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Fairfax County Park Authority
Fairfax County Department of Planning and Zoning
Fairfax County Public Schools
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Solid Waste Disposal and Resource Recovery Division, DPWES
Wastewater Collection Division, DPWES
Wastewater Planning and Monitoring Division, DPWES
Wastewater Treatment Division, DPWES
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Northern Virginia Soil and Water Conservation District
Northern Virginia Regional Commission
Virginia Department of Forestry

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V Conservation Currents, Five Issues from 2003, Published by the Northern Virginia Soil and Water Conservation District

EXECUTIVE SUMMARY

The 2003 Annual Report on the Municipal Separate Storm Sewer System (MS4) in Fairfax County was prepared in compliance with the Commonwealth of Virginia, Department of Environmental Quality, Virginia Pollutant Discharge Elimination System (VPDES) Permit No. 0088587 **(*Appendix A*)** reissued to Fairfax County on January 24, 2002 for a another 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. The County's VPDES permit covers the jurisdictional land area of Fairfax County excluding the Towns of Clifton, Vienna and Herndon, the City of Fairfax, as well as Fort Belvoir, and the Virginia Department of Transportation's road system. This report is intended to satisfy the Annual Report submittal requirements of the permit, covering the period January 1, 2003 through December 31, 2003, and is the seventh annual report. This report is prepared in accordance with the requirements of section I.C.4 of the permit and summarizes the County's collective efforts (government agencies and non-governmental organizations) in stormwater management and reduction in nonpoint source pollution to the "maximum extent practicable." Described in this report is the Stormwater Management Program in the County detailing the various components associated with or related to stormwater control and pollution prevention. The accomplishments and progress made by the various organizations during 2003 is also delineated in the report.

Fairfax County received recognition by the Chesapeake Bay Program as a Gold Award recipient for the second time since 1997 under the Chesapeake Bay Partner Community program. "The Chesapeake Bay Partner Community Award recognizes, encourages, and supports local government in the Chesapeake Bay watershed whose actions demonstrate their commitments to protecting and restoring the Chesapeake Bay, its rivers, and its streams."

Some of the agencies and organizations involved in stormwater management are 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), Environmental Quality Advisory Council (EQAC), Department of Health (HD), Fire & Rescue Department (FRD), Department of Planning and Zoning (DPZ), and Fairfax County Park Authority (FCPA), Fairfax County Public Schools(FCPS), Department of Public Works and Environmental Services (DPWES). They have been involved in promoting improved water quality through a variety of activities centering on the common goal of improving the environment. The following is a list of their activities and collective efforts in support of the mission of effective stormwater control:

- define a strategic plan for comprehensive stormwater management,
- develop countywide watershed protection and restoration strategy
- develop watershed management plans for major watersheds and sub-watersheds
- expand public outreach and environmental education programs
- seek research opportunities to develop alternative methods of improving water quality,
- implement water quality and quantity control practices,
- encourage and implement environmentally sensitive projects,
- conduct inspection and maintenance programs for stormwater control systems and structures to ensure their effectiveness,
- implement stormwater control retrofits,

- share resources and information for the purposes of educating the citizenry and developing strategies to promote good water quality improvement practices,
- conduct stream monitoring and evaluation programs,
- provide environmental analysis on proposed land use changes and development, including the effects on nearby streams and water quality,
- provide other agencies and private consultants advice regarding the adequacy of erosion and sediment controls and stormwater management techniques on development sites,
- provide technical advice on stream stabilization and restoration techniques,
- screen storm system outfalls for detection and removal of illicit discharges, and
- provide technical support to citizens and developers

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 Stormwater Planning Division (SWPD) promotes policies to improve and protect the quality of life and support environmental goals of the County and is working to develop a framework that would address the overall environmental goals and objectives of the County as well as 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).

