

2004 Stormwater Management Status Report Fairfax County, Virginia



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2004 Stormwater Management Status Report
on the
Municipal Separate Storm Sewer System (MS4)
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 (SWPD)
Department of Public Works and Environmental Services (DPWES)
Fairfax County, Virginia
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Foreword

The mission of Fairfax County's Stormwater Management (STW) business area is to develop and maintain comprehensive watershed and infrastructure management programs to protect property, to promote health and safety, to enhance the quality of life, and to preserve and improve the environment for the benefit of the public—"Protecting our land and our water." The STW business area is comprised of the Stormwater Planning Division and the Maintenance and Stormwater Management Division of the Department of Public Works and Environmental Services.

Stormwater regulatory challenges faced by the county include the requirements under the Chesapeake Bay Preservation Ordinance, VPDES/MS4 permitting requirements, state and federal impaired waters listing, nutrient and sediment reduction goals under the Potomac River Tributary Strategy, and state dam regulations. The county also responds to complaints by residents concerning flooding of roads and property.

Some of the problems facing Fairfax County streams include loss of riparian (streamside) vegetation buffers, changes in flow caused by increased impervious surfaces and altered hydrology, and water quality degradation including increased sediment and nutrient loads from polluted runoff. These problems result in stream bank erosion and loss of stability, flooding, and degraded habitat and biological communities.

This report summarizes the efforts of Fairfax County's STW business area and Department of Public Works and Environmental Services (DPWES) as well the county's Department of Health (HD), Fire & Rescue Department (FRD), Department of Planning and Zoning (DPZ); Fairfax County Park Authority (FCPA); Fairfax County Public Schools (FCPS); Northern Virginia Soil and Water Conservation District (NVSWCD), Virginia Department of Forestry (VDOF), Environmental Horticulture Division (EHD) of Fairfax County Extension Service, Northern Virginia Regional Commission (NVRC), and others. These organizations have a common goal of improving water quality through a variety of activities centering on the common theme of improving the environment by mitigating the negative effects to Fairfax County and the Chesapeake Bay of stormwater runoff associated with impervious areas. This report contains details on the accomplishments of the county's comprehensive stormwater management program and the efforts of all the organizations in: 1) Protecting property from damage; 2) Managing the quantity of stormwater runoff; 3) Monitoring and managing the quality of stormwater runoff; and 4) Educating and involving the residents and businesses of the county, not only in environmental friendly ways to deal with stormwater, but in its adverse effects on streams.

Through these accomplishments, the county will achieve the long-term goals of its comprehensive stormwater management program, thereby protecting streams such as the tributary to Difficult Run found on the cover of this report. By improving the integrity of the waterways throughout Fairfax County, we will be simultaneously improving the quality of water flowing into the Occoquan Reservoir and the Potomac River—sources of drinking water for more than one million Fairfax County residents—and then into the Chesapeake Bay.

In January, 2004, Fairfax County was again recognized as a Gold Award recipient by the Chesapeake Bay Program for its innovative stormwater management and watershed planning initiatives. In addition, the National Association of Counties presented Fairfax County with their 2004 Achievement Award for the county's innovative Watershed Management Program.

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Introduction

This report focuses on the state of stormwater management in Fairfax County, of which all efforts support the county's Municipal Separate Storm Sewer System (MS4) operation, retrofit, and maintenance efforts.

Approximately seventeen percent of Fairfax County's land is covered in impervious surfaces, which do not allow water to permeate into the ground, creating stormwater runoff. As the amount of impervious surface increases, so does the amount of stormwater runoff. If the quantity is not properly managed, runoff will cause damage to downstream waterbodies, existing infrastructure, and personal property through significant flooding and erosion. As runoff flows overland it picks up non-point source pollutants including sediment, pesticides, fertilizers, litter, motor oil, and pet waste. These pollutants are then either deposited directly into the county's 980 miles of perennial streams through the storm sewer network or indirectly through stormwater management ponds, where some pollutants have time to settle out of suspension and the stormwater volume is controlled and more slowly released into the streams. Uncontrolled stormwater runoff and non-point source pollution are the leading causes of water quality impairments in Fairfax County's streams.

Fairfax County's waterways drain either to Bull Run and the Occoquan Reservoir or the Potomac River, which are sources of drinking water for over a million Northern Virginia residents. Anything that enters a storm drain is discharged, untreated, into the same waterbodies we use for swimming, fishing, and providing drinking water. Based on results from the 2001 Fairfax County Stream Protection Strategy Baseline Study on the biological and physical conditions of county streams, over 70 percent of the 980 miles of the county's streams are in fair to very poor condition.

Fairfax County Government is responsible for compliance with federal and state regulations regarding water quality, and for providing stormwater management facilities, pipes, and other structures and services within its jurisdiction. The NPDES permit requires the county to maintain a comprehensive stormwater management program. This may entail the retrofit of existing stormwater facilities and the construction of new ones. The NPDES permit also requires erosion and sediment controls at construction sites and maintenance of existing stormwater management facilities. Neither the federal nor the state government provides funding directly for meeting these mandates.

The county is implementing a number of capital improvements and other strategies to mitigate the problems associated with managing stormwater quantity and quality. Watershed management plans are being written and implemented to protect and restore habitats, infrastructure is being maintained, and education and outreach programs are ongoing.

Fairfax County has been a participant in the NPDES Phase I permit program since the early 1990s, having conducted extensive countywide water quality monitoring as part of the Part I and Part II permit application process. The first permit was received in 1997. The reapplication process for an additional five years was conducted in 2001 and a second permit was issued in 2002. The existing permit comes up for renewal in 2007. Over these 10-plus years many positive changes have taken place in the county's comprehensive stormwater management program, which at the onset was primarily focused on water quality monitoring.

The first change, in 1998, was the funding of the Stream Protection Strategy (SPS) Baseline Study, which included 114 principal monitoring sites in 30 watersheds over 400 square miles of land. The study included a detailed assessment of the integrity of the biological communities (benthic macroinvertebrates and fish) and an evaluation of stream features (riparian and in-stream habitats). The county has long recognized the need to protect the living environment of the stream valleys and the SPS study provided

2004 STW

valuable information defining the state of our streams, both biological and physical. Earlier stream evaluation studies had focused solely on erosion, conveyance of water downstream, and flood control.

The next phase was protecting the county's stream valleys—a response to the 2001 State amendments to the Bay regulations, revising the method used to assign Resource Protection Areas (RPA) to water bodies by using perennial flow. Perennial stream identification protocols were developed by the county and approved by the state, and the county embarked on a survey of the headwaters of streams to designate perennial reaches upstream of existing RPAs. The overall length of recognized perennial streams in the County increased from over 600 miles to over 900 miles. These changes were adopted by the Board of Supervisors in November 2003 as amendments to Fairfax County's Chesapeake Bay Preservation Ordinances.

The development of Watershed Management Plans for all 30 watersheds is the next step in the county's watershed planning program. Data from the most recently completed countywide Stream Physical Assessment (SPA) of stream conditions, in combination with the SPS study and other watershed and stream monitoring information, is being used to evaluate the impact of watershed changes on stream quality. The stream assessment includes an evaluation of overall stream habitat and physical conditions and descriptions of features such as stream crossings, stormwater drainage pipes, utility crossings, streambank erosion, deficient buffers, illegal dump sites, and stream obstructions. Citizen input is an important component to each watershed management plan. The county has developed a collaborative public involvement campaign, which involves engaging the community and hosting public meetings to develop solutions to the problems identified as part of the watershed plan development process.

Fairfax County's comprehensive stormwater management program focuses on seven major areas to meet the federal and state regulations and to comply with the county's VPDES Permit 0088587:

- I. Watershed Management Planning
- II. Capital Improvements and Infrastructure Retrofit
- III. Maintenance and Operation
- IV. Strategic Initiatives, Policy, Management, and Emergency Response
- V. Monitoring and Assessment
- VI. Public Outreach and Education
- VII. Additional Permit Reporting Requirements

This report will also satisfy the 2004 annual report requirements of the county's VPDES permit on the Municipal Separate Storm Sewer System (MS4) in Fairfax County, covering the period January 1, 2004 through December 31, 2004, and is the eighth annual report. It was prepared in compliance with the Commonwealth of Virginia's Department of Conservation and Recreation, Virginia Pollutant Discharge Elimination System (VPDES) Permit No. 0088587, section I.C.4, (*Appendix A*), reissued to Fairfax County on January 24, 2002, for a second five years. The permit is in compliance with the provisions of the Clean Water Act as amended and pursuant to the State Water Control Law and regulations adopted pursuant thereto. The permit authorizes all existing and new stormwater point source discharges to waters of the state from those portions of the MS4 owned or operated by Fairfax County, except as prohibited under Part I.A.1.b of the permit (non-stormwater and stormwater discharges associated with industrial activity and materials from a spill).

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2004 Stormwater Management Status Report on the Municipal Separate Storm Sewer System (MS4) for Fairfax County, Virginia

I. Watershed Management Planning

Fairfax County's Watershed Management Program includes conformance to regulations, development and enforcement of policies, watershed planning, establishment of engineering design criteria, safety aspects, land rights and restrictions, performance, and maintainability. The county recognizes that alternatives to achieving water quality improvement goals have to be addressed continuously in order to provide environmentally sensitive and more cost effective programs and projects for its citizenry. The primary objective of the Stormwater Planning Division (SWPD) is to develop and implement comprehensive stormwater management plans and to provide input to current countywide policies affecting ecosystem and stormwater management issues. The SWPD promotes policies to improve and protect the quality of life and support environmental goals of the county. It is working to develop a framework that will address the overall environmental goals and objectives of the county and also ensure a link between regulations and project implementation through the planning, design, construction, and maintenance phases. The county's structural stormwater control program involves the collection, detention, and control of stormwater discharge with the objective of meeting the overall goal of reducing phosphorous discharge levels by 40 percent (50 percent in the Water Supply Protection Overlay District). A key requirement for controlling stormwater discharge is to limit post-development runoff to that which does not exceed pre-development runoff rates. This is accomplished through a variety of means and Best Management Practices (BMPs), including on-site detention and regional ponds, ponds incorporating water quality treatment, PL-566 lakes, underground chambers, percolation trenches, roof top storage, and other techniques. The county is pursuing the adoption of Low Impact Development (LID) techniques as a new approach to managing stormwater runoff closer to the source and restoring pre-development hydrological conditions.

Watershed Management Plans

The Stormwater Planning Division of DPWES is leading the effort to develop watershed management plans for all 30 adopted watersheds within the county. Watershed plan development for entire watersheds, sub-watersheds, and/or groupings of watersheds is anticipated to be completed over a three-to five-year period. The watershed plans are expected to provide an assessment of stormwater conditions, encourage public involvement, and prioritize recommendations for implementation within each watershed. There are several goals for the development of watershed management plans. These goals 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 are expected to include at least 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 Program; and 6) Documentation of watershed management plan. The status of current watershed planning projects in 2004 is as follows:

Cameron Run

The Cameron Run watershed management planning process was initiated in 2003. A steering committee, comprised of approximately fifteen watershed residents representing diverse interests, was formed to assist in developing the plan. The committee has met for the past eighteen months to identify problems with degraded streams and other natural resources in Cameron Run and consider a number of alternative solutions for protecting and restoring these resources. An issue scoping forum was held in June, 2004, to gain input from watershed residents on the types and locations of watershed problems. A tour of the Cameron Run watershed was conducted for interested citizens in July, 2004. Water quality Best Management Practices (BMPs) implemented by the Lake Barcroft Watershed Improvement District (LBWID) in the Tripps Run subwatershed were visited. A green roof and biofiltration rain garden constructed at Yorktowne Square Condominiums in the Holmes Run subwatershed were also part of the tour.

A community forum was held in October, 2004, to educate the public on the condition of the watershed and obtain further input on potential solutions to identified problems. Fairfax County has entered into a cooperative agreement with the Corps of Engineers and City of Alexandria to complete a more comprehensive watershed study that includes portions of Cameron Run outside the county. This will place the county in a favorable position to leverage federal government funds in the future for project implementation in the Cameron Run watershed. A draft watershed management plan is expected to be available for public comment by June, 2005, and a final plan completed by fall of 2005.

Cub Run/Bull Run Watershed

The Cub Run watershed management planning process began in 2004. The watershed plan is being developed with guidance from a steering 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. One public forum and watershed tour has been held for residents living, working, and recreating in the watershed to collect information about problem areas and raise awareness about issues facing Cub Run. The final watershed management plan for Cub Run is scheduled to be complete by early 2006.

Difficult Run Watershed

The Difficult Run watershed management planning process began in 2004 with the formation of a steering committee comprised of approximately 20 stakeholders representing diverse groups and interests in the watershed. The committee has attended monthly meetings and hosted an issue scoping forum to help identify problems in the watershed such as flooding, stream erosion, and poor water quality. Additionally, a watershed tour was conducted for those committee members who wanted to assess stream quality in Difficult Run first-hand. The committee is working with the county to coordinate a second public forum to educate residents living, working, and recreating in the watershed about watershed basics in order to prepare them to provide informed feedback on the future draft watershed management plan. The committee is simultaneously identifying areas for remediation and researching solutions such as implementing low impact development to the problems facing the watershed. The next step for the committee will be to work with the county and consultants to draft the watershed management plan for

Difficult Run and host two public forums to gain important feedback on the plan from residents. The final watershed management plan is slated for completion by early 2006.

Little Hunting Creek Watershed

The Little Hunting Creek watershed management planning process began in 2003. The watershed plan was developed with guidance from a steering committee comprised of approximately fifteen 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 nineteen projects are now under the design and implementation phase.

Additional projects and other recommendations of the plan will be initiated and funded through the annual budget process. The total cost of complete implementation of the plan over 25 years is estimated at \$30.4 million. Of that amount, \$26.6 million is attributed to project implementation costs and \$3.8 million is for development of policies and subsequent administration of newly adopted policies.

Pimmit Run and Middle Potomac Watersheds

The Pimmit Run and Middle Potomac watershed management plan encompasses five separate watersheds: Pimmit Run, Bull Neck Run, Scott's Run, Dead Run, and Turkey Run. The 18-month process began in 2004 with the formation of a steering committee comprised of approximately 20 stakeholders representing diverse backgrounds and interests in these five watersheds. The committee has attended three meetings and recently hosted one public issue forum to help identify the key problems in each watershed such as flooding, stream erosion, and poor water quality. Once these key issues are identified, the committee and consultants will begin the process of determining means to address these problems. The committee is working with the county to coordinate an informative watershed walk and a second public forum for this spring. It will educate residents living, working, and recreating in the watershed in basic watershed ecology in order to prepare them to provide informed feedback on the future draft watershed management plan. The next step for the committee will be to work with the county and consultants to draft the watershed management plan for Pimmit Run and Middle Potomac watersheds and host another public forum to gain important feedback on the plan from residents. The final watershed management plan is slated for completion in spring, 2006.

Popes Head Watershed

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. In addition, three public forums have been held for residents living, working, and recreating in the watershed. The first public meeting, the issues scoping forum held in January of 2004, collected information about problem areas in the watershed and raised awareness about issues facing Popes Head Creek. In March, 2004, the second public forum was the community watershed forum, which was aimed at disseminating information related to the issues identified in the watershed and facilitated discussions with watershed residents. The third public meeting, the watershed draft plan workshop, was held in October, 2004 and gave the residents an opportunity to review and provide feedback regarding the draft version of the Popes Head Creek Watershed

Management Plan. A final committee meeting is planned prior to the Final Popes Head Creek Watershed Management Plan public workshop, which will be held in April, 2005, and will focus on final comments and recommendations related to the completion of the watershed plan. The plan is expected to be submitted for approval by the Board of Supervisors sometime in summer 2005. 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. Project cost estimates are currently being developed for all projects proposed in the plan. Projects and other recommendations of the plan will be initiated and funded through the annual budget process. Implementation of the plan will occur over the next 25 years.

Other Watersheds

Other comprehensive watershed management plans anticipated to be started in 2005 include Accotink Creek, Dogue Creek, Little Rocky Run/Johnny Moore Creek, Pohick Creek, and Sugarland Run/Horsepen Creek. Consideration is currently being given to accelerate the development of the remaining plans to complete all county watershed plans by 2008.

II. Capital Improvements and Infrastructure Retrofit

Design and construction of new stormwater projects, retrofitting of watersheds with flood control facilities, rehabilitation and retrofit of county maintained stormwater management facilities, the Stormwater Needs Assessment Program, innovative BMPs in Fairfax County, and other stormwater improvements and retrofits are discussed in this section.

Projects Constructed in 2004

The Stormwater Planning Division (SWPD) and the Maintenance and Stormwater Management Division (MSMD) of DPWES work together closely in the planning, design, and construction of stormwater management-related projects. The following represents a review of the achievements of SWPD and MSMD in the area of project construction along with our emergency response and floodplain management effort over the year 2004. Projects are classified as one of the following types:

Type 1: Individual house flooding mitigation measures through the construction of flood walls, berms, and other flood proofing methods. There were four projects, Bridle Path, Foxstone Drive, Marl Pat Drive, and Tucker Avenue, completed in this category for a total expenditure of \$272,703.

Type 2: Storm drain pipes/channels to alleviate flooding. There were thirteen projects completed in this category in 2004, for a total expenditure of \$374,517. The projects were Burr Oak Way, Edgebrook, Fern Oak, Gladstone Place (Ph I), Griffith Road, Hillbrook Spring, Linda Marie Court, McFarland Drive, Middle Valley, Mount Vee Manor, Prelude Court, Radcliff, and Rosemont.

Type 3: Stream stabilization/drainage pipe installation to protect adjoining homes from eroding streambanks. In 2004 one project was completed in this category, Indian Run (Ph IV), for a cost of \$560,000.

Type 4: Stream stabilization/water quality designs using bio-remediation methods. The Long Branch project was completed in this category in 2004, for a total expenditure of \$343,000.

Type 5: Dam rehabilitation by the improvements of outlet structures, emergency spillways, etc. There were five projects completed for a total of \$309,000. The five projects were Braddock Forest, Centreville Green, Stone Crossing, Sully Station and Little Rocky Run R-3 Sec 29 Pond 2.

Type 6: Regional detention ponds designed to provide flood control and water quality treatment to meet state mandates. There were two regional ponds completed in 2004 with a total expenditure of \$1,700,000. These were Regional Ponds D-47 and R-8.

The following are brief descriptions of each project listed in the order they appear in the type descriptions above.

Type 1
Individual house flooding mitigation measures



Bridle Path flood proofing

Bridle Path

There was no overland relief for the public storm sewer system for this residential property and, as a result, significant house flooding occurred. A floodwall with a two step concrete landing at the basement was installed, alleviating the problem for a cost of \$4,223.

