Ecological Restoration & Protection Status Report 2003 - 2005

January, 2006

Delaware Department of Natural Resources and Environmental Control

Ecological Restoration and Protection

Ecological restoration is a very important mission for the Department of Natural Resources and Environmental Control. To strengthen the Department's abilities to implement environmentally beneficial on-the-ground projects, Secretary John A. Hughes assembled an Ecological Restoration and Protection Team in September, 2003. The goal of the Ecological Restoration and Protection Team is to restore and protect streams, drainage ditches, wetlands, and riparian corridors in a coordinated effort to ensure that the maximum level of environmental results are being derived to enhance water quality, provide stream-bank protection and reduce erosion, and establish wildlife habitat.

The Team is comprised of individuals representing all the Divisions within the Department as well as outside agencies like the Conservation Districts, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Delaware Riverkeeper, Center for the Inland Bays, Department of Agriculture, and Department of Transportation. Team members possess expertise from all the applicable scientific fields required for evaluating sites and implementing ecological restoration projects.

Through the efforts of the Team, the Department continues to implement projects utilizing new and innovative wetland and stream restoration techniques and concepts. Wetland restoration is taking place in a variety of settings from marginal agricultural fields to school yards to create additional wildlife habitat, improve water quality and increase the efficiency of farming operations. Stream restoration is being targeted toward existing tax ditches and degraded natural stream systems to provide long-term stability and improve ecological value by reestablishing natural flood plains and sinuous low-flow channels using geomorphological approaches.

Recognizing the need for the Department to have a single point of contact for restoration projects and to lead the Team, Stephen N. Williams serves as the Ecological Restoration Coordinator for the agency. For more information about the Department's Ecological Restoration and Protection initiative, please contact him at 302-739-9921 or Stephen.Williams@state.de.us

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I. Introduction

Ecological restoration efforts by the Department of Natural Resources and Environmental Control began in the early 1990s with the conversion of some marginal agricultural fields into wetlands. Since then, efforts have expanded to include the restoration of tidal and fresh water wetlands, streams, man-made drainage channels (tax ditches), and riparian corridors (the area within and adjacent to a stream).

DNREC Secretary John Hughes established the Ecological Restoration and Protection Team in the fall of 2003 and made it responsible for implementing stream and wetland restoration projects throughout the state. The team brings together expertise and resources from various agencies within and outside the Department. The success of the Team's efforts over the past two years has resulted in the establishment of a permanent Ecological Restoration Branch within the Division of Soil and Water Conservation.

This report highlights the progress and accomplishments that the team has made over the past two years.

II. Ecological Restoration Team

The Ecological Restoration Team, as part of Delaware's Green Infrastructure initiative, is supported by restoration scientists, engineers, environmental managers and environmentalists from the following agencies:

U.S. Fish & Wildlife Service
New Castle Conservation District
Sussex Conservation District
Division of Water Resources
Division of Parks & Recreation
The Nature Conservancy
Ducks Unlimited
Brandywine Valley Association
U.S. Geological Survey
U.S. Environmental Protection Agency
U.S. Army Corps of Engineers
Christina Basin Clean Water Partnership
National Park Service
Partnership for the Delaware Estuary
American Water Resources Agency (DE)
Delaware Riverkeeper Network
U.S.D.A. Natural Resources Conservation Service
Kent Conservation District
Division of Soil & Water Conservation
Division of Fish & Wildlife
Division of Air & Waste Management
Delaware Nature Society
University of Delaware Water Resources Agency
Red Clay Valley Association
Delaware Geological Survey
Department of Agriculture
Department of Transportation
White Clay Creek Wild and Scenic River Program
New Castle County Department of Land Use
Center for the Inland Bays
Corporate Wetland Restoration Partnership (DE)

III. Funding

This section describes the various funding sources that the Ecological Restoration Team utilizes to implement the various types of restoration projects throughout the state.

- **EPA National Wetlands Program Grant Ranked No. 1 in the Nation**

In the fall of 2005 the Department of Natural Resources and Environmental Control received $779,982 in funding over a three-year period from the U.S. Environmental Protection Agency. The funding will be used for protecting and restoring wetlands under the fiscal 2005 Environmental Outcome Wetland Demonstration Pilot. Delaware's proposal ranked first among the proposals submitted by states and tribes in a national competition.

The grant links program activities to measurable environmental outcomes, particularly no net loss, net gain, and protection of vulnerable wetlands. The Department's Division of Water Resources, Division of Soil and Water Conservation and Division of Fish and Wildlife, in concert with the Green Infrastructure Conservation Committee, which represents all state agencies and other conservation groups that protect, restore and manage wetlands, will implement the grant in a cooperative effort by expanding efforts in three areas: restoration, monitoring and assessment, and education.

Under the grant, degraded wetlands and streams in Delaware will be strategically identified and restored, and restoration plans will be developed to identify and address environmental impacts for entire watersheds and the state's green infrastructure. These restoration plans will be based upon the results of monitoring and assessment efforts used to determine the health of the state's remaining wetlands, type of impacts affecting them and actions needed to correct the problems. All the work will be non-regulatory and coordinated with landowners to protect and restore wetlands on both private and public lands. The grant will also support the expansion of wetland education and outreach programs.

- **Christina Watershed Group Receives $1 million EPA Grant**

As part of President Bush's Watershed Initiative, the U.S. Environmental Protection Agency conducted a national competition of the nation's most deserving watersheds to receive funding through Watershed Initiative grants. The Christina group was one of 20 community-based groups receiving federal funding under the first national watershed initiative. Grant recipients were selected from 176 nominations nationwide that were reviewed by regional and national experts. The candidates were chosen because they best demonstrated the ability to achieve on-the-ground environmental results in a short time. Each of the watershed organizations exhibited strong partnerships, showed innovation, and demonstrated compatibility with existing governmental programs. Grant totals ranged from $300,000 to $1 million.

On November 7, 2003, the EPA presented a $1 million dollar grant to the Christina Basin partnership, a bi-state group comprised of environmental organizations, federal, state and local governmental agencies. Over a three-year period the Christina Basin watershed group will be using the funds to further restore and protect streams in northern New Castle County by implementing agricultural and stormwater best management practices. Approximately 35 percent of the funds will be directly overseen by DNREC and will be used for stream restoration projects in which severely degraded stream channels will be restored and stabilized using geomorphological techniques.