Fairfax County has been a participant in the NPDES Phase I permit program since the early 1990's, having conducted extensive countywide water quality monitoring as part of the Part I and Part II permit application process, received the first permit in 1997, reapplied for another five years in 2001 and received the second permit in 2002. Over the 10 plus years many positive changes have taken place in the County's Stormwater Management Program which at the onset was primarily focused on water quality monitoring.

The first change, 1998, was the funding of a Stream Protection Strategy (SPS) survey which included 114 principal monitoring sites in 30 watersheds over 400 square miles of land and included biological monitoring (aquatic insects and fish) and a general evaluation of the localized watershed features (vegetation and in-stream features). The County had long ago recognized the need to protect the living environment of the stream valleys and the SPS study provided 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. Recently, a Countywide Watershed Protection and Restoration Strategy has been evolving as a follow-up to the Stream Protection Strategy (SPS) 2001 baseline study, with the overall goal of developing countywide guidance for the application of selected protection and restoration strategies at the subwatershed scale. The SPS baseline study established three broad management categories for future watershed protection and restoration efforts, based primarily on overall stream rankings of biological quality and projected development. The three management categories include Watershed Protection, Watershed Restoration Level I, and Watershed Restoration Level II. Details of the Countywide Watershed Protection and Restoration Strategy project and maps of the locations of the three management categories within the County's watersheds can be found in ***Appendix B***.

The next phase to protecting the County's valuable resource, the stream valleys, was the County response to the 2001 State amendments to the Chesapeake Bay Preservation Area Design and Management

Regulations by the Chesapeake Bay Local Assistance Board. Amendments to Chapter 118 of the County's Chesapeake Bay Preservation Ordinance (CBPO) changed the wording of what is protected by RPA to "tributary streams" with "water bodies with perennial flow". These amendments include a requirement to identify water bodies with perennial flow by using a scientifically valid method to conduct site-specific surveys. Perennial stream protocols were developed by the County and approved by the State, and the County embarked on a survey of the headwater reaches of streams to designate perennial streams upstream of existing RPAs. The results of the survey were adopted by the Board of Supervisors in November 2003 as amendments to the County's Chesapeake Bay Preservation Ordinances. This extensive perennial stream field survey resulted in an increase of 330 miles of perennial streams, a 52% increase, 638 miles to 968 miles. This increase in stream miles established 17.06 square miles (or 10,921.57 acres) of new RPA in the county, an increase of 31% from 55.3 square miles to 72.3 square miles. ***Figure 3*** illustrates the 1993 RPA streams (depicted in green) and the new 2003 RPA streams (depicted in red) of the Difficult Run Watershed. The County Chesapeake Bay Preservation Area maps display the boundaries of the RPAs adopted by the Board in 1993 and the additional RPAs adopted by the Board in 2003 in greater detail. The maps display the general locations of the RPA boundaries for planning purposes and the actual limits may be further refined by detailed field studies conducted at the time a plan is submitted to obtain a permit to develop a property. These maps can be viewed at:

http://www.fairfaxcounty.gov/maps/nofind/PdfLoader/default.htm

The development of Watershed Management Plans for all 30 watersheds is essential in the County's Watershed Planning Program. Data from the most recently completed Countywide Physical Stream Assessment of stream conditions integrated with the SPS study and other watershed and stream monitoring information is being used for evaluating the impact of watershed changes on stream quality. The stream assessment included 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. Watershed plan development for entire watersheds, sub-watersheds, and/or groupings of watersheds is being implemented over an anticipated 6 year period. The watershed plans are expected to provide an assessment of management needs and prioritize solutions within each watershed. The overall goal for the development of watershed management plans 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. Citizen Input is an important component to each watershed management plan. The County has developed an extensive 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. Major milestones in the development of the County's watershed management plans in 2003 include: Draft of Little Hunting Creek Watershed Plan; Popes Head Creek Watershed citizen advisory group was formed; and Cameron Run Watershed citizen advisory group started.