Foxstone Drive

The existing storm sewer system in the vicinity of the property was unable to handle the volume of stormwater generated during a 100-year storm event, causing the inlet behind the property to surcharge. Sufficient overland relief for the water was not available and the basement of 1865 Foxstone Drive in Vienna, VA was flooded regularly. The house was flood proofed by constructing a reinforced concrete wall with brick liner, eight feet tall and 65 feet long, and an overflow swale 75 feet long. The flood proofing wall with associated pump system and overland relief swale alleviated the house flooding. The project was completed in November 2003 for a cost of \$82,000.



Foxstone Drive flood proofing

Type 1 (continued)
Individual house flooding mitigation measures

Marl Pat Drive

There was no overland relief for the public storm sewer system for this residential property and, as a result, significant house flooding has occurred at the property. The project consisted of the installation of a two-step walkout from the basement entrance door and a concrete paved ditch, and grading of the side yard for a cost of \$ 36,470.



Marl Pat Drive, two steps



Tucker Avenue

Tucker Avenue

Flooding of two houses was occurring along a reach of Pimmit Run on Tucker Avenue in McLean, Virginia. On one house, a floodwall was retrofitted to the dwelling's architecture to block off a lower walk-out carport/house entry point that was subject to flooding. Window wells with grading were also included to block floodwater from entering. For the second house, the patio was raised in elevation and additional basement stairs were included to block the flood flows from entering the dwelling. The cost of this project was \$150,000.

Type 2

Storm drain pipes/channels to alleviate flooding

Burr Oak Way

The rear door of the house at 10722 Burr Oak Way in Burke, Virginia, is at an elevation that is subject to flooding during major storm events. A reinforced concrete flood proofing wall, six feet tall and 20 feet long, was constructed by the door and the yard was regraded to provide an overflow swale 120 feet long. The swale between houses 10722 and 10724 conveys the storm drain surcharge to the existing channel behind house 10722. The cost of this project was \$110,000.



Burr Oak Way

Edgebrook

There was no overland relief for the public storm sewer system for this residential property and as a result, significant house flooding has occurred. A grate inlet was replaced with a yard inlet for a cost of \$2,000.

Fern Oak Court

There was no overland relief for the public storm sewer system for this residential property and, as a result, significant house flooding occurred. A two step walkout from the basement entrance door was constructed, raising the areaway wall. The side yard was regraded and an additional yard inlet was installed to pick up the increased stormwater. The cost of the project was \$19,419.



Fern Oak, two steps



Fern Oak, yard inlet

Type 2 (continued)

Storm drain pipes/channels to alleviate flooding

Gladstone Place (Ph I)

The throat opening of the existing inlet limited the capacity of the stormsewer system, causing several residences to flood. The inlet was converted to a headwall opening to increase the capacity. Phase I of this project consisted of the modification of an existing inlet structure to a headwall and constructing a concrete ditch 30 feet long, leading to the new stormsewer inlet at a cost of \$6,551.

Griffith Road

The storm drainage system was deteriorated requiring a pipe replacement and relocation of the system within the existing easement. This project consisted of installing 300 feet of 30-inch diameter storm drainage pipe and three drainage structures for a cost of \$70,163.

Hillbrook Spring

The corrections to the pond on Winter Lane in Annandale, Virginia, were required to achieve code compliance using developer bonds. The dry detention pond was retrofitted with a BMP plate, the emergency spillway was armored with a cabled mattress, the outfall structure was modified to resolve erosion and safety concerns, the pond was excavated to design contours, and a trickle ditch was installed. The cost of this project was \$73,000.



Hillbrook Spring



Linda Marie Court

Linda Marie Court

There was no overland relief for the public storm sewer system for this residential property and, as a result, significant house flooding has occurred at the property. The project consisted of the modification of an existing yard inlet and the grading of an overland relief swale through the side yard of an adjacent property for a cost of \$6,911.

McFarland Drive

The swale that provides overland relief for stormwater around the house lacked sufficient grade differential to allow flow. To address the standing water in the side yard drainage swale, the grade of the swale was increased to allow the water to flow. Puddles and saturated ground was alleviated for a cost of \$5,000.

Type 2 (continued)

Storm drain pipes/channels to alleviate flooding

Middle Valley

There was inadequate overland relief for the public storm sewer system and the existing inlet pipe and channel were blocked with debris, resulting in basement flooding. The project consisted of installing a floodwall at the back of the residence with three concrete steps for a cost of \$17,693.

Mt. Vee Manor

Mt. Vee Manor is a developer default project and is located on Richmond Hwy in Mt. Vernon district. The developer had not developed the property per approved design plans and the adjacent property was being frequently flooded due to runoff from the site. To address this flooding situation, a minor storm drainage collection and conveyance system was built for a cost of \$5,000. This, combined with re-grading the site, insured that the run-off from the site did not flood the neighboring property.



Mt. Vee Manor flood protection



Prelude Court

Prelude Court

The existing in-take pipe system had a history of clogging with debris. There was no overland relief and, as a result, significant house flooding has occurred. A low maintenance improvement was made to the system that allows smaller debris into the pipe system but prevents larger debris from blocking the opening or getting jammed in the pipe system. The cost of installing the row of concrete-filled bollards with cables as a debris barricade was \$6000.

Radcliff

The invert of the corrugated metal pipe had completely deteriorated resulting in severe erosion. Thirty feet of deteriorated corrugated metal pipe was replaced with reinforced concrete pipe and a new headwall at a cost of \$28,434.

Rosemont Circle

The curb elevation did not allow water to drain from the rear of the house. A curb inlet and yard inlet were added to correct the house flooding for a cost of \$24,266.

Type 3

Stream stabilization/drainage pipe installation to protect homes

Indian Run (Phase IV)

Streambank erosion was occurring along a reach of Indian Run near Little River Turnpike in Annandale, Virginia, and there was house flooding. The streambanks were armored with riprap for a distance of 250 feet and an unnamed tributary to Indian Run was placed inside 250 feet of 60 by 38-inch elliptical pipe with a three-foot overflow swale to redirect the flood flows to Indian Run, eliminating flooding of the house. Cost of this project was \$560,000.



Indian Run, streambank erosion

Type 4

Stream stabilization/water quality designs using bio-remediation methods

Long Branch Stream Rehabilitation

Increased inflows into the stream from a highly urbanized drainage area resulted in considerable deterioration of the Long Branch Stream located at the border of Fairfax and Arlington Counties. Stream restoration was performed to rectify a majority of the problems. However, soon after the stream restoration, Hurricane Isabel caused considerable damage to the in-stream restoration efforts. This damage was corrected for a cost of \$343,000.



Long Branch stream rehabilitation

Type 5

Dam rehabilitation—improvements of outlet structures and emergency spillways

Braddock Forest

The pond's function was impaired due to failures of the corrugated metal riser pipe, deterioration of the principal spillway pipe, sediment build up, and deterioration of the control structure. Repairs and improvements were made to the dam embankment, a new riser structure and pipes were installed, a new water quality control device was installed, and the pond was enhanced with wetland marsh (to be planted in spring 2005) for a cost of \$85,000.



Braddock Forest before retrofit



Braddock Forest after retrofit

Centreville Green

The pond's function was impaired due to pipe separation, sediment build up, constant blockage, and water quality control deterioration. Repairs and improvements were made to the dam embankment and riser structure, a new water quality control device was installed, and the pond was enhanced with a wetland marsh (scheduled planting spring 2005) for a cost of \$63,000.



Centreville Green before retrofit



Centreville Green after retrofit, prior to wetland planting

Type 5 (continued)

Dam rehabilitation—improvements of outlet structures and emergency spillways

Stone Crossing Section 1

The pond's function was impaired due to failures including pipe separations, sediment build up, constant blockage, and water quality control device deterioration. Structural repairs and improvements to a dam embankment and riser structure were made, a new water quality control device was installed, and the pond was enhanced with wetland marsh (scheduled planting spring 2005) for a cost of \$61,000.



Stone Crossing after retrofit



Sully Station (Ph I) Pond II

Sully Station (Ph I) Pond II

Piping problems along the principal spillway were noticed during routine maintenance operations of the Sully Station (Ph I) Pond II, a dry pond with BMP located off route 28 on Westfields Boulevard. Non-rehabilitation could have led to failure of the dam and subsequent flooding. The following improvements were made: the principal spillway was replaced, a concrete apron was installed in front of the riser, a new BMP plate was installed, a concrete cradle was installed along the entire length of the principal spillway, a drainage blanket was installed along the downstream third of principal spillway, and new trash rack was installed. The cost was \$25,000.

Little Rocky Run R-3 Sec 29 Pond 2

The pond's function was impaired due to failures including pipe separation, sediment build up, constant blockage, and water quality control device deterioration. Structural repairs and improvements to a stormwater management dam embankment and riser structure were constructed and a new water quality control device was installed and enhanced with wetland marsh (scheduled planting spring 2005) for a cost of \$75,000.

Type 6

Regional detention ponds, flood control and water quality, state mandates

D-47 Regional Pond

Regional Pond D-47 was constructed by the developer of Fairfax Ridge via a cost sharing arrangement with the county. It provides water quality and quantity control for a 111-acre drainage area and features water quality control and progressive quantity control by providing extended detention of the one-year storm event. This pond will serve to reduce downstream flooding problems in the Fairfax Farms Subdivision that have plagued residents for over 15 years. The total project cost is \$800,000.

R-8 Regional Pond

This facility provides water quality and quantity control for a 100-acre drainage area. It is designed as a “wet” pond that incorporates wetlands plantings along a ten-foot wide bench around the perimeter. The pond and accompanying trail serve as an amenity within the center of the Buckley’s Reserve Subdivision. The facility was constructed by the site developer via a cost sharing arrangement with the county. The total project cost is \$900,000.



R-8 Regional Pond

Retrofitting of Watersheds with New Flood Control Facilities

Given limited funding sources, implementation of detention pond retrofit projects relies primarily on coordination with active projects during the rezoning and plan approval process. As funding permits, either through general fund appropriations, pro rata share revenues, or developer participation agreements, retrofit projects are implemented. The following tables list the regional ponds that have or will achieve retrofit benefits. The first table lists those projects that have been bonded or were completed during calendar year 2004. The second table lists those projects that currently have a submitted design plan incorporating construction/retrofit of a facility, which will provide BMPs for existing development. It is noted that this list may not be all-inclusive. The pictures are of Regional Pond R-8 and Regional Pond R-161, both Little Rocky Run watershed retrofit projects completed this year.

<i>Regional Facilities Bonded or Completed During 2004</i>			
Facility Name	New facility	Total area controlled (acres)	Area of existing development retrofitted with BMPs (acres)
Regional Pond C-41	yes	92	na
Regional Pond D-47	yes	111	90
Regional Pond D-46	yes	277	180
Regional Pond H-9	yes	100	60
Regional Pond R-8	yes	100	20
Regional Pond R-16	yes	120	105
Regional Pond R-161	yes	235	50
Total		1035	505



Regional Pond R-8, Rocky Run watershed retrofit



Regional Pond R-161, Rocky Run watershed retrofit

<i>Regional Facilities in Design or Land Acquisition Phase During 2004</i>				
Facility Name	New facility	Retrofit existing facility	Total area controlled (acres)	Area of existing development retrofitted with BMPs (acres)
Regional Pond C18	yes		442	342
Regional Pond C20 (Intl. Town & Country Club)	yes		515	252
Regional Pond C24	yes		99	0
Regional Pond C28	yes		181	124
Regional Pond C35	yes		109	30
Regional Pond C54	yes		328	95
Regional Pond D02 (Great Falls Hunt)	yes		246	33
Regional Pond D14 (Little Run Farm)	yes		147	79
Regional Pond H02	yes		101	15
Regional Pond R17	yes		322	322
Reston 913		yes	315	315
Regional Pond S05	yes		264	264
Regional Pond S07	yes		453	453
Vine Street	yes		229	229
Weltman Estates		yes	99	99
WolfTrap		yes	302	302
Total			4,152	2,954

Rehabilitation and Retrofit of County Maintained Stormwater Management Facilities

In 2004, four stormwater management ponds, serving a total drainage area of 72.96 acres, were rehabilitated and/or retrofitted (see table below). 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. Below is a summary of the sites.

Rehabilitated Facilities with Enhancements

Pond Name	Tax Map	Access Address	Drainage Area (Ac)	Season Completed
Braddock Forest	68-1	left side of property at 4704 Western Street	6.76	Spring 2004
Centreville Green Pond 4A	66-1	5670 Lonesome Dove Ct.	24	Summer 2004
Little Rockv Run R3 Sec.29 Pond 2	65-4	13914 Marblestone Drive	26.5	Summer 2004
Stone Crossing Sec. 1	54-1	Opposite 14662 Stone Crossing Ct.	15.7	Spring 2004
		Total	72.96	

Fairfax County continues to identify and repair/retrofit stormwater dry ponds that have experienced structural failure. These ponds no longer provide the water quantity or quality benefits as originally intended, and the repairs are necessary to maintain compliance with the county's MS4 permit. The repair work generally results in significant disturbance of the dam embankment, control structure, and pond floor. With these ongoing construction activities and associated restoration requirements, an opportunity has arisen to also provide retrofit elements that enhance the water quality treatment, natural habitat, and aesthetic aspects of the ponds. Though these retrofit elements may vary to a degree from site to site, a complete retrofit project will, where practical, generally conform to the Virginia Department of Conservation and Recreation standards for the installation of shallow marsh wetlands. The pollutant removal efficiencies of these retrofitted facilities exceed that of the typical county stormwater quality pond. It is anticipated that additional Best Management Practice (BMP) credits may be obtained through these types of practices and will help meet the intent of the Chesapeake Bay 2000 Agreement and the Virginia Tributary Strategies initiative. The considered practices are as follows:

- The installation of sediment basins at the inlets
- The removal of some or all of the concrete low-flow ditches
- The installation of check dams in portions of low-flow ditch intended to remain
- The installation of diversion berms, peninsulas, and islands to increase treatment flow paths
- The installation of shallow marsh pools planted with wetland grasses and other types of wetland and wet meadow plantings (i.e., herbaceous shrubs, ornamental trees, etc.)
- The installation of modifications to the outlet structure and principal spillway pipe

Stormwater Needs Assessment Program

Fairfax County hired a consultant to develop a Watershed Community Needs Assessment and Funding Options Study (July 2004) to address the strategies for developing a comprehensive stormwater management program and a dedicated funding mechanism to support it. The plan will address program needs, which include watershed planning, capital improvements, changing service levels, increased maintenance for infrastructure inventories, unfunded mandates, and emergency events. In addition to the study, the consultant is facilitating a series of meetings for a Board of Supervisors-appointed committee of residents who are reviewing the level and extent of service of the current comprehensive stormwater management program and possible funding sources.

The committee is named the Stormwater Advisory Committee and is made up of seventeen residents that represent diverse community interests. The residents were appointed to the committee by the Board of Supervisors in August, September, and October, 2004. The committee members began meeting once per month in October, 2004, to review the current comprehensive stormwater management program, identify future needs, and possible funding sources. The committee will continue to meet until March, 2005, to develop their recommendations for improvements to the current program and a dedicated funding source to finance the improvements. The committee will propose their recommendations to the members of the Board of Supervisors in March, 2005.

The county has initiated a Speakers Bureau to present information about stormwater management, the challenges facing the county's current program, and the Stormwater Needs Assessment Project (SNAP) working to address these challenges. This outreach effort is targeted at groups, organizations, and associations in Fairfax County. The Speakers Bureau's purpose is to raise awareness about the issues facing the county with respect to stormwater management and to make residents aware of the project working to face those issues.

In addition to the Speakers Bureau, the county has developed a Web site to communicate the Stormwater Needs Assessment Project to residents. Residents can visit this site and review agendas and meeting minutes of the Stormwater Advisory Committee meetings. Residents can also sign up to receive monthly updates about the project:

<http://www.fairfaxcounty.gov/dpwes/stormwater/needsassessment.htm>

Innovative BMPs in Fairfax County

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 (LID) practices that serve to minimize impervious cover and replicate natural hydrologic conditions are widely-recommended approaches for accomplishing this goal. Fairfax County's Public Facilities Manual (PFM) currently does not specifically address better site design or LID other than through a letter to industry for "innovative practices." The county is endeavoring to maintain a comprehensive stormwater management program that is both responsive to the need for stakeholder participation and adaptable to rapidly evolving technical information and guidance. With this in mind, the county's Environmental Agenda calls for better site design practices that protect our streams and other natural resources. It also encourages the use of LID concepts and techniques, especially in new residential and commercial areas, and in retrofitting established areas.

LID is a design strategy with the goal of maintaining or replicating the pre-development hydrologic regime through the use of integrated design techniques to create a functionally equivalent hydrologic site design. Hydrologic functions of storage, evapotranspiration, infiltration, and ground water recharge, as well as the volume and frequency of discharges, are maintained through the use of integrated and distributed micro-scale stormwater retention and detention areas, reduction of impervious surfaces, and the lengthening of flow paths and runoff times. Other prerequisite environmentally sensitive site design strategies focus on reduction of impervious cover; prevention of stormwater pollution; and the conservation/protection of environmentally sensitive site features such as riparian buffers, wetlands, steep slopes, valuable (mature) trees, flood plains, woodlands, highly permeable soils, and public safety.

Two letters to industry on the use of BMPs have been sent to all Architects, Builders, Developers, Engineers, and Surveyors practicing in the county—one in 2001, the other in 2002 ([Appendix B](#)). *Procedures for requests to use innovative Best Management Practice (BMP) facilities in Fairfax County* are defined in a Letter to Industry dated October 2, 2001; and *Innovative BMPs—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 to compliance with the revised design standards in the “Guidelines for the Use of Innovative BMPs in Fairfax County, Virginia.”

Fairfax County’s objective is to encourage the use of LID concepts and techniques, especially in new residential and commercial areas, and seek opportunities for retrofitting established areas. Four items were on the LID action list for 2004: 1) Development of an Implementation Plan for Stormwater Management that integrates LID; 2) Integration of environmentally friendly site design (EFSD) techniques and LID practices into Fairfax County’s comprehensive stormwater management program; 3) Preparation of a new letter to industry; and 4) Participation in and development of LID demonstration projects.

1) In February, 2004, a draft Implementation Plan for the “Role of Regional Ponds in Fairfax County’s Watershed Management” was drafted with the following recommended action items:

- Develop and implement a countywide watershed management program
- Develop a comprehensive Stormwater Policy and Manual
- Encourage public participation in stormwater management in Fairfax County
- Ensure a dedicated/comprehensive funding source
- Evaluate projects based on social, economic, and environmental issues

2) A contract was entered into with the Low Impact Development Center in Beltsville, Maryland to prepare an LID-related white paper, develop PFM amendments to include LID approaches to stormwater management, conduct LID public/stakeholder meetings, and present resulting recommendations for integration of EFSD and LID to county staff and the Board of Supervisors. The deliverables from this contract will be completed by September 2005.