➢ **Additional Funding Sources**

Financial resources have also been secured from the following agencies/programs to support ecological restoration efforts:

- EPA Non-point Source 319 Program
- DNREC Ecological Restoration Fund (General Fund)
- U.S. Fish & Wildlife Landowner Incentive Program
- U.S. Fish & Wildlife (Partners Program)
- Phragmites Control Program (State Fish & Wildlife and NRCS)
- State Fish & Wildlife's Wildlife Habitat Enhancement Program
- USDA NRCS Red Clay Creek/White Clay PL 566 Program
- EPA Chesapeake Bay Program
- EPA States Wetland Protection Grant
- DNREC Penalty Fund
- DelDOT
- Partnership for the Delaware Estuary
- Delaware's Corporate Wetland Restoration Partnership

IV. Restoration Projects

COMPLETED PROJECTS

The following section briefly describes restoration projects that have been completed over the past two years by members of the Department's Ecological Restoration Team. Restoration activities include stream restoration, wetland restoration, the planting of warm- and cool-season grasses, reforestation, riparian corridor planting, and invasive species control.

➢ **Dave Smith Wetland**

A total of three acres of farm fields have been restored to wetlands with future plans to convert and additional 16 acres that surround the wetlands to hardwood forests and cool-season grasses on Dave Smith's property located in western Sussex County. Sussex Tech High School students assisted with completing the project by planting over 250 wetland trees and shrubs at the site on December 10, 2003. Some of the students also assisted the Sussex Conservation District and the Drainage Section with the installation of a water-control outlet pipe. This site is located in the Nanticoke watershed, part of the Chesapeake drainage basin.

Students assist with installation of outlet pipe.

A proud 97-year old Mr. Smith admires the results of the Sussex Tech students' planting effort.

- **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.

The following photos are from the Three Little Bakers site:


Pre-restoration: a lack of streamside vegetation results in undercutting of banks and severe erosion.


Before construction rip-rap was used in some areas to hold the stream banks in place (photo on left). The same area has been restored using logs, tree stumps, boulders, and live-branch willow layering to stabilize the banks and create habitat for fish and macro-invertebrate species.


Stream banks have been stabilized and the sharp bends in the stream channel have been removed (photo on right). The pre-construction photo (left) shows a highly-eroded area with no main channel and banks that have been severely eroded and undercut.

The Three Little Bakers restoration project serves as an excellent outdoor classroom for students and environmental professionals.

- **Bethany Marina Wetland**

Boy Scouts install the few remaining plugs of *Spartina alterniflora* in disturbed tidal wetland.

On September 27, 2003, a 0.5 acre tidal wetland restoration was done by a Boy Scout Troop from New Castle County as part of an Eagle Scout project utilizing 319 NPS funds. The Eagle Scout candidate qualified for funding by preparing an application and plans for the project and submitting them to a review team comprised of individuals from DNREC and the Sussex Conservation District. The Boy Scouts planted approximately 1,800 plugs of *Spartina alterniflora* along a previously disturbed marsh zone adjacent to White Creek. This site is located in the Inland Bays drainage basin.

- **Taber State Forest Wetland**

A 4-acre wetland was constructed in a cooperative effort with the Department of Agriculture's Division of Forestry at the Taber State Forest located in southwest Sussex County in the spring 2005. The project involved the restoration of a wetland in an agriculture field. Runoff from the agriculture field is being directed through the wetland before it outlets into the adjacent tax ditch channel. This project is located in the Chesapeake drainage basin.

- **Christ the Teacher Catholic School Wetland**

The Delaware Department of Natural Resources and Environmental Control, in a cooperative effort with the Kent and Sussex Conservation Districts and the Diocese of Wilmington, completed the construction of a 1.5-acre wetland complex at Christ the Teacher Catholic School in the fall 2005. Christ the Teacher is an elementary school located at the intersection of Frazer Road and Route 40 in New Castle County, situated in the Perch Creek watershed that drains to the Chesapeake Bay. The school, which opened in 2002, supports grades K through 8. When the school was built, a stormwater management basin was constructed in the southwest corner of the property for sediment and stormwater controls for the entire site. Adjacent to and east of this basin was an unutilized upland field covered with lawn grasses that was immediately adjacent to a 46-acre wooded wetland owned by the Diocese of Wilmington. The wetland project involved the conversion of this open field into a wetland complex.

Restoration efforts like this create wildlife habitat, increase biodiversity and improve water quality, all vital components of a Livable Delaware. This project also creates the perfect "outdoor classroom" for the school to teach the fundamental principles of ecology and the importance of environmental stewardship.

On October 18, 2005, over 240 enthusiastic students and teachers from Christ the Teacher Catholic School located near Glasgow participated in a wetland "planting party" sponsored by the Department's Ecological Restoration Team. A total of eight 30-student teams made up of first through eighth graders planted hundreds of native trees, shrubs and wetland grasses throughout the school's newly constructed 1.5-acre wetland complex created by the Ecological Restoration Team in late August through mid-September. One of the unique features is that this wetland was designed to improve water quality by directing the surface water runoff from the parking lots, building, roadways and athletic fields on the school campus through the wetlands before entering the previously existing stormwater basin, ultimately finding its way to the Chesapeake Bay. This is the first project of its kind in Delaware where a wetland has been incorporated into an existing stormwater basin.

This project became possible because of some excellent teamwork demonstrated by a number of individuals and organization. The partners that made this project possible include**:** U.S. Environmental Protection Agency's Chesapeake Bay Program (funding source for this effort); Delaware's Corporate Wetland Restoration Partnership (providing signage for the plants); New Castle County, Sussex Conservation District, Kent Conservation District; Department of Natural Resources and Environmental Control; Christ the Teacher Catholic School and the Catholic Diocese of Wilmington.

Unutilized area adjacent to athletic fields has been converted into a wetland which will be used as on "outdoor classroom" by students and faculty at Christ the Teacher Catholic School. All of the surface water runoff from the fields is filtered through the wetland before making its way to the Chesapeake Bay.

Field adjacent to existing stormwater basin and 46-acre wooded wetland was restored to a wetland. Water from the school's parking lots, building and fields is directed through the wetland before discharging into the stormwater basin.

Over 240 students from Christ the Teacher School participated in the planting of ***their*** wetland in an event sponsored by DNREC's Ecological Restoration Team on October 18, 2005. The school has already enrolled in the Department's Adopt-a-Wetland Program.

- **Battista Wetland**

In the summer 2004 a 3-acre wetland was constructed on the Battista property located in western Kent County. A portion of this project involved converting ½-acre of their lawn into a wetland resulting in a true "backyard habitat." In the spring 2005, students from Polytech High School planted native trees, shrubs and wetland grasses at this site which consists of several interconnected wetland cells. This site is located in the Chesapeake drainage basin.

- **Hengst Farm Wetland**

A 5-acre wetland complex was constructed on marginal agriculture lands in the summer 2005 at the Hengst farm. The farm, located in northwest Kent County, is part of the Chesapeake drainage basin.

- **Addix Farm Wetland**

The Ecological Restoration Team constructed a 5-acre wetland complex on the Addix farm located in northwest Kent County. The project, completed in the summer 2005, ties the outlet pipe from the wetland into a clay-tile drainage system that has existed on the farm for more than 75 years. An additional component of this project involved the installation of a water control structure in a drainage ditch on the farm with wetlands constructed on each side of the channel. This site is located in the Chesapeake drainage basin.

