2005 Fairfax County Stormwater Status Report

"Protecting our land and our water."

Printed on Recycled Paper
3/9/06

Cover photos:

Demonstrating Innovation –
A Stormwater Retrofit at the Providence District Supervisor's Office
The Department of Conservation and Recreation/VA Chesapeake Bay Implementation Grant
BAY-2004-19-SR

2005 Fairfax County Stormwater Status Report on the Municipal Separate Storm Sewer System for Fairfax County, Virginia

In compliance with the
Authorization to Discharge
under the
Virginia Pollutant Discharge Elimination System
Permit No. VA0088587
and the
Virginia State Water Control Law
Clean Water Act

Report prepared and compiled by:
Stormwater Planning Division
Department of Public Works and Environmental Services
Fairfax County, Virginia
March 9, 2005

This page was intentionally left blank.

2005 Fairfax County Stormwater Status Report

Table of Contents

Executive Summary

This report describes Fairfax County's successes in executing the Fairfax County Board of Supervisors' Environmental Agenda elements of maintaining safe and caring communities, protecting the environment, and promoting environmental stewardship. This report discusses the efforts to comply with the Virginia Pollutant Discharge Elimination System Permit (***Appendix A***) for the period of Jan. 1, 2005, through Dec. 31, 2005, as well as the many challenges we face and the partnerships we've forged to meet them. Although the Fairfax Department of Public Works and Environmental Services compiled the data for this report, information was gathered from the many different organizations and agencies working in partnership.

This report helps tell the story about some of the challenges facing Fairfax County that impact outdoor recreation, wildlife habitat, stream banks, the Chesapeake Bay, and our sources of drinking water. It describes the projects and programs the county operates that address streamside vegetation buffers, streambank erosion, flooding, aging stormwater infrastructure, and stream water quality.

The following pages provide a more in-depth look into stormwater management in Fairfax County under the following categories:

I. **Watershed Management Planning**: Two watershed management plans have been completed and are being implemented. Four additional plans are being drafted with completion slated for 2006. Combined, these six plans will cover more than 50 percent of the land area in the county. Within the next few years, watershed management plans will be completed for the entire county to provide an assessment of stormwater conditions, recommend protection strategies and improvement projects, and encourage public involvement.

II. **Capital Improvements and Infrastructure Retrofit**: Fairfax County completed more than 30 stormwater management projects in 2005. Projects mitigated house flooding, stabilized streams, rehabilitated dams, and improved the water quality of stormwater runoff. Fairfax County and its partners constructed demonstration projects to encourage the use of low impact development concepts and techniques.

III. **Maintenance and Operation**: Fairfax County maintains more than 1,000 stormwater management facilities; 1,400 miles of pipe; and 45,000 drainage structures designed to protect 850 miles of perennial streams.

IV. **Strategic Initiatives, Policy, Management, and Emergency Response**: Fairfax County completed a quality assurance review of the perennial streams and Resource Protection Areas that resulted in identifying an additional 5.5miles of perennial streams. The Fairfax County Board of Supervisors committed additional financial resources to stormwater management and watershed protection through the commitment of a dedicated penny of the real-estate tax.

V. **Monitoring and Assessment**: Watershed monitoring included dry and wet weather screening, bacteria monitoring, biological monitoring, and storm event water quality monitoring. The county is also using data collected from more than 400 volunteer monitors and 500 students to track stream conditions.

VI. **Public Outreach and Education**: Fairfax County conducted presentations and booths at 27 community meetings events to raise awareness about non-point source pollutants and actions residents can take to help protect streams. Fairfax County partnered with numerous local

agencies to promote environmental stewardship such as the stream cleanups in 2005 that mobilized more than 1,000 volunteers. The county also partnered with various organizations to host a high school science program, a middle school teacher training program, stream buffer restoration projects, and a regional pollution prevention radio campaign.

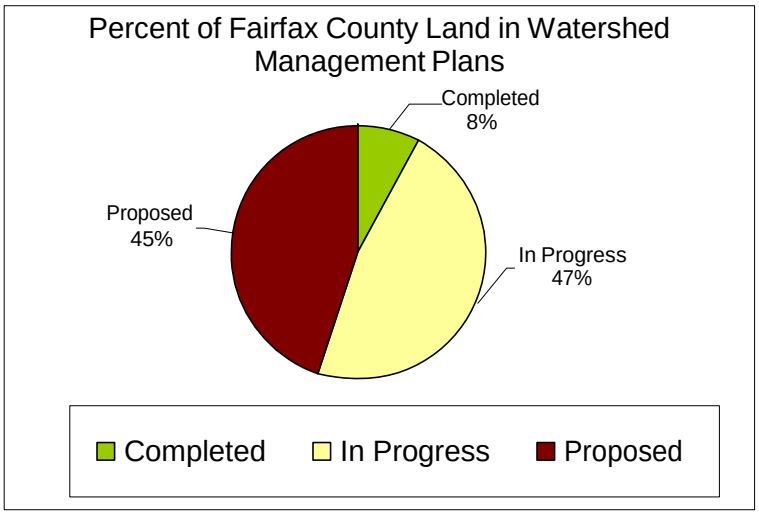
This page was intentionally left blank.

2005 Fairfax County Stormwater Status Report on the Municipal Separate Storm Sewer System for Fairfax County, Virginia

I. Watershed Management Planning

Watershed management plans are one component of the Virginia Pollutant Discharge Elimination System Permit requirements and the Fairfax County Board of Supervisors' Environmental Agenda Elements ***(Appendix B)*** program of maintaining safe and caring communities, protecting the environment, and promoting environmental stewardship. Two watershed management plans have been completed and are being implemented. Four additional plans are being drafted with anticipated completion in 2006. Combined these six plans will cover 55 percent of the land area in the county. Within the next few years watershed management plans will be completed for the entire county. The watershed plans provide an assessment of stormwater conditions, encourage public involvement, and prioritize recommendations for implementation within each watershed.

The goals of the plans include protecting and meeting state and federal water quality standards by identifying strategies to prevent and remove pollution, to support Virginia's commitment under the Chesapeake Bay 2000 Agreement to clean up and restore the bay, to replace the current 1970s-era watershed management plans, and to restore and protect the county's streams and enhance property values. Additionally, these plans will provide a consistent basis for the evaluation and implementation of solutions for protecting and restoring the health of receiving water, the ecological systems, and other natural resources of the county.



The development of comprehensive watershed management plans commenced in 2003 with the Little Hunting Creek Watershed. The plans include the following tasks: 1) review and synthesis of previous studies and data compilation; 2) evaluation of current conditions and a projection of ultimate development conditions; 3) development of non-structural and structural watershed management alternatives; 4) capital project implementation options including preliminary cost estimates, cost/benefit analysis, and prioritization; 5) Public involvement; and 6) documentation of the watershed management plan. The status of current watershed planning projects in 2005 is as follows:

Cameron Run

The Cameron Run watershed drains a 42-square-mile area of Northern Virginia, with 33-square-miles of this area located in Fairfax County. The remaining area lies within the Cities of Falls Church and Alexandria. The watershed has a long history of urbanization. The majority of land in the watershed was developed by the early 1970s, with an estimated five percent remaining vacant today. The Cameron Run watershed has a high degree of impervious surface resulting in substantial impacts to the streams in the watershed.

The Cameron Run watershed management planning process was initiated in 2003. An advisory committee, comprised of approximately 15 watershed residents representing diverse interests, was formed to assist in developing the plan. The committee assisted staff with the identification of problems with degraded streams and other natural resources in Cameron Run and provided input on a number of alterative solutions for protecting and restoring these resources. A draft Cameron Run Watershed Management Plan was released and made available for comments at a public meeting in June, 2005. Comments received on the draft plan are currently being incorporated into the plan. Field visits to evaluate projects in the draft plan were completed in December, 2005. Of the 235 candidate projects presented in the draft plan, it is anticipated that approximately 100 will be identified as highest priority, and these projects will be modeled and evaluated in detail. The other candidate projects will be included in the plan at the level of detail shown in the draft plan. A draft final plan for presentation to the advisory committee and public will be completed by March/April, 2006, and it is anticipated that the final plan will be presented to the Board of Supervisors in the fall, 2006.

Cub Run/Bull Run

The Cub Run/Bull Run watersheds drain a 47-square-mile area of Northern Virginia, with 35-square-miles of this area located within Fairfax County. This area has undergone rapid growth over the past 20 years. Western portions of the watershed were down-zoned to protect water quality in the Occoquan Reservoir. This zoning protects portions of the watershed from high density development.

The Cub Run/Bull Run watershed management planning process was initiated in 2004. The watershed plan is being developed with guidance from a community advisory committee comprised of approximately 28 residents representing diverse groups and interests in the watershed. The committee has met over the past year to help identify problems in the watershed, develop solutions, and review the watershed management plan. Significant outreach to residents and businesses living, working, and recreating in the watershed has been conducted through three public forums, numerous homeowners association and special interest group presentations, and a watershed tour. Through presentations to the committee and at other public events, the level of watershed and stormwater awareness in the western portion of the county has increased. At the same time, six major issues were identified for various types of structural and nonstructural projects and numerous problem areas and hot spots were located. The final watershed management plan for Cub Run is scheduled for completion by fall, 2006.

Difficult Run

The Difficult Run watershed is the largest watershed in Fairfax County, draining 60-square-miles. The watershed is substantially developed, primarily in residential uses. Even though further residential subdivisions followed, as late as 1976 approximately half of the watershed remained in forest or agriculture. This area was subsequently developed and by the 1990s, most of the watershed was built out, including a major commercial corridor which was established after the Dulles Toll Road was opened in 1984. The remaining open space is primarily in park land.

The Difficult Run watershed management planning process was initiated in 2004. The watershed plan was developed with guidance from a steering committee comprised of approximately 20 stakeholders representing diverse groups and interests in the watershed. In 2005, the steering committee attended six

monthly meetings and hosted the Watershed Forum and Draft Plan Workshop. Because of the size of the watershed, the Watershed Forum was presented twice with the option of a children's watershed forum, and the Draft Plan Review Workshop was presented three times with an additional presentation given to the residents near the site of the suggested regional pond, D-40. The consultant and county are currently addressing feedback from the committee, residents, and other agencies on the draft plan presented at the Draft Plan Review Workshops. The final watershed management plan for Difficult Run is slated for completion by summer, 2006.

Little Hunting Creek

The Little Hunting Creek watershed drains 11-square-miles of Fairfax County. The majority of the land use is residential with commercial areas located around Route 1 - Richmond Highway. The watershed is approximately 92 percent developed.

The Little Hunting Creek watershed management planning process was initiated in 2003. The watershed plan was developed with guidance from a steering committee comprised of approximately 15 residents representing diverse groups and interests in the watershed. The committee met for over one and a half years to help identify problems in the watershed, develop solutions, and review the watershed management plan. Four public forums were held for residents living, working, and recreating in the watershed in order to collect information about problem areas in the watershed, raise awareness about issues facing Little Hunting Creek, and get feedback regarding the draft watershed management plan. The final watershed management plan for Little Hunting Creek was approved by the Board of Supervisors on February 7, 2005. The plan includes a myriad of projects endorsed by residents such as stream restoration, rain barrel implementation, riparian vegetation buffer restoration, water quality improvements to existing stormwater facilities, and recommended modifications to the County Code and other supporting documents such as the Public Facilities Manual for the improvement of watersheds. Approximately 34 capital projects have been initiated and five are now complete. Additional projects and other recommendations of the plan will be initiated and funded through the annual budget process.

Pimmit Run and Middle Potomac

The Middle Potomac watersheds drain 26-square-miles of Fairfax County and encompass five separate watersheds: Pimmit Run, Bull Neck Run, Scotts Run, Dead Run, and Turkey Run. The majority of the land use is forested and low intensity residential with commercial areas located around Interstate 495 - the Capital Beltway.

The Middle Potomac watershed management planning process began in 2004. The watershed plan was developed with guidance from a steering committee comprised of approximately 20 stakeholders representing diverse backgrounds and interests in these five watersheds. The steering committee and the public have been instrumental in identifying the locations of specific problem areas in these watersheds, for example, flooding locations, severe streambank erosion, and opportunities to implement low impact development. Ten steering committee meetings and three public workshops were held in 2005. The first public workshop, held on February 15, 2005, was the Issue Scoping Forum. Participants were educated about watershed issues and asked to help identify the key problems in each watershed. At the April 16 workshop, attendees were further educated about the watersheds and asked to mark problem areas on maps. The steering committee then worked with the county and consultants to compile a list of projects to address these problems and then developed a draft plan. One area named the Tysons Corner area, has plans for major redevelopment in the Scotts Run watershed, so the group is working closely with the county agencies involved and the Tysons Corner Coordination Committee.

The draft plan was presented at the Draft Plan Review Workshop, held on November 1, 2005. County staff and consultants then presented the draft plan at a meeting of the Pimmit Hills Homeowners

Association as well as the McLean Civic Association. The final watershed management plan for the Middle Potomac is slated for completion in summer, 2006.

Popes Head

The Popes Head Creek watershed drains 19-square-miles of Fairfax County. Portions of the watershed were down zoned to protect water quality in the Occoquan Reservoir. This zoning protects portions of the watershed from high density development. Most of the watershed remains forested with low density residential development being the predominant urban land cover.

The Popes Head Creek watershed management planning process began in 2003. A steering committee, comprised of approximately 17 watershed residents representing diverse interests, was formed to assist in developing the plan. The committee has been meeting to help identify problems in the watershed, develop solutions, and review the watershed management plan. The Final Popes Head Creek Watershed Management Plan Public Review Workshop was held on April 12, 2005, and focused on final comments and recommendations related to the completion of the watershed plan. The plan was adopted by the Board of Supervisors in January, 2006. The plan includes various projects endorsed by residents such as stream restoration, low impact development projects, riparian vegetation buffer restoration, water quality improvements to existing stormwater facilities, road and culvert improvements, and recommended modifications to the County Code and other supporting documents such as the Public Facilities Manual for the improvement of the watershed.

Other Watersheds

Other comprehensive watershed management plans anticipated to be started in 2006 include the Accotink Creek, Pohick Creek, and Little Rocky Run/Johnny Moore Creek watersheds.

II. Capital Improvements, Infrastructure Retrofit and Low Impact Development/Best Management Practices

CAPITAL FACILITY IMPROVEMENTS

The Department of Public Works and Environmental Services Stormwater Projects

The Department of Public Works and Environmental Services Constructed 31 stormwater projects in 2005. They were designed to mitigate individual house flooding, alleviate yard flooding, stabilize streams using bioremediation methods, rehabilitate dams and provide stormwater management through the construction of regional detention ponds.

7808 O'Dell Street
Problem: Poor overland relief caused dwelling to flood
Solution: A combination flood wall and overland relief swale

7808 O'Dell Street flood wall.

1012 Dead Run Drive
Problem: Poor overland relief caused dwelling to flood.
Solution: A modification to the storm sewer system and overland relief swale

8704 Winding Way Court
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: A modification to the storm sewer system, berm/sump pump and grading for positive drainage

New stormsewer system, berm/sump pump and grading at 8704 Winding Way Court.

Hayfield Farm Subdivision (Three separate projects)
(7610 Hayfield Road)
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Flood wall/sump pump and grading for positive drainage

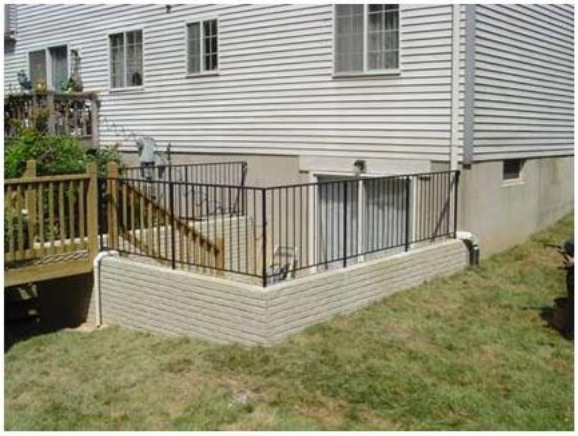

7610 Hayfield Road flood wall.

(7624 Luton Place)
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Flood berms and grading for positive drainage

(7626 Luton Place)
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Flood berms and grading for positive drainage

Heming Avenue (Two separate projects)
(5766 Heming)
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Flood wall/sump pump and grading for positive drainage

(5770 Heming)
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Flood wall/sump pump and grading for positive drainage

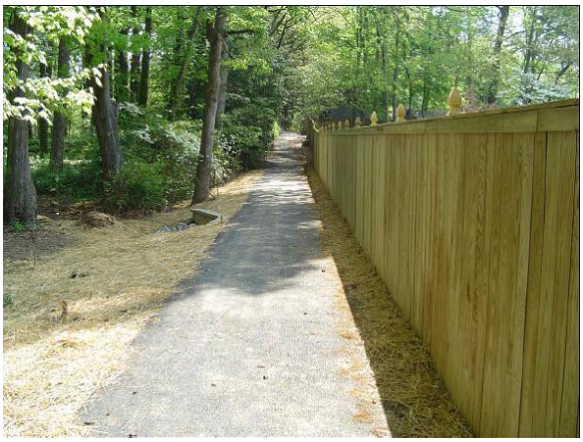

5770 Heming Avenue flood wall.

Gladstone Lane (#1028)
Problem: House flooding caused by inadequate county drainage channel
Solution: Construction of a raised landing and stairwell walls to the basement walkout

Kirby Court
Problem: Absence of a drainage system and poor grading caused dwelling to flood
Solution: A combination flood wall and drainage system was installed

Fenwick Road
Problem: Absence of a drainage system and poor grading caused several dwellings to flood
Solution: A combination of improved grading and the installation of a drainage system

Wheatfield Court
Problem: Absence of a drainage system and poor grading caused dwelling to flood
Solution: A combination flood wall and drainage system was installed



Wheatfield Court floodwall, outside.