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, economical and social

concerns while working in concert with better site designs and low impact development practices. The Subcommittee is currently coordinating the development of an implementation plan for all recommendations, including a time line and assignments. Several of the recommendations address the need to make modifications to the County's Public Facilities Manual (PFM), stormwater policies, codes and ordinances.

Currently, the County is engaged in two ongoing Total Maximum Daily Load (TMDL) studies. The first of these projects represents a 4.5 mile segment of Accotink Creek in Fairfax County that was placed on the 1998 Virginia 303(d) TMDL priority list for fecal coliform impairment. Fairfax County entered into an agreement with the USGS, Department of Conservation and Recreation (DCR), and Department of Environmental Quality (DEQ) in 1998 to complete the source tracking study which forms the basis for development of the TMDL for Accotink Creek. A follow-up study was initiated in August 2001 to identify and isolate specific areas contributing human fecal coliform bacteria within the watershed. Fairfax County staff is supporting this study with field sampling efforts as well as providing assistance with laboratory analysis for this three-year project. The second of these projects was at the request of the DEQ, the Northern Virginia Regional Commission entered into an agreement with the Commonwealth to prepare an Implementation Plan for the EPA-approved TMDL developed for bacteria in Four Mile Run. That TMDL was approved on May 31, 2002. Work has begun on the Implementation Plan with a goal to complete the plan by early 2004. A Technical Advisory Committee (TAC) was formed in May 2003 to provide input and guidance for the project. Staff from all four jurisdictions, various non-governmental organizations, the Virginia Department of Conservation and Recreation, the Virginia Department of Environmental Quality and NVRC participated on the TAC.

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 D)*****.** These letters are one of the initial steps in adopting and encouraging the use of "Better Site Design" and "Low Impact Design" techniques for improving water quality control in the County. ***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. This letter to industry details the application procedure, discusses the general design standards and application conditions, provides a list of Innovative BMPs and includes an "Innovative BMP Tracking Form." The second letter, ***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."

Two stream bank stabilization projects, the Difficult Run mainstem in Oakton and the Snake Den Branch in Reston, were sponsored and jointly constructed by VDOF, Reston Association (RA), NVSWCD and the Fairfax County DPWES. These stabilization projects were successful largely due to the partnership between the four organizations. The main purpose of these projects was the reduction of erosion for the protection of infrastucture and sediment reduction for the Chesapeake Bay watershed. In the Difficult Run Stream Valley project, approximately 60 linear feet of stream bank was stabilized utilizing root wads, coconut fiber matting, riprap, and native vegetation and was completed in approximately one week. In the Snakeden restoration project, approximately 1000 linear feet of stream bank was stabilized using natural materials: root wads (providing excellent fish habitat), coconut fiber matting, 9 biologs, over 300 live stakes, over 150 plantings, and in-stream structures.

The restoration of 150 feet of stream bank in Cinnamon Creek in 2001 has proven itself during the excessive amounts of rain in 2003 (approximately 1.5 times the average annual amount) and it has survived Hurricane Isabel. The Kingstowne Stream Restoration Project discussed in full in the 2001

VPDES report, continues to improve and regenerate. Today grass is growing on the floodplain, live stakes are in bloom on the banks, and tree and shrub seedlings are maturing. NVSWCD continues to monitor the Kingstowne and Cinnamon Creek streams and participate in similar restoration or stabilization projects. Additional information concerning both restoration projects is available on the web at the following addresses.

http://www.fairfaxcounty.gov/nvswcd/kingstowne.htm (Kingstowne) or,

http://www.fairfaxcounty.gov/nvswcd/cinnamoncreek.htm (Cinnamon Creek).