3) A letter to industry entitled *Acceptance and review of stormwater information provided on rezoning, special permit, and special exception applications* has been drafted jointly by LDS, SWPD, and MSMD in 2004 and released in February, 2005. This letter designates the Environmental and Site Review Division of LDS as the lead agency for the coordination of DPWES review of stormwater issues on rezoning, special permit, and special exception applications. The letter advances sound guidance for infill development and land use that is responsive to the need for environmentally-friendly stormwater management.

4) DPWES, NVSWCD, and others are currently cooperating in the planning, design, construction, and outreach activities associated with several LID demonstration projects funded through DCR grants. Currently in different stages of completion, each project varies in the practices to be installed as well as in its goals, ranging from redevelopment to stormwater retrofit.

Future plans for action include: 1) continued implementation of recommendations; 2) pending BOS approval of the recommendations from this initial stage of integration; subsequent integration of EFSD and LID into county guidelines for stormwater management will continue; 3) continued related changes in county policy, PFM, and other guidance documents; and 4) continued EFSD and LID demonstration projects to lead by example and adapt accordingly. A brief description of two projects follows:

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

This LID demonstration project is located within the Accotink Creek watershed and has a drainage area of 0.83 acre. In addition to the Providence Supervisor’s Office, the site is also the location of the county’s Merrifield Fire Station. DPWES and NVSWCD 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 proposed work will serve as a highly visible demonstration project featuring three LID practices: a bioretention basin (rain garden), a green roof, and permeable pavers. The bioretention basin and permeable pavers with underlying gravel infiltration bed will allow runoff to drain into a retention area where it can then slowly infiltrate into the surrounding soil. The green roof installation on an existing concrete storage structure will serve to reduce rooftop stormwater runoff and provide a comparison to an adjacent storage structure with an impervious roof. The bioretention basin will occupy an area of 680 square feet and the permeable paver area is 1,550 square feet in size, with a combined volume of approximately 9,841 cubic feet in the underlying gravel infiltration bed. The disturbed area will be 2300 square feet in size. The green roof will occupy an area of approximately 240 square feet. These three integrated LID practices will work in harmony to address both water quality and water quantity retrofit goals on the site. They are expected to retain and infiltrate a significant amount of the stormwater currently running off the impervious surface. See [Appendix C](#) for the LID conceptual design layout.



Tinner Hill Cultural Center

The top of Tinner Hill, along the Fairfax County/City of Falls Church border is being developed to commemorate the historic founding of the first rural branch of the N.A.A.C.P. 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 LID 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 Water Conservation District (NVSWCD) and with the help of a DCR 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 LID designs, each with narrative signage.



This site will become a primary county demonstration site to display LID practices that all developers and landowners can use on any size property. The design techniques include a vegetated green roof, rain garden, permeable pavers, grass pavers, vegetated swale, infiltration trench, above- and below-ground cisterns, and a “carriage-road-style” driveway. See Appendix C for the LID conceptual design layout. For further information call (703) 241-4109 or visit:

www.tinnerhill.org

Reston 913 Retrofit and DCR Water Quality Study

Reston 913, a 1.8 hectare regional in-line dry detention pond originally constructed in northwest Fairfax County in 1980 for flood control, has been identified for retrofitting as part of a Virginia Department of Conservation and Recreation Water Quality Improvement Fund (DCR WQIF) grant. The scope of the project consists of installing a BMP weir at the outlet to the pond with a drawdown time of 24 to 48 hours and conducting pre- and post-development water quality monitoring. Data generated from the monitoring program will be used to determine whether differences in pollutant loadings and peak concentrations as a result of the wetlands before and after construction of the weir wall are statistically significant. Similar hypothesis tests will be conducted to determine whether significant changes in wetland vegetation characteristics are indicated. Since the basic monitoring design is the before-and-after approach, an important aspect of data analysis will be to take into consideration year-to-year and seasonal variability.

Sanitary Sewer Extension and Improvement (E&I) Program

Waste Management and Capital Facilities within the Department of Public Works and Environmental Services jointly administer the E&I 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 2004, one E&I projects was completed consisting of 500 linear feet of eight-inch sewer line, 3500 linear feet of four-inch force main, two-pump station, and providing sanitary sewer service connections for ten existing homes.

Yorktowne Square

Rain Garden

NVSWCD designed a rain garden at the Yorktowne Square Condominiums to overcome an existing drainage problem within the community. The rain garden controls and treats runoff from 0.56 acres of rooftops, parking lots, and lawns. DPWES-MSMD helped to install the project by providing heavy equipment and operators to excavate and install underdrains, and the rain garden materials. The layers consist of mulch, a nutrient-rich and well-drained planting soil layer, and two filter layers. It is equipped with an underdrain system and an observation pipe, which helps with maintenance and monitoring. The surface area of the rain garden is 600 square feet. The residents of Yorktowne Square planted the vegetation and also constructed a dry stream bed to direct stormwater runoff from a parking lot to the rain garden.



Yorktowne Square raingarden

Green Roof

The 5,000-square-foot green roof at Yorktowne Square Condominium is one of the first, if not the first, retrofitted green roof in the state. Building Logics' German design green roof system was chosen because it was lightweight and the 35-year-old building had structural limitations. The soil substrate contains less than fifteen percent organic matter and is made up of a lightweight, highly absorbent clay baked material. 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. A graduate student in civil engineering at George Mason University has set up an experiment to measure the effectiveness of the green roof in reducing water runoff by measuring the volume of water draining from the green roof and an identical roof without vegetation. In addition, the water runoff from both roofs will be tested to measure any filtering qualities the green roof may provide (see [Appendix D](#)).



Yorktowne Square green roof

Northern Virginia Soil and Water Conservation District LID Research

Integrating Low Impact Development (LID) concepts into a re-development site

During 2004, NVSWCD and ATR Associates, with the help of a grant from DCR, 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—NVSWCD 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-retention filters and swales, porous paves, underground detention, and rain gardens. The Lorton Arts Foundation and its design engineers and landscape architects will decide 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 DPWES-MSMD. Once the re-development is completed, an education and information program will highlight all the LID practices, and will include a permanent display at the on-site museum.

BMP Handbook

The Northern Virginia Regional Commission (NVRC) is beginning an effort to revise the 1992 edition of the Northern Virginia BMP 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 BMP Handbook is a widely used resource for Fairfax County planners and public works staff. NVRC 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.

The Northern Virginia Regional Commission also worked with the Virginia's Low Impact Development (LID) ad hoc workgroup on that group's technical committee to develop a technical bulletin on LID to be incorporated into the Virginia Stormwater Management Manual. The bulletin will provide localities and consultants a common guidance document for incorporating LID into development projects under Virginia's stormwater regulations. The work group finished its efforts with the technical bulletin in January 2005 and is forwarding the document to the Virginia Department of Conservation and Recreation (VADCR) for review and incorporation.

Stream Restoration (Partnerships)

The two stream restoration projects that were sponsored and jointly constructed by Virginia Department of Forestry (VDOF), Reston Association (RA), NVSWCD and the Fairfax County DPWES Maintenance and Stormwater Management Division—Snake Den Branch and Difficult Run—remain stable, function as designed, and continue to handle storms successfully.

Lake Barcroft Watershed Improvement District Retrofits

The Lake Barcroft Watershed Improvement District (LBWID) continually strives to make advancements in a clean lake and a properly operating dam. Adjustments have been made to the diversion debris trap over Tripps Run at Potterton Road in order to increase its effectiveness and efficiency. In addition, the number of man-hours spent removing debris from the lake has increased. The LBWID is planning its next large-scale dredging event (approximately 12,000 cubic yards) for 2006, in addition to the small-scale dredging with its own equipment.

A new Cathodic Protection System (CPS) was installed on the Lake Barcroft Dam to protect the metal components of the dam from corrosion, replacing the CPS swept over the dam during Hurricane Isabel. In addition to the CPS, the LBWID installed new lake level sensors and a new rain gauge, both of which are connected to the dam's PLC (logic controller/computer) which was installed last year.

III. Maintenance and Operation

DPWES inspects and maintains dry ponds located within residential subdivisions, regional ponds, underground chambers, percolation trenches, and rain gardens. In addition, DPWES 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.

Structural and Source Controls

County Maintained Stormwater Management Facilities

As of December 31, 2004, there were 1,127 stormwater management facilities maintained by the county. The current inventory includes 995 on-site ponds, 38 regional dry ponds, 47 underground chambers, 33 percolation trenches, five regional wet ponds, six bio-retention areas, two manufactured BMPs, and one wetland. Last year the county inspected each DPWES-maintained facility at least once, mowed 530 dam embankments, and performed 291 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 investigations were then coordinated with engineering staff to ensure issues were resolved appropriately.

Privately Maintained Stormwater Management Facilities

In addition to the county maintained facilities, there were 2254 privately maintained facilities in the private inventory as of December 2004. The inventory included 282 wet ponds, 460 dry ponds, 114 sand filters, 52 manufactured BMPs, 336 percolation trenches, 554 roof top detention areas, 46 parking lot detention areas, 380 underground detention facilities, and six bio-retention areas. These facilities are routinely scheduled for inspection conducted by DPWES staff with the goal of performing a thorough inspection of each facility at least once every 5 years within the permit period. A total of 457 facilities (20%) were inspected in 2004. A detailed inspection report, with photographs and GIS 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 owners/operators of stormwater management facilities continues to be effective in achieving the desired level of service for these facilities.

State-Regulated Dam Facilities

Currently there are six state-regulated dams maintained by the county; all are located within Pohick Creek Watershed. However, as a result of legislation changes in 2002, there are an additional nine facilities that the county is working on to comply with the state's standards. These nine 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 studies include inspections, hydraulic analysis, dam breach analysis, and geotechnical analysis.

Combined, the six Pohick facilities serve a watershed area of 22,690 acres with an estimated population of 100,000 residents. DPWES staff and representatives from Natural Resources Conservation Services (NRCS) and NVSWCD formally inspect all PL-566 facilities in the fall of every year. The purpose of this formal inspection is to identify any safety or operational items in need of corrective action. 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. These inspections satisfy state requirements for dam safety. State issued operating permits are valid for six years and must be reissued at the end of each permitting period. Permit reissuing is tied to the most recent biennial inspection and its attached operation and maintenance plan. 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 permit and updated on February 2, 2005. During 2004, 69 tax maps were field verified and 90 were digitized.

Storm Sewer Inventory Digitizing

The inventory of stormwater management and storm sewer facilities is documented and tracked through the use of the county's mapping 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 is being digitized in a Geographic Information System (GIS) format for management and identification purposes. As of December 31, 2004, 250 tax map grids have been digitized.

Storm Sewer Maintenance Survey

In 2004, 169 miles of county-maintained storm sewer were field verified as to location and inspected for deficiencies. As a result of the information gathered 612 work orders were written to correct deficiencies.

Roadways and Parking Lots

The county maintains public facilities such as libraries, fire stations, governmental centers, park and ride lots, and a number of road segments totaling approximately five miles in cumulative length. Many of these segments are without curb and gutter or catch basins. In an effort to limit the discharge of sand and deicing materials into the county's streams, only those roadway lengths determined to pose a safety hazard are treated. Magnesium chloride is used on sidewalk applications, as it is more environmentally acceptable than sodium chloride. Where they exist, catch basins are cleaned on a regular basis and at the end of the winter season to remove accumulated sand.

Due to the widespread use of the public parking facilities in the county, routine sand and deicing materials treatment is provided during snow clearing operations. In an effort to reduce the discharge of these materials into the county's streams, the county's six park and ride lots, four commuter rail stations, and one bus transit facility are swept once each spring.

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:

2004 STW

- Sewer system evaluation survey, essentially consisting of wastewater flow measurement and analysis to identify areas of the wastewater collection system with excessive inflow/infiltration problems.
- Closed circuit television (CCTV) inspection of trunk sewer mains to specifically identify the defective sewer lines for repair and rehabilitation. In 2004, 228 miles of old sewer lines and 35 miles of new sewer lines were inspected.
- Repair and rehabilitation of sanitary sewer lines and manholes identified by CCTV 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 2004, approximately 139,000 feet of sanitary sewer lines were rehabilitated and over the past seven years this adds up to 1,039,700 feet (197 miles).
- 32 dig-up repairs and 209 trenchless point repairs were completed.
- 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.

Mosquitoes

In a proactive approach to mosquito surveillance and management, a Mosquito Surveillance and Management Subcommittee was formed in 2002 that includes the City of Falls Church, City of Fairfax, Town of Herndon, Town of Vienna, Health Department, Park Authority, DPWES, and other county agencies. An entomologist was employed in 2003 to coordinate the effort to suppress West Nile virus (WNV) and a company specializing in mosquito control was contracted to perform surveillance and treatment activities. It was determined that the primary vector for the transmission of WNV is a type of mosquito that primarily breeds in storm drainage catch basins and isolated containers. Therefore, the activities focused on surveillance, treatment of catch basins, and public education to enhance citizen awareness. Mosquito surveillance and catch basin treatments (three times during the season) were contracted in 2003. In 2004 all surveillance activities were brought in-house and the catch basin activities were contracted out. Information collected from the 2003 and 2004 surveillance provided data to effectively define areas of WNV activity and zero-in on appropriate future treatment areas. Treatment activities were suspended at the onset of cold weather, which suppresses mosquito and virus activity. County inspection crews supported treatment efforts by identifying suspect areas in storm drainage conveyance systems during regularly scheduled maintenance inspections. The Health Department also conducted a rigorous quality control effort and adjusted the contractor's activities so that they were consistent with program needs.

A program was maintained to educate citizens about WNV and informational handouts were developed in five languages to provide citizens and stormwater management facility owners/operators with background mosquito information and the “dos and don'ts” of mosquito management and personal protection. County staff became certified by the State Office of Pesticide Services to proctor exams and to certify field staff, which were then qualified to apply biological pesticides in storm drainage conveyance systems.

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 a compilation of those key DPWES Strategic Initiatives FY2004 identified in the Stormwater Management (STW) business area strategic plans and other department initiatives.

Implementation New Environmental Technologies in Capital Projects

Rain gardens are under construction as part of the Fairfax Center Fire Station project. Rain gardens are also included as part of the design of the Crosspointe Fire Station which will be ready for construction within the next several months. The use of rain gardens will be considered as plans are developed for other county facilities. The use of rain gardens continues to become a more acceptable alternative for meeting BMP requirements.

Outreach, Partnering, and Public Education

DPWES is collaborating with neighboring jurisdictions for uniformity in interpretation of building code requirements, common understanding of environmental regulations, and a shared vision on alternative energy sources, streamlining component, etc. DPWES is in the process of gathering the erosion and sediment (E&S) control regulations and policies of the neighboring jurisdictions of Loudoun, Prince William, and Stafford Counties. An evaluation and comparison of each of these neighboring jurisdictions' policies and regulations with Fairfax County's will be made by April 2005. Based on the results of the comparison, a determination will be made if there is any need, merit, or interest in developing more uniform regulations and enforcement policies. DPWES will work with the development stakeholders to create a common understanding on land development's link to environmental protection. DPWES has created several committees to improve working relationships with industry including the Fairfax Committee of Engineers and Surveyors Institute (ESI) and a Fairfax chapter of Northern Virginia Building Industry Association (NVBIA). Code modifications and environmental objectives are vetted through these groups. Over the last six months these groups have participated in developing requirements to address E&S issues, adequate outfall, and perennial streams. These are ongoing efforts to work in close collaboration with the development industry and the environmental stakeholders.

Assurance of Adequate Service Levels and Financial Management

DPWES is exploring options to stabilize the funding level for stormwater management in order to ensure that stormwater strategies can be implemented. DPWES will develop a funding strategy for stormwater management programs to reflect changing service levels, increased infrastructure inventories, unfunded mandates, and emergency events. The service levels for the stormwater management programs are currently being evaluated through a study known as the Fairfax County Watershed Community Needs Assessment and Funding study. A funding strategy is being developed for the stormwater programs as part of a service level evaluation. This study is being prepared by AMEC Earth and Environmental, Inc. The study identifies types of stormwater services and levels of services provided by Fairfax County. In addition, this assessment compares 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. The service gaps, issues, and needs with alternatives are identified to improve the current service level. Funding options for the resource needs were provided in this study. A committee appointed by the Board of Supervisors (BOS) is reviewing this report and developing recommendations on the

needs assessment and proposed service levels for the stormwater programs. The committee's report is to be presented to the BOS on March 28, 2005, for consideration in the Fiscal Year 2006 Budget.

Service Delivery

DPWES is improving service response and customer satisfaction of the land development process by reducing its complexity and will partner with the Engineering Standards Review Committee (ESRC). In 2004, an initiative was started to incorporate the use of Low Impact Development (LID) practices in the Public Facilities Manual to address and mitigate the impacts of stormwater associated with development. This initiative is to identify six or more LID practices that can be incorporated into the PFM for immediate application and using standard submission requirements with new development plans. The ESRC and development engineers are major partners in this initiative. A stakeholders' forum is scheduled for March 9 and 16, 2004, for review and input of potential LID practices for immediate inclusion with the PFM.

Watershed Management

DPWES is implementing a comprehensive watershed management program that will meet the state's MS4 permit requirements. The first watershed plan, for Little Hunting Creek, is complete and was presented to the BOS on February 7, 2005. Plans are being developed to implement some of the measures identified. The second watershed plan, for Popes Head Creek, is nearing completion and plans will be developed to start implementation in FY2006. Four other watershed plans are in various stages of development and three more will be initiated in FY 2005. The county's 30 watersheds are currently grouped into fifteen watershed planning projects. There is a possibility that planning may be accelerated so that the plans will be completed ahead of FY2009. The outcome of the Stormwater Needs Assessment Project currently underway will be used to develop a comprehensive program to meet the needs of the MS4 permit renewal process due to start in January 2006.