Wheatfield Court floodwall, inside.

1903 Cathy Lane
Problem: Poor overland relief and inability of existing storm drain to convey larger storm events caused dwelling to flood
Solution: Overflow piped system installed

1903 Cathy Lane overflow piped system.

Buchanan Street
Problem: Failed pipe system in storm drainage easement causing house flooding
Solution: Replacement of 40 feet of twin six-inch with 12-inch pipe

13074 Autumn Willow Drive
Problem: Failed storm drainage pipe system
Solution: A replacement of a failed storm sewer system

13074 Autumn Willow Drive storm sewer replacement.

Eddys Park
Problem: Failed storm drainage pipe system
Solution: Spot repair of the storm drainage pipe system

Boyett Place
Problem: Failed storm drainage pipes causing surface cave-ins and soil erosion
Solution: Re-line with 150 feet of 27 inch diameter cured-in-place

Bromyard Court
Problem: Failed storm drainage pipes causing surface cave-ins and soil erosion
Solution: Replace and construct 85 feet of storm drainage pipe

Municipal Separate Storm Sewer System Supplemental Sweeping of Parking Lots
Problem: Poor water quality in county streams
Solution: Remove snow chemicals and debris from various parking lots to enhance water quality

Greenmont Court
Problem: Severely eroded stream caused increased sediment loading and steep banks
Solution: Stream restoration using bioengineering was implemented

Reston Section 59 Pond
Problem: Piping of principal spillway and failed dam embankment
Solution: Rehabilitation of dam and outlet works including retrofitting for best management practices

Rehabilitation of Reston Section 59 Pond dam and outlet, including BMP retrofit.

Rehabilitation of Sequoia Lea Drive Pond outlet, including BMP retrofit.

Sequoia Lea Drive Pond
Problem: Piping of principal spillway and failed dam embankment
Solution: Rehabilitation of outlet works including retrofitting for best management practices

Essex Manor Place
Problem: Poor water quality in county streams
Solution: Retrofitting of the facility for best management practices to improve water quality

Noral Place
Problem: Poor water quality in county streams
Solution: Retrofitting of the facility for best management practices to improve water quality

West Ox Regional Pond
Problem: Non-functional outlet and maintenance issue with long-standing water because of debris blockages
Solution: Repair and rehabilitation of weir wall, outlet sluice gate, new trash rack, access road and cat-walk at weir wall

Olley Lane Regional Pond
Problem: Non-functional outlet works causing long standing-water caused by debris blockages
Solution: Construction of a new 25-foot inlet channel, replacement of the outlet structure, and addition of a larger trash/debris rack

Stone Crossing Section 1 DM250
Problem: Repair of non-functional Stormwater Management pond needed
Solution: Retrofit stormwater management pond and wetland

Gatepost Estates Pond #1
Problem: Non-functional Stormwater Management/best management practices and failed dam
Solution: Repair to correct function and add wetlands – this project provided for critical repairs to the existing pond including the installation of clay liner on the upstream and downstream of dam embankments, 70 linear feet of diversion berm in the pond floor, 100 cubic yards of riprap and other related items

Hawthorne Estates DF005
Problem: Non-functional Stormwater Management/best management practices and failed dam
Solution: Repair to correct function and add wetlands

Regional Pond C-41
Regional Pond C-41 was constructed by the developer of Chantilly Crossing via a forthcoming cost sharing arrangement with the county. It is designed as a "wet" pond that incorporates wetland plantings along a graded bench around the perimeter. It provides water quality and quantity control for a 92-acre drainage area.

Regional Pond C-41

Regional Pond H-9

Regional Pond H-9

This facility provides water quality and quantity control for a 100-acre drainage area. The pond includes several sediment forebays and a large tree save area. The pond and accompanying trail serve as an amenity within the Dulles Station at Dulles Corner development. The facility is substantially complete and was constructed by the site developer via a cost sharing arrangement with the county.

The Department of Public Works and Environmental Services Leadership in Energy and Environmental

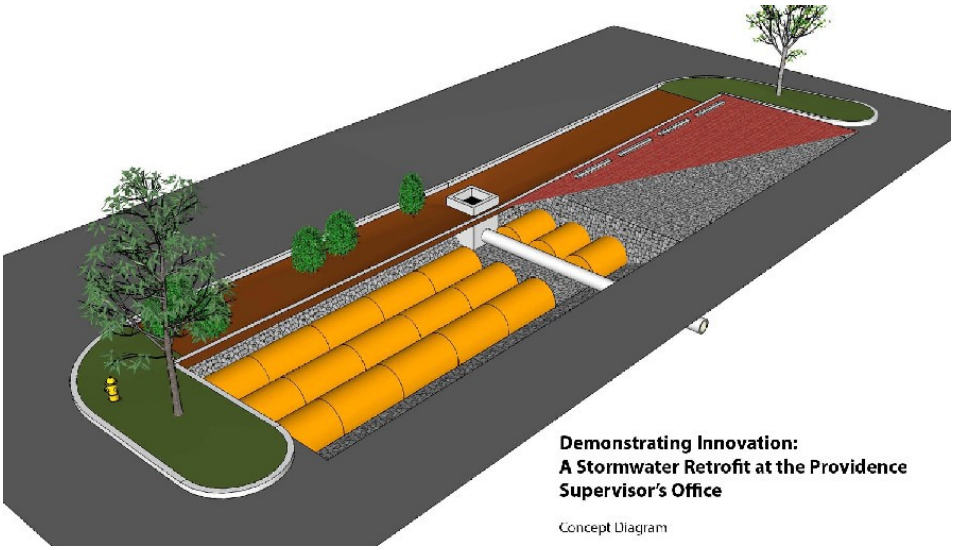
The Department of Public Works and Environmental Services has initiated two pilot projects under the Leadership in Energy and Environmental Design Green Building Program. With the support of the Facilities Management Department and the Fire and Rescue Department, Public Works has undertaken this initiative on the Fairfax Center Fire Station and the Crosspointe Fire Station projects. The goals of the initiative are to gain a better understanding of the environmentally sensitive design concepts that are promoted under the Green Building Program, to educate county agencies on the benefits of the program, and to implement a more environmentally sensitive design on these two projects. At the outset, the goal for the two projects was to attain a Silver Certification under the Leadership in Energy and Environmental Design program. A summary of sustainable design building projects can be found in ***Appendix D***.

The Department of Public Works and Environmental Services has also undertaken a significant initiative to implement innovative low impact development approaches to addressing the stormwater runoff issues on the sites of new and expanded county buildings. Based on the tight and constricted nature of many new and redeveloped sites and based on the desire to provide more environmentally sensitive and aesthetic site development and stormwater facilities, Public Works is continuing to design and implement rain garden-type Best Management Practices facilities for water quality. Public Works is continuing to evaluate the use of other innovative, vegetated stormwater best management practices approaches including infiltration trenches and sand filters, and also promotes the use of other low impact development approaches Environmental Services has completed construction of ten rain gardens at nine different sites that provide stormwater quality for a total of approximately 24 acres of drainage area and 16 acres of imperviousness. It has also implemented, or is in the process of implementing, porous pavement at various sites with a total area of over 10,000 square feet, and has dedicated over five acres for conservation easement area. It is continuing to evaluate additional innovative alternatives for implementing low impact development techniques, including a concerted effort to implement green roof pilot projects. See ***Appendix D*** for a list of facilities.

Demonstrating Innovation: A Stormwater Retrofit at the Providence Supervisor's Office

This low impact development demonstration project is located within the Accotink Creek watershed and has a drainage area of 0.83 acre. In addition to the Providence District Supervisor's Office, the site is also the location of the county's Merrifield Fire Station. The Department of Public Works and Environmental Services and the Northern Virginia Soil and Water Conservation District are partnering in the analysis, design, and construction. The overall complex encompasses a land area of 1.8 acres with approximately 1.44 acres being impervious. The completed project serves as a highly visible demonstration featuring an integrated stormwater management system consisting of a bioretention basin (rain garden), a vegetated roof and permeable pavers. The bioretention basin and permeable pavers with underlying gravel infiltration gallery allow runoff to slowly infiltrate into the surrounding soil. The vegetated roof installation on an existing concrete storage structure serves to reduce rooftop stormwater runoff and provides a comparison to an adjacent storage structure with an impervious roof for future runoff monitoring efforts. The bioretention basin occupies an approximate area of 560 square feet and the permeable pavers an area of 1,550 square feet, with a combined volume of approximately 9,841 cubic feet in the underlying gravel infiltration gallery. The vegetated roof occupies an area of approximately 240 square feet. These three integrated low impact development practices work in harmony to address both water quality and water quantity retrofit goals on the site. They are expected to retain, infiltrate, or filter a significant amount of the stormwater otherwise running off the site.

The raingarden and permeable pavers have an underground bioretention basin.



Sanitary Sewer Extension and Improvement Program

The Department of Public Works and Environmental Services administers the Sanitary Sewer Extension and Improvement Program. The purpose of this program is to provide sanitary sewer service to eligible areas that have been identified by the Department of Health as having non-repairable malfunctioning septic systems. Pollution abatement and addressing public health considerations are achieved by providing sanitary sewer service to these areas. During 2005 two Extension and Improvement projects were completed consisting of 950 linear feet of eight-inch sanitary sewer and providing sanitary sewer connections to seven existing homes.

Fairfax County Park Authority

As part of the park planning process, the Park Authority looks for opportunities during conceptual site planning to recommend low impact stormwater management techniques. During 2005 a site plan was development for Patriot Park which includes low impact development in the development scope for the site. Lake Accotink Park maintains two rain gardens to enhance water quality and educate residents. The Park Authority worked with the Department of Public Works and Environmental Services and the Northern Virginia Soil and Water Conservation District to design five low impact development demonstration facilities which will be built at different parks in 2006, in support of the Board of Supervisors Environmental Improvement Program.

The Park Authority was awarded a 2005 Land Conservation Award in the erosion and sediment control category for work at Lake Fairfax Park. The project was Lake Fairfax Park Core Facilities: Phase I Construction. The scope of work included new accessible marina facilities, boardwalk, stairs and accessible ramps. Work along the lake front utilized a turbidity curtain in conjunction with other Erosion and Sediment controls to prevent disturbed sediment from getting into the lake. The technique proved highly successful and prevented pollution of lake waters.

Also, as in past years, the Park Authority sponsored programs and hosted resident groups to plant or enhance riparian buffers. In addition, the Park Authority partnered with the Department of Public Works and Environmental Services, the Northern Virginia Soil and Water Conservation District Water, and the Virginia Department of Forestry, along with other organizations and many volunteers, to plant over five acres of stream buffer at numerous park sites in support of the Board of Supervisors Environmental Improvement Program. Park Authority staff worked to reduce the amount of mowed turf areas at numerous park sites around the county, concentrating on riparian corridors and lake fronts to promote water quality.

Other significant projects included the renovation of one best management practices facility at Green Spring Gardens; construction of the Stormwater Management pond at Clemyjontri Park that, when finished, will include a wetland forebay; commencement of construction for two bank stabilization projects on Difficult Run upstream of Browns Mill Road and Old Dominion Drive in conjunction with planned stream valley trail improvements for the Cross County Trail; and partnership with the Department of Public Works and Environmental Services to complete planning for an early 2006 construction of the Barnyard Run improvements at Huntley Meadows Park.

The Park Authority completed a large scale stream stabilization project on Difficult Run at Georgetown Pike in November 2005. The project involved the stabilization of over 300 feet of stream bank using a combination of traditional and bioengineering techniques to include root wads, large boulder revetments, coir matting, terracing, rock vanes, vegetated geogrids and a significant number of plantings of native shrubs to stabilize the banks and provide habitat benefits. These structures were installed in order to recreate the natural meander of the channel, while stabilizing the toe and banks. This area also provided trail connectivity between the existing gravel parking lot, the trail segment upstream, and Great Falls National Park. A feeder stream entering the project under Georgetown Pike now drops into a plunge pool to reduce velocity and let sediment fall out before entering Difficult Run. The project also saved one of

the most highly used public parking areas for trail access and a segment of the Cross County Trail before it enters Great Falls National Park.

INFRASTRUCTURE RETROFIT

In 2005, seven stormwater management ponds, serving a drainage area greater than 80 acres, were rehabilitated and/or retrofitted. Rehabilitations consisted of repair, replacement, or modification of the facility to meet or exceed safety and functional requirements and to extend the service life of each facility. Retrofits employed the use of shallow wetland marshes to enhance nutrient uptake and provide an increase in water absorption and transpiration. A secondary effect of wetland marshes and naturally vegetated pond floors is the creation of habitat for wildlife.

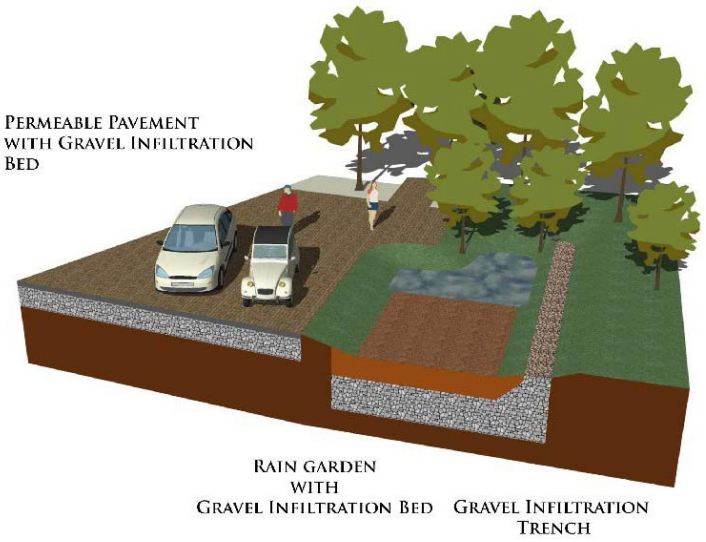
In addition, two regional stormwater management facilities were completed during 2005 providing Best Management Practice for 60 acres and controlling stormwater runoff from 192 acres of land. There were an additional twelve regional facilities in the design plan stage in 2005.

LOW IMPACT DEVELOPMENT/BEST MANAGEMENT PRACTICES IN FAIRFAX COUNTY

A brief description of recently completed private projects or projects currently in planning and design that include Low Impact Development techniques:

Tinner Hill Cultural Center

The top of Tinner Hill, along the Fairfax County and City of Falls Church border, is being developed to commemorate the historic founding of the first rural branch of the NAACP in the nation. To honor the original importance of water to this historic community and to protect the current residents of the hill who live below this small county-owned site, the project will include eight separate low impact development design techniques to contain, reuse, and infiltrate up to the 100-year storm event. Assisted by county stormwater planners and the Northern Virginia Soil and the Water Conservation District and with the help of a the Department of Conservation and Recreation state grant through the Northern Virginia Regional Commission, the Tinner Hill Heritage Foundation will develop "The Drinking Gourd Trail" to lead visitors past each of the low impact development designs, each with narrative signage.



This site will become a primary county demonstration site to display low impact development practices that all developers and landowners can use on any size property. The design techniques include a vegetated roof, rain garden, permeable pavers, grass pavers, vegetated swale, infiltration trench, above- and below-ground cisterns, and a "carriage road-style" driveway. For further information call (703) 241-4109 or visit www.tinnerhill.org

Tinner Hill Cultural Center—"The Drinking Gourd Trail"
The trail leads visitors past each of the LID designs, each with narrative signage.

Northern Virginia Soil and Water Conservation District Low Impact Development Research

During 2004, the Northern Virginia Soil and Water Conservation District and ATR Associates, with the help of a grant from the Department of Conservation and Recreation, conducted research and analysis, developed a plan, and made recommendations for incorporating low impact development practices into the stormwater management plan for a 55-acre site at the former Lorton Prison as it is being re-developed into the Lorton Workhouse Arts Center. Working in collaboration with a stakeholders group, the Lorton Arts Foundation and its consulting engineers and landscape architects, and county staff, the Northern Virginia Soil and Water Conservation District and ATR conducted a comprehensive feasibility study and developed a plan for specific recommendations and an accompanying design report. Factors considered during the study and in making the recommendations include the hydrologic regime and rainfall intensity of the region, amount of impervious surface, soil infiltration capability, and opportunities within each sub-watershed for capturing stormwater and increasing the groundwater contribution through infiltration. At the same time, it was important to maintain the historical and architectural integrity of the site. The major practices recommended were bio-

Three feet of biofilter media were spread over the pea gravel.

retention filters and swales, porous pavers, underground detention, and rain gardens. During 2005, the Department of Planning and Zoning and the Northern Virginia Soil and Water Conservation District worked with the Lorton Arts Foundation and its design engineers and landscape architects to determine what recommended practices will be integrated into the final plan. In advance of the re-development project, one practice, a rain garden, was installed near a building facing a major road. The heavy equipment work was done by the Department of Public Works and Environmental Services. Once the re-development is completed, an education and information program will highlight all the low impact development practices, and will include a permanent display at the on-site museum**.**

The rain garden was completed with plants.