On July 7, 2003, County staff presented the Board of Supervisors with an implementation plan responding to each of the 29 recommendations of the report prepared by the New Millennium Occoquan Watershed Task Force co-chaired by NVRC. The task force was established as part of the 2002 Board of Supervisors celebration of the 20th anniversary of the downzoning of nearly 41,000 acres of land in the Occoquan Watershed for the purpose of protecting the Occoquan Reservoir (one of the County's major sources of drinking water) from nonpoint source pollution. The Task Force's report which presented a series of recommendations addressing watershed management issues was first presented to the Board of Supervisors on January 27, 2003. Continued progress on implementation of the report's recommendations is anticipated.

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". 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.

The floodplain management program in Fairfax County, in addition to reducing flood risks, provides water quality benefits in several ways. In any floodplain served by a drainage area of greater than 360 acres (major floodplains), development and disturbance is strictly limited. Considered in every proposed use in a floodplain, including minor floodplains with drainage areas between 70 and 360 acres, are the environmental impacts resulting from the proposed work. The overall effect of this program, together with the restrictions in Fairfax County's Zoning Ordinance which prohibit increases in the 100-year water surface elevation except for road crossings and certain county-driven improvements, is to preserve and to limit the disturbance to large areas within floodplains.

DPWES conducts inspections and maintenance of regional ponds and dry ponds located within residential developments, along with certain underground chambers, and percolation trenches within residential developments. In addition, DPWES conducts inspection and enforcement of maintenance agreement terms for the privately maintained facilities, including wet and dry ponds, culvert storage areas, sand filters, oil/grit separators, percolation trenches, inlet treatment devices, rooftop storage, and all commercial and/or industrial detention facilities. In addition, in 2003, ten stormwater management ponds, serving a total drainage area of 436 acres, were rehabilitated and/or retrofitted. Rehabilitations consisted of repair, replacement, or modification of the facility to meet or exceed safety and functional requirement and to extend the service life of each facility. Retrofits employed the use of shallow wetland marshes to enhance nutrient uptake and provide an in increase water absorption and transpiration. A secondary effect of wetland marshes and naturally vegetated pond floors is the creation of habitat for wildlife.

Lake Barcroft Watershed Improvement District continues its urban BMP studies with a special emphasis on the 14.5 square mile Barcroft Watershed along the upper reaches of the Holmes Run and Tripps Run. The six-year EPA grant under Section 319 of the Clean Water Act to identify and demonstrate appropriate urban BMPs has concluded with a Final Report in the form of an interactive CD-ROM containing voluminous text and hundreds of digital color pictures.

The Fairfax County Public Schools curriculum includes courses in Environmental Sciences, Biology, Chemistry and Geosystems. Students study basic ecology concepts, the hydrologic cycle and how to apply them to the Chesapeake Bay Watershed ecosystem. These educational programs have a direct lasting effect on improving water quality as educated students form lasting habits toward preventing nonpoint source pollution. In 2003, 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. Finally, a contest was held to name the new county recycling mascots – the Recycle Guys. Nearly 500 FCPS students entered the contest.

The County is currently conducting a Pesticide, Herbicide and Fertilizer (PH&F) survey to evaluate current methods of application and prepare recommendations that are designed to reduce the quantity of pollutants that may enter the MS4 and streams in the County. The data will be used to identify areas where the use of pesticides, herbicides and fertilizers can be reduced on county owned properties by implementing non chemical or reduced chemical management practices.

Fairfax County's Dry Weather Screening program has been a part of the permit for the past 7 years. The goal of this comprehensive monitoring program is to continue ongoing efforts to detect the presence of illicit connections and improper discharges to the MS4. During 2003, extensive field screening efforts lead by the United States Geological Survey (USGS) and county staff were carried out in the Accotink Creek Watershed as a result of a proactive implementation phase for a TMDL which was developed for fecal coliform impairment for portions of Accotink Creek.

Conversely, Fairfax County's program for Wet Weather Screening is a new requirement in the permit. 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. A GIS-based screening procedure for identifying potential "hot-spots" in the wet weather screening program will be developed as part of a comprehensive monitoring program.