- **Mike Brown Farm Wetland**

In the spring 2004 a 2-acre wetland was constructed on the Brown farm located in western Kent County. The wetland complex is located in the vicinity of an existing shallow-water pond. This site is part of the Chesapeake drainage system.

- **Fish and Wildlife's Willow Grove Tract Wetland**

This 4-acre wetland was constructed in the summer 2004 and is located in western Kent County on property owned by the Division of Fish & Wildlife. The site is part of the Chesapeake drainage basin.

- **Fish and Wildlife's Urban Tract Wetland**

In the spring 2004 an 11-acre wetland complex consisting of multiple cells was constructed on the Urban farm. This site is located in western Kent County and is part of the Chesapeake drainage basin.

- **Fish and Wildlife's Fire Tower Tract Wetland**

In the summer 2005 a 4-acre wetland was constructed on this Division of Fish & Wildlife property located in western Kent County. The wetland is located in a retired agricultural field, all part of the Chesapeake drainage basin.

- **Fish and Wildlife's Ommelanden Hunter Education Center Wetland**

In the summer 2004 three interconnected wetland cells were constructed at the Ommelanden Hunter Education Center in New Castle County. The 2-acre wetland complex will be incorporated into the hunting education courses taught by the Division of Fish & Wildlife. The site is located in the Delaware Bay and Estuary drainage basin.


Wetlands at the Ommelanden Hunter Education Center constructed in the summer 2004. On September 19, 2005 this wetland complex was dedicated to Arthur L. Spingarn (deceased) who worked as a wetland scientist with the EPA.

- **Fish and Wildlife's Caulk Property Wetland**

A large 5-acre wetland complex was constructed in the spring 2004 on the Caulk property owned by the Division of Fish & Wildlife. The site, located in Kent County, also had an additional 25 – 30 acres of wetland restoration work done in 2004, some resulting from plugging several water outlet pipes. The property is located in the Delaware Bay and Estuary drainage basin.

- **Steve Conner Farm Wetland**

In the spring 2005 a 1.5-acre wetland complex consisting of three separate cells in very close proximity to one another was constructed on the Conner farm. The farm is located in western Kent County and is part of the Chesapeake drainage network.

- **Mill Creek Riparian Corridor Enhancement at Delaware Park**

Riparian corridor enhancement and invasive species control (Japanese Hops) took place in the summer 2005 along a reach of Mill Creek at Delaware Park, the site of the Department's first stream restoration project completed in the spring 2001. Approximately 3-acres of the riparian corridor were enhanced with the eradication of invasive species and the planting of additional native species to maintain the habitat quality of the corridor. This site is located along Mill Creek and is part of the Christina basin.

- **Lake Forest High School**

In the summer of 2005 approximately 12.7 acres were restored to early successional (warm season grasses), riparian and wetland habitat at Lake Forest High School. The school is located in Kent County and is part of the Delaware Bay drainage basin.

- **Lulu Ross Elementary School**

In the summer of 2005 approximately 3 acres of early successional habitat were established at Lulu Ross Elementary School. The site is located in Sussex County and is part of the Delaware Bay drainage system.

- **Milford High School**

In the summer of 2005 approximately 10.6 acres of early successional habitat were established and 0.5 acres of wetland habitat restored at Milford High School. The site is located in the Delaware Bay drainage basin.

- **Jerry Lynch Wetland**

In the fall of 2005, two acres of prior converted wetland habitat were restored on the Lynch property. The site is located in Sussex County in the Chesapeake drainage basin.

- **Bog Turtle Restoration Project 1**

In the fall of 2005, two acres of marginal wetland habitat were enhanced through invasive species control and management of woody vegetation to improve conditions for the federally listed endangered bog turtle. The site is located in New Castle County in the Christina (Northern Piedmont) drainage basin.

- **Wheaton Project**

In the fall of 2005, two acres of forest habitat were enhanced through invasive species control to benefit a plant species (rough horsetail, *Equisetum hymale*) that is currently at risk in the state. The site is located in Sussex County in the Chesapeake drainage basin.

- **Bog Turtle Restoration Project 2**

In the fall of 2005 approximately .37 acres of phragmites were controlled by mechanical and chemical means to improve wetland conditions for species-at-risk including the Mulberry wing, Bog-turtle and Carpenter frog. The site is located in New Castle County in the Christina (Northern Piedmont) drainage basin.

- **Bog Turtle Restoration Project 3**

In the fall of 2005 approximately .4 acres of phragmites were controlled by mechanical and chemical means to improve wetland conditions for species-at-risk including the Mulberry wing, Bog-turtle and Carpenter frog. The site is located in New Castle County in the Christina (Northern Piedmont) drainage basin.

- **Purple Loosestrife Control (Lythrum salicaria)**

In the spring of 2005, two species of Galerucella (9,000 insects) were released on state-owned wildlife management areas in New Castle County as a form of biological control for Lythrum salicaria L.(purple loosestrife). Release locations were in the Delaware Bay drainage basin.

- **Pike Property**

From the spring of 2005 to present approximately 3.3 acres of marginal forest habitat has been enhanced by controlling invasive species by both mechanical and physical means. In addition, over 200 trees and shrubs have been planted to reestablish the understory of this forest habitat. Restoration efforts were completed in eastern Sussex County in the Delaware Bay drainage basin.

- **Branham Corporation Wetlands**

In the summer of 2004 two wetlands were created on the Branham Corporation property located in western Kent County. The wetlands were 0.5 and 1 acre in size. This site is part of the Chesapeake Bay drainage system.

- **Delaware Wild Lands Inc. – Cux Farm**

This 4-acre wetland was constructed in the summer 2004 and is located in eastern New Castle County on property owned by Delaware Wild Lands Inc. The site is part of the Delaware Bay drainage basin.

- **Delaware Wild Lands Inc. – Liston Farm**

In the summer of 2004 a 4-acre wetland was constructed on property owned by Delaware Wild Lands Inc. located in the eastern part of New Castle County. The site is part of the Delaware Bay drainage basin.

- **Hudson Farm Wetland**

In the summer of 2004 a 2-acre wetland was constructed on the Hudson farm located in Sussex County. The site is part of the Delaware Bay drainage basin.