Northern Virginia Soil and Water Conservation District Infiltration studies

Infiltration studies were conducted for the soils at 16 sites in the county. These tests aid in the design and location of infiltration practices such as rain gardens. Some of the sites were the Providence District Office parking lot, Tinner Hill site, Lorton Arts Foundation site, St. Louis Church in the Little Hunting Creek watershed, and seven sites in county parks.

Northern Virginia Regional Commission *Best Management Practices Handbook*

The Northern Virginia Regional Commission is beginning an effort to revise the 1992 edition of the Northern Virginia best management practices Handbook. Research and technology has grown over the last ten years regarding stormwater management and best management practice design. The current handbook does not always reflect today's stormwater management trends. The Best Management Practices Handbook is a widely used resource for Fairfax County planners and public works staff. The Northern Virginia Regional Commission will coordinate with local jurisdictions to seek input and coalesce the broad spectrum of interests to revise the manual to reflect the current state of stormwater management. A work plan has been developed with emphasis on: 1) Updating the current Northern Virginia best management practices Handbook; 2) Appending appropriate chapters to cover new best management practices and low impact development practices; 3) Developing a process for continuing updates of the handbook and addition of practices that may not yet be ready for adoption; and 4) Assembling a team of hydrological modeling experts to investigate the need to develop new techniques that will better evaluate the effectiveness of low impact development. A Steering Committee, which includes the director of Public Works for Fairfax County, is providing guidance and oversight.

Yorktowne Square

The rain garden at the Yorktowne Square Condominium has performed well since installation in 2004; the area drains within five hours after a storm and the vegetation (all native) is thriving. It was designed by the Northern Virginia Soil and Water Conservation District to overcome an existing drainage problem within the community and treats runoff from 0.56 acres of rooftops, parking lots, and lawns.

In 2005, the 5,000-square-foot green roof at Yorktowne Square Condominium won the Green Roofs for Healthy Cities excellence award for design in the extensive residential category. Built in 2004, it was one of the first, if not the first, retrofitted green roof in the state. There were 8,400 sedums planted on the roof (*Sedum album, Sedum sexangular,* and *Sedum reflexum*). Within one year, the vegetated cover more than doubled. The roof continues to function well, both for water tightness and reduction of stormwater runoff from the roof.

In 2004 the green roof was just beginning to grow.

In 2005 the plants were already well established.

III. Maintenance and Operation

The Department of Public Works and Environmental Services inspects and maintains dry ponds located within residential subdivisions, regional ponds, underground chambers, percolation trenches, and rain gardens. In addition, the Department of Public Works and Environmental Services performs inspections and enforces maintenance for privately maintained facilities including wet ponds, dry ponds, underground detention, sand filters, oil/grit separators, percolation trenches, inlet treatment devices, rooftop storage, and all commercial and/or industrial detention facilities. They also inspect 20 percent of the storm drainage network each year and starting in 2006 they will use Close Caption Television to inspect approximately five percent of the network per year.

Structural and Source Controls

County Maintained Stormwater Management Facilities

As of December 31, 2005, there were 1,178 stormwater management facilities maintained by the county. The current inventory includes 1041 on-site ponds, 41 regional ponds, 47 underground chambers, 33 percolation trenches, eight wet ponds, six bioretention areas, one manufactured best management practices, and one wetland. Last year the county inspected each the Department of Public Works and Environmental Services-maintained facility at least once, mowed 584 dam embankments, and performed 206 maintenance work orders to correct deficiencies. No state or federal permits were required to perform this work. The mowing of retention and detention facilities continued to be limited to the dam embankments and other critical areas. These reduced mowing limits allow vegetation in the pond floor to provide for enhanced nutrient and absorption rates. To ensure overall program effectiveness, a visual inspection of each facility was conducted during each maintenance activity in addition to the scheduled inspections. When critical deficiencies were identified by maintenance personnel, follow-up investigation was coordinated with engineering staff to ensure issues were resolved appropriately.

Privately Maintained Stormwater Management Facilities

In addition to the county-maintained facilities, there were 2251 privately maintained facilities in the private inventory as of December, 2005. The inventory included 283 wet ponds, 457 dry ponds, 120 sand filters, 55 manufactured best management practices, 334 percolation trenches, 559 roof top detention areas, 48 parking lot detention areas, 387 underground detention facilities, and eight bioretention areas. These facilities are routinely scheduled for inspection conducted by the Department of Public Works and Environmental Services staff with the goal of performing a thorough inspection of each facility at least once every five years within the permit period. A total of 457 facilities (20 percent of the facilities with maintenance agreements) were inspected in 2005. A detailed inspection report, with photographs and Geographic Information Systems maps, is provided to each owner upon completion of each inspection. The county continued ramping up its efforts to ensure privately maintained facilities are maintained and operated consistent with industry standards. Education of owner/operators of stormwater management facilities continues to be effective in achieving the desired level of service for these facilities.

State-Regulated Dam Facilities

The county maintained dams are inspected every year by Fairfax County Department of Public Works and Environmental Services staff and representatives from the Natural Resources Conservation Services and the Northern Virginia Soil and Water Conservation District. In addition, a biennial inspection is conducted by an engineering firm under contract with the county or by in-house professional engineering staff with expertise in dam design and construction. Additional facilities are being studied to determine what, if any, remedial measures need to be taken to ensure that they meet the state's criteria for dam safety. The purpose of this formal inspection is to identify any safety or operational items in need of

corrective action. Based on these formal inspections, as well as other less formal inspections, a work program to correct deficiencies and address maintenance items is established and implemented. Critical items such as the stability of the dam embankment and the functioning of the water control structures are addressed on a priority basis. Routine items such as mowing are accomplished on a scheduled basis, currently five times per year.

Stormsewer Infrastructure Management

A Stormsewer Infrastructure Management Plan and Schedule (***Appendix E***) was submitted on July 24, 2002, in accordance with the Municipal Separate Storm Sewer System permit and updated on January 13, 2006.

Storm Sewer Inventory Digitizing

The inventory of stormwater management and storm sewer facilities is documented and tracked through the use of the county's Geographic Information System. The county's 400-square-mile jurisdiction is currently divided into 440 tax map grids; each grid encompasses a surface area of approximately one square mile. The documented inventory of storm drainage infrastructure has been digitized in a Geographic Information Systems format for management and identification purposes. As of December 31, 2005, all tax map grids have been digitized.

Storm Sewer Maintenance Survey

In 2005, 215 miles of county-maintained storm sewers were field verified as to location and inspected for deficiencies. As a result of the information gathered, 261 work orders were written to correct deficiencies.

Roadways and Parking Lots

The county maintains the roadways and parking lots of public facilities such as government centers, libraries, fire stations, police stations, health centers, bus transit facilities, park and ride lots, commuter rail stations, and approximately 5 miles of road segments. In an effort to limit the discharge of sand and deicing materials into the county's streams, sand and chemical treatment are provided when dictated by safety. Magnesium chloride is used on sidewalk applications as necessary, as it is more environmentally acceptable than sodium chloride. In an effort to reduce the discharge of these materials into the county's streams, the County performed sweeping operations at a total of 64 sites.

Sanitary Sewer Infiltration Abatement Program

The Wastewater Collection Division, an agency of the Department of Public Works and Environmental Services, manages the county's infiltration abatement program. Major activities of this program include:

- A sewer system evaluation survey, which essentially consists of wastewater flow measurement and analysis to identify areas of the wastewater collection system with excessive inflow/infiltration problems.
- Closed circuit television inspection of trunk sewer mains to specifically identify the defective sewer lines for repair and rehabilitation. In 2005, 229 miles of old sewer lines and 30 miles of new sewer lines were inspected.
- Repair and rehabilitation of sanitary sewer lines and manholes identified by closed circuit television inspection. This includes, among others, dig up repairs, manhole rehabilitation, and

trenchless pipe repair technologies such as robotic, cured-in-place, and fold-and-reformed pipe rehabilitation processes. In 2005, approximately 115,557 feet of sanitary sewer lines were rehabilitated and over the past eight years this totals 1,155,257 feet (219 miles).

- Completion of 36 dig-up repairs and 101 trenchless point repairs.

In addition to reducing infiltration of extraneous waters into the wastewater collection system, this repair and rehabilitation program significantly extends the life of the sewer system.

IV. Strategic Initiatives, Policy, Management, and Emergency Response

This section discusses stormwater management strategic initiatives, policy, pesticides, landfill management, and emergency response related to the effort to respond to the stormwater regulatory challenges faced by the county.

IV. (A) Strategic Initiatives

The following are some key Strategic Initiatives identified for the Stormwater Management business area.

Development Standards

Federal and state guidelines are placing an increasing emphasis on controlling stormwater runoff close to its source. Environmentally sensitive site design and low impact development practices serve to minimize impervious cover and replicate natural hydrologic conditions. With this in mind, the county's Environmental Agenda includes suggestions for better site design practices that protect our streams and other natural resources. It also encourages the use of low impact development concepts and techniques, especially in new residential and commercial areas, and in retrofitting established areas.

Two letters to industry on the use of best management practices have been sent to all architects, builders, developers, engineers, and surveyors practicing in the county—one letter in 2001, the other in 2002 (***Appendix C***). *Procedures for requests to use innovative Best Management Practice facilities in Fairfax County* are defined in a Letter to Industry dated October 2, 2001; and *Innovative Best Management Practices—3.07 Enhanced extended detention dry ponds now acceptable for public maintenance in residential areas and on governmental sites* was sent on May 14, 2002. Enhanced detention dry ponds are now acceptable for public maintenance in residentially zoned areas and on governmental sites subject in compliance with the revised design standards in the "Guidelines for the Use of Innovative Best Management Practices in Fairfax County, Virginia."

In 2005, as part of a larger effort to integrate low impact development techniques and practices into the county's stormwater management program, six low impact development practices were identified by the Department of Public Works and Environmental Services in coordination with a stakeholders' group for incorporation into the Public Facilities Manual. The six practices are: bioretention basins and filters (rain gardens), water quality (vegetated) swales, tree box filters, vegetated roofs (green roofs), permeable pavers, and reforestation. Final adoption by the Board of Supervisors is projected to occur by the end of the summer of 2006. The Department of Public Works and Environmental Services will provide appropriate training for review and inspection staff as part of implementation of the Public Facility Manual amendments after adoption.

In addition to the low impact development amendments, the Department of Public Works and Environmental Services also developed amendments to the adequate drainage provisions of the Public Facilities Manual to address adequate outfall and drainage diversions. These amendments were adopted by the Board of Supervisors in February 2006. The amendments to the adequate outfall provisions clarify the extent of downstream analysis that must be provided; and provide options for proving no adverse impact and a proportional improvement of outfalls. The amendments to the drainage diversion provisions provide guidance as to when a diversion may be justified and requirements for analyzing downstream impacts.

Stormwater Needs Assessment and Funding

The Department of Public Works and Environmental Services conducted a study known as the Fairfax County Watershed Community Needs Assessment and Funding study to explore options to provide an adequate and stable funding source to implement stormwater strategies. The study was prepared by AMEC Earth and Environmental, Inc. with the assistance of a special advisory committee appointed by the Board of Supervisors. The recommendations of the study were presented to the Board of Supervisors in March, 2005. The study identified types of stormwater services and levels of services provided by Fairfax County and compared these current levels of service against a benchmark of similar communities in the United States in order to show how Fairfax County compares in relation to these other programs. Funding strategies were presented for stormwater management programs to reflect changing service levels, increased infrastructure inventories, unfunded mandates, and emergency events. As part of the budget deliberation process, the Board of Supervisors elected to adopt a one-cent dedication of real estate tax revenues to fund the overall stormwater program. The dedication resulted in $17.9 million for Fiscal Year 2006 and is estimated to be $21.9 million for Fiscal Year 2007.

IV. (B) Policy

Resource Protection Areas and perennial streams, the Chesapeake Bay Preservation Ordinance, Total Maximum Daily Loads, the county's Comprehensive Land Use Plan, infill plans, erosion and sedimentation control regulations, and Zoning Ordinance requirements all play a key part in effective stormwater management. They are discussed in this section.

Perennial Streams Identification and Mapping Project

In the summer of 2005, the results of the Quality Assurance/Quality Control study along with the revised Chesapeake Bay Preservation Area Maps were presented before the Board of Supervisors. A total of 154 sites were resurveyed during the Quality Assurance/Quality Control study. Eighty-one percent (124) of the sites were randomly selected and 19 percent (30) of the sites were targeted. The field resurveys resulted in approximately 7.7 miles of streams being reclassified as perennial and 2.2 miles of streams being reclassified as intermittent. This net change of 5.5 miles of perennial streams represents 0.6 percent of the total 860 miles of perennial streams (excluding the shorelines of the Occoquan River, Potomac River and embayments) within Resource Protection Areas on the adopted 2003 maps. In general, these changes were refinements to the upstream limits of perenniality and were not complete reclassifications of an entire stream.

Perennial Streams Miles:
Old* (not shorelines)…….520
Additional*…… ..340
Total……..860
Increase from 1993...…....65%

RPA Miles^2 (including water):
Old…….. .55.3
Additional…… ...17.4
Total…….72.7
Increase from 1993..…....31%

* "Old" represents the extent of the 1993 RPAs, while "Additional" represents the final extent of the 2005 RPAs.

In July of 2005, the Board of Supervisors adopted all but one updated Chesapeake Bay Preservation Area Map, with the last map adopted in December. In addition to the 5.5 miles of newly mapped perennial stream, Chesapeake Bay Preservation Area Map Quality Assurance/Quality Control brought the total perennial stream miles to 860. Resource Protection Areas now make up 18.4 percent of land within Fairfax County. The figure identifies the refinements to Resource Protection Areas from the 1993 to the 2005 amendments.

In addition to identifying and mapping all perennial streams in the county, this project helped to develop an updated stream data layer of the county's waterways. It also aided in the informal characterization and inventory of headwater streams by providing information on their physical and ecological conditions.

The Fairfax County Stream Classification Protocol, Field Data Sheet, and interactive maps displaying the county's Chesapeake Bay Preservation Areas are available on the county's Web site, by visiting:

www.fairfaxcounty.gov/dpwes/watersheds/perennial.htm

Chesapeake Bay Preservation Ordinance

Revisions to the map of Chesapeake Bay Preservation Areas were most recently adopted by the Board of Supervisors on July 11, 2005; the revisions became effective the next day. The revisions included corrections to the buffer components of Resource Protection Areas and the refinement of Resource Protection Area designations based on an extensive quality control effort that was pursued subsequent to the initial mapping of perennial streams throughout the county.

The Chesapeake Bay Preservation Ordinance, Chapter 118 of The Code of the County of Fairfax, Virginia, was adopted by the Board of Supervisors on March 22, 1993, and became effective July 1, 1993. This ordinance protects certain areas along the corridor of streams, designated as Resource Protection Areas, from most development and requires that the remaining areas outside Resource Protection Areas be designated as Resource Management Areas. Resource Protection Area and Resource Management Area components are identified in § 118-1-7 of the Code. Performance criteria have been established that require water quality control measures designed to prevent a net increase in non-point source pollution from new development based on average land cover conditions.

The Chesapeake Bay Preservation Ordinance has been amended several times since its initial adoption in 1993; a particularly noteworthy amendment was adopted on July 7, 2003 and became effective on November 18, 2003. This amendment incorporated a Resource Protection Area designation along all perennial streams, including many that were not previously so designated. The amendment also included changes to the performance criteria for development and redevelopment in Resource Protection Areas and Resource Management Areas; changes in the information to be provided with plans of development in applications for construction permits; and changes to the procedures and criteria for the granting of exceptions to the requirements of the Chesapeake Bay Preservation Ordinance.

This ordinance is enforced through the development review and inspection process, which assures that the development plans address the requirements of the ordinance and are constructed as approved. Civil and criminal penalties are available to address violations.

The Department of Public Works and Environmental Services enforces compliance with the Chesapeake Bay Preservation Ordinance through the development review and inspection process. In addition, the Department of Public Works and Environmental Services has the responsibility for assuring that development plans address the requirements of the ordinance as well as are constructed as approved. During 2005, the Department of Public Works and Environmental Services received 376 site, subdivision, and public improvement plans for review and approval; of these, 198 were first submission plans (a plan may be submitted multiple times before approval is granted).

The Northern Virginia Soil and Water Conservation District develops soil and water quality conservation plans for all land in agricultural use. In most cases in Fairfax County, these are horse-keeping operations.

The plans are written to comply with the Chesapeake Bay Preservation Act guidelines to include best management practices to reduce sediment pollution from erosion; excess nutrients from animal waste and fertilizers; and misuse of pesticides and herbicides. The plans also prescribe riparian buffers for Resource Protection Areas. As required by county ordinance, soil and water quality conservation plans are developed for all agricultural and forestal districts in the county. Plans are updated and technical assistance is provided by the Northern Virginia Soil and Water Conservation District as needed. The Northern Virginia Soil and Water Conservation District also develops conservation plans for landowners receiving state cost-share money for installing agricultural best management practices, such as manure storage and composting structures, or fencing animals out of streams. In 2005, spot checks were made on four practices installed earlier. All were found to be well maintained and in good working order.

In 2005, twenty soil and water quality conservation plans were developed for 544 acres and included 21,255 linear feet of Resource Protection Areas. Cumulatively, 10,504 acres and 288,416 linear feet of Resource Protection Areas are covered by water quality conservation plans that have been developed since 1994 when the program began.