In addition, the Industrial and High Risk Runoff Monitoring, which may include monitoring for pollutants in stormwater discharges to the MS4, is a new requirement in the permit. 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 2003 a list of all VPDES permitted stormwater industrial facilities that discharge into the Fairfax County's MS4 was obtained from DEQ.

NVSWCD's Volunteer Stream Monitoring Program supplements the SPS program as well as provides other services to the environmental community in Fairfax County. The number of monitoring sites and active monitors are steadily increasing. In 2003, 30 monitoring sites were active during the winter, 35 sites were active during spring, 55 sites were active for summer, and 38 sites were active for fall monitoring. During 2003, volunteers logged over 3,305 Earth Team hours. Approximately 225 students

were introduced to stream monitoring through indoor workshops at schools, outdoor special programs and science fair projects. NVSWCD conducts training sessions for monitors, conducts special programs at schools, make presentations at environmental conferences, sponsors tours, and publishes a newsletter. In addition they partner with other groups in the County government, Homeowners Associations, County Parks, local universities, and private environmental organizations.

Funding for the County's stormwater control programs continues to be primarily through General Fund appropriation, along with some pro rata share revenues for capital improvement projects. Ongoing programs within various County agencies continue through their respective annual appropriations. Several privately funded organizations and volunteer groups provide support for monitoring programs, water quality improvements, and public awareness programs. Funding for maintenance and inspections of both public and privately maintained facilities continues through the County General Fund. Other programs such as the Department of Health programs and NVSWCD programs are funded by a combination of State, County, and grant funds. The private organizations, which conduct water quality programs, are usually privately and/or grant funded.

A total of 17 TMDLs are currently on the 2002 impaired waters listing (DEQ's 303(d) list) with others to be added by an imminent 2004 listing. These TMDLs will require development between 2006 and 2014 and implementation of mitigating plans following their approval. In addition, the threat of a Chesapeake Bay and Potomac River Basin wide TMDLs 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.

The County's stormwater business area's core leadership team which was formed in 2001 to help define long-term strategic planning and thinking for stormwater management in the County completed the development of an environmental scan and strategic plan in 2003. This core leadership team will continue to pursue the implementation of action steps from the strategic plan for the stormwater business area. It is generally recognized that the future stormwater management program 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 and TMDLs. Strategic efforts will have to focus on how to maximize existing resources and obtain new resources to keep pace of this increasing demand to improve ecological health of our watersheds and preserve the quality of life for the community.

2003
Annual 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

INTRODUCTION

Fairfax County has been a participant in the NPDES Phase I permit program since the early 1990's, having conducted extensive countywide water quality monitoring as part of the Part I and Part II permit application process, received the first permit in 1997, reapplied for another five years in 2001 and received the second permit in 2002. Over the 10 plus years many positive changes have taken place in the County's Stormwater Management Program which at the onset was primarily focused on water quality monitoring. The first change, 1998, was the funding of a Stream Protection Strategy (SPS) survey which included 114 principal monitoring sites in 30 watersheds over 400 square miles of land and included biological monitoring (aquatic insects and fish) and a general evaluation of the localized watershed features (vegetation and in-stream features). The County had long ago recognized the need to protect the living environment of the stream valleys and the SPS study provided 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 to protecting the County's valuable resource, the stream valleys, was the County response to the 2001 State amendments to the Bay regulations, revising the method to assign Resource Protection Areas (RPA) to water bodies by using perennial flow. Perennial stream protocols were developed by the County and approved by the State, and the County embarked on a survey of the headwater reaches of streams to designate perennial streams upstream of existing RPAs. The length of the 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 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 Physical Stream Assessment of stream conditions integrated with the SPS study and other watershed and stream monitoring information is being used for evaluating the impact of watershed changes on stream quality. The stream assessment included 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 will be an important component to each watershed management plan. The County has developed an extensive 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.

