be created in the Broadkill River, St. Jones River, and Upper Chesapeake Bay watersheds. Existing teams will continue to be supported while completing and implementing their strategies.	$24,000	$16,254	$40,254
06-09	Tree Planting Cost Share Program- These funds will be used to provide cost-share for planting riparian buffers and adjoining uplands on urban and suburban public owned areas in Delaware. Special emphasis will be placed on tree planting components of other 319 funded work plans	$50,000	$50,000	$100,000
06-10	Cost-Share for Cover Crops and Other Best Management Practices to Assist with the Inland Bays Pollution Control Strategies (PCS) Goals- Funding from this project will be used to supplement Sussex Conservation District cost share incentives to increase cover crop and best management practice (BMP) implementation in the Inland Bay watershed. The primary goals of the proposal are provide technical assistance on 5,000 acres of cover crop in the Inland Bay watershed; and, provide technical and financial assistance on various BMPs addressed in the Inland Bay Pollution Control Strategy.	$103,527	$69,053	$172,580

06-11	Ecological Restoration- Wetland and Stream Restoration & Education and Outreach- Funding will assist the drainage section in educating the ag. community and the general public about the importance of wetlands, streams, and riparian buffers to enhance water quality. This will be accomplished by implementing wetland and channel restoration projects, development of educational material to market restoration and construction techniques, and presenting and attending meetings and conferences on the subject.	$60,000	$63,365	$123,365
06-12	Urban Nutrient Management Planner- Funds will be used to hire an Urban Nutrient Management Planner to develop nutrient mgt. plans for individuals who apply nutrients in urban areas, for example, school grounds, athletic fields, and open space.	$60,500	$40,354	$100,854
06-13	Water Resource Planner- A Water Resources Planner will be hired through the Sussex Conservation District to plan and implement BMPs on tax, public, and private ditch systems in order to reduce NPS pollution and enhance wildlife habitat.	$51,600	$34,418	$86,018
06-14	Appoquinimink River Association Stormwater Retrofit and Stream Restoration Program- The Appoquinimink River Assoc. will identify, prioritize and implement stormwater retrofits and stream repair project sites in the Appo. Watershed, with the help of DNREC and the Center for Watershed Protection.	$118,400	$79,000	$197,400
	TOTAL	**$1,438,100**	**$967,689**	**$2,405,789**

Division of Soil & Water Conservation
Department of Natural Resources and Environmental Control
89 Kings Highway
Dover, DE 19901

The Delaware NPS Program receives Funding from the Federal Clean Water Act Section 319 Grant.