- **Summary Table of Implemented Ecological Restoration Projects**

Restoration efforts have involved a variety of initiatives including stream restoration, invasive species control, reestablishment of forest habitat, wetland restoration and riparian corridor planting. The following table summarizes the ecological restoration projects that have been implemented from September 2003 through December 2005:

Project	Project Type*	Area Restored (acres)**	Drainage Basin
Dave Smith	W	3	Chesapeake Bay
Pike Creek at Three Little Bakers	S, R, W	5,000 lf – S 5 – R; 3 - W	Christina
Bethany Marina	W	0.5	Inland Bays
Taber State Forest	W	4	Chesapeake Bay
Christ the Teacher Catholic School	W	1.5	Chesapeake Bay
Battista Property	W	3	Chesapeake Bay
Hengst Farm	W	5	Chesapeake Bay
Addix Farm	W	5	Chesapeake Bay
Brown Farm	W	2	Chesapeake Bay
F & W Willow Grove Tract	W	4	Chesapeake Bay
F & W Urban Tract	W	11	Chesapeake Bay
F & W Fire Tower Tract	W	4	Chesapeake
F & W Ommelanden Ed. Center	W	2	Del. Bay & Estuary
F & W Caulk Property	W	35	Del. Bay & Estuary
Conner Farm	W	1.5	Chesapeake Bay
Mill Creek at Delaware Park	R	3	Christina
Lake Forest High School	W, R	12.7	Del. Bay & Estuary
Lulu Ross Elementary School	G	3	Del. Bay & Estuary
Milford High School	W, G	10.6 G; 0.5 W	Del. Bay & Estuary
Jerry Lynch	W	2	Chesapeake Bay
Bog Turtle Restoration Project #1	W, I	2	Christina
Wheaton Project	F, I	2	Chesapeake Bay
Bog Turtle Restoration Project #2	W, I	0.4	Christina
Bog Turtle Restoration Project #3	W, I	0.4	Christina
Purple Loosestrife Control	I	F & W Lands	Del. Bay & Estuary
Pike Property	F, I	3.3	Del. Bay & Estuary
Branham Corporation	W	1.5	Chesapeake Bay
Delaware Wild Lands – Cux Farm	W	4	Del. Bay & Estuary
Delaware Wild Lands – Liston Farm	W	4	Del. Bay & Estuary
Hudson Farm	W	2	Del. Bay & Estuary
TOTAL AREA RESTORED		5,000 lf – S; 140.9 acres – W,F,G,R,I	

*W – wetland; F – forest G – grasses; S – stream; R – riparian corridor planting; I – invasive species control

** all units are in acres unless linear feet (lf) is noted

- **Summary Table of Wildlife Habitat Enhancement Program**

Under the Division of Fish and Wildlife's Wildlife Habitat Enhancement Program, early successional stage habitat desired by quail has been established on the following properties:

Landowner Name	Acreage	Year Enrolled	Drainage Basin
Norman "Eddie" Davidson	5	2003	Inland Bays
Benjamin L. Moore	5	2003	Chesapeake Bay
Rodney Smith	5	2003	Inland Bays
Dean Stoakley	7	2003	Chesapeake Bay
Morris Tatman	16.5	2003	Chesapeake Bay
Delaware Nature Society	5	2004	Del. Bay & Estuary
Masten Holdings, Inc.	10.5	2004	Chesapeake Bay
Allen Rogers	4	2004	Inland Bays
KGB Properties	7.5	2004	Chesapeake Bay
Richard Clifton	5	2004	Del. Bay & Estuary
Harvey O. Thomas Sr.	5	2004	Chesapeake Bay
Branham Corporation	5	2004	Chesapeake Bay
Chris Hill	4	2005	Del. Bay & Estuary
Jerry K. Rider	15	2005	Chesapeake Bay
Josephine M. Hearn	5	2005	Chesapeake Bay
Charles P. West II	1	2005	Inland Bays
TOTAL AREA	105.5		

- **Phragmites Control Program**

The Phragmites Control Program, a joint initiative between DNREC's Division of Fish & Wildlife and U.S.D.A. Natural Resources Conservation Service, has treated record-breaking acres of land over the past several years. Since 2003, the program has been responsible for treating 26,645 acres as highlighted below.

2003

Through the cost-share program, the initiative is responsible for treating 3,067 acres of phragmites for 63 different landowners. The Division provided $35,938 in match to these landowners. A total of 3,131 acres were sprayed on state wildlife areas as part of the Northern Delaware Wetland Rehabilitation Project (NDWRP) at a cost of $123,500.

2004

A total of 5,751 acres were treated on private properties of 90 individuals through the cost-share program with the Division providing $53,916 in match. The Division coordinated the spraying of 3,628 acres of phragmites on public projects at a cost of $113,375.

2005

A record 6,766 acres of phragmites were treated for 91 landowners requiring the Division to provide $64,588 in match. An additional 4,302 acres were treated on wildlife areas, NDWRP and other DNREC properties at a cost of $136,889.

UPCOMING PROJECTS

The following section briefly describes restoration projects that are in the process of being completed, or are in the planning phase and targeted for completion in the near future.

- **Tributary to Red Clay Creek Stream Restoration Project (Gwen Chen site)**

A 350 feet stream restoration project will be underway in the first quarter of 2006 along a tributary to the Red Clay Creek located in the vicinity of Hercules Country Club. Members of the Department's Ecological Restoration Team gathered the baseline stream data and prepared the design plans. The permit from the U.S. Army Corps of Engineers was approved in the fall 2005. This site is located in the Christina drainage basin.

- **Sanford School Riparian Corridor Planting**

In 2002, approximately 400 linear feet of degraded urban stream channel located below a dam were restored and riparian vegetation was planted using a wide variety of native plants. The planting was done by the Sanford School students under the supervision of Jennifer Johnson (Holmes) when she was with the Wetlands and Subaqueous Lands Section. The project was made possible by a 319 NPS grant. The project benefited by the resources and input provided by Duffield Associates, Delaware Nature Society, DNREC and the New Castle Conservation District. These organizations teamed together to design and implement the project.

To enhance the riparian canopy, the planting of additional native trees and shrubs will take place in the spring 2006 at the Sanford School restoration site. This stream is a tributary to Mill Creek and is located in the Christina drainage basin.

- **Hindu Temple Wetland**

The Hindu Temple, located in Hockessin, is proposing to expand their existing temple facility. Because this expansion will require them to reconstruct their existing stormwater basin, they would like to incorporate a wetland into the revised stormwater basin design. The wetland

would be used as an "outdoor classroom" by the younger members of the congregation and the Charter School of Wilmington (a temple member is the science teacher at the Charter School). Members of the Department's Ecological Restoration Team have provided several alternatives to the proposed design which would maximize the efficiency of the stormwater basin and proposed wetland taking into account the limited amount of land area that is available. Representatives from the temple are working with their consultants and New Castle Country Department of Land Use to ensure that the revised design plans incorporate the necessary recommendations. This site is located in the Christina drainage basin. Construction is expected to take place in 2006.

- **Pike Creek Stream Restoration at Independence School**

An 1,800 to 2,200 feet stream and wetland restoration project is being planned by members of the Ecological Restoration Team. Biohabitats, an environmental restoration firm, is currently preparing the design plans. This project will utilize the same types of stream and wetland restoration techniques utilized at the recently completed Three Little Bakers project located just downstream from this site. The site is located in the Christina drainage basin an is part of the White Clay Creek Wild & Scenic River System. Construction activities are being planned for the summer 2006.