Water Quality

DPWES is implementing all commitments made under the Chesapeake Bay Agreement. The focus of the Chesapeake Bay 2000 Agreement is the restoration of the bay to a healthy ecological community, to support the living aquatic resources, and to reverse the current impairments to the bay's water quality. The multi-state approach to meeting the restoration goals and commitments are aimed at removing the bay from the EPA's impaired waters list by 2010. Fairfax County is doing its share to meet the commitments as part of Virginia's Potomac River Tributary Strategies, by being good environmental stewards, and by satisfying the regulatory requirements of the Municipal Separate Storm Sewer System (MS4) permit. The county has the responsibility to implement a comprehensive stormwater management program under the MS4 permit. One condition of the MS4 permit is to complete watershed management plans and implement recommended improvements; another condition is to have a monitoring plan to assess and report on the stream and stormwater infrastructure conditions annually. In order to assess the overall conditions of streams and the health of watersheds, the county has established a Stream Quality Index (SQI) to track conditions annually. The SQI is based on biological and habitat monitoring data taken from representative sites across the county and applying a weighted average to determine the average score on a scale of one to five, where five represents the highest quality streams and one represents the lowest quality. The first year (2003) the SQI was determined as 2.8 and the index for 2004 is 2.4.

Efficient Use of Land to Meet Stormwater Requirements

DPWES is working with other county agencies, Environmental Quality Advisory Group (EQAC), and other interest groups to evaluate the feasibility of meeting stormwater management requirements through the use of regional stormwater ponds. A multi-agency committee was directed by the BOS to develop a unified position on the use of regional ponds as well as other alternative types of stormwater controls as watershed management tools. On March 3, 2003, the committee completed a report entitled The Role of

Regional Ponds in Fairfax County's Watershed Management; June, 2003, the Implementation Plan for Stormwater Management was started; February 25, 2004, the draft Implementation Plan for Stormwater Management was completed. Implementation continues within the following recommended action areas: develop and implement a countywide watershed management planning program; develop a comprehensive stormwater policy and manual; encourage public participation in stormwater management in Fairfax County; find a dedicated/comprehensive funding source; and conduct project evaluations based on social, economic, and environmental issues. DPWES is working with county agencies involved in land development to establish sound environmental policy for infill development as a component of the Residential Development Study. A letter to industry entitled "Acceptance and Review of Stormwater Information Provided on Rezoning, Special Permit and Special Exception Applications" has been drafted. The letter and imbedded "Minimum Stormwater Information for Zoning Applications" checklist advances sound guidance for infill development and land use that is responsive to the need for environmentally-friendly stormwater management. In addition to requiring adequate stormwater outfall conditions, it requires descriptions of: Low Impact Development (LID) and environmentally sensitive site design practices investigated; existing vegetation and other site features including those to be preserved; potential retrofit/rehabilitation of existing STW facilities; existing physical, biological, and chemical characteristics of receiving stream valleys, projected impact from development, and proposed avoidance/mitigation practices; existing soil properties including pH, bulk density, infiltration rates, depth to bedrock, and depth to high water table.

IV. (B) Policy

RPAs and perennial streams, the Chesapeake Bay Preservation Ordinance, TMDLs, 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

The Quality Assurance/Quality Control (QA/QC or QC) study of the Perennial Streams Identification and Mapping project was conducted between May and October of 2004.

A total of ten percent of the streams initially surveyed between 2002 and 2003 were selected for the QC process. While the majority of these sites were randomly selected, many of them were targeted based on the following criteria:

- Visual evaluation of tributaries to determine areas that may be suspect (large drainages or sites determined to be "borderline")
- Sites where surveys were completed by our consultant teams
- Field notes from original surveys that indicate particular streams should be resurveyed in a drier or wetter season
- Contentious locations, i.e., development sites (rezoning or by-right) or citizen calls disputing determinations

QC surveys were completed throughout the moist-to-normal conditions of spring 2004 for watersheds originally surveyed during the 2002 hydrologic drought (approximately 35 percent of the total streams surveyed during the QC study). The remaining watersheds, originally surveyed in 2003 during a period of normal to above average rainfall, were assessed beginning in late July 2004 under normal to drier

weather conditions (approximately 65 percent of the total streams surveyed during the QC study). All QC fieldwork was completed by October 2004.

In the spring of 2005, the results of the QC study along with the revised Chesapeake Bay Preservation Area Maps will be presented before the Board of Supervisors.

The impetus for the Perennial Stream Identification and Mapping Project came from the Board of Supervisors, based on resolution from the Environmental Quality Advisory Council, to map and protect additional stream segments under the county’s Chesapeake Bay Preservation Ordinance (CBPO). In 2003, the Chesapeake Bay Local Assistance Department (CBLAD) revised the state’s CBPO, concurrently, to include identifying perennial streams using a scientifically defensible protocol as an appropriate method for determining Chesapeake Bay Preservation Areas.

The county’s project was initiated in 2001 with the development of a protocol to classify streams as perennial or non-perennial, based on their hydrological, geomorphological, and biological features. This protocol was approved by CBLAD in March, 2002, as an acceptable method for determining perenniality. Fieldwork commenced in March 2002 and ended by October 2003.

Approximately 330 miles of stream were newly designated as perennial, increasing the total from 520 miles to 850 miles. Fairfax County’s Board of Supervisors approved the revised CBPO maps, which became effective on November 18, 2003.

Perennial stream lengths and Resource Protection Areas, for 1993 and 2003

	1993	2003
Perennial Stream Length - excluding shorelines (miles)	520	850
Resource Protection Areas (square miles)	55.3	72.3

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/watersheds/perennial.htm

Chesapeake Bay Preservation Ordinance

The Chesapeake Bay Preservation Ordinance (CBPO), 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 (RPAs), from most development and requires that the remaining areas outside RPAs be designated as Resource Management Areas (RMAs). The amendments also included changes to the performance criteria for development and redevelopment in RPAs and RMAs; 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 Board of Supervisors held a public meeting on May 19, 2003, about possible perennial stream amendments to the CBPO and adopted the amendments during their regularly scheduled Board meeting on November 17, 2003. These amendments became effective on November 18, 2003. The amendments to the Public Facilities Manual of Fairfax County were adopted on July 7, 2003, and also became effective on November 18, 2003, to include those areas that the Board designated as RPAs and RMAs. RPA and RMA 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.

DPWES enforces compliance with the Chesapeake Bay Preservation Ordinance through the development review and inspection process. In addition, DPWES has the responsibility for assuring that development plans address the requirements of the ordinance as well as are constructed as approved. During 2004, DPWES received 384 site, subdivision, and public improvement plans for review and approval; of these, 188 were first submission plans (a plan may be submitted multiple times before approval is granted).

The NVSWCD 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 (RPAs). 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 NVSWCD as needed. NVSWCD also develops conservation plans for landowners receiving state cost-share money for installing agricultural BMPs, such as manure storage and composting structures, or fencing animals out of streams.

In 2004, thirteen soil and water quality conservation plans were developed for 1001 acres and included 7,070 linear feet of RPAs. Cumulatively, 9,960 acres and 267,161 linear feet of RPAs are covered by water quality conservation plans that have been developed since 1994 when the program began.

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

Four Mile Run TMDL/Implementation Plan

In compliance with the Virginia Water Quality Monitoring Information and Restoration Act (WQMIRA), the Northern Virginia Regional Commission (NVRC), under a contract with the Virginia Department of Environmental Quality (VADEQ), worked with the four watershed jurisdictions—Fairfax and Arlington County 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 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 marks the first for an urban area in Virginia and was endorsed by all four watershed jurisdictions.

<http://www.novaregion.org/tmdlresource.htm>

Other TMDLs in Fairfax County

There are nineteen Category 5 waterbodies (impaired—requiring a TMDL) with drainage areas in Fairfax County included in DEQ’s Virginia Water Quality Assessment 305(b)/303(d) Integrated Report (August 2004). A summary of these waterbodies is provided in the table below. Of the listed waterbodies, twelve 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 PCBs in fish tissue and bacteria. Ten of the nineteen waterbodies are multi-jurisdictional, i.e., include drainage areas outside Fairfax County. Fecal coliform TMDLs have been completed for two waterbodies, Accotink Creek (above Lake Accotink) and Four Mile Run, and were approved by EPA on May 31, 2002, and by the Virginia State Water Control Board (SWCB) on June 17, 2004. According to DEQ’s current schedule, seven waterbodies require TMDL studies to be completed by 2010, nine require studies to be completed by 2014, with three to be completed by 2016. 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 county had broad discretion in developing an approach to this effort; through the Chesapeake Bay Supplement, an innovative approach was pursued that 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. In all, 42 actions are recommended in the supplement (with three actions listed twice). Many of these recommended actions build from efforts that are already under way or anticipated, while others reflect new initiatives that will need to be pursued. Staff is currently developing implementation plans for the actions that are recommended in the supplement.

The Environmental Quality Corridor (EQC) 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 EQC

policy recommends the preservation and restoration of areas including floodplains, steep slopes (slope gradients of 15% 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 EQC protection (RPA and floodplain provisions in the County Code protect many, but not all, EQC areas), the application of the EQC 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 design (LID) 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 (DPZ), in coordination with other DPZ staff and staff from other county agencies, reviewed 121 rezonings and related applications (e.g., amendments), 66 special exceptions and amendments, and 138 special permits in 2004 for environmental considerations.

Stormwater management and drainage issues continue to be evaluated throughout the development review process, and the county continues to seek improvements in how these issues are addressed during this process. On March 29, 2004, the Board of Supervisors adopted an amendment to the Zoning Ordinance that substantially expanded the submission requirements for all special permit, special exception, rezoning, and development plan applications as they relate to stormwater management and drainage issues. The amendment also significantly restricted the extent to which the limits of clearing and grading for stormwater management facilities can be expanded (such expansions are not permissible where they will result in a reduction of non-stormwater management open space, tree save, and/or landscaping area on the property in question). Details are provided in a letter to industry that was sent to all Architects, Builders, Developers, Engineers, and Surveyors practicing in Fairfax County. The letter can be found at the following Web address:

<http://www.fairfaxcounty.gov/dpwes/publications/lti/04-06.htm>

In conjunction with the adoption of this amendment, the technical review of stormwater management and drainage issues during the development review process was strengthened

In September, 2002, the Board of Supervisors adopted a plan amendment to revise the criteria that are used to evaluate residential development proposals. This amendment included a heightened emphasis on environmental protection, including stormwater management. The following text was added to address water quality and drainage issues; this text is applied during the review of all residential rezoning requests:

Water Quality: Developments should minimize off-site impacts on water quality by commitments to state-of-the-art best management practices for stormwater management and low-impact site design techniques.

Drainage: The volume and velocity of stormwater runoff from new development should be managed in order to avoid impacts on downstream properties. Where drainage is a particular concern, the applicant should demonstrate that off-site drainage impacts will be mitigated and that stormwater management facilities are designed and sized appropriately. Adequate

drainage outfall should be verified, and the location of drainage outfall (onsite or offsite) should be shown on development plans.

DPZ staff is implementing this Comprehensive Plan guidance during the rezoning process for proposed residential projects.

Implementation of Infill and Residential Development Stormwater and Erosion and Sedimentation Control Initiatives

The Infill and Residential Development Study staff have reviewed the effectiveness of current policies regarding erosion control and storm drainage with the multiple goals of minimizing impacts of storm water from a proposed development on downstream properties, limiting the impacts of stormwater management facilities on neighborhoods, ensuring that developers are accountable for impacts from their developments, and upgrading existing inadequate facilities. Some of the recommendations presented include:

- Adoption of innovative BMP policies to reduce impact during development and allow greater flexibility in the engineering of proposed sites
- Improved design and performance of proposed storm water management facilities by implementing a technical review of certain components during the rezoning process
- Enhanced requirements and better definitions for design professionals for evaluating the adequacy of stream channels for increased runoffs due to new developments during the design process
- Identification and survey of water impoundments downstream of a proposed development that could be impacted by a proposed development, and assignment of accountability for impact resolution
- Adoption of a program to retrofit existing non-water quality control facilities to perform this function as well
- Development of a BMP monitoring program

Implementation of the recommendations is continuing in all areas of the initiatives identified in the “Infill and Residential Development Study.” Significant progress was made toward fulfillment of the storm water and erosion and sedimentation (E&S) control initiatives over the past year. Many of the initiatives have been completed in prior years and further completion or substantial progress was made, most recently, in the following key areas:

- Amendment of the Zoning Ordinance to strengthen stormwater management submission requirements, and a concurrent strengthening of staff’s technical review of stormwater management issues during the development review process
- Completion of a Violation Matrix to better enable staff to enforce the E&S requirements and provide industry with a more predictable path toward resolution of violations
- Continued analysis of measures and methods to improve the efficiency and capabilities of E&S site controls including drainage area to temporary inlets, use of devices such as the Faircloth Floating Skimmer, chemical erosion prevention products, or bonded fiber matrix products
- Establishment of a committee comprised of staff and industry professionals, in conjunction with the Engineers and Surveyors Institute (ESI), to review and evaluate the current adequate outfall provisions with intent to recommend policy and regulatory changes to help address these issues.

Zoning Ordinance and Subdivision Ordinance

During 2004, 384 site, subdivision, and public improvement construction plans were reviewed for code compliance; of these, approximately 174 were approved for construction. DPWES enforces the Zoning Ordinance and Subdivision Ordinance criteria related to stormwater for new development and redevelopment through its plan review process. This ensures that BMPs 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. The complaints related to potential stormwater impacts are sorted into the following categories:

- 1) Drainage, which includes such items as obstructed streams or blocked drainage structure inlets, backyard flooding, etc
- 2) Junk yards, which involve construction debris, abandoned vehicles, used appliances, etc., often located on vacant lots
- 3) Outside storage located at an occupied residence, which includes general items such as bikes, boats, batteries, used lumber, tires, empty paint or fuel
- 4) Storage yards, which may involve construction-related material (including mobile homes left behind), roof material, tires, etc.

Strengthening the Effectiveness of the Erosion and Sediment Control Program

The Board of Supervisors passed a motion in April, 2004, directing staff to strengthen the effectiveness of the county's erosion and sediment control. A committee has been formed. The members of the committee include DPWES staff, Northern Virginia Building Industry Association (NVBIA), and the Engineers and Surveyors Institute (ESI). The committee has identified the following items for further study, evaluation and implementation:

- Improve communication between development community, Department of Planning and Zoning, Site Review, Inspections and citizens
- Examine current drainage complaint databases and streamline reporting, evaluation, and resolution of complaints
- Enforce existing codes and regulations more strictly
- Add codes and regulations that will enhance E&S Program.
- Examine E & S practices of other jurisdictions and consider adopting those that might be useful to Fairfax County, such as a 'Sod Ordinance' which may require that house grading lots below one half acre must be stabilized by placing sod instead of the current practice of seeding and mulching
- Subject small sites to ESI Peer Review, similar to the current practice in other plans
- Require adjoining property notice for infill lot development proposals
- Increase civil penalties for E & S violations
- Provide incentives to engineering industry for constructability review of their plans
- Enhance education and information programs for industry and citizens

Letters to Industry

Site Development Services sent two letters to the industry that affected off-site impact of stormwater, erosion, and sediment transport and deposition.

- The letters informed industry of the zoning amendment that requires development plans to include the location; estimated size of facility footprint in area; and type of all stormwater management facilities, including the full extent of side slopes, embankments, spillways, dams and water surface elevations of design storms, if applicable. In addition, all applications are required to submit a preliminary stormwater management plan that includes information about the adequacy of downstream drainage, including the sufficiency of capacity of any storm drainage pipes and other conveyances into which stormwater runoff from the site will be conveyed. In addition to the above, those applications proposing land disturbing activity of 2500 square feet or more are required to submit additional graphic and narrative information. The graphic information requires the depiction of: 1) the facility footprint and, where applicable, the height of any dam embankment and location of the emergency spillway outlet; 2) the on-site and off-site areas to be served by the facility and the acreage draining to each facility; 3) a preliminary layout of all on-site drainage channels, outfalls, and pipes within the facility; 4) the location of any access roads or other means of access to the facility with a description of the type of road surface; 5) proposed landscaping and tree preservation areas in or near the facility; and 6) the approximate limits of clearing and grading on-site and off-site for the facility, storm drainage pipes, spillways, access roads and outfalls, including energy dissipation, storm drain outlet protection and/or stream bank stabilization measures. The narrative information requires: 1) a description of how the detention and best management practice (BMP) requirements will be met; 2) the estimated area and volume of storage of the stormwater management facility to meet the detention and BMP requirements; 3) the existing outfall conditions for each watercourse receiving drainage from the site; and 4) a description of how adequate outfall requirements of the Public Facilities Manual will be satisfied.
- In response to industry requests, Land Development Services clarified the existing on-site and off-site tree protection requirements during development to conserve and protect the land, water, air, vegetation, and other natural resources of Fairfax County; and to alleviate erosion, siltation, and other harmful effects of land-disturbing activities on neighboring land and streams by ensuring that the owner of the property on which land-disturbing activities are to be carried out provides adequate controls of erosion and sedimentation and takes necessary measures to preserve and protect trees and other vegetation during all phases of any land-disturbing activity.

A class and a workshop are annually conducted on E&S controls, constructability issues pertaining to the implementation of E&S controls, and E&S regulations through the Engineers and Surveyors Institute (ESI). The class and workshop were attended by both the private and public sector employees. In addition, in 2004, EFID staff planned and conducted a course through ESI that addressed house lot grading issues with an emphasis on E&S controls during plan submission, inspection, and compliance. State and federal requirements for E&S control as well as practical applications were discussed. Facilitation of construction and maintenance of E&S controls and NPDES/UPDES permits were discussed.

The Environmental and Facilities Inspections Division of DPWES (EFID) organized and conducted a presentation to the Fairfax County Public Schools Construction Industry in partnership with the Virginia Department of Conservation and Recreation, and the Virginia Department of Environmental Quality, on federal, state, and Fairfax County requirements pertaining to E&S controls and the protection of natural resources during the land development process. Other efforts included presentations to Green Breakfast

Group and other partners in environment protection. In 2005, EFID is expanding its outreach to many friends of the environment and enlisting their support of our efforts to protect the county resources.

Staff from EFID visited Stafford County to discussed regional approach to erosion and control. These efforts will be continued as other surrounding jurisdictions are joining Fairfax County in this endeavor. A regional conference on E&S is planned.

EFID has implemented the Alternative Inspections Program approved by the state. Under this program the construction sites are given a score according to the following criteria: (A) denuded area of the project, (B) proximity to watercourse crossing, (C) distance to adjacent downstream property, (D) distance of a denuded area to a Natural Watercourse, (E) vegetative buffer, (F) distance from the site storm outfall to any environmentally sensitive feature such as wetlands, (G) presence of any critical slopes within 50 feet of an adjacent property and, (H) soil erodibility. The overall project score classifies the project as high, medium, or low priority. The frequency of inspections is based on this classification. This program has resulted in a decrease in downstream properties being negatively impacted by erosion and sedimentation from active construction sites. Refinements to this program are being made in 2005 in cooperation with the Department of Information Technology. With these improvements staff will be able to predict trouble spots and change inspection priorities.