Two stream crossing designs for horse trails were prepared for the Fairfax County Park Authority's Turner Farm property. These crossings will allow horses to cross streams without damaging streambanks and degrading water quality.

At Meadowood Farm, the Bureau of Land Management property on Mason Neck, the Northern Virginia Soil and Water Conservation District designed and sited a windrow composting pad as a demonstration project to show how to better manage horse manure.

Four Mile Run Total Maximum Daily Load/Implementation Plan

In compliance with the Virginia Water Quality Monitoring Information and Restoration Act Association, the Northern Virginia Regional Commission, under a contract with the Virginia Department of Environmental Quality, worked with the four watershed jurisdictions—Fairfax and Arlington Counties and the Cities of Alexandria and Falls Church—to develop an implementation plan for the Total Maximum Daily Load study developed for bacteria in Four Mile Run. The implementation plan focuses on limiting bacteria contamination associated with human and pet sources in the waters of Four Mile Run. The Four Mile Run plan covers a myriad of initiatives from community and individual behavioral changes to large-scale capital projects. The plan was the first Total Maximum Daily Load Implementation Plan developed for an urban area in Virginia and was endorsed by all four watershed jurisdictions.

Although only the very upper reaches of Four Mile Run flow through Fairfax County, it is important to note the Total Maximum Daily Load associated with Four Mile Run and Fairfax County's participation in the long standing regional Four Mile Run Watershed Management Program.

Information about the Four Mile Run Watershed Management Program can be found at:

www.novaregion.org/fourmilerun.htm

Four Mile Run was listed as impaired in 1996 on the state's 303(d) Impaired Waters List due to elevated levels of fecal coliform bacteria. It was subsequently on the list published in 1998 and thus fell under the 1999 Consent Decree requiring Virginia to develop Total Maximum Daily Loads for all of the impaired stream segments listed on the 1998 303(d) Impaired Waters List by 2010. During 2001 and 2002

Northern Virginia Regional Commission and the Department of Environmental Quality developed the Fecal Coliform Total Maximum Daily Load for Four Mile Run approved by the Environmental Protection Agency in May, 2002. Following up on the Total Maximum Daily Load document, Northern Virginia Regional Commission led an effort with the local jurisdictions and the Department of Environmental Quality in 2003 and 2004 to develop an Implementation Plan for the Total Maximum Daily Load. Under this plan the four watershed jurisdictions including Fairfax County have committed to specific actions directed at reducing bacteria in Four Mile Run. Both the Total Maximum Daily Load study and the implementation plan as well as additional background information and ongoing efforts can be found at:

www.novaregion.org/tmdlresource.htm

Other Total Maximum Daily Loads in Fairfax County

There are nineteen Category 5 waterbodies (impaired—requiring a Total Maximum Daily Load) with drainage areas in Fairfax County included in the Department of Environmental Quality's Virginia Water Quality Assessment 305(b)/303(d) Integrated Report (August 2004). Of the listed waterbodies, 12 are riverine systems totaling 58.45 miles, six are estuarine systems with a total area of 23.23 square miles, and one is a drinking water reservoir with an area of 1,700 acres. Several waterbodies that were listed in previous assessment cycles have additional impairment causes shown in the 2004 report, mainly for bacteria (fecal coliform and/or *E. coli*). This is usually due to the change in the bacteria water quality standard from 1,000 cfu/100 mL to 400 cfu/100 mL, and the transition from a fecal coliform to an E. coli standard, which became effective February 12, 2004.

The cause of impairment for the majority of the riverine waterbodies in Fairfax County is either bacteria or impacts to the benthic community. For the estuarine waterbodies, the cause of impairment for the majority of systems is bacteria or PCBs in fish tissue. Ten of the 19 waterbodies are multi-jurisdictional, i.e., include drainage areas outside Fairfax County. Fecal coliform Total Maximum Daily Loads have been completed for two waterbodies, Accotink Creek (above Lake Accotink) and Four Mile Run, and were approved by Environmental Protection Agency on May 31, 2002, and by the Virginia State Water Control Board on June 17, 2004. According to the Department of Environmental Quality's current schedule, seven waterbodies require Total Maximum Daily Load studies to be completed by 2010, nine require studies to be completed by 2014, with three to be completed by 2016. In order to meet this schedule, bacteria and benthic Total Maximum Daily Loads are being developed for seven tributaries to the Occoquan River, including Popes Head Creek and Bull Run, and will be submitted to Environmental Protection Agency in May 2006. Virginia is also partnering with Maryland and the District of Columbia to develop a PCB Total Maximum Daily Load for the Tidal Potomac. The PCB Total Maximum Daily Load will be submitted to Environmental Protection Agency in September 2007. A complete list of impaired waterways in Fairfax County can be found in ***Appendix F***.

Comprehensive Land Use Plan

On November 15, 2004, the Board of Supervisors adopted an amendment to the Comprehensive Plan pursuant to the comprehensive planning requirements of Virginia's Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulations. Included in the amendment were revisions and additions to Comprehensive Plan text and policies as well as the incorporation into the plan of a "Chesapeake Bay Supplement." The amendment satisfied the specific requirements identified by the state while more comprehensively addressing water resource conditions, issues, policies, regulations, and initiatives in support of the county's commitment to the regional

Chesapeake Bay Program, in furtherance of the county Board of Supervisors' "Environmental Excellence 20-year Vision Plan," and in support of other environmental and open space goals. The supplement presents information regarding water quality factors, water pollution sources, water quality conditions, and shoreline conditions in the county within the context of the county's land use and its water quality policies, regulations, and initiatives. The supplement culminates in an analysis and series of recommendations addressing water pollution sources, infill development, redevelopment, shoreline erosion control, and shoreline access.

The Environmental Quality Corridor policy, as found in the Environment section of the Policy Plan volume of the county's Comprehensive Plan, does not directly address stormwater discharges; however, it is particularly relevant to the county's overall water quality management program as it serves to identify, protect, and, in some cases, restore environmentally-sensitive resources. Specifically, the Environmental Quality Corridor policy recommends the preservation and restoration of areas including floodplains, steep slopes (slope gradients of 15 percent or greater) adjacent to streams or floodplains, wetlands connected to stream valleys, minimum stream buffers (variable in width depending on topography), and sensitive habitat areas. While there is no county regulation requiring Environmental Quality Corridor protection (Resource Protection Area and floodplain provisions in the County Code protect many, but not all, Environmental Quality Corridor areas), the application of the Environmental Quality Corridor policy during the zoning process has been effective in protecting, and in some cases restoring, environmentally sensitive areas.

Another area of interest with respect to the Comprehensive Plan is an objective addressing water quality and stream protection; there are a series of policy statements in the plan that are related to this objective. This section of the plan was amended in the year 2000 to provide explicit support for better site design and low impact development measures, and opportunities to implement such measures are explored during the zoning process. In a number of cases, staff has negotiated successfully for measures such as reductions in proposed impervious cover and the provision of biofiltration facilities (rain gardens) to provide water quality control through infiltration.

The Environment and Development Review Branch of the Department of Planning and Zoning, in coordination with other Department of Planning and Zoning staff and staff from other county agencies, reviewed 147 rezonings and related applications (e.g., amendments), 72 special exceptions and amendments, and 78 special permits in 2005 for environmental considerations.

Zoning Ordinance and Subdivision Ordinance

During 2005, 376 site, subdivision, and public improvement construction plans were reviewed for code compliance; of these, approximately 146 were approved for construction. The Department of Public Works and Environmental Services enforces the Zoning Ordinance and Subdivision Ordinance criteria related to stormwater for new development and redevelopment through its plan review process. This ensures that best management practices are implemented on all new developments in compliance with the Occoquan Water Supply Protection Overlay District and the Chesapeake Bay Preservation Ordinance. The on-site inspection program and Bonding assures that sites are constructed in accordance with approved plans.

The Zoning Enforcement Branch of the Department of Planning and Zoning investigates complaints of possible Zoning Ordinance violation issues, including several types of complaints that may have potential

stormwater impacts. The following table summarizes the 2005 complaint investigation activity for complaints related to stormwater issues.

2005 Zoning Ordinance Complaints Related to Potential Stormwater Issues

	Complaints Received	Cases Closed	Cases Pending
Drainage	21	19	2
Junk Yard	44	38	6
Outdoor Storage	649	626	23
Storage Yard	23	20	3
Total	737	703	34

Erosion and Sedimentation Control Program

The Department of Public Works and Environmental Services staff, Northern Virginia Building Industry Association, and Engineers and Surveyors Institute are working together exploring ways to improve the effectiveness of the county's Erosion and Sediment Control Program. The committees' work is scheduled to be complete in 2006.

Classes and workshops were conducted in 2005 through the Engineers and Surveyors Institute on the county's Erosion and Sediment requirements, constructability issues, quality control of plans and inter-jurisdictional Erosion and Sediment regulations. The class and workshop were attended by both private and public sector employees. This supplemented the course conducted by Land Development Services staff through Engineers and Surveyors Institute which addressed house lot grading issues with an emphasis on the design of Erosion and Sediment controls and state and federal permit requirements.

Land Development Services organized and conducted a presentation to the Fairfax County Environment Quality Advisory Council pertaining to Erosion and Sediment controls and the protection of natural resources during the land development process. Other efforts included presentations to several citizen groups on the county's environmental protection requirements. In 2006, Land Development Services is expanding its outreach to other groups that are interested to learn about the county's efforts to protect our resources during the land development process.

Construction Site Runoff

During 2005 a total of 258 Erosion and Sediment plans were submitted and approved for projects that would disturb one acre or more of land. Monthly letters were written to the Department of Environmental Quality informing them of these individual sites (***Appendix G***). In addition, 27,469 Erosion and Sediment inspections were conducted by Land Development Services staff during 2005 on all sites under construction in Fairfax County. This amounted to providing Erosion and Sediment inspections on over 3,100 projects each month. Approximately 45 percent of the 3,100 projects per month consisted of bonded site plans and subdivision plans. The remaining 55 percent consisted of individual residential grading plans and minor site plans.

A 24-hour hotline established by the Code Enforcement Division of the Department of Public Works and Environmental Services continues to be an effective means for citizens to report complaints about erosion and sedimentation.

Land Conservation Awards

Each year, the county recognizes those developers and site superintendents who do an excellent job of installing and maintaining erosion and sediment controls on construction sites in its Land Conservation Awards Program. While sites normally are nominated by county inspectors, others are encouraged to make nominations as well. Northern Virginia Soil and Water Conservation District provides a judging team that evaluates sites twice a year for these awards; 17 sites were judged in 2005. An award also is given to an outstanding county inspector. Those sites that demonstrate excellence in tree preservation are also recognized in these annual awards; the judging is done by the Fairfax County Tree Commission. An awards ceremony that includes remarks by elected officials and representatives of the development community is held in January.

Northern Virginia Regional Commission

Occoquan Watershed Management Planning

Northern Virginia Regional Commission continues to direct the Occoquan Basin Nonpoint Pollution Management Program, which was established in 1982 to provide an institutional framework for maintaining acceptable levels of water quality in the Occoquan Reservoir through management of nonpoint source pollution. The Occoquan Reservoir is one of two major water sources of the majority of Northern Virginians. Six jurisdictions within the watershed, including Fairfax County, as well as various stakeholders participate in this program.

Because of continued high population growth, the Occoquan Program will begin to turn its attention to broader watershed management and planning issues in addition to its current emphasis on best management practices and modeling. As part of the watershed management planning process, the Northern Virginia Regional Commission continues to review local policies and meet with key stakeholders in Prince William, Fauquier, Fairfax, and Loudoun counties.

The Occoquan Watershed and Reservoir models have been calibrated to 1995 land uses and now are undergoing a verification step to the 2000 land uses. This verification step should be completed by winter of 2006. Northern Virginia Regional Commission will incorporate 2005 land use upon availability of aerial photography.

IV. (C) Management

Management of pesticides, herbicides, fertilizers, and control of our landfills has a significant role in watershed management.

Pesticide, Herbicide and Fertilizer Application Program

A Pesticide, Herbicide, and Fertilizer Application Program was submitted on January 24, 2003, in accordance with the Municipal Separate Storm Sewer System permit requirement. A survey was conducted in 2003 and 2004 and an application rate reduction report was generated recommending that the county develop a Nutrient Management Plan and an Integrated Pest plan. The development of a Nutrient Management Plan and an Integrated Pest Management is part of an effort to control excessive use of pesticides, herbicides and fertilizers in the county. Currently the county's 2003/2004 application rate reduction report is being reviewed as well as the Department of Conservation and Recreation, the

Environmental Protection Agency, the Northern Virginia Soil and Water Conservation District and the Environmental Horticulture Division of Virginia publications on proper use of Pesticide, Herbicide, and Fertilizer. An updated survey is being conducted to see what changes may have taken place since 2003. Initially, only county agencies responsible for county public right of ways, parks and other municipal property will be the ones surveyed as they are part of the county's Municipal Separate Storm Sewer System permit. Other agencies and private organization such as the county's public schools, private golf courses, Federal Government-owned land in the county, the Virginia Department of Transportation and others will be asked to participate on a voluntary basis. Personal interviews may also be conducted to further define the current usage of Pesticide, Herbicide, and Fertilizer.

The Nutrient Management Plan and Integrated Pest Management of other counties will be reviewed and compared to the data collected in Fairfax County, with the ultimate goal being the development of a Nutrient Management Plan and Integrated Pest Management for the county.

Northern Virginia Soil and Water Conservation District (Northern Virginia Soil and Water Conservation District)

The Northern Virginia Soil and Water Conservation District continues to distribute *You and Your Land—A Homeowner's Guide for the Potomac Watershed.* It can be viewed at the Northern Virginia Soil and Water Conservation District's web site at:

www.fairfaxcounty.gov/nvswcd/yyl-intro.htm

Under the county's Chesapeake Bay Preservation Ordinance, the Northern Virginia Soil and Water Conservation District develops soil and water quality conservation plans for land in agricultural use. The plans recommend best management practices so that sediment, fertilizers, pesticides, herbicides, and animal wastes do not harm water quality.

The Northern Virginia Soil and Water Conservation District continues to distribute *Agricultural Best Management Practices for Horse Operations in Suburban Communities.* It is posted on the Web site with several photographs to accompany the text. The web page gets 50 to 100 visitors each month. The address is:

www.fairfaxcounty.gov/nvswcd/horse.htm

In addition, the Northern Virginia Soil and Water Conservation District reviews nutrient management and integrated pesticide management plans for golf courses and provides comments and recommendations to the Department of Planning and Zoning. The Northern Virginia Soil and Water Conservation District reviewed a nutrient management plan for the International Country Club golf course that includes 123 acres and 7,000 linear feet of Resource Protection Areas. It also reviewed water chemistry test results submitted by Mount Vernon Country Club, as part of its requirement to monitor water quality within the golf course operation.

Landfill

Hazardous Waste Treatment, Storage, and Disposal Facilities

There were no new or previously unidentified landfills, hazardous waste treatment, or storage and disposal facilities identified in the county since the Municipal Separate Storm Sewer System permit application was submitted in November, 1992.

Landfill Monitoring Program

The Division of Solid Waste Disposal and Resource Recovery, of the Department of Public Works and Environmental Services, is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road, Lorton, Virginia 22079, and the I-66 Transfer Station/Closed Landfill, located at 4618 West Ox Road, Fairfax, Virginia 22030. Both facilities are located on county property. Both facilities are covered under the Virginia Pollution Discharge Elimination System General Permit. The I-95 Landfill is registered under the permit as VAR051076, and the I-66 Transfer Station/Closed Landfill is registered under the Virginia Pollution Discharge Elimination System permit asVAR051074. The permit expires on June 30, 2009.

The I-95 Closure Project was designed to complete the capping of approximately 130 acres of the Municipal Solid Waste section of the landfill, as approved by the Virginia Department of Environmental Quality. The closure project is divided into four phases, with each phase consisting of approximately 40 acres. Phase III and Phase IV of the closure project are currently being implemented in the central area of the landfill. The final cover system consists of 18 inches of low-permeability soil and a 15-inch protective cover/vegetative support layer. As a result of this work, stormwater is managed more efficiently and infiltration is reduced significantly, in turn providing for less generation of leachate. The final cover system also minimizes the need for post-closure maintenance. In addition, a new stormwater detention pond is currently under construction north of the ash cell in Area Three Lined Landfill, Phase IIB.

The Area Three Lined Landfill, Phase IIB project is part of the I-95 Area Three Lined Landfill Project. The Phase IIB project has a disposal capacity of 375,000 tons, and will accept ash from the Energy/Resource Recovery Facility located at the I-95 Complex and a similar facility in Alexandria. This phase has a service life of four years. The 7.5-acre cell consists of a bottom lining system that includes two feet of low-permeability soil, a double synthetic liner (60 mil HDPE) system, and a leachate collection and detection system.

Division staff performs quarterly visual inspections of the stormwater outfalls located at the I-95 Landfill and the I-66 Transfer Station/Closed Landfill. The inspections are performed in each quarter of the calendar year (January through March, April through June etc.). Annual benchmark sampling is performed between July 1 and June 30 of the monitoring year. The cost for the required Virginia Pollution Discharge Elimination System monitoring, testing, and other related activities are included as part of the operating budget for each facility and is not funded separately. This is done because most of the activities required by the Virginia Pollution Discharge Elimination System permit are also required under the operating permits granted by the Department of Environmental Quality. Test results and inspection reports are maintained at the division's main office, and copies are on file at the facility's administration offices.