- **University of Delaware Newark Farm Wetland Sites**

Ecological Restoration Team members have evaluated the University of Delaware farm property near Newark and have identified 5 – 7 potential sites to construct wetlands throughout the farm complex. The wetlands will serve various functions: serve as buffers between actively farmed fields and mature forests; filter surface water runoff from cattle grazing areas and farmed fields before waters enter the headwater tributaries of Cool Run; serve as "connectors" to existing habitat areas.

This area is being targeted for restoration work for the following reasons:

- Headwaters of Cool Run, a tributary of the White Clay Creek, which is a congressionally-delegated Wild and Scenic River system;
- White Clay Creek discharges into the Christina River, which has been targeted for nutrient reductions as part of the Environmental Protection Agency's total maximum daily load (TMDL) program;
- Serves as a public drinking water source;
- Restoration sites will be "outdoor classrooms" for use within College of Agriculture and Natural Resources' teaching, research, and extension programs; and
- Creation of highly functioning wetlands allows for ground-water recharge, flood control, and reduced sediment and nutrient loads to surface waters.

Design plans for the site are being developed and approvals have been obtained from the State Historic Preservation Office.

- **Carl Solberg Channel Restoration and Wetland**

A project agreement has been executed for this stream channel and wetland restoration project. Clearing and grubbing of trees have been completed, design plans are being finalized, and members of the Ecological Restoration Team are preparing an application for a nationwide restoration permit from the U.S. Army Corps of Engineers. This project involves the

abandonment of an existing tax ditch and the installation of two water-control structures in the channel. Wetlands will be constructed adjacent to the channel to serve as floodplain wetlands. This project, located in western Kent County, is part of the Chesapeake drainage basin. Construction is planned for the spring 2006.

V. Initiatives

The section highlights some of the initiatives that members of the Ecological Restoration Team have been involved with since the fall of 2003 when the team was established.

- **Christina Basin Watershed Initiative**

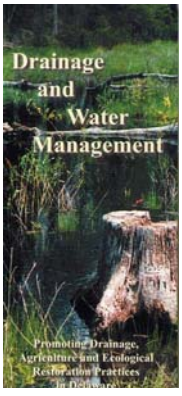
In November 2003, the Department, in cooperation with the Delaware Emergency Management Agency, New Castle County, New Castle Conservation District, Department of Transportation, Duffield Associates, Delaware Nature Society, University of Delaware Water Resources Agency, Delaware Geological Survey, U.S. Geological Survey, Red Clay Valley Association and the U.S. Army Corps of Engineers, began to evaluate the need to conduct a detailed assessment of the Red Clay Creek concerning issues relating to flood control, ecosystem restoration, recreation, watershed planning, and stream stabilization. In December 2004 the Feasibility Study Project Management Plan was finalized.

On February 23, 2005 the Department entered into a Feasibility Cost Share Agreement with the U.S. Army Corps of Engineers for the Red Clay Creek Watershed. The feasibility study will identify potential projects which can be implemented in a partnership with the Corps to address issues like flood damage reduction; riparian buffer restoration; stream reach improvements and stabilization; sediment, nutrient, and pollutant load reduction; wetland creation and/or restoration; and fish passage restoration.

On December 13, 2005 Kevin Donnelly (Director, Division of Water Resources) and Steve Williams (Ecological Restoration Coordinator, Division of Soil and Water Conservation) met with Bill Mulloy representing the U.S. Army Corps of Engineers Philadelphia District Office to discuss the status and future direction of the Red Clay Creek Feasibility Study. At the request of Kevin Donnelly, the Corps is going to evaluate the possibility of performing a focused feasibility study which would only address the critical elements of the work plan. The goal is to initiate the study in early 2006.

- **Drainage, Water Management and Ecological Restoration Brochure**

A brochure was completed on 10/23/03 and 10,000 copies have been printed. Funded by the Center for the Inland Bays, this document describes the need for water management, the tax ditch program, historic channel-construction practices, and the current techniques being implemented for stream and wetland restoration. The document is currently being distributed to schools; federal, state and local governmental agencies; conservation districts; environmental organizations; and various farming-related facilities (e.g., tractor equipment companies, Southern States, etc.).



- **Inventory of Restoration Sites**

Members of the Ecological Restoration Team, in a cooperative effort with numerous state, federal and non-profit agencies, are in the process of developing an inventory of all ecological restoration projects throughout the state. The information is being entered into an Access database and will eventually be incorporated into the Environmental Navigator. The datasheet is located in Appendix A.

- **Ecological Restoration Conference**

On April 20th and 21st, 2004, a two-day conference was held at the Dover Sheraton Inn. The conference, sponsored by the Department's Ecological Restoration Team, focused on professional presentations and discussions about wetland and stream restoration issues and techniques. The second day of the workshop consisted of a field trip throughout the state which provided attendees with an opportunity to see the types of stream and wetland restoration projects that exist in Delaware. As part of the EPA National Wetlands Program Grant, another Ecological Restoration conference is being planned for fall 2006.

- **Ecological Restoration and Protection Displays**

Two photo-intensive display boards were created/updated by the Ecological Restoration Team which depict key stream restoration and wetland projects throughout the state and the scientific techniques and methodologies used when implementing these types of projects. The display boards and related brochures and articles have been featured at numerous conferences and workshops throughout the tri-state region and at national conferences over the past 2 years.

- **Delaware's Corporate Wetland Restoration Partnership**

At the October 20, 2004 meeting, Delaware's Corporate Wetland Restoration Partnership agreed to provide funds to support two ecological restoration projects: Diamond Back Terrapin protection and habitat enhancement along Coastal Highway 1; and signage to identify trees and shrubs at a wetland at Christ the Teacher Catholic School (wetland constructed fall 2005). The Delaware Chapter of the Corporate Wetlands Restoration Partnership, with Delmarva Power (Conectiv Energy) as the lead agency, is made up of several businesses and governmental agencies.

- **Regional Applied Research Effort**

In the fall 2003 the Ecological Restoration team received a $75,000 Regional Applied Research Effort (RARE) grant from the EPA to evaluate the effectiveness of restored wetlands for the treatment of agricultural runoff. This team is performing a research assessment and chemical analysis on surface runoff water as it enters various wetland systems to determine its chemical composition. Samples are also collected and analyzed after the water passes through the wetland systems to evaluate the level of treatment provided by the wetland. This data will be utilized to develop a model that will indicate the size and type of wetlands that are required for treatment based on surface water characteristics. Members of the Ecological Restoration Team are working with staff from EPA's Research and Development office located in Ada, Oklahoma. The Department's Laboratory Services Section is currently in the process of collecting and analyzing samples from the various sites selected for this project.