Construction Site Runoff

During 2004 a total of 268 Erosion and Sediment (E&S) Control 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 (DEQ) informing them of these individual sites (***Appendix G***). In addition, 30,888 E&S inspections were conducted by the Environmental and Facilities Inspections Division (EFID) during 2004 on all sites under construction in Fairfax County. This amounted to providing E&S 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.

The construction sites that do not conform to the construction rules are given a notice to comply and a written notice of violation. There were 335 notices of violation given to the construction sites not conforming to the approved plans. This requires follow-up inspections by the site inspectors. There were 834 violation inspections, in addition to 30,888 E&S inspections.

A 24-hour hotline established by the Code Enforcement Division of DPWES continues to be an effective means for citizens to report complaints about erosion and sedimentation. For soil erosion and sediment transport and deposition affecting adjacent land or streams or other bodies of water, or mud being tracked onto public streets by construction vehicles, residents can contact the Code Enforcement Division at (703) 324-1937. For problems with the removal and addition of soil without a construction permit, residents should contact the Code Enforcement Division or Northern Virginia Soil and Water Conservation District at (703) 324-1460. For problems with soil erosion on private property that are not related to land-disturbing activities, residents should contact the Northern Virginia Soil and Water Conservation District at (703) 324-1460. More information is available with regard to reporting environmental concerns or of possible violations of Fairfax County environmental regulations at DPWES' web site:

<http://www.co.fairfax.va.us/gov/dpwes/publications/urbanfor.htm>

In support of the E&S control review program, the Northern Virginia Soil and Water Conservation District (NVSWCD) evaluates E&S controls, water quality protection, and stormwater management aspects of preliminary plans and site plans in the Pohick Creek Watershed. They also evaluate all Department of Public Works and Environmental Services (DPWES), Fairfax County Park Authority, and School Board projects; projects within three miles of the Potomac River; and other plans as requested, particularly those which appear to involve special difficulties in soil types and slopes and with particular attention to the properties of soils, the potential for erosion, and the impact on drainage, stormwater management, and the surrounding environment. Comments are provided to the Department of Planning and Zoning; and NVSWCD provided technical advice and information to developers, consultants, and engineers on the properties of soils in the county and on potential erosion and drainage problems. 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 with Land Conservation Awards. A NVSWCD judging team evaluates sites twice a year for these awards. 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, which includes remarks by elected officials and representatives of the development community, is held in January.

Northern Virginia Regional Commission

Regional Pollution Prevention Outreach Strategy

Northern Virginia Regional Commission (NVRC) continued to coordinate with the EPA Chesapeake Bay Program's pollution-prevention campaign on behalf of Northern Virginia localities. The purpose of coordinating media campaigns on a regional basis is to ensure a greater number of exposures and audience reach to improve the cost-effectiveness of local outreach efforts. Public education is a required component or nonstructural best management practice (BMP) of stormwater and other water quality programs, such as Total Maximum Daily Loads (TMDLs).

For the Northern Virginia campaign, representatives of local jurisdictions reviewed stormwater educational messages and selected a pre-produced radio ad for airing during early spring, 2005. A number of jurisdictions committed to pooling stormwater education funds in order to achieve greater impact for dollars spent. NVRC issued a Request for Proposals and a media buying firm was selected.

Coastal Program Pollution Prevention Media Strategy

Working with local jurisdictions, NVRC prepared a media strategy report to address the problem of stormwater pollution. The report addresses the pollution-causing behaviors to be targeted, target audience demographics, messages, media options, and budget alternatives. In addition, the report contains findings regarding the basics of behavior change, conservation communications challenges, market research, effective messages, media considerations, and "earned" or unpaid media coverage. The information contained in the report is intended to be a useful reference for any conservation-related communications effort.

NVRC is coordinating the proposed regional campaign with that of the larger Chesapeake Bay Program. It is expected that local participation in the campaign will address the outreach requirements of a number of existing programs, including MS4 stormwater programs, Total Maximum Daily Load implementation, and Potomac Tributary Strategies. Upon acceptance by government partners, NVRC will coordinate implementation. NVRC will report to the Virginia Department of Environmental Quality on implementation progress and will make an assessment of the effectiveness of a regional approach.

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 NVRC chairs. Activities include participating on a conference planning subgroup of the workgroup. This subgroup is planning an Urban Summit Conference to be sponsored by the Chesapeake Bay Program at the request of the Bay Programs Implementation Committee. Fairfax staff members have also been active in a workgroup initiative to look at the science of biofiltration BMPs and all their derivatives and the implication to local government operations and pollution credit. Some of the leading academic researchers are assisting in this effort and the intention is to bring together science and local government reality.

Coastal Resource Protection Teacher Education

NVRC staff conducted a session at the Earth Force Teachers Institute in Alexandria in September to brief area teachers on resource protection tools, ranging from blue and green infrastructure and conservation design to low impact development and watershed planning. Teachers were provided with examples of things that students can do to make a difference—from monitoring streams, to reporting erosion and sediment control violations, to testifying before elected officials on natural resource issues.

Occoquan Watershed Management Planning

NVRC 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 and various stakeholders, participate in this program.

At the request of the Occoquan Technical Advisory Committee and the Virginia Department of Environmental Quality (DEQ), the Northern Virginia Regional Commission entered into agreement with the Commonwealth of Virginia to develop TMDLs for bacteria in Occoquan sub watersheds of Licking and Cedar Run. NVRC has started to coordinate with key staff from the affected localities that share the watershed. The TMDL was completed and adopted by the EPA in July of 2004. The rationale for the approval can be found at the following address:

<http://www.deq.virginia.gov/tmdl/apptmdls/epa/epacdrk.pdf>

The TMDL was adopted by the State Water Control Board in December of 2004.

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

Onsite Wastewater Treatment Systems

This project, funded by the Virginia Coastal Nonpoint Pollution Program, is designed to foster sustainable solutions to the management challenges associated with new alternative onsite wastewater treatment systems (AOWTS). Proper management of AOWTS is essential to protect public health, property values and the safety and integrity of surface and ground water.

A technical forum as part of NVRC's project was held in conjunction with the Virginia Onsite Wastewater Recyclers Association (VOWRA) annual conference on October 7, 2004, in Chantilly, Virginia. Nationally known speakers presented perspectives on planning and managing onsite wastewater

systems. Participants included industry practitioners, health department officials, planning commissioners, and planning staff. The forum was designed to lay the groundwork for a long-term solution to the need for effective management of onsite wastewater treatment systems.

Quick guides to alternative onsite wastewater systems for officials and homeowners were developed as part of this project. Guides for officials present the elements of AOWTS technologies and management implications to support land use decision-making. The guides for homeowners underscore the importance of maintaining AOWTS to protect family health, property values, and ground and surface water quality. In addition, the project included reports on findings and analyses of primary and secondary research, forum proceedings, and recommendations for future activities.

Low Impact Development

With funding from the Virginia Department of Conservation and Recreation and the EPA Chesapeake Bay Program, NVRC completed a multi-faceted project to address the need for basic information related to Low Impact Development (LID) technology. NVRC coordinated the writing, story development, and production of “Reining in the Storm—One Building at a Time.” This 30-minute digital film presents the essential elements of LID, reflecting the five principles developed by Virginia’s multi-stakeholder LID workgroup. In addition to the film, an 8-page full-color guide and electronic slide show covering the basics of LID, also reflecting the same themes, were produced to accompany the film.

In addition to the LID film, NVRC coordinated the integration of LID practices into the redevelopment of Tinner Hill, an African-American heritage site in the City of Falls Church and Fairfax County. When completed, this historic site will feature two buildings: a museum to be housed in a residential-like structure and a small performance barn to accommodate small outdoor performances. Fairfax County and the Northern Virginia Soil and Water Conservation District performed the site evaluation, soil testing, and schematic design of LID practices in conjunction with the Tinner Hill Heritage Foundation’s architectural design team and civil engineer. The goal of the LID strategy for Tinner Hill is to reproduce the hydrology of undisturbed forested conditions.

Working with the Tinner Hill Heritage Foundation staff, NVRC developed a program for interpretive signage for LID practices designed for the Tinner Hill site. A LID “trail” will enable visitors to the planned museum and performance barn to view eight individual, decentralized stormwater practices and better understand the value of water as a resource.

Finally, “LID in Northern Virginia” is an informal review of the status of LID in the region, compiled in response to interest in the local introduction of LID strategies into stormwater management programs. A sharing of information and insights is expected to stimulate follow-up activities such as workshops or dialogues to address issues of common concern.

IV. (C) Management

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

Pesticide, Herbicide and Fertilizer (PH&F) Application Program

Application Rates Reduction Report

In an effort to determine application rates and to determine an approach to reduce the amounts of pesticides, herbicides, and fertilizers applied to public rights-of-way, parks, and other municipal

properties, a of the survey of the Fairfax County Park Authority and the Virginia Department of Transportation was conducted. ***Appendix H contains*** the summary report. The goal of the survey was to characterize current agency approaches for the management of pests and weeds and to determine the need for and rates of fertilizer application. A component of the survey was designed to determine current rates of pesticide, herbicide, and fertilizer application by county agencies and utilities. The methodology for developing and conducting the survey, along with the information gathered, are discussed in the report along with resulting evaluation of current methods of pesticide, herbicide, and fertilizer application and recommendations for implementing management measures that will result in reductions in the amounts applied and transported to the county's receiving streams.

The report identifies opportunities to reduce the use of chemical controls for pest and turf management based on the evaluation of current practices being implemented by county agencies and the identification of opportunities to apply best management practices, such as integrated pest management (IPM), and other management approaches. Opportunities for improving management approaches and reducing use of pesticides, herbicides, and fertilizers through the use of environmentally benign controls that meet environmental goals are evaluated. Recommendations for a county-wide approach to reduce the amount of chemicals used to control pests and manage vegetation by county agencies and utility companies are included.

The report notes that the differences in amounts currently used on a per acre basis were substantial and that a first priority in managing pesticide, herbicide and fertilizer use in the county should be to determine the cause of these differences and then eliminate them to the maximum extent practicable.

In addition, the report recommends a countywide, a three-pronged approach to limit the amounts of chemicals applied to county lands. The first step would be the development of a countywide IPM plan, and plans specific to agencies with different land management goals. The next step would be to make these plans available to all county land managers and to provide training in IPM. Finally, since some agencies have implemented IPM principles to a greater extent than others, a countywide land managers' forum could help foster communication among different agencies and facilitate the exchange of ideas for new practices.

Once such an approach has been implemented, future surveys could help determine trends in pesticide, herbicide and fertilizer applications to county lands.

NVSWCD

NVSWCD continues to distribute *You and Your Land—A Homeowner's Guide for the Potomac Watershed*. It can be viewed at NVSWCD's web site at:

<http://www.fairfaxcounty.gov/nvswcd/yyl-intro.htm>

Under the county's Chesapeake Bay Preservation Ordinance, the NVSWCD 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.

NVSWCD 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.

<http://www.fairfaxcounty.gov/nvswcd/horse.htm>

In addition, NVSWCD reviewed nutrient management and integrated pesticide management plans for three golf courses and provided comments and recommendations to the Department of Planning and Zoning.

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 MS4 permit application was submitted in November 1992.

Landfill Monitoring Program

The Division of Solid Waste and Resource Recovery (Solid Waste Management Program) is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road in Lorton, Virginia, and the I-66 Transfer Station/Closed Landfill, located at 4618 West Ox Road in Fairfax, Virginia. Both facilities are located on county property and are covered under the VPDES 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 VPDES permit as VAR051074. The permit expires on June 30, 2009.

The I-95 Closure Plan project was designed to complete the capping of approximately 130 acres of Municipal Solid Waste (MSW) section of the landfill, as approved by the Virginia Department of Environmental Quality (VADEQ). The construction of the project started in May 2003 and is anticipated to be completed by December 2005. The closure project is divided into four phases, with each phase consisting of approximately 40 acres. The final cover system will consist of an 18-inch low-permeability soil and 15-inch protective cover/vegetation support layers. As a result of this work, storm water will be managed more efficiently and infiltration will be reduced significantly, in turn providing for less generation of leachate. The final cover system will minimize the need for post-closure maintenance.

The Area Three Lined Landfill Phase IIB project is part of the I-95 Area Three Lined Landfill Project (ATLL). This project will receive approximately 1,000 tons of incinerator ash per day from the Energy Resource Recovery Facility (E/RRF) located at the I-95 Complex and in Alexandria. Construction of the ash cell started in June 2004, was substantially completed in early November 2004, and is currently awaiting final inspection from VADEQ. The 7.5-acre cell consists of a landfill bottom lining system that includes two feet of low-permeability soil, double synthetic liner (60 mil HDPE), and a leachate collection and detection system. The capacity of this project for the placement of ash is anticipated to be three years.

The E/RRF has added a dolomitic lime system to its operations to chemically bind metal with the ash to prevent leaching when the ash is landfilled. The system allows the reduction of the pebble lime reagent during the burning process. Recovered metal accounts for 8.1% of the total ash stream and is recycled.

Division staff performs quarterly visual inspections at stormwater outfalls located at the I-95 Landfill and I-66 Transfer Station/Closed Landfill. The quarterly 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 VPDES monitoring, testing, and other related activities are included as part of the operating budget for each facility and are not funded separately. This is done because most of the activities required by the VPDES permit are also required under the operating permits granted by VADEQ. Test results and inspection reports are maintained at the division's main office, and copies are on file at the facilities' 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 VPDES permit condition have been satisfactory.

The division maintains a website 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.

Dam Safety Program

Revised Emergency Action Plans for Four Dam Sites

A study was performed on the adequacy of the emergency action plans for four of the six County's PL-566 earthen dams. The emergency spillways of the four dams involved in the study were previously investigated and found to be unable to convey the Probable Maximum Flood without severe damage to the spillways and even the breaching of the dams themselves. The emergency action plans were revised to reflect not only the results of the emergency spillway studies but also in light of the recently released rainfall versus intensity curves released by the National Weather Service. In addition, Emergency Actions Plans for nine other dams owned and operated by DPWES have been prepared and will soon be submitted to DCR's Division of Dam Safety for review, in accordance with the State's Impounding Structure Regulations. Dam breach inundation zones were determined and corresponding layers were created in the County's Geographic Information System for use with Emergency Management's Reverse 911 system. Additionally, inspections were performed to identify any deficiencies which pose safety concerns. Once accepted by DCR these nine dams will be added to the six DPWES facilities currently regulated by DCR.

Floodplain Management

Digital Elevation Model 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 GIS, SWPD contracted with photogrammetry and mapping specialists to create one-foot contour interval digital mapping over the two square miles of the flood prone area.

Level I Digital Flood Insurance Rate Map

With the help of a grant from FEMA, the source data for the current Federal Flood Insurance Rate Maps (FIRMs) was digitized and a draft Level I Digital Flood Insurance Rate Map (DFIRM) was created. This is the first and most involved step in the process of creating an official DFIRM. Once approved by FEMA, this information can be overlaid on base mapping to create the final product. The final version of the DFIRM 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 FEMA. 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 DFIRM production.

FIDO Floodplain Warning Tool

The new permits computer database, “Fairfax Inspections Database Online” or “FIDO,” scheduled to be launched in April, 2005, 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 HECGEORAS 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 FIDO was being created. SWPD and the GIS 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 FIDO 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 by developers and approved by SWPD.

Spill Prevention and Response

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

The Hazardous Materials & Investigative Services Section (HMIS) investigates complaints of potential and actual releases, many of a non-emergency nature. Approximately 500 investigations of oil or other liquid spills are conducted each year. HMIS 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, HMIS 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 HMIS 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, HMIS, as an agent of the Director of DPWES, accepts, reviews, and processes requests to discharge treated groundwater from remedial activities at those sites into county sewers. HMIS then monitors the discharge for the duration of the agreement. DPWES 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 FRD’s HMIS aggressively enforces County Code Chapters 105 and 106 in conjunction with DWPES and DPZ 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 I*) 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 (CAPs). A CAP may be issued to a site for remedial activity required because of groundwater contamination. The CAPs may involve the discharge of treated groundwater to the storm sewer system. The FRD'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 77 active sites undergoing remediation activities.

In 2004, responses to incidences which had the potential to discharge hazardous materials into storm drains or surface water included: fifteen improper disposals, nine pipeline incidents, 63 various types of product release and 252 petroleum releases. Storm drains and creeks/streams were reported to have been directly contaminated in 33 cases. There were fourteen cases involving products released from transportation accidents. None were reported to have reached storm drains or surface waters in the county. Major incidents for the year included 275 gallons of off-road diesel fuel being discharged into the Potomac River and 275 gallons of waste motor oil being discharged into Tripps Run and Lake Barcroft. The incidents involving potentially hazardous materials entering the storm sewer system and areas of surface water runoff are summarized in *Appendix J*.

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 is a significant cause of erosion in county streams.



Runoff carries pollutants, including trash, to county streams.

Dry Weather Screening Program

A total of 280 sites were screened for illicit connections and improper discharges to the MS4 during 2004, using a combination of grab samples, optical brighteners, and automated hourly sampling. Fairfax County's Dry Weather Screening program has been a part of the VPDES permit for the past eight years. The goal of the program is to continue ongoing efforts to detect the presence of illicit connections and improper discharges to the MS4. During 2004 extensive field screening efforts were again carried out in the Accotink Creek Watershed as a result of proactive implementation of a TMDL, which was developed for fecal coliform impairment for portions of Accotink Creek. SWPD's staff worked with the USGS in screening outfalls. There were 220 sites sampled during two sampling events, optical brightener monitoring was performed at 60 locations, and hourly sampling (via automated samplers) was performed at six stations.

Wet Weather Screening Program

The goal of the program is to investigate and address known areas within the county that are contributing excessive levels of pollutants to the MS4. In 2004, using the data collected as part of the Industrial and High Risk Runoff program, nine potential sites were identified for possible wet weather screening. Some of these sites will be sampled in 2005. A map showing the nine locations is in [Appendix K](#).

A GIS-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.

Industrial and High Risk Runoff Program

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 MS4. Possible areas include: landfills; other treatment, storage, or disposal facilities; hazardous waste treatment, storage, disposal, and recovery facilities; facilities subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) Title III, Section 313.

During 2004, nine sites from the DEQ list of VPDES permitted stormwater industrial facilities that discharge into the Fairfax County MS4 were selected for potential wet weather monitoring, some of which will be sampled in 2005. This list will be expanded in future years by coordination with the county's Fire and Rescue Department's (FRD) Hazardous Materials and Investigative Service (HMIS) and the County's Division of Solid Waste Disposal. The complete list is in [Appendix L](#).

Watershed Monitoring Program

The permit requires the development of a long-term Watershed Monitoring Program to verify the effectiveness and adequacy of stormwater management controls and identify areas of water quality improvement or degradation.