Training in pollution prevention for facility staff is provided and is a part of the I-95 Landfill and I-66 Transfer Station/closed landfill waste disposal permits. Pollution Prevention Plans are maintained at each facility and are updated when conditions change. Additionally, spill kits are readily available at each location. Water quality test results conducted to satisfy the Virginia Pollution Discharge Elimination System permit condition have been satisfactory.

The division maintains a Web site at:

http://fairfaxcounty.gov/dpwes/trash/recyclingtrash.htm

IV. (D) Emergency Response

Fairfax County has a proactive dam safety program, floodplain management program, and a hazardous materials pollution response team. They provide the county's emergency response network for stormwater related problems.

Floodplain Management

Digital Elevation Model and Floodplain Study in the Belle Haven Watershed

After Hurricane Isabel delivered a record tidal surge to several communities along the Potomac and Cameron Run, the need for a more accurate digital elevation model was identified. Working with Geographic Information Systems, the Stormwater Planning Division contracted with photogrammetry and mapping specialists to create one-foot contour interval digital mapping over the two square miles of the flood prone area.

In cooperation with the USACE's Baltimore District, County and USACE staff performed a flood study, using joint probability methods, to more accurately assess the flooding risks to the Belleview and New Alexandria Communities and other nearby communities. This project, due to be completed in 2006, will create the critical hydrologic, hydraulic and statistical models necessary to perform cost benefit analysis for alternatives to reduce flooding risks in this area.

Level I Digital Flood Insurance Rate Map

With the help of a grant from Federal Emergency Management Agency, the source data for the current Federal Flood Insurance Rate Maps was digitized and a draft Level I Digital Flood Insurance Rate Map was created. This is the first and most involved step in the process of creating an official Digital Federal Flood Insurance Rate Maps. Once approved by Federal Emergency Management Agency, this information can be overlaid on base mapping to create the final product. The final version of the Digital Federal Flood Insurance Rate Maps will enable engineers, mortgage lenders, and citizens access to accurate flood insurance data, with associated base mapping information, online. It will also virtually eliminate the high volume of corrections to the maps which are submitted to Federal Emergency Management Agency. Hundreds of these mapping corrections are currently on file with the county, which impact over 1000 properties. These corrections (or "Letters of Map Amendment") will also be incorporated in the final phase of the Digital Federal Flood Insurance Rate Maps production.

Fairfax Inspections Database Online Floodplain Warning Tool

The new permits computer database, "Fairfax Inspections Database Online" or "Fairfax Inspections Database Online," scheduled to be launched in February, 2006, will be equipped with a floodplain warning tool. Because only about 500 miles of the county's 900 miles of floodplain are mapped, a tool was needed to somehow flag permits associated with properties containing floodplain. Although approximate mapping of much of the county's minor floodplains using aerial topography and HECGEO will be completed over the next five years as the watershed master plans are completed, the floodplain warning tool had to be created now as the software for the Fairfax Inspections Database Online was being created. The Stormwater Planning Division and the Geographic Information Systems department worked to create a collage of available floodplain data with approximate floodplain limits used where no other data was currently available. A table was then created of all the properties in Fairfax County that are impacted by either floodplain. Because the Fairfax Inspections Database Online program only references the database table, updated floodplain information can be easily added as each of the watershed master plans are completed and as new studies are submitted.

Spill Prevention and Response

The Fire and Rescue Department responds to all reported incidents of hazardous material releases, spills, and discharges. Staff are trained and equipped to initiate spill control measures to reduce the possibility of hazardous materials reaching the municipal separate stormsewer system. Resources available to Fire and Rescue Department personnel include personal protective equipment, technical tools and equipment for control, and absorbent products such as pads and booms for containment. The Fire and Rescue Department also maintains a contract with a major commercial hazardous materials response company to provide additional containment and clean-up support for large-scale incidents.

In 2005, the Fire and Rescue Department's Hazardous Materials and Investigative Services section responded to 584 calls involving hazardous material, including 525 reported spills, leaks or releases of hazardous materials. There were 146 hydraulic oil spills/releases (mostly from trash trucks), 88 fuel oil or home heating oil releases, 51 gasoline releases and 36 diesel fuel releases. There were 66 responses to incidences which had the potential to discharge, or did discharge, hazardous materials into storm drains or surface water.

Hazardous Materials and Investigative Services staff, through vigorous enforcement of appropriate codes and ordinances, ensures that the responsible party takes appropriate spill control and cleanup action. In both emergency and non-emergency spills that reach the municipal storm sewer system, Hazardous Materials and Investigative Services staff utilizes appropriate enforcement actions to ensure that proper cleanup activities are undertaken to protect and restore the environment as well as recover costs incurred by the county for initial emergency response to the incident.

The Hazardous Materials and Investigative Services monitors, on a long-term basis, contaminated sites that have a potential for the contaminant coming in contact with surface structures including stormwater management facilities. As a part of the Oversight Program, Hazardous Materials and Investigative Services, as an agent of the Director of Department of Public Works and Environmental Services, accepts, reviews, and processes requests to discharge treated groundwater from remedial activities at those sites into county sewers. Hazardous Materials and Investigative Services then monitors the discharge for the duration of the agreement. Department of Public Works and Environmental Services staff members receive regular training in pollution prevention measures and in proper response procedures for incidences where pollutants or spills are found that are exposed to stormwater. Select groups are also trained in the proper handling of hazardous wastes and operate the Household Hazardous Waste collection program.

Ordinances and Enforcement

The Fire and Rescue Department's Hazardous Materials and Investigative Services section aggressively enforces County Code Chapters 105 and 106 in conjunction with the Department of Public Works and Environmental Services and the Department of Planning and Zoning and has issued criminal citations during the investigations of Hazardous Materials Incidents. Chapters 105 & 106 contain the provisions that address illicit discharges to state waters and the county's storm drainage system. Procedural Memorandum No. 71-01, Illegal Dump Site Investigation, Response, and Cleanup, (***Appendix H***) outlines the process of follow-up action for non-emergency incidents of illegal dumping; establishes action under County Code Chapter 46, Health or Safety Menaces; and provides referrals for action on complaints that are not public health hazards nor regulated.

In May, 1995, the county established the Fairfax County Hazardous Materials Task Force. Their charge is to provide oversight of remedial activities required as a result of Corrective Action Plans. A Corrective Action Plan may be issued to a site for remedial activity required because of groundwater contamination. The Corrective Action Plan may involve the discharge of treated groundwater to the storm sewer system. The Fire and Rescue Department's Hazardous Materials Services Section acts as an agent of the Director of the Department of Public Works and Environmental Services to permit and enforce actions on these activities. The Hazardous Materials Technical Support Branch currently monitors 68 active sites undergoing remediation activities.

V. Monitoring and Assessment

This section discusses the county's ongoing monitoring and watershed assessment program in water quality and stream quality (physical assessment and bioassessment) as well as the roles of the Northern Virginia Soil and Water Conservation District and the Audubon Naturalist Society.

Runoff carries pollutants, including trash, to county streams.

Runoff is a significant cause of erosion in county streams.

Dry Weather Screening Program

The determination of the areas in the county, and ultimately the selection of the specific storm sewer outfalls that would comprise the 2005 Dry Weather Screening Program, started with a review of the following: United States Geological Survey Accotink Total Maximum Daily Load study results, data collected by staff as part of the Bacteria Monitoring Program, and the locations of the National Pollution Discharge Elimination Systems permitted sites in the county. Fourteen subwatersheds in the county were selected and a Geographic Information Systems layer was created allowing the identification of the specific outfalls to be monitored. Fifty-seven outfalls were identified and Geographic Information Systems maps created to assist the field teams in locating the outfall. The field investigation resulted in finding 23 outfalls with flow. Water quality analysis for pH, copper, detergents, conductivity, chlorine and phenol were taken in the field, resulting in six positive tests for contaminants. In the retests of five of the sites the pollutants were no longer detected, however in one site the pollutants remained. The Department of Environmental Quality and the Department of Conservation and Recreation were notified of the location of the site and its National Pollution Discharge Elimination Systems permit number. As part of the 2006 program, all six of these sites will be screened again with particular attention placed on the one site that continued to have pollutants.

Wet Weather Screening Program and Industrial and High Risk Runoff Program

During 2005, two of the nine sites identified in 2004 from the Department of Environmental Quality list of Virginia Pollution Discharge Elimination System permitted stormwater industrial facilities were selected for wet weather monitoring. All nine sites were field investigated in 2005 to determine potential monitoring locations and to evaluate accessibility. One of the sites monitored was a used motor vehicle parts yard and the other a petroleum bulk station and terminal, both permitted by the Department of Environmental Quality for industrial stormwater.

These sites were monitored twice during rain events and the water quality samples were processed by the county's Noman Cole Waste Water Treatment Facility. ***Appendix J*** is a summary of the water quality analysis. On August10, 2005, both sites had levels of copper, lead, and zinc which were above the Virginia Water Quality Standards for Aquatic Life, Fresh Water Chronic.

The 2006 wet weather screening program will evaluate potential re-tests of the 2005 sites and will update the program plan and the list of potential sites to be monitored. The 2004 list of potential sites will be expanded by coordination with the county's Fire and Rescue Department's Hazardous Materials and Investigative Service and the county's Division of Solid Waste Disposal. In addition, a Geographic Information Systems-based screening procedure for identifying potential "hot-spots," based primarily on intensity of land-use (imperviousness and land-use type), is part of the long term goals and will be used to rank and prioritize potential sites for field screening. Possible areas include landfills; other treatment, storage, or disposal facilities; hazardous waste treatment, storage, disposal, and recovery facilities; and facilities subject to the Emergency Planning and Community Right-To-Know Act (Title III, Section 313. The goal of the county's program is to identify and possibly investigate and monitor industrial and other high-risk areas to determine if they are contributing substantial pollutant loading to the Municipal Separate Storm Sewer System.

Watershed Monitoring Program

The permit requires the development of a watershed monitoring program to verify the effectiveness and adequacy of control measures in the county's Storm Water Management Plan and to identify areas of water quality improvement or degradation. The permit requires monitoring to be conducted at representative stations in at least two watersheds at in-stream locations and/or stormwater outfalls with a minimum drainage area of 100 acres.

The county's goals for the watershed monitoring program are to: (i) obtain data for the development, calibration, and verification of water quality simulation models, and (ii) determine whether the concentrations of constituents in stormwater runoff from different residential land-uses (low density and medium/high density) are statistically significant.

To support these goals, a long-term monitoring program was established at two in-stream stations. The first station (VNA) drains a 152-acre medium/high density residential area in the Accotink Creek watershed, while the second station (OQN) drains a 415-acre low density residential area in the Sandy

Run watershed. Station VNA has an estimated imperviousness of 25.1 percent while station OQN has an estimated imperviousness of 10.1 percent (Table 1 of ***Appendix K***).

Automated sampling equipment is used to collect stormwater for water quality monitoring. Collection is triggered by preset rainfall amount and stream stage level. The rain gauges, designed to National Weather Service specification, operate by a tipping bucket mechanism capable of measuring rainfall at 0.01-inch intervals. Sampling equipment consists of the following equipment: Isco 6700 automatic sampler, Isco 730 bubble flow module, Isco Pal 1101 pH and temperature monitors, and American Sigma rain gauge. To report data from the Isco 6700 automatic sampler and Pal 1101 pH monitor, data loggers use Isco FlowLink4 and Isco Samplink software programs, respectively. The FlowLink4 reports include hourly summary reports and graphs (plotted using five-minute data intervals) for rain and flow. The Isco Pal pH monitor measures pH during the entire monitoring period; readings are recorded every fifteen minutes and whenever a sample is collected. For quality control, flow depth calibrations and flow depth measurement checks, along with rain gauge precipitation checks are conducted during each station set up.

Wet weather sampling equipment:
Isco automatic sampler with bubble flow module and pH and temperature monitors; and American Sigma tipping bucket rain gauge.

A total of five storms were monitored over this reporting period. Rainfall, flow, and water quality analysis data sheets from the monitored storms are provided in ***Appendix K***. The results of a statistical analysis to determine if there were significant differences between observed constituent concentrations at the two stations is shown in Table 2 of ***Appendix K***. Seasonal and annual unit-area constituent loadings from the monitored sites for 2005 were computed using the Simple Method, and are summarized in Table 3 of ***Appendix K***.

As can be seen from Table 2 in ***Appendix K***, a significant difference ($p < 0.1$) is indicated for NH_3-N and TKN concentrations from the two sites, with differences for other constituents not statistically significant. The NH_3-N and TKN concentrations are higher at the medium/high density residential site compared to the low density residential site. A point estimate for the difference in NH_3-N concentrations is 0.205 mg/l, while a point estimate for the difference in TKN concentrations is 0.770 mg/l. Monitoring will continue in 2006 and the full data set used to determine if the observed high variance in constituent concentrations from the medium/high density residential site can be reduced sufficiently to allow detection of statistically significant differences for other constituents. The data set will also support the development of continuous water quality models that provide more refined prediction of water quality loadings.

Bacteria Monitoring Program

As required by the Environmental protection Agency, Fairfax County completed its transition in 2005 to using *E. coli* as our indicator of possible fecal contamination versus using fecal coliform. *Escherichia coli* (*E. coli*) is a type of bacteria that is found in the intestines of warm blooded animals. Alone, this bacterium is generally not harmful to humans, but it may indicate the possible presence of pathogenic

(disease-causing) bacteria and viruses. The level of *E. coli* in streams is used by localities to determine if primary recreational contact is safe in local and state waterways.

To determine the concentration of *E. coli* in streams, the Stormwater Planning Division conducted bacteria sampling at 39 locations throughout the county. Grab samples of stream water are collected twice every season, starting in the spring, for a total of six rounds in 2005. Water chemistry parameters were also collected at the time of sampling, including levels of nitrate and total phosphorous, pH, water temperature, dissolved oxygen, and specific conductance.

E. coli, nitrate, and total phosphorous samples are processed at the Fairfax County Health Department Laboratory, using the Colilert® Quanti Tray/2000 by Idexx and Skalar San++ Analyzer, respectively. The remaining chemical parameters were recorded in the field using a hand-held YSI meter. More information will be available in the Stormwater Planning Division's Annual Report on Fairfax County's Streams, which will be completed in spring, 2006.

Bioassessment and Integrated Water Quality Monitoring Program

The long-term biological and bacteriological monitoring program provides a comprehensive analysis of stream conditions throughout the county, while simultaneously meeting the requirements set forth in local, state, and federal regulations, including the:

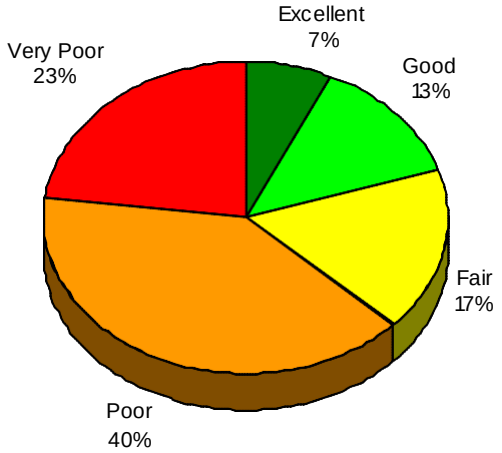
- Chesapeake Bay Act
- Municipal Separate Storm Sewer System Permit
- Virginia Pollutant Discharge Elimination System Clean Water Act

The program will develop a substantial dataset, which over time will provide essential data to determine the overall rate of change or trends in the conditions of Fairfax County's streams and provide a basis for prioritizing implementation measures to restore the county's watersheds.

In 2005, a probabilistic-based site selection sampling methodology was used to identify randomly-selected stream bioassessment locations throughout Fairfax County. These sites were stratified and proportionally distributed throughout the county based on Stahler stream order. This methodology eliminates any site selection bias and is commonly used as a cost-effective way of obtaining statistically defensible determination of stream conditions at a countywide scale. A total of 43 sites were sampled in 2005 with:

- 30 sites randomly selected in Fairfax County
- 11 reference locations in Prince William National Forest Park
- Two coastal plain reference locations in Fairfax County

Results from the 2004 monitoring campaign suggest 80 percent of the county's waterways are in "Fair" to "Very Poor" condition. This indicates significant impairments in the county's streams due to a notable decrease in biological diversity.



More information regarding the results of the 2004 monitoring campaign is available in the *2005 Annual Report on Fairfax County's Streams* available on the Web at:

www.fairfaxcounty.gov/dpwes/stormwater/streams/assessment.htm

This report also includes volunteer monitoring data and information regarding the 2001 Stream Protection Strategy Baseline Study Report. The results from this bioassessment were used to identify, rank, and prioritize county streams. The baseline data is being used as part of a long-term database as well as a guide for future management activities, especially as they relate to the development and implementation of Watershed Management Plans. The baseline report was publicized in 2001 and is available on the county's Web site at:

www.fairfaxcounty.gov/dpwes/environmental/sps_main.htm

Floatable Monitoring Program

The county is an active participant and supporter of several trash cleanup and education programs. Throughout calendar year 2005, an army of volunteers collected over 100 tons of trash from Fairfax County's land and waterways. The dominant types of trash that were collected include plastic grocery bags, aluminum cans, glass bottles, Styrofoam pieces and cups, and athletic balls.