➢ **Evaluating the Effectiveness of Wetland Restoration Techniques**

In August 2003, a $105,359 Wetland Program Development Grant was awarded to Amy Deller Jacobs with the Division of Water Resources to evaluate the effect of microtopography, coarse woody debris, and organic matter on the biotic community of restored wetlands in Delaware. Currently no quantifiable information is available to assess the effect (positive or otherwise) that these new construction techniques are having on the biotic communities of restored wetlands in Delaware. Determining the biological effects of these construction techniques would provide wetland managers and practitioners valuable information to plan future restoration activities. Additionally, the information collected can be used as baseline monitoring data to begin a long-term dataset to assess how these sites develop over time. The information obtained during this study will be shared with other organizations that are performing wetland restoration in Delaware including other divisions within DNREC (Fish and Wildlife and Soil and Water), Natural Resource Conservation Service, U.S. Fish and Wildlife Service, Chesapeake Bay Foundation, Ducks Unlimited, Conservation Districts, Delaware Department of Agriculture and Delaware Department of Transportation. A workshop will be sponsored to present the findings of this research and to provide hands-on experience with the field monitoring and construction techniques. The goal is to provide the transfer of information to improve future wetland restoration projects in Delaware.

➢ **Adopt-a-Wetland Program**

The Adopt-a-Wetland program continues to be a strong education and outreach mechanism for delivering wetland information and stewardship of wetland systems. Currently there are participating volunteers numbering in the thousands who represent over 80 adopting groups that are responsible for watching over more than 10,000 acres of wetlands throughout Delaware. The Adopt-a-Wetland program is housed in the Division of Fish and Wildlife at the Aquatic Resources Education Center.

VI. Outreach & Education

The Ecological Restoration Team has been working in a coordinated manner on numerous public outreach efforts. This section provides details about the Team's activities over the past two years.

CONFERENCE SPEAKERS

- Tom Barthelmeh spoke at the National Arbor Day Foundation's "Restoring Native Ecosystems" conference held November 7-8, 2005, in Nebraska City, Nebraska and at the North American Lakes Management Society's 2005 Symposium held in Madison, Wisconsin held November 9-11, 2005. The presentations were entitled "Wetland Restoration in Marginal Agricultural Fields/Innovative Wetland Restoration Techniques" and "Tax Ditch Best Management Practices." The wetland restoration display was taken to the Madison symposium.

- On October 21, 2005, Stephen N. Williams, the Department's Ecological Restoration Coordinator with the Division of Soil and Water Conservation, was the keynote lunchtime speaker at the *Water-Friendly Landscape Design: A Prescription for Healthy Watersheds* forum sponsored by the University of Delaware's Water Resources Agency. Williams' presentation

was entitled "Stream and Wetland Restoration in Delaware: Featuring Pike Creek Stream Restoration at Three Little Bakers and a Wetland Complex at Christ the Teacher Catholic School." Tom Barthelmeh and Jim Chaconas, members of the Department's Ecological Restoration Team, were also present and served as technical experts, fielding numerous questions on the topic of stream and wetland restoration. The team also had a photo-display available which featured the various construction techniques used on restoration projects.

- Amy Jacobs and A. Alsfeld gave a presentation at the Society of Wetland Scientists Conference, July 7-10, in Charleston, SC. The title of her talk was "Evaluating the Effects of Coarse Woody Debris and Substrate Microtopography Additions on the Biotic Community of Constructed Wetlands."

- In February 2005, Jennifer Holmes and Tom Barthelmeh spoke at the New Jersey Nursery and Landscape Association's Trade Show in Somerset, New Jersey. Their presentations focused on the restoration efforts of the Department.

- On December 5 – 10, 2004, Steve Williams and Tom Barthelmeh participated in the First National Conference on Ecosystem Restoration in Orlando, Florida. Williams and Barthelmeh each made presentations describing stream and wetland restoration techniques and projects being implemented in Delaware and the significant strides that have been made in Delaware citing the Green Infrastructure Conservation Coordination Executive Order signed by Governor Minner in October. Their presentations also noted the coordination taking place between other state agencies (e.g., Agriculture, DelDOT) and NGOs on restoration initiatives as well as the support given by the State Legislature by approving a funding category in DNREC's current budget specifically designated for Ecological Restoration.

- Amy Jacobs, Abby Rokosch, and J.Lister gave a presentation entitled "Using HGM Data to Develop a Matrix of Management Options for Wetland Protection and Restoration" at the Society of Wetland Scientists Conference July 19-23, 2004 in Seattle, WA.

- Amy Jacobs gave a presentation entitled "Development of a rapid wetland condition assessment method based on HGM models" at the Delaware Wetland and Stream Restoration Conference in Dover on April 20-21, 2004.

- Amy Jacobs and Abby Rokosch gave a presentation entitled "Delaware's wetland restoration database" at the Delaware Wetland and Stream Restoration Conference in Dover on April 20-21, 2004.

- Steve Williams gave the opening presentation entitled "Delaware's Ecological Restoration Initiative" at the Delaware Wetland and Stream Restoration Conference in Dover on April 20-21, 2004.

- On March 3, 2004, Tom Barthelmeh and Steve Williams gave presentations at the 13th Annual Native Plant / Ecological Restoration Conference sponsored by Pinelands Nursery in Columbus, NJ. The presentations focused on best management practices that Delaware utilizes for wetland and stream restoration as well as Secretary Hughes' Ecological Restoration Team initiative for

the Department. In addition to the presentations, display boards were also showcased highlighting the various stream and wetland restoration techniques implemented on projects throughout the State. Over 150 individuals attended the conference from New Jersey, Maryland, New York and Pennsylvania.

- On October 26, 2004, Steve Williams spoke at the 6th Annual Wetlands Workshop in Atlantic City, NJ. Williams' presentation focused on the development of the Department's Ecological Restoration Team and highlighted the various restoration projects and techniques being developed and utilized by the team when implementing on-the-ground restoration projects.

- Tom Barthelmeh and Steve Williams served as co-moderators for a series of presentations entitled "Landowners Perspective on Restoration" at the Wetlands Workshop in Atlantic City, New Jersey on 10/27/05. The series of presentations featured the viewpoints from four different Delaware landowners that worked with the Department's Ecological Restoration Team to construct wetlands on their property.

POSTER DISPLAY AND SPEAKING ENGAGEMENTS

- On December 9, 2005, Steve Williams (Ecological Restoration Coordinator, Division of Soil and Water Conservation) gave a presentation to the Christina Basin Clean Water Partnership Policy Committee about the status of various ecological restoration projects in the Christina Basin. Williams' presentation featured the Pike Creek stream restoration project at Three Little Bakers as well as plans that are currently being developed for stream restoration work along Pike Creek at the Independence School and several wetland complexes at the University of Delaware farm in Newark.