The county's goals for the program are: 1) Evaluate the effectiveness of regional versus on-site stormwater management practices; 2) Obtain data for the development, calibration, and verification of water quality simulation models; and 3) Determine whether differences in pollutant concentrations from various residential land-uses (low, medium, and high density) are statistically significant.

A paired watershed approach is being used to meet these goals. The paired watershed approach entails the comparison of water quality data from two or more watersheds with different levels of imperviousness. Potential locations (at a subwatershed scale, approximately 0.8 square miles) for water quality monitoring have been identified by using available GIS information as part of the county's integrated monitoring design. Subwatersheds with current land uses that were (1) predominantly low density residential, and (2) predominantly medium to high density residential, were identified. These subwatersheds have been evaluated using GIS layers (orthophotography, street, streams and stormwater, and storm sewer inventory) to determine locations for field investigation.

During 2004, field investigations of the potential sites were conducted. One of the most important aspects was site access, not only for installation/construction, but for maintenance, placement and recovery of the automated sampling equipment and collection of water samples. Two sites were selected and water sampling hardware was mounted in the outfall. Permanent housing structures with locks were installed next to the outlet for the Isco sampler and the rain gauge.

Water Quality Monitoring

Two sites, one draining a high-density residential area, and the other a low-density residential area, were monitored in 2004 during the same rainfall event. The water quality and rainfall data are summarized in [Appendix M](#). The data suggest the event mean concentrations (EMCs) for many constituents are significantly greater for the high-density residential site compared to the low-density residential site. While total nitrogen (TN), total kjeldahl nitrogen (TKN), and total dissolved solids (TDS) concentrations were similar at both sites, total suspended solids (TSS) and total phosphorous (TP) concentrations were

two to two and a half times greater at the high density urban site. Additionally, fecal strep and *E. coli* concentrations were seven to ten times higher at the high density urban site. When compared to the five-year median (1997 to 2001) EMCs for most of the constituents are comparable except for TSS and TP, which are considerably higher in the 2004 sample. One possible explanation for this is that the sampler intake location may have resulted in bedload sampling. This will be further evaluated after the next round of sampling results is available. At the current time there is insufficient data to allow statistical analysis of the differences in constituent EMCs from the two sites or computation of loadings from the sites. Monitoring will continue in 2005 and the data used for statistical analysis of differences in constituent EMCs from the sites as well as the development of continuous water quality models that provide more refined prediction of water quality loadings. This will allow more meaningful evaluation of alternative stormwater management strategies.

Automated sampling equipment was used to collect stormwater for water quality monitoring. Collection was triggered by preset rainfall amount and stream stage. 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 reporting data from the Isco 6700 automatic sampler and Pal 1101 pH monitor, data loggers use Isco FlowLink4 and Isco Samplink software programs, respectively. The Isco FlowLink4 data reports (program settings report, combined results rain and flow reports, and the data tables for flow and rainfall) correspond to the American Sigma Streamline data reports provided in year one of the permit. In addition, the FlowLink4 reports include hourly summary reports and graphs (plotted using five-minute data intervals) for rain and flow. The Isco Pal pH monitor will measure 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, will be 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.

Bacteria Monitoring Program

The first full year that the Stormwater Planning Division (SWPD) has taken over bacteria monitoring from the Health Department was concluded in 2004. The 84 original sampling sites were sectioned into nine separate zones and two of those zones were sampled twice a month, for a total of over 300 bacteria samples. In response to the EPA recommendation to use concentrations of *E. coli* rather than concentrations of fecal coliform to determine possible health issues, the concentration of *E. coli* was determined in addition to fecal coliform starting in May of 2004. Bacteria sampling involved using whirl packs to take grab samples from the stream to determine the concentration of fecal coliform and *E. coli* in the water. In addition to the assessment of bacteria, sterile bottles were used to collect samples to determine NO₃ and PO₄ as a secondary test for possible human inputs. Finally, chemical parameters, such

as pH, water temperature, dissolved oxygen, and specific conductance, were taken at the time of bacteria sampling using a combination of YSI 85 or YSI 556 and Accumet Portable pH meters. The sampling techniques, the sample site locations, the parameters sampled, as well as the chemical data collected for each site is the same as the previous Health Department monitoring program. More information will be available in the SWPD Comprehensive Monitoring Report, which will be completed in spring of 2005.

Bioassessment and Integrated Water Quality Monitoring Program

In 2004 a probabilistic site selection sampling methodology was implemented to allow statistically defensible inferences on a countywide basis. A stratified random site selection methodology was chosen to achieve this goal. Stratification was based on the Strahler stream order and randomly selected from all county waterways from first to fifth order (rivers and lakes excluded). Sites were also chosen to proportionally represent the distribution of stream orders throughout the county network, and also with respect to physiographic province. Therefore, the majority of sites were selected from first order streams, while the higher order streams had proportionally fewer sample sites (relative to their representative abundance). Likewise, a proportionally representative number of samples were randomly chosen from the three physiographic provinces that the county lies in. In 2004, 30 sites were sampled in Fairfax County, along with the 11 Piedmont reference sites in Prince William Forest National Park. Two additional Coastal Plain reference sites (located in the county) were also sampled. All sites were sampled for benthic macroinvertebrates, while second- through fifth-order sites were also sampled for fish. First order sites were excluded from fish sampling because of their relatively low abundance of fish.

Other ongoing 2004 Stream Protection Strategy (SPS) program activities included:

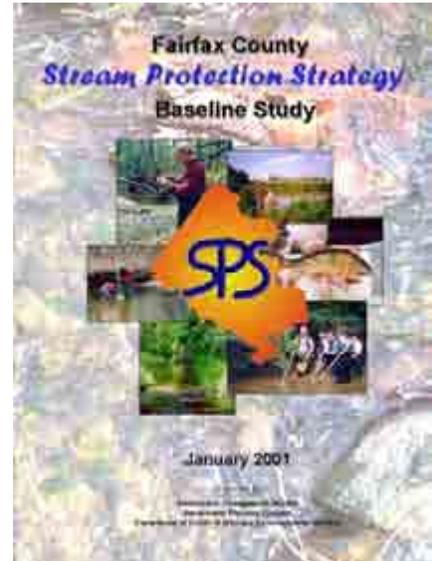
- Conducting a quality assurance/quality control (QA/QC) survey on the perennial stream field data and updating/correcting the Fairfax County Chesapeake Bay Preservation Area maps (adopted in 2003) with any necessary changes (for final submittal in spring 2005).
- Collaborating with George Mason University in an USEPA jointly funded assessment of wetlands within Fairfax County, with a special emphasis on their relative degree of correspondence with National Wetland Inventory (NWI) maps and analysis of similarity between urban BMPs and natural wetlands.
- Assisting U.S. Geologic Survey staff in sample collection and discharge assessment in an ongoing fecal coliform source tracking study within the Accotink Creek watershed related to the bacterial TMDL.
- Cooperation with citizen groups such as Audubon Naturalist Society and the Northern Virginia Soil and Water Conservation District in training and educating citizens in volunteer stream monitoring and the subsequent incorporation of this data into the county database of stream assessments.

The SPS program is an ongoing assessment of the ecological integrity of major streams and tributaries within the 30 watersheds in Fairfax County. The initial phase of this study commenced in September 1998, and a program of annual field monitoring was instituted in the spring of 1999. An original baseline study was conducted in 1999 to evaluate the physical, chemical, and biological conditions of freshwater streams countywide. Modified versions of the EPA's Rapid Bioassessment Protocol (RBP III) were employed along with a QA/QC methodology at 114 sample sites within the county and also at 11 additional biological reference sites in the Prince William Forest National Park. Fish and Benthic

2004 STW

macroinvertebrate communities were sampled along with instream and riparian habitat assessments, chemical (water quality) parameters, channel morphology, and land use/impervious cover assessments. The results from the original baseline assessment (completed in 2000) were used to identify, rank, and prioritize county streams, and broad management categories and strategies were subsequently developed for future restoration and/or preservation efforts on a sub-watershed basis. Major recommendations from the study included:

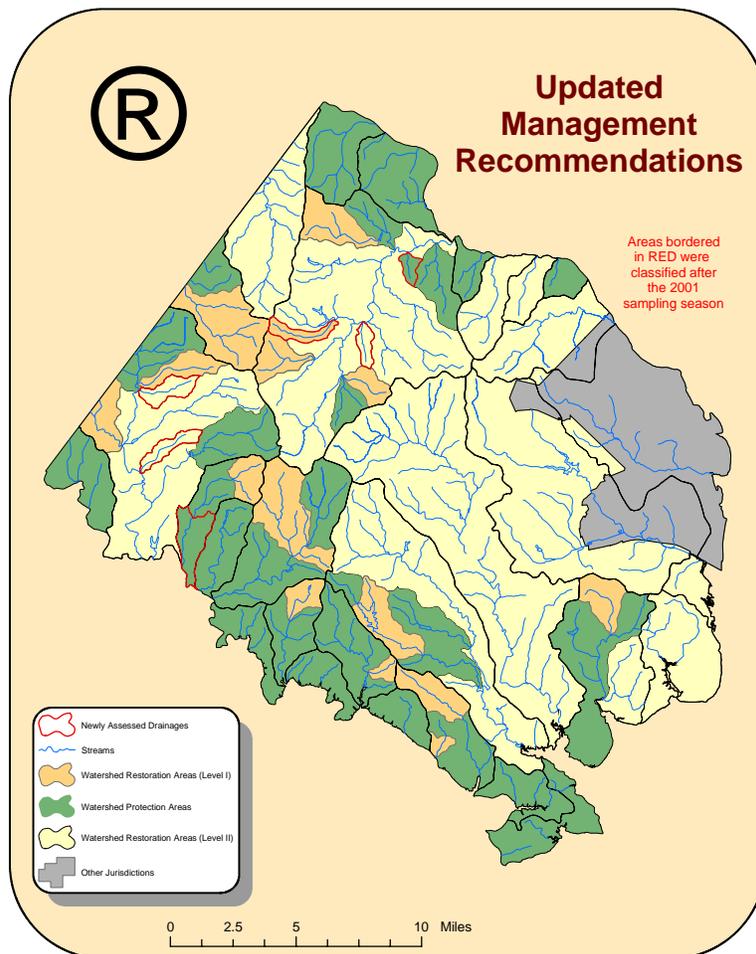
- A continued 5-year rotational sampling scheme for the county's streams
- The need for a complete countywide stream physical assessment survey to be conducted on ALL streams
- Ultimately, the development and implementation of watershed management plans
- The pursuit of a dedicated source of funding for implementing the proposed improvements in county streams and the stormwater infrastructure system
- Encouraged use of Best Management Practice (BMP) and Low Impact Development (LID) techniques in all new construction and retrofit activities



The baseline data is being used as part of a long-term database as well as to guide future management activities, especially as they relate to the development and implementation of Watershed Management Plans. Publication of the baseline report occurred in January, 2001, and the entire document was subsequently made available to the public on the county's Web site:

http://www.fairfaxcounty.gov/dpwes/environmental/sps_main

The countywide sub-watershed management categories were further refined and updated in 2001 (see figure below).



Floatable Monitoring Program

The county is an active participant in Virginia Department of Conservation and Recreation’s (DCR) Adopt-A-Stream program. The Watershed Planning and Assessment Branch of DPWES has adopted a 1.5 mile section of stream in the headwaters of Difficult Run, which they have been cleaning up since the fall of 1999.

During 2003 and 2004 the program expanded to include the determination of the quantity of floatables collected by the numerous clean-up groups within the county. A list of the DCR sponsored Adopt-A-Stream organizations in Fairfax County was obtained from DCR, a survey questionnaire was developed, and contact was made with thirteen organizations to collect the following information: organization name and contact; stream name and location; clean-up dates; and quantity and description of floatables collected. This information was put into a database. The floatables study is presented in **Appendix N**.

Each of the thirteen organizations has adopted a single stream reach within Fairfax County. Stream reaches where clean-up activities are occurring include: Accotink Creek, Cedar Run, Daniels Run, Difficult Run, Tributary of Difficult Run, Dogue Creek/Pikes Creek, Holmes Run, Little Rocky Run,

Pimmit Run, Pohick Creek, Saucy Branch, Shenandoah River, Snakeden Branch, and unnamed perennial streams.

The dominant type of trash found was bottles and cans; next was trash bags, toys, and tires. The average number of bags of trash and the total number of bags increased from 1999 to 2002. In 2002, the total amount of trash decreased while the average number of bags per cleanup event remained relatively constant.

Respondents were asked to identify the most unusual item they found, which included: a Frisbee, deer skull, silt fence, bike, gas mask, beaver skull, golf ball, shovel, car transmission, La-Z-Boy recliner with electric cord, Metrobus sign, empty asphalt containers, civil war cannon ball, apartment advertisement sign, plastic drainage pipe, plastic edging material, muffler, decking material, toilet, motorcycle frame, sofa bed frame, handcart, carpet, street sign, water heater, turkey baster, toothbrush, rusted out car parts, tricycle, truck tailgate, tennis racket, 100 pounds of concrete, wheel barrow, wedding pictures, computer monitor, Ab-roller, partial kayak, baby shoe, and a hub cap.

Accotink Creek Total Maximum Daily Load

In 1998, a 4.5 mile segment of Accotink Creek in Fairfax County, beginning at the confluence of Crook Branch and Accotink Creek to the start of Lake Accotink was placed on the Virginia 303(d) Total Maximum Daily Load (TMDL) priority list for fecal coliform impairment. As a result of this, Fairfax County Health Department entered into a partnership with the United States Geological Survey (USGS), the Virginia Department of Conservation and Recreation (DCR), and Virginia Department of Environmental Quality (DEQ) to pursue a bacteria source tracking study for Accotink Creek as part of a statewide study. The initial study results indicated that the sources of bacteria are distributed as follows; 40% waterfowl, 20% human, 13% dogs, 5.4% raccoon, 1.4% deer, and 21% other.

The final two of eight planned synoptic sampling events were performed during 2004. The first event was completed the week of February 17–20 with a total of 109 samples collected. The second synoptic sampling event was performed Sept 12–15 with a total of 115 samples collected. As part of the September sampling event, optical brightener monitoring was performed at approximately 60 stations, and hourly sampling (via automated samplers) was performed at six stations. This hourly sampling was done to document any short-term variability in the water quality at these stations. Lastly, more intensive storm drain sampling was performed at four storm drains to better understand how elevated fecal coliform concentrations were occurring at the storm drain outfalls. To achieve this goal, samples were collected from the storm drain outfall and a number of other sites that were located further up-gradient into the branched network of each storm drain outfall. Bacteria Source Tracking (BST) and organic tracers were used selectively during campaigns three through seven.

Samples collected exceed the 400 col/100 mL water quality standard 36 percent of the time. A multi-agency team consisting of Stormwater, Wastewater, and Building Code Enforcement personnel was utilized to investigate the storm sewer network, sanitary lines, and buildings near outfalls that were consistently elevated with fecal coliform bacteria and/or other tracers. One such investigation took place at Site T13, where an overflow was repaired. The boron, surfactants, and fecal coliform data collected at this site were at remarkably lower levels after the repair was completed. A preliminary list of “hot spots” has been identified for future investigation in 2005.

The U.S. Geological Survey will be preparing a report summarizing the findings and providing recommendations on the most effective tracers for identifying human sources of fecal coliform bacteria.

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.

The USGS has published a paper specifically on their project in the Accotink Creek watershed of Fairfax County. This report outlines the techniques and methods used in the study and development of the fecal coliform TMDL for Accotink Creek. It can be viewed and downloaded from the Web at:

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

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 BMPs, are minimizing sediment loads to Dogue Creek. Phosphorous loads are not meeting the U.S. Army Corps of Engineers' requirements and almost half the BMP ponds need maintenance. The county and the Corps are currently evaluating the problem and determining the course of action.

The original monitoring program consisted of a single station upstream of Telegraph Road (known 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 are to be 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).

A total of eighteen baseflow water quality samples were collected at the Kingstowne station and South Van Dorn during the July 2003–June 2004 monitoring period. Baseflow sampling provides a good indication of background levels of pollutants and may provide information regarding chronic water quality problems. The data will also serve as a basis for long-term water quality trend analysis. Since grab samples were taken on a monthly-to-biweekly basis, these data provide a “snapshot” of water quality conditions rather than a continuous record. The Kingstowne Annual Report is presented in [Appendix O](#).

Northern Virginia Soil and Water Conservation District Volunteer Stream Monitoring Program

Across Fairfax County, Northern Virginia Soil and Water Conservation District's (NVSWCD) 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 P](#)). 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 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, Department of Environmental Quality, 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. NVSWCD works with many organizations to coordinate and lead additional watershed-based learning opportunities for citizens and students to help them become better environmental stewards. NVSWCD also provides guidance for science projects and internships.

NVSWCD'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, NVSWCD 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. NVSWCD 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, Fairfax Trails and Streams, Friends of Cub Run, and Friends of Sugarland Run.

In 2004, NVSWCD led 54 stream monitoring training sessions or watershed programs, with over 150,000 participants (note: The same person can attend multiple programs and therefore is counted multiple times. The number accounts for each attendee not for different individuals). 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.

The numbers of active monitors is steadily increasing. In 2004, there were 53 active sites. There were 100 monitors who collected winter data, 138 monitors who collected spring data, 165 monitors who collected summer data, and 174 monitors who collected fall data. Approximately 225 students were introduced to stream monitoring through indoor workshops at schools, outdoor special programs, and science fair projects. During 2003, volunteers logged over 3705 Earth Team hours. The Earth Team is a national program of the Natural Resources Conservation Service and tracks volunteer time.

The Northern Virginia Soil and Water Conservation District sponsored teams from James Madison High School, Thomas Jefferson School for Science and Technology, 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.

Newsletters and calendars are sent to about 700 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:

<http://www.fairfaxcounty.gov/nvswcd/monitoring.htm>

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

In 2004, partners included: George Mason University's New Century College, Arlington County's Environmental Services Department, Reston Association, Stormwater Planning Division—Department of Environmental Services and Public Works, 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, Lee High School, G.C. Marshall High School, Fairfax High School, T.C. Williams High School, Robinson High School, Westfields High School, Daniels Run Elementary School, Thomas Jefferson School for Science and Technology, and Green Hedges School. In 2004, NVSWCD continued its strong partnership with GMU's New Century College, introducing over 150 college students to monitoring and involving them in stream restoration and clean-up projects.

NVSWCD continues to distribute *A Volunteer Partnership, Working with Citizens to Improve our Streams*. The brochure was developed by DPWES and NVSWCD to inform citizens about the Stream Protection Strategy study and ways they can become involved through stream monitoring and Adopt-a-Stream programs.