To better highlight cleanup efforts and identify trash hot spots, in calendar year 2006 the county will continue to work with and support the following organizations that coordinate large and small-scale volunteer cleanups:

- The Alice Ferguson Foundation
- The Virginia Department of Conservation and Recreation
- The International Coastal Cleanup
- The Friends of the Occoquan

More information about the cleanup events that occurred in 2005 is available in the Stormwater Management Outreach and Education Section of this report.

Accotink Creek Total Maximum Daily Load

The United States Geological Survey has published a paper specifically on the Total Maximum Daily Load project in the Accotink Creek watershed of Fairfax County. This report outlines the multi tracer techniques and methods used in the study to detect sources of human waste in stormwater and the development of the fecal coliform Total Maximum Daily Load for Accotink Creek. It can be viewed and downloaded from the Web at:

http://water.usgs.gov/pubs/wri/wri034160/wrir03-4160.htm

United States Geological Survey conducted eight synoptic sampling events of over 100 sites each in an effort to address the fecal coliform Total Maximum Daily Load. County staff plans to use the results and lessons learned from this study to help investigate and address areas with elevated fecal coliform bacteria based on hot spots identified as part of the countywide bacteria monitoring program.

Kingstowne Environmental Monitoring Program

The goal of the Kingstowne Environmental Monitoring Program is to provide information to protect Huntley Meadows Park from the detrimental effects of upstream development occurring in Dogue Creek watershed. Of particular concern are excessive sediment loads, which can place too much silt in the natural stream channels and potentially smother wetland vegetation. Excessive sediment loads could also increase the suspended sediment concentrations to levels that are harmful to aquatic life. Construction upstream of the monitoring point is minimal and erosion and sedimentation controls, including stormwater best management practices, are minimizing sediment loads to Dogue Creek.

The original monitoring program consisted of a single station upstream of Telegraph Road (know as the Kingstowne station). During the summer of 2002 a new monitoring station (known as South Van Dorn, or SVD) was established on Dogue Creek downstream of the existing Kingstowne station in order to comply with a U.S. Army Corps of Engineers permit issued for the construction of South Van Dorn Street, Phase III. This new station is intended to evaluate the implementation of the Dogue Creek Watershed Stormwater Control Plan. This plan resulted in the construction of a number of stormwater management facilities, which were designed to achieve a 50 percent total phosphorus removal rate from stormwater discharges in the watershed. A 10-year monitoring and maintenance plan is in the process of being implemented in order to confirm compliance with this permit condition. The new station is located adjacent to Telegraph Road and monitors drainage from a watershed area of 1,148 acres (the 845 acres monitored by the Kingstowne station, plus an additional 303 acres). Phosphorous loads are not meeting the U.S. Army Corps of Engineers' requirements; the county and the Corps are currently evaluating the problem and determining the course of action.

A total of 20 baseflow (grab samples) and 23 storm water quality samples (using automated samplers) were collected at the Kingstowne station and South Van Dorn during the July 2004 – June 2005 monitoring period. Baseflow sampling provides a good indication of background levels of pollutants and may provide information regarding chronic water quality problems. Since the grab samples were taken on a monthly-to-biweekly basis, the data provide a "snapshot" of water quality conditions rather than a continuous record. The data from the water quality samples (using automated samplers) will serve as a basis for long-term water quality trend analysis. The Kingstowne Annual Report is presented in ***Appendix L***.

Northern Virginia Soil and Water Conservation District Volunteer Stream Monitoring Program

The Northern Virginia Soil and Water Conservation continued its successful biologically-focused volunteer stream monitoring program. Across Fairfax County, trained volunteers assess the ecological health of streams. This Volunteer Stream Monitoring Program provides training, equipment, support, data processing, and quality control (See program overview, ***Appendix M***). Monitoring includes biological and chemical aspects and a habitat assessment. Volunteers are trained to assess ecological conditions in streams based on the diversity and composition of benthic macroinvertebrates (stream insects). They conduct biological monitoring following the modified Virginia Save Our Streams Protocol. Volunteers also conduct chemical analyses of turbidity and nitrate/nitrite and make physical observations. Training includes indoor and field workshops and mentoring by experienced monitors. Volunteers commit to monitoring their chosen stream four times a year or assist other monitors at their sites. Sites are located throughout the county and in the City of Fairfax. Certified data is forwarded to Fairfax County, the Department of Environmental Quality, the Virginia Save Our Streams,

and other interested organizations or individuals. In addition to learning about stream monitoring, many volunteers also become involved in watershed groups, clean-up programs, and educational programs. The Northern Virginia Soil and Water Conservation District works with many organizations to coordinate and lead additional watershed-based learning opportunities for citizens and students to help them become better environmental stewards. The Northern Virginia Soil and Water Conservation District also provides guidance for science projects and internships.

The Northern Virginia Soil and Water Conservation District's Volunteer Stream Monitoring Program supplements the county program and provides other services to the environmental community in Fairfax County. In addition to providing monitoring data, the Northern Virginia Soil and Water Conservation District provides training sessions for monitors, conducts special programs at schools, makes presentations at environmental conferences and for civic associations, sponsors tours, hosts a list serve, and publishes a newsletter. Many programs are enhanced by partnerships with other groups in the county government and private environmental organizations. The Northern Virginia Soil and Water Conservation District staff assists a variety of citizen watershed groups by providing administrative and technical support. These groups include: Difficult Run Community Conservancy, Friends of Little Rocky Run, Friends of Accotink, Friends of Burke Spring Branch, Fairfax Trails and Streams, Friends of Cub Run, and Friends of Sugarland Run.

In 2005, the Northern Virginia Soil and Water Conservation District led 55 stream monitoring training sessions or watershed programs, with over 1500 participants (note: The same person can attend multiple programs and therefore is counted multiple times). Watershed programs include: indoor stream ecology programs at schools, presentations to civic groups, table displays at environmental programs, tours of water and sewage treatment plants, watershed walks, and stream clean-ups. In 2005, the Northern Virginia Soil and Water Conservation District began a new series of watershed bike rides. They were popular and will be continued in future years.

The numbers of active monitors is remaining steady, with new monitors replacing those who move away from the area. In 2005, there were 50 active sites. There were 100 monitors who collected winter data, 140 monitors who collected spring data, 165 monitors who collected summer data, and 180 monitors who collected fall data. Approximately 500 students were introduced to stream monitoring through indoor workshops at schools, outdoor special programs, and science fair projects. During 2005, volunteers logged over 4000 Earth Team hours. The Earth Team is a national program of the Natural Resources Conservation Service and tracks volunteer time.

Starting in 2005, Northern Virginia Soil and Water Conservation District and added two new monitoring programs bacterial monitoring, and temperature monitoring

In partnership with the Fairfax County Park Authority, the Department of Public Works and Environmental Services, and a volunteer scientist from United States Geological Survey, the Northern Virginia Soil and Water Conservation District began to coordinate a temperature monitoring program to assess the impact of a large stream restoration project. Data is downloaded monthly, and the temperature is measured every half hour at the sites. Volunteers were trained to download temperature data at seven stations from "ibuttons" using a Palm Pilot. Training materials for the program are available at:

www.fairfaxcounty.gov/parks/resources/tempmonitor.pdf

In partnership with the Department of Environmental Quality and Arlington County, the Northern Virginia Soil and Water Conservation District co-coordinates with Arlington County a bacterial monitoring program to assess the changes in Four-Mile Run as a result of Total Maximum Daily Load implementations. Data is collected monthly from ten sites by more than 25 volunteers. An overview of

the program was published in the Northern Virginia Soil and Water Conservation District newsletter and is available at:

www.fairfaxcounty.gov/nvswcd/newsletter/ecoli.htm

Audubon Naturalist Society

The Audubon Naturalist Society water quality monitoring program recruits, trains, equips, and organizes volunteers to assess the health of streams throughout the Washington, D.C., region. The program uses a modified version of the Environmental Protection Agency's Rapid Bioassessment Protocols to perform habitat assessments and benthic macroinvertebrate surveys. All monitoring equipment is provided to the volunteers. There are currently four permanent Audubon Naturalist Society sites within Fairfax County, with a fifth scheduled to open spring 2006, and these are covered by approximately 20 volunteers. The data collected by Audubon Naturalist Society are currently shared with the Department of Environmental Quality for 305 (b) listings, Prince William County, the Department of Public Works and Environmental Services, National Park Service, and Dept of Game & Inland Fisheries.

Volunteers assess habitat conditions and macroinvertebrate community composition (usually to family level) at specific points throughout the year (May, July, and September, with an optional winter sample). Macroinvertebrates are collected using a "hand-scrubbing" sampling technique, and collected individuals are visually identified to the family taxonomic level where possible. Multiple samples are collected from riffle and pool areas.

Monitors gauge overall habitat condition by visually assessing parameters such as substrate composition, embeddedness, turbidity, bank cover, and canopy cover. Four other components of the Environmental Protection Agency's Rapid Bioassessment Protocol habitat assessment—channel flow status, bank stability, sediment deposition and riparian zone width—are also scored. Readings of pH and water temperature are taken concurrently.

VI. Public Outreach and Education

Public outreach and education are of foremost importance to environmentally sound stormwater management. They raise the level of awareness of the county at large with regards to existing stormwater problems and environmentally friendly solutions. The primary goal of public outreach and education is "pollution prevention." An aware county resident will most likely change pollution-causing behaviors and seek to help in supporting environmental programs.

Outreach and Education by the Stormwater Planning Division of the Department of Public Works and Environmental Services

Stormwater Public Education and Involvement Program 2005 Overview

The information that follows provides a brief summary of the outreach and education activities conducted by Fairfax County in 2005 to its more than one million residents.

Presentations on General Information

Fairfax County makes presentations to various groups throughout the county regarding stormwater management and watershed basics. The presentations include an overview of watersheds, stormwater management, and actions that residents can take to protect the water quality of local streams, the Occoquan Reservoir, the Potomac River, and the Chesapeake Bay. In 2005, the county presented to the following groups:

- 3 Fairfax County homeowners associations
- 2 Environmental groups
- 5 Schools
- 2 Youth Groups

Exhibition/Educational Booths at Public Events

Fairfax County hosts educational booths at several public events annually to raise awareness among residents about stormwater issues facing the county and to encourage behaviors that positively impact watersheds. The following list includes the events Fairfax County participated in as an exhibitor and or environmental educator:

- Celebrate Fairfax
- Centerville Days
- Fall for Fairfax
- Earth Force Youth Summit
- Fairfax County Earth Day Exposition
- Earth Day Celebration Tree Planting
- Geographic Information Systems Week
- Hidden Oaks Nature Center Kids Camp
- Hidden Pond Nature Camp
- McLean Day
- Middle Ridge Community Night Out
- Mount Vernon Town Hall Meeting
- Naturefest at Runnymeade Park
- Providence District Environmental Workshop
- Riverside Fall Festival at Riverbend Park

Explore Your Watershed Walks

Fairfax County partners with the Audubon Naturalist Society and Northern Virginia Soil and Water Conservation District to host watershed walks. These walks provide an opportunity for residents to learn more about the organisms living in Fairfax County's stream valleys, the pollution that threatens them, and how we can work together to improve the quality of our local waterways and those downstream. Watershed walks were conducted in the following three watersheds in 2005:

- Cub Run
- Accotink Stream Valley
- Bull Neck Run

Watershed Cleanups

Fairfax County Stormwater staff, in partnership with numerous other local agencies, support the ongoing efforts to improve the water quality and habitat of Fairfax County's waterways by participating in semi-annual and annual watershed cleanups. Large-scale annual and/or semi-annual events that the county participates in include:

- The Alice Ferguson Foundation's Potomac Watershed Cleanup
- The Virginia Department of Conservation and Recreation's Adopt-a-Stream Program
- The International Coastal Cleanup
- The Friends of the Occoquan's Occoquan River Shoreline Cleanup

Volunteers remove trash from a local stream in April, 2005.

Of special note, the annual 2005 Potomac Watershed Cleanup yielded great success with more than 1,000 volunteers participating to remove more than 2,000 bags of trash.

Number of Cleanup Sites	Number of Volunteers	Number Bags of Trash	Number Bags of Recyclables	Number Tires	Number Balls	Interesting Items Found
86	1336	2025	275.5	168	985.5	basketball hoop, Easter egg filled with candy, DVD player, washing machine, rocking horse, bicycles, a crutch

Regional Pollution Prevention Outreach Campaign

In partnership with the Northern Virginia Regional Commission and surrounding jurisdictions, Fairfax County implemented a region-wide radio outreach campaign. The radio campaign aired in July, 2005. It was aimed at raising awareness among residents about harmful non-point source pollutants and actions residents can take to help protect the water quality of local streams and the Chesapeake Bay.

Web Page Development
The following Web pages were developed or reorganized in 2005 to provide better and more information to residents regarding volunteer opportunities, stormwater management projects in the county, and the state of local waterways:

- Stormwater Management home page
  - www.fairfaxcounty.gov/dpwes/stormwater
- Riparian Buffer Restoration
  - www.fairfaxcounty.gov/dpwes/stormwater/riparianbuffer/
- Calendar of Events
  - www.fairfaxcounty.gov/dpwes/stormwater/events.htm
- Reports
  - www.fairfaxcounty.gov/dpwes/stormwater/resources.htm#reports
- Storm Drainage System
  - www.fairfaxcounty.gov/dpwes/utilities/stormdrains.htm

High School Science Program
Fairfax County Stormwater Management is partnering with the county's Wastewater Department to implement a sewer science program for high school students. This new program promotes an understanding of stormwater, its relationship with wastewater, how the water and the land are connected, and how each individual can make a difference in the health of our environment.

The program teaches high school students about municipal wastewater treatment and stormwater management using specially designed tanks, analytical equipment, and a student workbook. Fairfax County works with students in grades nine through 12 to raise awareness about pollution prevention messages and introduce students to careers in the wastewater and stormwater field.

Meaningful Watershed Experience Program
Fairfax County Stormwater is partnering with Fairfax County Public Schools to implement the Meaningful Watershed Experience Program. The program is aimed at training Life Science teachers in the county's water quality monitoring techniques and program; local, state, and federal policies surrounding watershed protection; and stewardship opportunities offered by the county for teachers and students. The two objectives of the program are as follows:

- Beginning with the class of 2005, provide a meaningful Bay or stream outdoor experience for every school student in the watershed before graduation from high school.
- Provide students and teachers alike with opportunities to directly participate in local restoration and protection projects, and to support stewardship efforts in schools and on school property.

In 2005, Fairfax County participated in three teacher trainings workshops to build the capacity of teachers in approximately 15 schools, ultimately resulting in meaningful outdoor watershed experiences for more than one thousand seventh grade students.

Stream Buffer Restoration
Fairfax County initiated a countywide riparian buffer restoration project in collaboration with volunteers and various partners to mitigate stormwater runoff into local streams and to support the Board of Supervisors' adopted Environmental Agenda.

The buffer restoration initiative began in spring of 2005 with restoration of seven sites. Since then, the county, its partners, and many volunteers have restored 12 areas by removing invasive plants and planting native trees and shrubs. The results for 2005 are listed below:

- Number of trees/shrubs planted: 3,430
- Restored areas: 8 acres
- Number of volunteers: 722

Volunteers plant trees at a Fairfax County park to protect local streams on April 23, 2005.

Volunteers install a protective sleeve around a newly planted tree.

Fairfax Watershed Network

The Fairfax Watershed Network is a dedicated group of organizations, agencies, and individuals that support and promote the improvement and protection of Fairfax County's streams and watersheds through outreach and education efforts. Fairfax County Stormwater Management is a founding member of this group.

Earth Force

Fairfax County Stormwater Management serves as a technical resource for Earth Force's Global Rivers Environmental Education Network program. Responsibilities include identifying stream monitoring sites, assisting with outdoor training exercises, developing presentations, and presenting to students and teachers in a classroom setting.

Earth Force engages young people as active citizens who improve the environment and their communities now and in the future.

Global Rivers Environmental Education Network builds on national academic standards and teaches elementary, middle, and high school-aged youth essential skills including critical thinking, teamwork, problem solving, and the application of science to real world problems. Using proven scientific methods, Earth Force teaches young people to assess the quality of their local water, using water monitoring equipment and conducting classroom research to understand the health of their watershed.

Volunteer Stream Water Quality Monitoring
Fairfax County Stormwater Management works with the following partners to conduct volunteer monitoring training Fairfax County:

- Audubon Naturalist Society
- Northern Virginia Soil and Water Conservation District

The Environmental Horticulture Division of Fairfax County Extension

The Environmental Horticulture Division of Fairfax County Extension provides research-based technical information from Virginia Polytechnic Institute and State University promoting sound landscaping practices that reduce the quantity of pesticide and fertilizers added to the environment, slow runoff rates, keep erosion to a minimum, and encourage significant absorption of pollutants by plant materials.

Environmental Horticulture Division programs educate private residents on ways of achieving attractive and sustainable home landscapes with the minimum use of fertilizer, pesticides, and other chemical inputs. Each year:

- One-on-one advisory services reach more than 18,000 residents.
- Low-input lawn care advice is circulated to more than 25,000 residents through monthly articles in resident association newsletters.
- Approximately 4,000 Virginia Polytechnic Institute publications are distributed on such topics as "Lawn Fertilization in Virginia," "Horse Pastures in Virginia," and "Selection of Plant Material Suitable for this Area."
- More than 2,500 residents and commercial horticultural companies use the extension office's soil testing service to determine the precise levels of fertilizer and liming necessary for a healthy landscape (Note: In part, due to information and assistance provided by the Fairfax County Public Library, Fairfax is the greatest user of this service in Virginia).
- Over 40 pre-recorded messages on environmental horticulture and horticulture topics are available to the public 24 hours a day on Parkline at (703) 324-8700.