- On December 7, 2005, Steve Williams (Ecological Restoration Coordinator, Division of Soil and Water Conservation) gave a presentation to the State's Source Water Protection Advisory Committee about the recently completed Pike Creek stream restoration project at the Three Little Bakers Golf Course. In addition to improving habitat, the Pike Creek project has helped to improve water quality in a stream that is a source of public drinking water for the residents of northern Delaware.

- On October 21, 2005, Stephen N. Williams, Tom Barthelmeh and Jim Chaconas had a photo-display available which featured the various construction techniques used on stream and wetland restoration projects at the *Water-Friendly Landscape Design: A Prescription for Healthy Watersheds* forum sponsored by the University of Delaware's Water Resources Agency.

- On October 18, 2005, Steve Williams made a presentation to the entire student body at Christ the Teacher Catholic School prior to the wetland planting event. Williams, in speaking to over 480 students and teachers, explained the importance of wetlands and the various functions they serve. Williams went on to explain the step-by-step process that was involved in constructing the wetland at Christ the Teacher School.

- Two photo-intensive display boards which depict key stream restoration and wetland projects throughout the state and the scientific techniques and methodologies used when implementing

these types of projects were featured at the Sixth Annual Wetlands Workshop in Atlantic City, NJ on October 25 – 28, 2004.

- ❒ Steve Williams and Tom Barthelmeh manned an ecological restoration display at the First National Conference on Ecosystem Restoration in Orlando, Florida from December 5 – 10, 2004. Their exhibit was a photo-intensive display that demonstrated the various types of restoration techniques and restoration projects being implemented in the First State. The display was located in the Exhibition Hall throughout the entire conference. Individuals from all over the country, and even some international attendees, were extremely impressed with the practical and on-the-ground approach that Delaware is implementing with regard to ecological restoration. Several states (e.g., North Carolina, Florida, and Wisconsin) asked the Delaware representatives if they would be willing to travel to their state and assist with jump-starting their programs by walking them through a project utilizing the restoration techniques being deployed in Delaware. Delaware certainly made a lasting impression on numerous individuals that participated in the First National Conference on Ecosystem Restoration. It was very evident that the "First State made a "first rate" impact. Additional information regarding the conference is available at http://conference.ifas.ufl.edu/ecosystem/

- ❒ In conjunction with the Non-Point Source National Monitoring Conference held in Ocean City, Maryland from 9/26/04 through 9/28/04, Tom Barthelmeh conducted a field trip to the Haines Farm stream and wetland restoration project in Kent County, Delaware.

- ❒ During August 2004, at the 24th Annual ESRI International GIS conference, Mark Biddle participated in a seminar/panel discussion on "Wetlands Restoration and GIS Mapping". Delaware's wetland mapping efforts have been well recognized for a few years at this conference of geographic information system mapping experts from around the world.

- ❒ Tom Barthelmeh, Steve Williams and Bill Whitman attended the Sussex Conservation District 2003 Cooperators' Dinner on the evening of December 3rd at the Bridgeville Fire Hall. They shared their ecological restoration displays and brochures highlighting stream and wetland restoration projects and techniques. Tom Barthelmeh also participated in the 2005 Cooperators Dinner.

- ❒ *The Ecological Restoration Team's displays were also featured at the following events:*

    - Coast Day – Lewes, Delaware (10/3/05)
    - National Hunting and Fishing Day – Ommelanden Hunter Education Center (9/25/05)
    - Delaware State Fair – (7/22/05 – 7/30/05)
    - Pinelands Nursery's Native Plant/Restoration Symposium on March 2005 in Columbus, NJ
    - Gumboro Fire Hall - Delaware Sportsman Dinner (1/28/05)
    - Delaware Agronomy Day – Delaware State Fair (1/25/05)
    - Inland Bays – "Pollution Control Strategies Meeting" at Roxanna and Rehoboth (2005)
    - Watersheds and Wetlands Workshop – Atlantic City, New Jersey (October 25-28, 2004)
    - Non-Point Source National Monitoring Conference – Ocean City, Maryland (9/26/04 – 9/28/04)

- University of Maryland Drainage Ditch Symposium (August 2004)
- Pinelands Nursery's Native Plant/Restoration Symposium on March 2, 2004 in Columbus, NJ

MISCELLANEOUS EFFORTS

- Over 50 members of the Christina Basin Clean Water Partnership from Delaware and Pennsylvania had the opportunity to tour the Christina River Basin on Friday, September 9th 2005, as part of the 10th Annual Christina Basin Bus Tour. Tour participants visited the sites of Christina Basin restoration projects in both Pennsylvania and Delaware, seeing first hand examples of watershed management strategies put in place to protect this important resource. Bob Struble and Jim Jordan of the Brandywine Valley Association coordinated the tour. This year's itinerary was put together by Dan Greig, Steve Williams, and Jerry Kauffman and included stops at the following sites: Chester County, PA - Phillip's Mushroom Farms, waste water management pond and spray field; Floodplain Forest Restoration, Bucktoe/Red Clay Creek, Kennett Township; Norwood Road-Ludwig's Creek Stormwater Retrofitting Project; New Castle County, DE - Newark Reservoir; University of Delaware, WRA Rain Garden; Pike Creek Stream Restoration at Three Little Bakers Golf Course (Tour led by Steve Williams - Ecological Restoration Coordinator, Department of Natural Resources). As the largest stream restoration project in Delaware's history, this project is in the process of restoring 5000 feet of the stream channel and adjacent bank on Pike Creek, which is part of the White Clay Creek Wild and Scenic River System. This undertaking is the work of the Delaware Department of Natural Resources and Environmental Control, in partnership with Three Little Bakers Golf Course, which owns the land surrounding this portion of the stream. Project goals include: bank stabilization and erosion reduction, habitat creation, improvement of water quality, and maintaining the natural look of the stream. Stream-side wetlands and meander bends to the stream channel were also added. Riffle-pool-run sequences have been put in the stream channel as well. Construction and planting was completed in October.

- Amy Jacobs participates on the Wetland Evaluation Task-group that is part of the Chesapeake Bay Program. This group was formed to evaluate and assess progress being made toward the Chesapeake Bay restoration and enhancement goals.

- Mark Biddle represents Delaware for input on Region 3 issues to the Mitigation Action Plan Interagency Workgroup for development of the National Wetlands Compensatory Mitigation Action Plan. The plan is in various stages of development and the 2005 Stakeholder Forum was postponed until 2006 as the workgroup waits for the release of National Mitigation Rulemaking called for in 2004 by the National Defense Authorization Act.