Audubon Naturalist Society

The Audubon Naturalist Society (ANS) 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 EPA's Rapid Bioassessment Protocols (RBP) to perform habitat assessments and benthic macroinvertebrate surveys. All monitoring equipment is provided to the volunteers. There are six permanent ANS sites within Fairfax County that are covered by 20 to 30 volunteers each year. The data collected by ANS are currently shared with DEQ for 305 (b) listings, Prince William County DPWES, 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 EPA's RBP 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 DPWES

Stormwater Public Education and Involvement Program 2004 Overview

The public education and involvement program is an essential component to stormwater management. The county educates residents in hopes of changing behaviors that have adverse affects on Fairfax County’s waterways. Education is one of the least costly ways of improving the county’s watersheds. In this regard, public education is the purest form of implementing countywide water quality improvements.

Throughout 2004, the Stormwater Planning Division educated and engaged more than 5,000 Fairfax County residents through the following projects and activities:

Presentations on General Information

- 5 Fairfax County homeowners associations
- 5 Fairfax County civic organizations
- 10 Environmental groups
- 2 Churches—Adult education classes
- 3 Schools (elementary, high school, and college)

Presentations on Project Specific Information

Information was presented on the Perennial Streams Identification and Mapping Project, Stream Scoping Initiative, Stormwater Management Program, and Watershed Planning.

- 3 Government agencies (local and state)
- 2 National Conferences
- National Water Quality Monitoring Conference
- Cacapon Water Quality Monitors Workshop

Exhibition/Educational Booths at Public Events Sponsored by Fairfax County

- Celebrate Fairfax
- Fall for Fairfax
- Earth Day Expo
- Mt. Vernon Town Hall Meeting
- Providence District Environmental Workshop

Exhibition/Educational Booths at Non-County Public Events

- Naturefest at Runnymede Park
- Earth Day/Arbor Day at Northern Virginia Community College—Annandale Campus



Fall for Fairfax

- World Water Monitoring Day

Explore Your Watershed Walks

(in partnership with the Audubon Naturalist Society and Northern Virginia Soil and Water Conservation District) - Provide opportunities 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.

- Cub Run Watershed (2)
- Pohick Creek
- Cameron Run
- Bull Neck Run

Watershed Cleanups

SWPD staff in partnership with numerous other local agencies support the ongoing efforts to improve the aesthetics and health of Fairfax County's waterways by participating in semi-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

Other initiatives include:

Master Watershed Steward Program

The Potomac River Greenways Coalition, in partnership with DPWES, NVSWCD, ANS, and the Potomac Conservancy, sponsored a free Master Watershed Steward Program for county residents interested in learning about watersheds and how to protect streams that flow into their sources of drinking water—the Potomac River and Occoquan Reservoir. The program consisted of eight evening sessions focusing on the technical and organizational information related to watershed management. Participants gained an understanding of watersheds, stream restoration, management plans and techniques, and how to organize communities for watershed protection. Fifty-four residents completed all of the program requirements, including 24 hours of volunteer service in their watershed (such as cleaning up stream valleys, monitoring streams, implementing low impact development practices, and restoring stream banks) and became certified as master watershed stewards.



Master Watershed Steward Program

Brochures

- Watershed Planning in Fairfax County, May 2004
- Watershed Stewardship Opportunities in Fairfax County, May 2004

Regional Pollution Prevention Outreach Campaign

(in partnership with NVRC and County of Arlington)

- Allocated more than \$75,000 in general funds for this project

Web Page Development

- Web pages were developed for:
 - Stormwater Management home page
www.fairfaxcounty.gov/dpwes/stormwater
 - Stormwater Needs Assessment
www.fairfaxcounty.gov/dpwes/stormwater/needsassessment.htm
 - Occoquan River Dredging project
www.fairfaxcounty.gov/dpwes/stormwater/occoquan.htm
- Online stormwater information is expected to expand over the next year

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. SWPD is a founding member of this group.

Earth Force

SWPD serves as a technical resource for Earth Force's Global Rivers Environmental Education Network (GREEN) 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.

GREEN 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, GREEN 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

- Assisted in training efforts for volunteer monitoring programs in Fairfax County, including:
 - Audubon Naturalist Society
 - Northern Virginia Soil and Water Conservation District

The Environmental Horticulture Division (EHD) of Fairfax County Extension

The Environmental Horticulture Division (EHD) of Fairfax County Extension provides research-based technical information from Virginia Polytechnic Institute and State University (VPI) 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.

EHD 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 15,000 residents
- Low-input lawn care advice is circulated to more than 25,000 residents through monthly articles

in resident association newsletters

- Approximately 4,000 VPI 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

EHD also works intensively with horticulture professionals, both in private industry and local government. In addition to providing one-on-one technical advice on request, EHD 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, EHD plays a major role in the Virginia Nursery and Landscape Association Certification training.

Pesticide use and safety is a major focus of the EHD program, which provides educational materials and logistical support for pesticide applicator certification in cooperation with the Virginia Department of Agriculture and Consumer Services (VDACS). A three-day training session prepared over 65 landscape professionals and local government employees for testing with VDACS 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 Greens Industry Seminar. At a Procrastinators Re-certification Training in late June, 81 participants had the ability to get re-certified in five states and in eighteen categories.

EHD 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 (DPZ). The nutrient and pesticide management plans are developed pursuant to development conditions that are negotiated by DPZ during the zoning process for cases (typically special permit or special exception applications) involving substantial turf-oriented recreational activities (e.g. athletic fields, golf courses, and driving ranges).

Public Reporting

Over the last decade, there have been numerous programs developed to promote stream awareness in Northern Virginia through a variety of activities. These programs include, but are not limited to, the Department of Conservation and Recreation’s Adopt-A-Stream program, which focuses on stream clean-ups; the Northern Virginia Soil and Water Conservation District and Audubon Naturalist’s Society’s Volunteer Stream Monitoring Program, both of which collect benthic macroinvertebrates, use simple water chemistry tests, and observe physical changes in the stream’s morphology; and the Potomac Conservancy, a non-profit organization that monitors the state of the Potomac River shoreline for potential pollution problems from illegal activities.

Volunteers in the NVSWCD stream monitoring program keep an eye on stream segments in their neighborhoods. They routinely report sedimentation and pollution problems that they observe.

Ned Foster, president of the Friends of Little Rocky Run, keeps a lookout for threats to this stream and reports E&S control failures, violations in the RPA, blockages, and other problems to the appropriate county agencies.

The Potomac Conservancy, a non-profit organization, keeps an eye on the Potomac River shoreline, often using canoes to conduct surveillance. It reports pollution problems, such as sediment plumes, and illegal activities such, as clear-cutting, to DPWES.

Fairfax County Health Department

Environmental Health Specialists presented 20 public awareness programs to approximately 500 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 sewer disposal systems, a stream awareness component to alert residents to possible stream health hazards, and information on how to report stream pollution problems.

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 its 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. Robinson students in IB Environmental Systems are doing stream monitoring through the Izaak Walton League’s Virginia Save Our Streams Program. Students at Marshall High School are studying the effect of a rain garden on the water that comes off the school parking lot. Other projects examine geomorphologic changes and nonpoint source pollution. Many schools also offer advanced environmental science courses. In addition to the courses offered, there are school-based projects that examine geomorphologic changes, nonpoint source pollution, and stream monitoring.

The picture on the right is of seventh grade GT Center students from Rocky Run Middle School. They grew underwater grasses, in conjunction with the Chesapeake Bay Foundation’s Bay Grasses in Classes program, as part of a larger unit studying the Chesapeake Bay. The students learned about the importance of the underwater grasses to the health of the Chesapeake Bay—they help reduce the amount of sediments and nutrients in the Chesapeake Bay and its tributaries and provide habitat for numerous species. As a culmination to the project, GT Center students went on a field trip to Mason Neck State Park where they had the opportunity to plant the grasses grown in



Seventh grade GT Center students from Rocky Run Middle School, May, 2004

their science classrooms into the Potomac River. In addition to planting the grasses, students participated in other activities with the Chesapeake Bay Foundation staff such as seining for fish and testing the water quality of the river.

In 2001, Daniels Run began a school-wide environmental education program. The objective was 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 was made to create a sense of environmental stewardship among the students. The next plan of action is to create a riparian buffer along the stream to increase biodiversity and habitat and reduce stormwater runoff. They received a VA Naturally grant to help them in this effort. The participating students will gain 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 will be addressed in very real terms. Students will actually create an area that will improve the water quality within the courtyard area (The Gardens) where students grow crops, using red wiggler worm compost as fertilizer. The red wigglers are fed fruit and vegetable scraps from the school cafeteria.



The students at Daniels Run have been given the opportunity to get 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 and a restored forest understory. Other activities and accomplishments include: certification in June, 2004, as Schoolyard Habitat #2129 by the National Wildlife Federation; a paper-recycling program maintained by Student Council Association (SCA) members; and design of a storm drain marker that will go on every storm drain in the City of Fairfax.

Newspaper articles about the program at Daniels Run can be found through:

- **Washington Post**, Saturday, November 27, 2004, "These Schoolchildren Take a Down-to-Earth Approach to Learning About Their Habitat"
- **Fairfax Connection**, June 10-16, 2004, "Protecting the Environment at Daniels Run Elementary."
- **Conservation Currents**, Northern Virginia Soil and Water Conservation District, December 2003, "Science Grows at Daniels Run Elementary"
- **Close Up**, A Focus on the City of Fairfax Schools, September-October 2003, "A Watershed Event"
- **Fairfax Connection**, July 3-9, 2003, "Please Feed the Worms, Daniels Run Students embrace New Environmental Curriculum"
- **Close Up**, A Focus on the City of Fairfax Schools, March 2003, "Young Scientists Flower at Daniels Run"

In 2004, the Solid Waste Management Program (SWMP) continued to support school recycling efforts through the SCRAP (Schools County Recycling Action Program) program. SWMP published a catalog (the SCRAPbook) of the many educational opportunities available to teachers and students through the SWMP and the Clean Fairfax Council. SWMP awarded grants worth \$3000 to six Fairfax County public schools to fund school environmental projects. For Clean Your Files Week, outstanding recycling and

reuse projects from scout troops and school classes were rewarded with certificates for free ice cream cones from Ben & Jerry's. Finally, over 250 students entered an essay contest about the "Adventures of the Recycle Guys."

Fairfax County Recycling

During 2004, Clean Fairfax Council (CFC) provided information on litter prevention and recycling to Fairfax County Public Schools. The executive director or her designees made 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 CFC offered a program called "Critters Don't Need Litter," which stressed the havoc roadside litter causes wild animals that come to the roadside. The CFC distributed litter/recycling newsletters to all fifth and sixth grade students. Each year, the CFC sponsors the Fairfax County Earth Day/Arbor Day Celebration and participates in two county events—Fall for Fairfax and Celebrate Fairfax. Additionally, the CFC sponsors two countywide cleanups (spring and fall), which involved 20,000 volunteers in 2004.

The Solid Waste Management Program (SWMP) met its goal of collecting 5,000 pairs of shoes as part of the NIKE Reuse-a-Shoe Program. Over 40 Fairfax County government employees were recognized with a Team Excellence Award for their participation in the program. The SWMP is currently applying for a grant for \$25,000 toward a floor made from NIKE Grind (ground up shoes) for a local RECenter.

The SWMP continued its innovative and productive partnership with ServiceSource to recycle used computers. ServiceSource is a nonprofit 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 nonprofit organizations. Advertisements were placed on the radio, on cable TV, and in local newspapers. Three highly successful computer recycling events were held in 2004. Over 400 tons of computers have been recycled since the program's inception in 2002.

SWMP staff made presentations and sent information to 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 the Kingstowne Festival. The Solid Waste Management Program's booth was awarded a blue ribbon for design at Celebrate Fairfax which draws over 10,000 attendees yearly.

To encourage commercial recycling, the SWMP continued 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 winner's site to present the awards at a staff gathering and maximize program exposure.

Internally, the Employee Recycling Committee (ERC) has continued to thrive. The ERC has increased its membership to 25 employees in 2004 and has sponsored 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 ERC was recognized by the Virginia Recycling Association as one of the top recycling efforts in the state in 2004.

The Recycling Ambassadors program continues with over 100 people volunteering over the course of 2004. The Junior Ambassador program launched last year has continued to grow with over 300 hours of

2004 STW

service given by students in 2004. Top volunteers were recognized at our America Recycles Day event last November.

Fairfax County participated cooperatively with the Metropolitan Washington Council of Governments (MWCOG) in a regional recycling radio campaign, which was broadcast over 7 radio stations during a two-week period. The county also partnered with MWCOG to expand the Recycle Guys Awareness Campaign. Recycle Guys PSAs were played extensively on local cable systems and Recycle Guys signs were placed on the outside and inside of Washington Metropolitan Area Transit Authority buses. Additionally, the county participated with MWCOG in the America Recycles Day Campaign. To show their support for this important effort, the Fairfax County Board of Supervisors proclaimed November 15th as America Recycles Day. Over 90,000 America Recycles Day pledge cards were distributed through county schools, libraries, and recreation centers and at county events. Both of the regional prizes were awarded to Fairfax County residents. The County sponsored a highly successful Community Recycling Road Show where over 30 tons of computers, 130 bicycles, 500 cell phones, and nearly 300 pairs of eyeglasses were collected. Nearly a dozen community groups were involved in the effort, which was heavily advertised throughout Fairfax County.

The Solid Waste Management Program maintains a web site at:

<http://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 Solid Waste Management Division publications. New information about recycling education opportunities and events is constantly being added to the Web site. New this year is the *Fairfax Recycler* e-newsletter, which is sent to over 500 list-serve subscribers.

Northern Virginia Soil and Water Conservation District (NVSWCD)

During 2004, NVSWCD 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:

- erosion and sediment control on construction sites
- air quality initiatives
- land conservation programs
- the county's Environmental Vision and Plan
- the Potomac Tributary Strategies
- proposals to fund the cleanup of the Chesapeake Bay

NVSWCD 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. The NVSWCD has the responsibility for guiding storm drain stenciling projects in the county and ensuring they adhere to District and VDOT standards. In 2003, two stenciling projects brought nonpoint source pollution prevention information directly to 740 households.

The NVSWCD 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

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pollution in runoff to streams and lakes; and the sound management of our urban, suburban, and agricultural lands.

During 2004, NVSWCD received 461 public information inquiries and distributed approximately 4,217 brochures and flyers related to the reduction of nonpoint source pollution. NVSWCD'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 NVSWCD 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 2004, the watershed model was used during six presentations to educate 145 people.

NVSWCD provided technical advice to 669 homeowners and homeowner associations, including 248 on-site visits to advise on erosion, drainage, and other environmental problems, and 45 site visits to advise on pond management.

NVSWCD 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. NVSWCD, DPWES, ANS, the Potomac River Greenways Coalition, and several watershed 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.

Envirothon

NVSWCD sponsors Envirothon, a hands-on natural resources competition between teams of high school students. Teams demonstrate their knowledge in aquatics, forestry, soil, wildlife, and a special topic—this year it was natural resource management in the urban environment. They advance from a local competition to the regional, state, and national competitions. In March, NVSWCD provided training and a local competition for three teams, and, in April, hosted the regional Envirothon at Wakefield Park. DPWES staff helped with training and judging.

NVSWCD'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 2004, 5,600 tree and shrub native plant seedlings, mostly in 400 packages of 14 seedlings each, were sold to citizens at a small cost.

NVSWCD continues to expand its reach with a home page that is part of Fairfax County's Internet site. The site gets an average of 6,000 visitors each month and is credited with increasing the county's environmental presence on the web. By the end of 2004 there were 156 "pages" online. NVSWCD is a member of the DPWES web team and participated in the creation of an Environmental Channels page to enable citizens to find environmental services and resources more easily. NVSWCD's Web address is as follows:

<http://www.fairfaxcounty.gov/nvswcd>

NVSWCD published and circulated Conservation Currents, an eight-page newsletter, three times in 2004. In addition to the printed newsletter, NVSWCD distributes the newsletter via e-mail upon request and

posts the articles on its Web page. The most-visited articles on the Web included: Building a Farm or Amenity Pond; You and Your Land—Soils and Drainage; Green Roof at Yorktowne Square; Native Seedling Sale; Frequently Asked Questions; Volunteer Stream Monitoring; Soils Information; and Agriculture and Horses.

More than 4,855 Earth Team volunteer hours were logged by citizens doing stream monitoring, tree plantings, and stream cleanups; participating in a program to control the goose population; helping with seedling programs and seminars; and engaging in regional and state environmental efforts. Earth Team is a USDA-Natural Resources Conservation Service program coordinated by NVSWCD.

Fairfax County Park Authority

As in past years, Fairfax County Park Authority sponsored and organized stream valley clean up days in many of our Stream Valley Parks. These day-long volunteer events draw many citizens into the creeks and woods, providing excellent learning opportunities as well as removing more than six dumpster loads of trash in 2004. As in past years, the Park Authority sponsored programs and hosted citizen groups to plant or enhance riparian buffers. In addition, the Park Authority partnered with the Virginia Department of Game and Inland Fisheries, Trout Unlimited, and Dominion Virginia Power to conduct a stream stabilization on Accotink Creek at Americana Park. This project stabilized banks and provided habitat improvements that will benefit water quality as well as the on-going trout stocking program.

The Park Authority worked with other county agencies on numerous projects to educate citizens on the importance of maintaining healthy wetlands.

As part of its park planning process, the Park Authority looks for opportunities during conceptual site planning to recommend low impact stormwater management techniques. An example of this in 2004 was the adoption of a master plan for Popes Head Estates Park, which includes such techniques in the development scope for site projects. Other significant projects included the renovation of two ponds at Green Spring Gardens; the completion of the Mason District Park pond conversion project; and planning for three bank stabilization projects on Difficult Run upstream of Brown's Mill Road and Georgetown Pike in conjunction with planned stream valley trail improvements.

The Park Authority worked with other county agencies on numerous projects, including the retrofit of a DPWES stormwater management pond, upstream of Hidden Pond, to modify the outlet structure to reduce the impacts from the one-year storm. This project also included the renovation of the forebay of Hidden Pond to increase capacity and efficiency and will include a future bank stabilization project of the stream channel between the two ponds.

Virginia Department of Forestry

The Virginia Department of Forestry (VDOF) 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 2,050 seedlings within Fairfax County. VDOF continues to plant riparian buffers in watersheds throughout the county. VDOF 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.

VDOF works with Fairfax County with the **Agricultural and** watershed/water quality presentations are given 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 21 such activities presented by VDOF in 2004.