Environmental Horticulture Division also works intensively with horticulture professionals, both in private industry and local government. In addition to providing one-on-one technical advice on request, Environmental Horticulture Division provides educational and logistical assistance to the Northern Virginia Nursery and Landscape Association and the Professional Grounds Management Society. In 2004, more than 770 people received professional training at the annual three-day Greens Industry Professional Seminar. Similarly, Environmental Horticulture Division plays a major role in the Virginia Nursery and Landscape Association Certification training.

Pesticide use and safety is a major focus of the Environmental Horticulture Division program, which provides educational materials and logistical support for pesticide applicator certification in cooperation with the Virginia Department of Agriculture and Consumer Services. A three-day training session prepared over 90 landscape professionals and local government employees for testing with Virginia Department of Agriculture and Consumer Services to become certified Pesticide Applicators or Registered Technicians. Most, if not all, of the participants were already applying pesticides without proper certification. In addition, more than 450 horticultural professionals and members of the structural pest control industry received recertification training and credit at the annual Green Industry Seminar. At a Procrastinators Re-certification Training in late June, 2005, 148 participants had the ability to get re-certified in five states and in eighteen categories.

Environmental Horticulture Division offers technical support to other agencies on demand, for example, the review of nutrient and pesticide management plans for the Department of Planning and Zoning. The nutrient and pesticide management plans are developed pursuant to development conditions that are negotiated by the Department of Planning and Zoning during the zoning process for cases (typically special permit or special exception applications) involving substantial turf-oriented recreational activities athletic fields, golf courses, and driving ranges).

Fairfax County Health Department

Environmental Health Specialists presented 12 public awareness programs to approximately 338 county residents during the year, each about the Chesapeake Bay requirement to pump septic tanks every five years. Other outreach programs have been given that incorporate preventative maintenance issues for onsite sewage disposal systems, a stream awareness component to alert residents to possible stream health hazards, and information on how to report stream pollution problems. In 2005, the county sent out 14,220 Flow Diversion Valve reminder notices. These reminders are sent to homeowners on the anniversary of the installation of their system to remind them to turn their Flow Diversion Valve once a year. It also reminds them to pump their septic tank on a regular schedule of every three to five years.

Fairfax County Public Schools

Environmental issues and concerns are a part of many science courses. The Fairfax County Public Schools curriculum for its approximately 14,000 seventh grade students includes a course in "Investigations in Environmental Science." During this course, the students study basic ecology concepts and how to apply them to their local watershed and the Chesapeake Bay ecosystem. The curriculum for the approximately 10,000 ninth grade students includes "Biology 1," in which the students explore the interactions of populations in ecology. Another course is "Chemistry 1," which addresses chemistry in the community and water quality issues. In it, issues involving the use of resources as it relates to the conservation of matter are addressed. A course in "Geosystems" is also available and includes a section on the hydrologic cycle and a study of the effect of economic and public policy on our resources. The "Geosystems" course includes specific environmental projects tied to environmental science courses across the county. Herndon students in Advanced Placement Biology are doing stream monitoring following the Fairfax stream protection strategies. In addition to the courses offered, there are school-based projects that examine geomorphologic changes, nonpoint source pollution, and stream monitoring.

Daniels Run Elementary School has a school-wide environmental education program. The objective is to increase the students' understanding of how watersheds function and the impact development has on them, focusing particularly on their specific watershed and its interaction with the larger system. An effort is made to create a sense of environmental stewardship among the students.

The "pollinators" garden at Daniels Run Elementary School

Another view of the garden, showing an interpretive sign

The students at Daniels Run have been involved in many environmental projects including the creation of a "Bayscaped" area located on the school grounds. This area includes two rain gardens, a pollinator garden, a native grass hillside, a restored forest edge, a restored forest understory, a riparian buffer, and stream bank stabilization.

In 2005, the school partnered with the City of Fairfax and Filtrexx International to stabilize portions of the Daniels Run Stream. This stream was very impacted by a new development upstream from the school; they urged the City of Fairfax to join their efforts to stabilize the stream banks using a new non-invasive technique. Fortunately, the City of Fairfax agreed and Filtrexx International designed and installed this new technique along 760 feet of stream bank. The restoration process was completed in June of 2005.

The area to be stabilized was infested and degraded by invasive plants, most notably invasive vines, which had to be removed. This portion of the work was done by teachers and community volunteers. Erosion and undercutting along the banks of the stream was so severe, numerous trees had fallen into the stream; exposed tree roots and unstable trees were common. The Filtrexx technique offered a chance to save all of the existing trees along the stream bank. The technique backfilled the undercut areas and placed and secured stabilizing "soxx" along the banks and around existing vegetation.

Before Stream Bank Stabilization

After Stream Bank Stabilization

In addition to the stream bank stabilization project, in fall, 2005, students created a riparian buffer along the stream to increase biodiversity and habitat and reduce stormwater runoff. They received a Virginia Naturally grant to help them in this effort. The participating students gained a fundamental understanding of stormwater runoff issues in developed areas and the value of riparian buffers in reducing the negative impacts of development. Soil and water conservation were addressed in very real terms.

In order to increase the ability of the riparian area to absorb stormwater, before student planting, the area was trenched parallel to the stream and the trenches were filled with a soil mix high in compost content. This technique, devised by Dr. Frank Gouin of University of Maryland, is recommended for treatment of compacted soil to increase water retention and vegetation growth. The open space portion of our riparian area was compacted and the turf cover acted more like a sheet carrying runoff to the stream rather than intercepting and absorbing it. The Gouin technique was applied to improve the growing conditions of the riparian area and reduce runoff reaching the stream. The soil mix used was a composted growing medium provided by Mulch Solutions, a local distributor of Filtrexx International. Fairfax County partnered with Filtrexx in this component and provided men and machinery for removing the turf and doing the trenching. Earth Sangha drew up the design for the buffer zone and provided the native riparian plants.

The trenches in the riparian buffer were filled with compost.

Students planting the riparian buffer

Other activities and accomplishments include participation in the Chesapeake Bay Foundation restoration of underwater grasses project where underwater grass were grown in an aquatic system that replicates the Chesapeake Bay water conditions; they were later transplanted into the Chesapeake Bay. Students at Daniels Run also competed in a stormdrain marker design contest. The final design was a composite of several student designs and will go on every stormdrain in the City of Fairfax.

This marker was designed by students and will go on stormdrains in the City of Fairfax.

In the courtyard area (The Gardens), students grow crops to learn about the life processes of plants. By using red wiggler worm compost as fertilizer, students learn about the role of resources in the natural

world and how people can utilize those resources in a sustainable way. The red wigglers are fed fruit and vegetable scraps from the school cafeteria.

Fairfax County Recycling

Fairfax County's Solid Waste Management Program is a strong supporter of the education of the community regarding the prevention of litter and recycling. This educational effort assists the county in protecting the surface water by preventing litter and by emphasizing the benefits of recycling. The following information describes the public education efforts of Solid Waste Management Program that will help in reducing impacts to surface water from litter and trash.

The Solid Waste Management Program supports school recycling efforts through the Schools County Recycling Action Program. Solid Waste Management Program publishes a catalog (the SCRAPbook) describing the many educational opportunities available to teachers and students through the Solid Waste Management Program and the Clean Fairfax Council. This catalog allows teachers to utilize the county's educational resources and work them into their lesson plans if desired. Solid Waste Management Program, in conjunction with Clean Fairfax Council, awarded $6000 in grant funding to 12 Fairfax County Public School classes to fund school environmental projects.

America Recycles Day is always held on November 15 and is promoted by the Solid Waste Management Program in county schools. To recognize America Recycles Day, the Solid Waste Management Program distributes information about the benefits of recycling to all Fairfax County Public School students (about 150,000) which includes a form to enter the America Recycles contest where prizes are awarded at the national, regional and county level. This year, a Fairfax County Public Schools student won the regional grand prize of a $300 gift certificate to a local bicycle store and a $500 grant to the school for an environmental project. Solid Waste Management Program also hosted its third annual Community Recycling Roadshow at Herndon High School where electronics, shoes, bicycles, cell phones, rechargeable batteries, and eyeglasses were collected either for recycling or reuse. Over 500 residents participated in this one-day event held on November 5

In 2005, the Solid Waste Management Program strengthened its relationship with the Fairfax County Public Schools by partnering with Chantilly Academy and Edison Academy to support two computer and electronic recycling events held in April and September, 2005, respectively. At these two events over 1,000 residents were provided with recycling services as well and educational material about litter prevention and recycling.

Clean Fairfax Council provides information on litter prevention and recycling directly to students in the Fairfax County Public Schools. Each year, the Clean Fairfax Council makes grade-specific presentations in the schools on issues including litter control, recycling, graffiti and water pollution caused in part by litter. Twice during the year, the Clean Fairfax Council offers a program called "Critters Don't Need Litter" which describes the impact of roadside litter. The Clean Fairfax Council distributed litter/recycling newsletters to all fifth- and seventh-grade students. Each year, the Clean Fairfax Council sponsors the Fairfax County Earth Day/Arbor Day celebration and participates in two county events: Fall for Fairfax and Celebrate Fairfax. Additionally, the Clean Fairfax Council sponsors two countywide cleanups (spring and fall) which involve approximately 20,000 volunteers.

The Fairfax County Solid Waste Management Program worked to change the county's solid waste ordinance to require that privately-owned refuse and recycling collection companies collect additional recyclables at the curb. Plastic bottles and jugs, mixed paper and flattened cardboard are now required to

be collected for recycling at the curb. Advertisements about this change appear in all 12 editions of the *Times Community News* distributed in Fairfax County and the Fairfax Weekly of the *Washington Post*. This information was also developed into a Public Service Announcement that is continually run on Fairfax County's television channel, channel 16.

A rechargeable battery recycling program was initiated in 2005 through which rechargeable batteries can be recycled at any of the Fairfax County Board of Supervisors offices.

The Solid Waste Management Program continued its innovative and productive partnership with ServiceSource to recycle used computers. ServiceSource is a non-profit that employs people with disabilities to disassemble and recycle computers. The program has co-sponsored and advertised several community collection events in partnership with nearly a dozen schools, businesses, and non-profit organizations. Advertisements were placed in local newspapers and distributed through the school system. Three highly successful computer recycling events were held in 2005. Approximately 1,000 tons of computers have been recycled since the program's inception in 2002.

Solid Waste Management Program staff made presentations and sent information to various community groups and schools. Citizens were able to learn more about recycling at booths at various community fairs and festivals including Celebrate Fairfax, Fall for Fairfax, Earth Day/Arbor Day, and at several events sponsored by individual members of the Fairfax County Board of Supervisors. The Solid Waste Management Program won the grand prize at Celebrate Fairfax for its display design; the event draws over 10,000 attendees yearly.

To encourage commercial recycling, the Solid Waste Management Program continues its business recycling awards program. Three businesses won awards. In addition to presenting the awards to the recipients at Earth Day/Arbor Day, staff traveled to each of the winner's sites to present the awards at a staff gathering to maximize program exposure.

Internally, the Employee Recycling Committee has continued to thrive. The Employee Recycling Committee has increased its membership and sponsors several events to encourage employees to recycle including contests and seminars for Clean Your Files Day, a countywide Earth Day Expo, and an intranet site with county employee recycling information.

The Recycling Ambassadors program continues with over 120 people volunteering over the course of 2005. The Junior Ambassador program launched last year has continued to grow with over 300 hours of service given by students in 2005.

Fairfax County participated cooperatively with the Metropolitan Washington Council of Governments in a regional recycling radio campaign, which was broadcast over seven radio stations during a two-week period in the fall of 2005.

The Solid Waste Management Program maintains a web site at the following address:

www.fairfaxcounty.gov/dpwes

The site includes information on residential, office, and yard waste recycling; buying recycled content products; and reducing waste. It also provides electronic versions of most division publications. New information about recycling education opportunities and events is constantly being added to the website. An e-newsletter, the *Fairfax Recycler*, is sent to over 500 listserv subscribers with specific information about recycling and county-sponsored environmental events.

Northern Virginia Soil and Water Conservation District

During 2005, the Northern Virginia Soil and Water Conservation District hosted six Green Breakfasts to provide an opportunity for the community to hear about topics of environmental interest and discuss environmental issues. Presentations and discussions included:

- innovative ways to manage stormwater in Stuttgart, Germany
- a film about the low impact development concept and practices, "Reining in the Storm"
- county trails, including the Cross-County Trail, which will help to foster an appreciation for and foster stewardship of stream valleys
- funding for stormwater management, including findings and recommendations of the Stormwater Advisory Committee
- riparian buffers
- the natural resources management plan developed by the Fairfax County Park Authority
- the proposed Tree Action Plan developed by the Tree Commission

The Northern Virginia Soil and Water Conservation District sponsors neighborhood education programs about the dangers of dumping pollutants (e.g., leaves, fertilizer, oil, toxic chemicals, animal waste, trash, etc.) in storm drains. The information and education program culminates with stenciling a message on the face of several drains throughout the neighborhood, or gluing a small plastic marker on the top of drains that reads "No Dumping, Drains to Stream" in both English and Spanish. Northern Virginia Soil and Water Conservation District has the responsibility for guiding storm drain stenciling projects in the county and ensuring they adhere to District and Virginia Department of Transportation standards. The Department of Public Works and Environmental Services and the Northern Virginia Soil and Water Conservation District have forged a partnership whereby the Department of Public Works and Environmental Services purchases storm drain markers and the Northern Virginia Soil and Water Conservation District provides the oversight and guidance for volunteers to carry out the community education and marking projects. In 2005, six projects brought nonpoint source pollution prevention information directly to 6,198 households. Eight hundred and twenty-two drains were labeled with a reminder message. One hundred forty-six volunteers were involved in the implementation of these projects. Three of the projects were in the Difficult Run watershed, one was in the Pohick Creek watershed, and two were in the Accotink Creek watershed.

The Northern Virginia Soil and Water Conservation District provides technical assistance and information to county agencies and citizens for the prevention and control of soil erosion; the management of stormwater; the reduction of nonpoint source pollution in runoff to streams and lakes; and the sound management of our urban, suburban, and agricultural lands.

During 2005, the Northern Virginia Soil and Water Conservation District received 395 public information inquiries and distributed approximately 5,268 brochures and flyers related to the reduction of nonpoint source pollution. The Northern Virginia Soil and Water Conservation District's Water Quality Stewardship Guide is available on its Web page. It contains a great deal of useful information about water and watersheds, water quality, and the sources of nonpoint source pollution, and suggests specific actions citizens can take to improve water quality.

Education resource materials, watershed awareness programs, and an interactive watershed model provided by the Northern Virginia Soil and Water Conservation District are aimed at teachers, youth, schools, Scout groups, and the general public. The watershed model, called an *Enviroscape*, is used to

demonstrate the sources and methods for controlling nonpoint source pollution from various land uses. During 2005, the watershed model was used during 11 presentations to educate 966 people.

The Northern Virginia Soil and Water Conservation District makes presentations at seminars and workshops and provides displays, information and publications for events throughout the year. These cover a wide range of topics, from "Stream Dynamics," "low impact development Site Hydrology Analysis," "Learning about Soils," "Erosion and Sediment Controls on Construction Sites," and "Managing Manure in Your Horse-Keeping Operation," to "Dumping in Storm Drains Pollutes Our Streams," "Responsible Lawn Care," "Dealing with Drainage Problems," and "Cleaning up Trash in the Potomac." During 2005, 20 presentations were made to over 1,300 people in groups ranging from 10 to 150 or more. Exhibits were manned at seven events.

The Northern Virginia Soil and Water Conservation District provided technical advice to 598 homeowners and homeowner associations, including 94 on-site visits to advise on erosion, drainage, pond management and other environmental problems.

The Northern Virginia Soil and Water Conservation District provides administrative, technical, and educational support to citizen-based watershed groups, including the Difficult Run Community Conservancy, Fairfax Trails and Streams, Friends of Sugarland Run, Friends of Cub Run, and Friends of Little Rocky Run.

The Northern Virginia Soil and Water Conservation District, The Department of Public Works and Environmental Services, Audubon Naturalist Society, and several 'Friends of' groups meet bi-monthly as the "Fairfax Watershed Network." Their purpose is to exchange information, to promote community-based watershed stewardship groups, and to provide support. In 2005 a major project was to promote the annual Potomac River cleanup, which is coordinated regionally by the Alice Ferguson Foundation. The Board of Supervisors declared April 2 as "Clean Streams Day" and the Chairman signed the Trash Treaty, agreeing that Fairfax County, along with neighboring jurisdictions, will work toward eliminating trash that is carried to the Potomac River. In Fairfax County, 83 sites were registered for the April cleanup. Forty tons of trash were picked up by 1,500 volunteers. This included 281 bags of trash that could have been recycled.

The Northern Virginia Soil and Water Conservation District sponsored teams from James Madison High School and Hidden Pond Nature Center in the Virginia Envirothon, a natural resources competition for high school students. Participants learn about stewardship and management concepts and work to solve real and hypothetical environmental problems. The program is field-oriented and gives students an opportunity to work with natural resource professionals in the areas of aquatics, forestry, soils, and wildlife.