- Numerous site tours were conducted at Pike Creek Three Little Bakers restoration site over the summer, fall and winter: the Delaware River Basin Commission sponsored a stream restoration class where Pike Creek was used as an outdoor classroom; the Christina Basin Task Force comprised of scientists and managers representing the USGS, Chester County Water Resources Agency, Chester County Conservation District, Brandywine Valley Assoc., Red Clay Creek Valley Assoc. U of D, New Castle County, Trout Unlimited, NRCS, EPA and state

environmental officials toured the site on 9/9/05; DNS summer environmental students toured the site on 7/20/05; Delaware Riverkeeper; Partnership for the Del Estuary; EPA.

- On May 25, 2004, members of the Ecological Restoration Team (Jim Chaconas and Steve Williams, DNREC; Carol Sullivan, DelDOT) met streamside with Joy Ford, Anna Montone and Pam Steinebach (DelDOT), Tom Carroll (Landmark Engineering), and Craig Smith (McCulley Environmental Consultants) to discuss ways of utilizing stream restoration techniques for improvements to Brackenville Road along a tributary of Red Clay Creek near Ashland Nature Center. Several areas were identified where stream cut-banks are encroaching toward the foundation of the roadway. The goal is to maintain the integrity of the stream channel and riparian habitat and still be able to provide long-term structural stability to the roadway. The meeting proved to be very productive as DelDOT and their subcontractors were very receptive to incorporating various restoration techniques into their design plans. Jim Chaconas offered to assist DelDOT with surveying the stream channel and marking the locations for stream stabilization structures.

UPCOMING EVENTS

- Steve Williams will be the keynote speaker at the Delaware State Golfing Association Green Section Annual Winter Meeting on January 24, 2006 at the Maple Dale Country Club in Dover. The presentation will feature the Pike Creek stream restoration project at the Three Little Bakers Golf Course.

- Tom Barthelmeh will be speaking about wetland and tax ditch restoration at the 2006 U.S.D.A. Cooperative State Research, Education, and Extension Service National Water Conference February 5-9, 2006 in San Antonio, Texas.

- Steve Williams will be a presenter at the American Water Resources Association Annual Conference of the Mid-Atlantic Sections in Branchville, NJ from June 14 – 16, 206. Williams will feature the stream restoration project at the Three Little Bakers Golf Course.

- Jennifer Holmes will be speaking about ecological restoration efforts at the 2006 Project Wet National Coordinators Conference which will be held in Lake George, NY from May 13 – 17, 2006.

- The Ecological Restoration Team is planning an Ecological Restoration Conference for the fall of 2006.

VII. APPENDIX A --- Restoration Datasheet

Site Name _____ **Existing project ____Potential project ____**

Information Source _____ **Funding needed? ___**

Type of funding: **___ federal**
___ non-federal
___ in-kind services

Landowner Information

First Name _____ **Street address**_____

Last Name _____ _____

Organization _____ **City**_____

Phone number_____ **State**_____

Other phone _____ **Zip code**_____

Additional Landowners:

Site Information

Date construction completed _____ **Public property? _____ Photos taken? _____**

Total restoration size (actual): _____
{in ha or linear feet for streams;
includes all types of restoration
at this location}

Permits required	Date obtained
permit 1 _____	_____
permit 2 _____	_____
permit 3 _____	_____

Site watershed_____

Site county_____ **Easement? ___ easement type**_____

Lat _____ **Long** _____ **Conservation program**_____
term _____

Tax parcel ID _____ **Long-term goal**_____

Directions to site:

Restoration Type

Type (federal definitions – *see below)

___ Restoration **___ Establishment** **___ Enhancement** **___ Protection/Maintenance**

___ re-establishment

___ rehabilitation

Habitat Type	**Actual Size (ha or linear feet)**	**Estimated Size (ha or linear feet)**	**Description**
___ upland _____	_____	_____	_____
(list type: wildflower meadow, open space, urban garden, warm season grass meadow, shrub, or forest)			
___ wetland			
___ tidal _____	_____	_____	
___ non-tidal _____	_____	_____	
___ invasive species	_____	_____	_____
___ buffer	_____	_____	_____

cover: grass or forest

target: stream/ditch or wetland

___ selective thinning	_____	_____	_____
___ stream	_____	_____	_____

Partners

Organizations	**Contribution Type (technical or financial)**	**Amount**	**Contribution Source**
Lead group _____	_____	_____	_____

Contact name _____

Contact phone _____

Partner 1 _____ _____ _____ _____

Partner 2 _____ _____ _____ _____

Partner 3 _____ _____ _____ _____

Partner 4 _____ _____ _____ _____

Partner 5 _____ _____ _____ _____

Construction Techniques

General techniques

___ inlet

___ outlet

___ closed basin

___ ditch plug

___ microtopography

score (1-10) _____

___ islands/macrotopography

___ excavation

___ control structure

___ boards

___ pipe

___ burning

___ log toe protection

___ rock toe protection

___ cross vanes

Amenities

___ top soil

___ horse bedding

___ straw/hay

___ coarse woody debris

___ biologs

___ coconut mats

___ rip rap

___ liners

___ native plantings

___ live branch layering

___ herbicide control

date of last application _____

___ other _____

Hydrology

% permanent water _____

Invasive species management

___ wet-glove

___ backpack sprayer

___ mechanical

___ drip

___ biological control

___ injection

___ cut stump

___ burn

Invasive species

percent *Typha* _____

percent *Phragmites* _____

other invasives percent

species 1 _____ _____

species 2 _____ _____

species 3 _____ _____

___ log vanes

___ rock vanes

___ root wads

___ j-hooks

primary water source _____

% open water _____

Site Management

Long-term management needed? _____

Type _____

Party responsible _____

Site Comments

***Federal Agency Definitions for Wetland Tracking (www.epa.gov/owow/wetlands/restoration/defs.htm#Fed)**

Restoration: the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to former or degraded wetland. For the purpose of tracking net gains in wetland acres, restoration is divided into:

- *Re-establishment:* the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former wetland. Re-establishment results in rebuilding a former wetland and results in a gain in wetland acres.

- *Rehabilitation:* the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions of degraded wetland. Rehabilitation results in a gain in wetland function, but does not result in a gain in wetland acres.

Establishment: the manipulation of the physical, chemical, or biological characteristics present to develop a wetland that did not previously exist on an upland or deepwater site. Establishment results in a gain in wetland acres.

Enhancement: the manipulation of the physical, chemical, or biological characteristics of a wetland (undisturbed or degraded) site that heighten, intensify, or improve specific function(s) or for a purpose such as water quality improvement, flood water retention or wildlife habitat. Enhancement results in a change in wetland function(s) and can lead to a decline in other wetland function, but does not result in a gain in wetland acres. This term includes activities commonly associated with the terms enhancement, management, manipulation, directed alteration.

Protection/Maintenance: the removal of a threat to, or preventing decline of, wetland conditions be an action in of near a wetland. Includes purchase of land or easement, repairing water control structures or fences, or structural protection such as repairing a barrier island. This term also includes activities commonly associated with the term preservation. Protection/Maintenance does not result in a gain of wetland acres or function.