VDOF assisted Fairfax ReLeaf with the installation of a rain garden in 2004 at Crossfield Elementary School. This particular garden will capture parking lot and playing field surface flow before it enters Difficult Run. Parking lots contribute petroleum products to stormwater; playing fields are highly managed with fertilizers rich in nitrogen and phosphorus, contributing to high nutrient levels in storm water. The garden is located on Fairfax County Park Authority property. A guide was created to assist teachers with planning and establishing rain gardens. Literature, demonstration gardens, and workshops are the means being used to educate the public about the values of these stormwater management tools. VDOF maintains a Web site for riparian buffer and rain garden information at:

<http://www.dof.virginia.gov>

The Virginia Department of Forestry assists Fairfax County with the Agricultural and Forestal District Program. This program is aimed at 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. Approximately ten to twelve such plans are completed each year.

Reston Association

The Reston Association (RA), 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. The Reston Watershed Action Group (ResWAG), an active citizen stakeholders' group, helps educate and engage members of the community in watershed improvements efforts.

Accomplishments and efforts in 2004 related to stormwater management and watershed improvement include:

- RA started working 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 U.S. Environmental Protection Agency to establish the groundwork for developing the Reston Stream Restoration Banking Instrument. The scope of work entails restoring all of the streams identified and assessed in the Reston Watershed Management Plan, as well as additional priority reaches identified by RA staff, using natural channel design concepts.
- RA developed a "Help Our Watersheds—Living in the Potomac and Chesapeake Bay Watershed" brochure with funding from a 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.
- RA continued its volunteer stream monitoring program in conjunction with the Northern Virginia Soil and Water Conservation District (NVSWCD) VA Save Our Streams program. The NVSWCD provided valuable assistance and in-kind support throughout the year. In February

2004, RA co-hosted an indoor “Introduction to Stream Monitoring” workshop with the NVSWCD.

- Water quality in Reston’s four lakes (Anne, Newport, Thoreau, and Audubon) and two ponds (Bright and Butler) was monitored from April through September. The annual lakes report provided data analysis and recommendations.
- In late 2004, Reston’s four primary lake spillways were inspected. In addition to the dive inspections, the riser stems and gates were cleaned and greased. An inspection report and dive videos were provided to RA.
- RA’s shoreline stabilization guidelines were updated. Several shoreline and streambank stabilization projects using biologs, erosion cloth, and native plantings were installed. Staff worked with several clusters and individual homeowners on shoreline stabilization projects. RA 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.
- In April 2004, RA staff and volunteers participated in the sixteenth Annual Potomac Watershed Cleanup, hosting numerous cleanup sites along Snakeden Branch, The Glade, and Colvin Run tributaries. RA staff members and 128 volunteers removed 182 bags of trash, weighing in at approximately 2.6 tons, in addition to other items including shopping carts, chairs, mattresses, bikes, and various car and construction parts.
- RA staff worked on a number of culvert improvement and stabilization projects throughout Reston.

The Yorktowne Square Condominium Association Green Roof

Public tours have been given of the 5,000 sq. feet green roof and the 20 feet, by 30 feet, by 4 feet deep rain garden constructed at Yorktowne Square Condominium in 2004. In addition, a booklet was prepared (“Down the Drain, a Story about Urban Water”) to help educate the public. The booklet covers many stormwater and watershed issues and gives a detailed account of Yorktowne’s plan and its implementation. It serves as an educational piece as well as a guide for other individuals and communities and is currently being prepared for the web to enable interested parties to download it directly.

VII. Additional Permit Reporting Requirements

VII. (A) Proposed Changes to the Stormwater Management Program

The county's Department of Public Works (DPWES) is leading the effort to develop watershed management plans for all 30 watersheds within the county. Watershed plan development for entire watersheds, sub-watersheds, and/or groupings of watersheds is anticipated to be completed over the next three to five years. The watershed plans are expected to provide an assessment of management needs, encourage public involvement, and prioritize the implementation of needed capital improvements within each watershed.

The county is has completed field studies of all stream valleys, providing an assessment of management needs and a prioritization of solutions within each watershed. These are being used to help develop Watershed Management Plans. The county has also completed the field identification of all perennial streams, thus ensuring that these streams received designation as Resource Protection Areas (RPA) under the Chesapeake Bay Preservation Ordinance. In addition, the county is conducting long-term biological monitoring and watershed water quality monitoring to establish trends, to verify the effectiveness and adequacy of stormwater management controls, and to identify areas of water quality improvement or degradation.

Recommendations from the ongoing Stormwater Needs Assessment Program (SNAP) will form the basis for overall stormwater program changes over the next several years.

Regional Pond Study

In February 2004 the draft Implementation Plan for Stormwater Management was completed with recommendations to continue working in the following action areas:

- Develop and implement a countywide watershed management planning program
- Develop a comprehensive Stormwater Policy and Manual
- Encourage public participation in stormwater management in Fairfax County
- Ensure a dedicated/comprehensive funding source
- Conduct project evaluations based on social, economic, and environmental issues

Background

In 2002, county staff formed a multi-agency committee to develop a unified position on the use of regional ponds as well as alternative types of stormwater controls as watershed management tools. During 2003, the Regional Pond Subcommittee provided recommendations regarding the use of regional ponds as well as other innovative and non-structural techniques as part of watershed management. The focus of the effort was to determine in a deliberate and comprehensive way whether modifications to current practices, policies, and regulations would be beneficial. After much deliberation, research, and consultation with the public and stakeholders, the subcommittee identified 61 recommendations to improve Fairfax County's stormwater management program and to clarify the role of regional ponds in that program. The general consensus is that regional ponds do play a role in the county's stormwater management program but their design needs to address several ecological, economic, and social concerns while working in concert with better site designs and low impact development practices. Several of the recommendations are being implemented and will also address the need to make modifications to the county's Public Facilities Manual (PFM), stormwater policies, codes, and ordinances. The results of all of these efforts are expected to have significant impacts on the stormwater management program.

VII. (B) Revisions, if Necessary, to the Assessments of Controls and the Fiscal Analysis of the Effectiveness of New Controls Established by the Stormwater Management Program

Results of the monitoring efforts and field screening activities indicate that the stormwater controls in Fairfax County generally maintain water quality and discharges in compliance with the MS4 permit requirements. As the county approaches build-out conditions, it has become increasingly challenging to mitigate the impacts of impervious area and nonpoint source pollution on streams. The Stormwater Management (STW) business area will need to expand in order to adequately address this increasing challenge. However, several efforts through the existing stormwater management program are helping to reduce or minimize water quality impacts such as: the mandate of controls (BMPs) by the Chesapeake Bay Preservation Ordinance; development and implementation of Comprehensive Watershed Management Plans; development of an extensive retrofitting program for existing developed areas; and changes to current stormwater management codes, policies, ordinance and guidelines.

VII. (C) Annual Expenditures for the Reporting Period

Department of Public Works and Environmental Services (DPWES)

The following cost information of stormwater spending in FY2004 are not budget numbers but an estimation of spending, demonstrating how stormwater costs are distributed across the agency. They are broken down into Stormwater Planning, Maintenance and Stormwater Management, and miscellaneous Public Works.

The Stormwater Planning Division total costs were approximately \$5,203,000. Major activities include: implementation and execution of stormwater control policies, developing the Watershed Management Plans, the Countywide Watershed Protection and Restoration Strategy, a long-term watershed and water quality monitoring program, and a long term biological monitoring program; retrofitting developed areas with water quality control facilities; designing facilities for urban flood control and stormwater management; implementing the Regional Stormwater Management Plan; conducting public outreach and education; providing support for the dam safety program; conducting dry and wet weather field screening; conducting industrial high risk and floatables monitoring; and preparing the annual report.

The Maintenance and Stormwater Management Division total costs were approximately \$5,143,000. Major activities include: Maintenance and inspection of stormwater management facilities; inspection of privately maintained stormwater management facilities; and engineering support and program management. Inspection includes all the publicly maintained stormwater management ponds, the PL-566 dams, and approximately 20 percent of the privately maintained stormwater management facilities. Engineering inspection of the public ponds and mowing are included in maintenance.

Additional major program costs associated with DPWES were approximately \$1,405,000. Major activities include: general code development and review; inspection of new development stormwater systems; erosion and sediment control program; dam safety program; emergency reported maintenance; capitol improvements; and land easements and right-of-way acquisition.

The total costs associated with stormwater management for FY2004 were approximately \$11,751,000. The Watershed Community Needs Assessment and Funding Options Study recommends an increase in dedicated resources, targeting capital improvements and maintenance enhancements, and ranges from \$28,000,000 to \$52,000,000 over the next five years. This approach should allow the county to expand the level of service for stormwater to achieve the goals and outcomes defined in protection strategies,

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both regulatory and voluntary, as stated in the Stormwater Management (STW) business area's Strategic Plan, and in the county's Environmental Agenda. It will also provide an expansion of the stormwater management programs to reflect changing service levels, increased infrastructure inventories, unfunded mandates, and emergency events.

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, DPWES. 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 VPDES expenditures are estimated to be \$30,000 for the I-95 facility and \$17,000 for the I-66 facility (closed). In addition, this division operates the Household Hazardous Waste program, which costs approximately \$500,000 annually.

Department of Planning and Zoning (DPZ)

There are currently three full-time professional positions in the Environment and Development Review Branch, DPZ, devoted to environmental planning. Additional staff resources from other DPZ branches or divisions will occasionally address water quality issues. A fourth environmental planner position was authorized during FY 2005 and should be filled by the end of FY 2005. The environmental planning function in DPZ was funded at approximately \$200,000 in FY 2004. A similar budget allocation was established at the beginning of FY 2005; this amount was increased during FY 2005 to provide for a new environmental planner position.

Northern Virginia Soil and Water Conservation District (NVSWCD)

All technical and educational programs of the NVSWCD are considered to benefit water quality in Fairfax County. The personnel and operations budget for calendar year 2004 was approximately \$437,712, with Fairfax County contributing \$314,760 and the state contributing \$82,990. Several grants were received, including \$600 for the stream monitoring program and \$9,800 to provide technical assistance on stream projects. In addition, the value of volunteer services provided to Fairfax County is approximately \$220,696, of which \$95,698 is contributed by stream monitors.

Northern Virginia Regional Commission (NVRC)

The NVRC estimated budget expenditures related to stormwater management in Fairfax County include: Four Mile Run Program (Fairfax County share) \$12,021 for FY 2003 and \$12,697 for FY 2004; a DEQ grant for a Four Mile Run Bacteria TMDL Implementation Plan for \$31,110 (11/02–4/04); Occoquan Nonpoint Pollution Management Program (Fairfax County share) \$52,046 for FY 2003 and \$42,351 for FY 2004; a DEQ grant of \$60,000 for TMDL studies in the Occoquan watershed (11/02–4/04) and \$2,923 for Occoquan Meteorological Equipment purchase. A DCR grant of \$16,530 has supported adaptation of "Tributary Strategies Scenario Builder" software from Maryland for use in the Occoquan watershed as a tool to guide BMP implementation choices (1/03 – 4/04). Just over \$25,000 from public and private sources, including \$15,000 from DCR and \$5,000 from Fairfax County Water Authority, has supported adult and student watershed education projects including development and release of a film and curricula on the history of and the importance of preserving the Occoquan as a source of drinking water (FY 2003 and FY 2004). NVRC received \$35,000 through a grant from DCR and matched \$34,152 in NVRC contributions to produce the LID film and collateral materials. The On-Site Wastewater Treatment project was funded through \$17,325 in DCR grant monies with \$17,325 in NVRC contributions. Lastly, the Regional Pollution Outreach Strategy is part of the NVRC Coastal Program that is funded through \$27,000 in NOAA funds and a \$43,500 NVRC match.

Reston Association (RA)

In 2004, RA spent over \$250,000 on watershed and stormwater management initiatives including: continued implementation of the Reston Watershed Management Plan; lake, pond, dam, and stream

maintenance; shoreline and stream bank stabilization; erosion and nutrient control project design and implementation; lake and stream water quality monitoring; technical/professional consultation; educational programs and workshops; and development and distribution of watershed improvement educational literature.

VII. (D) Identification of Water Quality Improvements or Degradation

Overall, the stormwater control program has been effective in achieving compliance with the permit to date. However, it is anticipated that the increased nutrients (phosphorus and nitrogen) and sediment reductions as part of the proposed Potomac River Basin Tributary Strategy will place increased demands and requirements on the county's MS4 to achieve the necessary allocations and pollutant levels in the effort to restore the Chesapeake Bay. The detailed levels of pollutant reductions anticipated through the Tributary Strategy have not yet been determined for localities such as Fairfax County. The impacts of pollutant reduction requirements will be the focus of future collaborative efforts with the state at which time capital improvements and funding needs can be better determined.

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Summary

Through the collaborative efforts of numerous county agencies, non-government organizations, and volunteer groups, Fairfax County has been able to maintain an effective stormwater management program that has satisfied the requirements of the VPDES Phase I permit for the last eight years. Participation by non-government agencies in stormwater management plays a significant role in achieving this. During 2004, the stormwater management program has focused on development of the Watershed Management Plans; the Perennial Stream Survey and Mapping; long-term watershed monitoring program; long-term biological monitoring; infrastructure mapping, inspections and maintenance; retrofitting developed areas with water quality control facilities; and more rigorous public involvement, outreach and education.

The development of the watershed management plans for all 30 watersheds, including sub-watersheds and/or groupings of watersheds, is in process and will continue over the next three to five years. The overall goal is to provide a consistent basis for the evaluation and implementation of solutions for protecting and restoring the receiving water, the ecological systems, and other natural resources of the county. Six watershed management plans have been started and the Little Hunting Creek Watershed Plan has been approved by the BOS. The implementation of recommendations from these plans is the next step and will require substantial capital investment to accomplish. This effort has commenced through existing and anticipated increased budget allocations towards stormwater. The development of these plans, combined with an active community and dedicated county staff, will be a cornerstone in “*Protecting our land and our water*” —the slogan of the Stormwater Management (STW) business area. The overall goal is the improvement of the state of our watershed and environmental quality, the protection of public health, and, where necessary, restoration of the integrity of natural resources.

The stormwater monitoring program has been expanded to include a paired watershed monitoring component to evaluate the effectiveness of stormwater controls and BMPs. In addition, a wet weather screening and floatables monitoring component and a high risk and industrial monitoring component have been implemented since 2002.

There are nineteen Category 5 waterbodies (impaired—requiring a TMDL) with drainage areas in Fairfax County included in DEQ’s Virginia Water Quality Assessment 305(b)/303(d) Integrated Report (August 2004). According to DEQ’s current schedule, seven waterbodies require TMDL studies to be completed by 2010, nine require studies to be completed by 2014, and three are to be completed by 2016. In addition, the threat of a Chesapeake Bay and Potomac River Basin-wide TMDL looms if mitigating efforts do not reverse the existing water quality impairment to the Bay by 2010. In light of this, several regulatory actions could be imposed on localities, including Fairfax County, to implement additional corrective measures and curtail development until the impairment to the Bay is alleviated. It is speculated that the MS4 permit will become the mechanism through which increased water quality requirements will be enforced.

STW’s core leadership team, which was formed in 2001 to help define long-term strategic planning and thinking for stormwater management in the county, updated the strategic plan for 2004. This core leadership team will continue to pursue the implementation of action steps from the strategic plan for STW. It is generally recognized that in the future STW will be increasingly challenged to achieve full compliance with changing permit requirements and increasing state and federal mandates as a result of Chesapeake Bay commitments, the state’s Tributary Strategy, and TMDLs. Strategic efforts will have to focus on how to achieve a reliable and dedicated funding source to better support the increasing demand to improve the ecological health of our watersheds and preserve the quality of life for the community.

Acronym List

ANS: Audubon Naturalist Society
BMP: Best Management Practice
BST: Bacteria Source Tracking
CAP: Corrective Action Plan
CASH: Citizens Alliance to Save Huntley
CBLAB: Chesapeake Bay Local Assistance Board
CBLAD: Chesapeake Bay Local Assistance Department
CBPO: Chesapeake Bay Preservation Ordinance
CCTV: Closed Circuit Television
COG: Council of Governments
DCR: Department of Conservation and Recreation
DEQ: Department of Environmental Quality
DPWES: Department of Public Works and Environmental Services
DPZ: Department of Planning and Zoning
E&I: Extension & Improvement
E&S: Erosion and Sediment
EFID: Environmental and Facilities Inspection Division
EHD: Environmental Horticulture Division
EMC: Event Mean Concentration
EPA: Environmental Protection Agency
EPCRA: Emergency Planning and Community Right-To-Know Act
EQC: Environmental Quality Corridor
ESI: Engineers and Surveyors Institute
FCPA: Fairfax County Park Authority
FCPS: Fairfax County Public Schools
FRD: Fire and Rescue Department
FMD: Facilities Management Division
FY: Fiscal Year
GIS: Geographic Information System
GMU: George Mason University
HHW: Household Hazardous Waste
HMIS: Hazardous Materials and Investigative Services Section
ICPRB: Interstate Commission on the Potomac River Basin
LBWID: Lake Barcroft Watershed Improvement District
LID: Low Impact Development
MOU: Memorandum of Understanding
MRF: Materials Recovery Facility
MS4: Municipal Separate Storm Sewer System
MSMD: Maintenance and Stormwater Management Division
MSW: Municipal Solid Waste
MWSOG: Metropolitan Washington Council of Governments
NPDES: National Pollutant Discharge Elimination System
NPS: Nonpoint Source
NRCS: Natural Resources Conservation Service
NVBIA: Northern Virginia Building Industry Association
NVCT: Northern Virginia Conservation Trust
NVRC: Northern Virginia Regional Commission
NVRPA: Northern Virginia Regional Park Authority

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NVSWCD: Northern Virginia Soil and Water Conservation District
NWI: National Wetland Inventory
OCF: Office of Capital Facilities
OSDS: Office of Site Development Services
PDD: Planning and Design Division
PH&F: Pesticide, Herbicide & Fertilizer
RA: Reston Association
ResWAG: Reston Watershed Action Group
RMA: Resource Management Areas
RPA: Resource Protection Area
SCRAP: Schools County Recycling Action Plan
SPS: Stream Protection Strategy
STW: Stormwater Management business area
SWMP: Solid Waste Management Program
SWPD: Stormwater Planning Division
TMDL: Total Maximum Daily Load
USDA: United States Department of Agriculture
USGS: United States Geological Survey
VDACS: Virginia Department of Agriculture Consumer Services
VDOF: Virginia Department of Forestry
VDOT: Virginia Department of Transportation
VPDES: Virginia Pollutant Discharge Elimination System
WID: Watershed Improvement District
WQIF: Water Quality Improvement Fund

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This index is provided to assist in locating sections of the 2004 VPDES Report that meet specific requirements of the permit.

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