The Northern Virginia Soil and Water Conservation District partnered with the Department of Public Works and Environmental Services to assist with training middle school science teachers to implement the new science curriculum that has an emphasis on watershed education. The training program is funded by the Bay Watershed Education and Training grant program. More than 100 teachers were trained.

The Northern Virginia Soil and Water Conservation District's annual seedling program emphasizes the role of vegetation in preventing erosion, conserving energy, and decreasing and filtering stormwater runoff. Besides being aesthetically pleasing, trees and shrubs, particularly those planted in and near riparian areas, help to protect stream water quality and channel stability. In 2005, 6,061 tree and shrub native plant seedlings, mostly in 400 packages of 14 seedlings each, were sold to citizens at a small cost.

The Northern Virginia Soil and Water Conservation District continues to expand its reach with a home page that is part of Fairfax County's Internet site. The site gets an average of more than 6,000 visitors each month and is credited with increasing the county's environmental presence on the Web. The most popular pages are those with information about soils and drainage (*You and Your Land* Homeowner's Guide), followed by science fair information, water quality stewardship, the seedling sale, volunteer stream monitoring, and building an amenity pond. Northern Virginia Soil and Water Conservation District's Web address is as follows:

www.fairfaxcounty.gov/nvswcd

The Northern Virginia Soil and Water Conservation District published and circulated *Conservation Currents*, an eight-page newsletter, four times in 2005. In addition to the printed newsletter, the Northern Virginia Soil and Water Conservation District distributes the newsletter via e-mail upon request and posts the articles on its Web page. Topics relevant to stormwater included:

- Citizen *E. coli* monitoring program
- Stormwater retrofit of the parking lot at Providence District office
- Fall lawn care and environmentally-friendly weed-free lawns
- No-till agriculture reduces soil erosion and improves soil
- Reducing soil erosion problems in horse-keeping operations
- Proper disposal of household hazardous waste
- Storm drain marking and pollution prevention education
- Solving pond problems
- Announcements: Clean Streams Workshop; publication of a Rain Garden Guide; Northern Virginia Watershed Institute (Center for Watershed Protection)
- Protecting a pond during development
- Heavy metal pollution in runoff

Newsletters and calendars are sent to about 900 people and forwarded to hundreds more, a very effective way to reach large numbers of existing and potential monitors. Several newsletters are available for downloading from the monitoring websites. The monitoring Web addresses are below:

www.fairfaxcounty.gov/nvswcd/monitoring.htm

http://mason.gmu.edu/~jcornell/StreamMonitoring/index.html

In 2005, partners included: George Mason University's New Century College, Arlington County's Environmental Services Department, Reston Association, Stormwater Planning Division—Department of Public Works and Environmental Services, Lake Accotink Park—Upper Accotink Creek Watershed Education Program, Riverbend Park, National Park Service—George Washington Memorial Parkway, Alexandria Seaport Foundation, Eleanor C. Lawrence Park, George Mason University's Hemlock Overlook Center for Outdoor Education, and Hidden Oaks Nature Center. The Stream Monitoring Program worked with the following schools: Woodson High School, G.C. Marshall High School, Fairfax High School, Robinson High School, Westfields High School, Thomas Jefferson School for Science and Technology, and GW Community School, South County High School.

The Northern Virginia Soil and Water Conservation District continues to distribute *A Volunteer Partnership, Working with Citizens to Improve our Streams.* The brochure was developed by the Department of Public Works and Environmental Services and Northern Virginia Soil and Water

Conservation District to inform citizens about the Stream Protection Strategy study and ways they can become involved through steam monitoring and Adopt-a-Stream programs.

More than 4,500 Earth Team volunteer hours were logged by citizens doing stream monitoring, tree plantings, and stream cleanups Earth Team is a United States Department of Agriculture – Natural Resources Conservation Service program coordinated by the Northern Virginia Soil and Water Conservation District.

The Northern Virginia Soil and Water Conservation District assisted with the Occoquan Water Trail project, overseen by the Northern Virginia Regional Park Authority. More than 15 agency and organizational partners worked on the project. The project will result in maps showing access points along the Occoquan, educational signs, and water trail markers.

Fairfax County Park Authority

As in past years, Fairfax County Park Authority sponsored and organized lake and stabilization projects on Difficult Run and two of our lake front parks. These day-long volunteer events draw many citizens into the creeks, lakes and woods, providing excellent learning opportunities as well as removing more than six dumpster loads of trash in 2005.

The Park Authority also partnered with the Virginia Department of Forestry, the Northern Virginia Soil and Water Conservation District and the Virginia Department of Game and Inland Fisheries to conduct a stream stabilization workshop for staff from numerous agencies and citizen volunteers on Accotink Creek at Americana Park. Lake Accotink Park also maintains two rain gardens to enhance water quality and educate citizens. Staff developed educational signs for use along the Cross County Trail and at Lake Accotink Park and elsewhere promoting the benefits of establishing vegetated buffers along bodies of water.

Several Resource Managers participate in the county stream quality monitoring program directly, as well as through training and sponsoring citizen volunteer monitors. Huntley Meadows staff also held the annual Wetlands Awareness Day to educate citizens on the importance of maintaining healthy wetlands.

Fairfax ReLeaf

Through Fairfax ReLeaf, 379 volunteers planted 806 trees this year. Sprint/Nextel worked with ReLeaf to plant vegetation around a stormwater pond in the Herndon/Dulles Toll Road area. ReLeaf participated with Earth Sangha in the planting of three riparian sites in the spring of 2005 and three in the fall of 2005. ReLeaf volunteers also spent 437 hours on invasive plant removal from 12 sites.

Virginia Department of Forestry

The Virginia Department of Forestry worked with volunteers from organizations such as the Chesapeake Bay Foundation, Difficult Run Community Conservancy, Potomac Conservancy, and Eagle Scouts in 2004 to plant approximately 3,500 seedlings within Fairfax County. The Virginia Department of Forestry continues to plant riparian buffers in watersheds throughout the county and is supporting the Department of Public Works and Environmental Services with their riparian project initiative. The Virginia

Department of Forestry assisted an Eagle Scout with a stormwater management project in the Rocky Run watershed. The project resulted in erosion reduction along a 200-foot drainage-way next to New Braddock Road. A buffer of shrubs was planted along the drainage-way to stabilize the embankment and step pools were constructed to slow the water.

The Virginia Department of Forestry works with Fairfax County in conducting watershed/water quality presentations on a regular basis to students, homeowners, professionals, and organizations. Volunteers are educated and enlisted to plant riparian buffers. Rain garden presentations and workshops are given for garden clubs, homeowner associations, and professionals. Brochures and exhibits have been developed for public outreach at festivals, Arbor Day, and other environmental celebrations. There were 30 such activities presented by the Virginia Department of Forestry in 2004.

The Virginia Department of Forestry worked with Fairfax County Park Authority's Lake Accotink Park to construct a crib wall to reduce bank erosion along a 30-foot section of stream bank below the Lake Accotink dam. The Virginia Department of Forestry has also developed and published a Rain Garden Guide for citizens and worked with homeowners to develop rain gardens on their property as additional stormwater retention.

The Virginia Department of Forestry also assists Fairfax County with the Agricultural and Forestal District Program. This program provides tax incentives for landowners with 20 acres or more of land in agricultural and forest management. Stream management zones are particularly noted on these plans and efforts are made to include buffers from the agricultural uses. The protection of forest cover and water quality are both promoted in the Agricultural and Forestal management plans. Sixteen such plans were completed this year.

Reston Association

The Reston Association, the homeowners association for the large, planned community of Reston, has an active watershed and lakes management program that focuses on the monitoring and improvement of water quality in its streams, lakes and ponds; public education; and innovative approaches to erosion and drainage control. Reston Association helps educate and engage members of the community in watershed improvements efforts. Accomplishments and efforts in 2005 related to stormwater management and watershed improvements include:

- Continued work with Northern Virginia Stream Restoration, L.C., the Virginia Department of Environmental Quality, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the Environmental Protection Agency and Wetlands Studies and Solutions Inc. to establish the groundwork for developing the Reston Stream Restoration Banking Instrument.
- Continued distribution and promotion of the "Help Our Watersheds – Living in the Potomac and Chesapeake Bay Watershed" brochure, which was funded through the Chesapeake Bay License Plate Grant. The brochure covers several topics: controlling runoff, preventing and managing erosion, improving water quality with "bayscaping", and helpful local resources. This brochure and other best management practices are advocated on the Reston Association website www.reston.org.
- Continuation of the volunteer stream monitoring program in conjunction with the Northern Virginia Soil and Water Conservation, and the Virginia Save Our Streams program. There are currently 12 sites monitored in Reston with 15 volunteers participating.
- Monitoring of water quality in Reston's four lakes (Anne, Newport, Thoreau, and Audubon) and two ponds (Bright and Butler) from April through September. The annual lakes report provided data analysis and recommendations.

- Commencement of algaecide treatments on Lake Anne for treatment of the persistent blue-green algae bloom problems.
- Staff's continuation of the goose management program in Reston to protect water quality of the lakes.
- Inspection of Reston's four primary lake spillways in late 2005. In addition to the dive inspections, the riser stems and gates were cleaned and greased and the spillway gates on Lake Thoreau Dam were replaced.
- Installation and maintenance of several shoreline stabilization and stream restoration projects using biologs, erosion cloth, and native plantings in 2005. Staff worked with several clusters and individual homeowners on shoreline stabilization projects. Reston Association continues to promote natural shoreline stabilization and encourages the use of more environmentally sensitive materials for bulkheads and docks as opposed to conventional pressure-treated timber.
- Participation of Reston Association staff and volunteers in the 17th Annual Potomac Watershed Cleanup by hosting numerous cleanup sites along Snakeden Branch, The Glade, and Colvin Run tributaries. Reston Association staff members and 39 volunteers removed 100 bags of trash and about 350 pounds of loose debris. Additional items of interest were collected such as a bird cage, mattresses, bikes, and various car parts and construction supplies.

Northern Virginia Regional Commission

Virginia Coastal Program: Regional Pollution Prevention Outreach Strategy

The Northern Virginia Regional Commission, in coordination with Fairfax County and seven other localities, launched a stormwater education radio campaign during June and July of 2005. A 60-second radio spot was aired on nine radio stations for four weeks. The spot was also aired in Spanish, and it targeted three pollution-causing behaviors: excessive use of fertilizer and improper disposal of pet waste and used motor oil.

The campaign resulted in the airing of a total of 895 ads and public service announcements. Free Web banners, public service announcements and brochure distribution were negotiated by the media buyer as part of a paid campaign. The result of the campaign was that the ad was heard by 70 percent of the target audience an average of 12 times.

Public education is a required component of nonstructural best management practices for stormwater and other water quality programs, such as Total Maximum Daily Loads. The Northern Virginia Regional Commission continues to coordinate with the Environmental Protection Agency Chesapeake Bay Program's media strategy to look for opportunities to reinforce messages and strengthen stormwater education in the region.

Citizens' Erosion and Sediment Control and Watershed Tools Workshop

Fairfax County was a participant in a regional workshop by the Northern Virginia Regional Commission to train citizens to identify and report erosion and sediment control problems during land disturbing activities. A handbook for citizens was included in the project.

The workshop also introduced citizens to a range of natural resource protection tools and programs. These include the green infrastructure design network, watershed planning, conservation design, better site design, low impact development, and green building.

Chesapeake Bay Support

Fairfax County staff members have been assisting in guiding local policies and programs at the Federal Chesapeake Bay Program through their activity and support of the Urban Nonpoint Source Workgroup,

which a staff member of the Northern Virginia Regional Commission chairs. Activities include participating on a conference planning subgroup of the workgroup. This subgroup is planning a second Urban Summit Conference to be sponsored by the Chesapeake Bay Program at the request of the Bay Programs Implementation Committee. Fairfax staff members continue to be active in a workgroup initiative to look at the science of biofiltration best management practices and all their derivates and the implication to local government operations and pollution credit. Some of the more specific concerns being addressed are the application or miss-application of the Chesapeake Bay Watershed Model for the development of Maryland local Total Maximum Daily Loads; the potential for a Bay Total Maximum Daily Load and how the Chesapeake Bay model relates to local water quality impairment issues; and a belief that the tidal Potomac Total Maximum Daily Load for nutrients and sediment will be based entirely upon the Bay Agreement derived Tributary Strategies with the potential for nutrient limits based on a local government political subdivision.

Low Impact Development

"Reining in the Storm – One Building at a Time," Northern Virginia Regional Commission's 30-minute digital film presenting the basics of low impact development, continues to be aired on cable television stations and distributed around Virginia by The Department of Conservation and Recreation and across the country by the Environmental Protection Agency. Northern Virginia Regional Commission was asked to present a paper regarding the use of film as a medium for reaching certain audiences. "Selling Low Impact Development: Audiences, Messages and Media" was presented at the National Non-point Source Pollution Outreach Conference in Chicago in October, 2005. The Northern Virginia Regional Commission staff members continue to be invited to speak at presentations of the film and meetings to present the basics of low impact development to developers, engineers, watershed organizations, and citizens groups.

Citizen's Guide to Tree Planting Projects

With funds from the Virginia Department of Forestry, Urban and Community Forestry Assistance, Northern Virginia Regional Commission produced an updated version of its publication, *A Citizen's Guide to Tree Planting Projects in Northern Virginia.* The guide is designed to improve public understanding of the benefits of tree cover, promote volunteerism, encourage planting of trees in urban areas, and assist individuals and organizations in accessing technical resources needed for sustainable tree-planting projects in Northern Virginia.

Private Owner's Guide to best management practices Maintenance and Rain Gardens: Homeowners Guide, Workshops And Demonstration

The update of Northern Virginia Regional Commission's publication, "Maintaining Your Best Management Practices – A guidebook for private owners and operators in Northern Virginia" was initiated in partnership with Fairfax County in late 2005. The updated guide will include a wider range of low impact development practices that are increasingly being constructed on private lots and expected to be maintained by the homeowner. As part of the project Northern Virginia Regional Commission is partnering with the Community Appearance Alliance to foster the use of rain gardens as an attractive addition to the landscape that confers water quality benefits as well. Two forums (one for homeowners and one for the trades), a demonstration rain garden, and a do-it-yourself rain garden manual for homeowners are included in the project.

VII. Financial Efforts

As identified throughout the report, Fairfax County's stormwater program is accomplished through partnerships of many private and public entities. The following captures some of the major contributors, whose primary mission is stormwater management.

Department of Public Works and Environmental Services

The total funding associated with stormwater management for calendar year 2005 was approximately $15,901,000. The Stormwater Planning Division and the Maintenance and Stormwater Management Division operating funding were $1,298,000 and $5,798,000 respectively. The capital stormwater funding for stormwater public works construction, storm drainage bond construction, storm drainage Pro Rata Share and stormwater program requirements was $8,805,000.

Other costs not directly associated with stormwater management but of importance to the stream environment are incurred by the Division of Solid Waste Disposal and Resource Recovery, The Department of Public Works and Environmental Services. This division is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road in Lorton, Virginia, and the I-66 Transfer Station Landfill (closed), located at 4618 West Ox Road in Fairfax, Virginia. Annual Virginia Pollution Discharge Elimination System expenditures are estimated to be $150,000 for the I-95 facility and $30,000 for the I-66 facility (closed). In addition, this division operates the Household Hazardous Waste program, which costs approximately $500,000 annually.

In addition, in April the county's Board of Supervisors authorized one penny of the real estate tax to be dedicated to the stormwater management program for Fiscal Year 2006, totaling $17.9 million dollars in addition to existing programs. The one cent of the real estate tax is currently in the county executive's proposed budget for Fiscal Year 2007. The continuation of the one cent of the real estate tax dedication will provide program stability, accommodate program growth, and provide continuity across fiscal years.

Department of Planning and Zoning

There are currently four full-time professional positions in the Environment and Development Review Branch, the Department of Planning and Zoning, devoted to environmental planning. Additional staff resources from other the Department of Planning and Zoning branches or divisions will occasionally address water quality issues. The environmental planning function in the Department of Planning and Zoning was funded at approximately $270,000 in Fiscal Year 2005. A similar budget allocation was established for Fiscal Year 2006.

Northern Virginia Regional Commission

The Northern Virginia Regional Commission estimated budget expenditures related to stormwater management in Fairfax County include: Four Mile Run Program (Fairfax County share) $12,925 for Fiscal Year 2005 and $14,982 for Fiscal Year 2006; Occoquan Nonpoint Pollution Management Program (Fairfax County share) $44,069 for Fiscal Year 2005 and $42,301 for Fiscal Year 2006; update to the best management practices Handbook $46,000 for Fiscal Year 2006; Water Quality Tools and Training (August, 2004 to August, 2005) grant amount $13,259 and match amount $14,443; 2004 Coastal Resources Management, Technical Assistance (October, 2004 to September, 2005) grant amount $27,500 and match amount $43,555; 2005 Coastal Resources Management, low impact development best management practices Handbook for Private Owners and Rain Garden Workshop (October, 2005 to September, 2006) grant amount $54,266 and match amount $54,266; and A Citizen's Guide to Tree Planting in Northern Virginia (June, 2005 to May, 2006) grant amount $6,750 and match amount $7,066.

List of Appendices

Department of Public Works and Environmental Services
12000 Government Center Parkway, Fairfax, Virginia 22035