The 2003 Annual Report on the Municipal Separate Storm Sewer System (MS4) in Fairfax County was prepared in compliance with the Commonwealth of Virginia, Department of Environmental Quality, Virginia Pollutant Discharge Elimination System (VPDES) Permit No. 0088587 **(*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. This report is intended to satisfy the Annual Report submittal requirements of the permit, covering the period January 1, 2003 through December 31, 2003, and is the seventh annual report. This report is prepared in accordance with the requirements of section I.C.4 of the permit.

Fairfax County received recognition by the Chesapeake Bay Program as a Gold Award recipient for the second time since 1997 under the Chesapeake Bay Partner Community program. “The Chesapeake Bay Partner Community Award recognizes, encourages, and supports local government in the Chesapeake Bay watershed whose actions demonstrate their commitments to protecting and restoring the Chesapeake Bay, its rivers, and its streams.”

a. Watershed Management Program

Introduction

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 comprehensive stormwater management plans and to review current Countywide policies affecting the ecosystem and stormwater management issues. The SWPD promotes policies to improve and protect the quality of life and support environmental goals of the County, and is working to develop a framework that would 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 newer Low Impact Development (LID) techniques such as rain gardens.

Perennial Streams

Perennial streams receive designation as a resource protection area (RPA) under the County's Chesapeake Bay Preservation Ordinance (CBPO). This entitles them to a 100 foot riparian buffer and protects them from development. Under the original CBPO, United State Geological Survey's (USGS) 7.5 minute quadrangle maps were the only tool used to make perenniality designations. However, these maps are known to have errors in consistently and accurately depicting perennial streams. The Chesapeake Bay Local Assistance Board adopted amendments to the Chesapeake Bay Preservation Area Design and Management Regulations on December 10, 2001, with an effective date of March 1, 2002. The state mandated that Fairfax County and other Tidewater jurisdictions implement these changes by December 31, 2003. Chapter 118 of the CBPO amendments changed the wording of what is protected by RPA to "tributary streams" with "water bodies with perennial flow". The Fairfax County perennial stream identification and mapping project was initiated in September 2001 to address these changes.

These amendments include a requirement to identify water bodies with perennial flow by using a scientifically valid method to conduct site-specific surveys. In response to this, the DPWES-SWPD developed a protocol for identifying perennial streams in Fairfax County using geomorphological, biological, and hydrological characteristics as indicators for perennial streams. ***Figure 1*** shows two SPS team members searching for benthic macroinvertebrates while surveying a stream. In June of 2003, SWPD gave a two day training workshop geared towards consultant and engineering groups who would be involved in making perennial stream determinations, ***Figure 2***, in order to address questions concerning the application of the protocol. A copy of the perennial stream protocol and field sheet **(*Appendix B*)** can be found at:

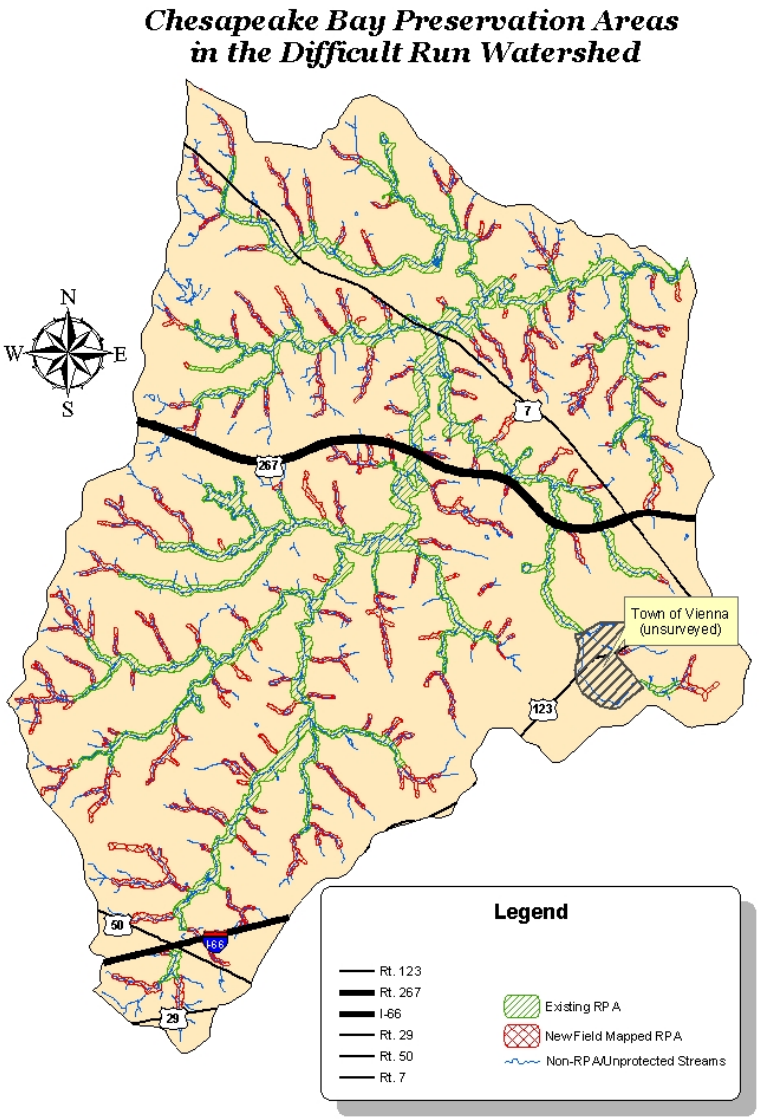
http://www.fairfaxcounty.gov/dpwes/watersheds/perennial.htm#protocol.

Figure 1. SPS Team members search for benthic macroinvertebrates during a perennial stream survey.

Figure 2. Perennial Streams Workshop put on by Fairfax County SWPD.

In October of 2003, the countywide survey was completed and new RPAs were adopted by the Board of Supervisors on November 17, 2003, becoming effective the following day. The extensive field survey established 17.06 square miles (or 10,921.57 acres) of new RPA in the county, an increase of one-third from 55.3 square miles to 72.3 square miles for a total of 968 perennial stream miles. ***Figure 3*** illustrates the 1993 RPA streams (depicted in green) and the new 2003 RPA streams (depicted in red) of the Difficult Run Watershed. The County Chesapeake Bay Preservation Area maps display the boundaries of the RPAs adopted by the Board in 1993 and the additional RPAs adopted by the Board in 2003 in greater detail. The maps display the general locations of the RPA boundaries for planning purposes and the actual limits may be further refined by detailed field studies conducted at the time a development plan is

Figure 3. Visual representation of how much RPA was added after completion of the Perennial Stream Project in one watershed, Difficult Run.



submitted to obtain a permit to develop a property. These maps can be viewed at:

http://www.fairfaxcounty.gov/maps/nofind/PdfLoader/default.htm

In addition to identifying and mapping all perennial streams in the County, the perennial streams identification and mapping project has also helped to develop an updated stream data layer of the County's drainageways, and aided in the characterization and inventory of headwater streams by providing data on physical and ecological conditions.

Countywide Watershed Protection and Restoration Strategy

The current project (***Appendix C***) was conceived as a follow-up to the baseline SPS study, with the overall goal of developing countywide guidance for the application of selected protection and restoration strategies at the subwatershed scale. The SPS baseline study established three broad management categories for future watershed protection and restoration efforts, based primarily on overall stream rankings of biological quality and projected development. The three management categories include Watershed Protection, Watershed Restoration Level I, and Watershed Restoration Level II. The appendix contains maps of the locations of the three management categories within the County's watersheds.

The specific objectives of the Countywide Watershed Protection and Restoration Strategy project are to:

- Delineate county subwatersheds, and classify them as protected, critical, and redevelopment based on current and projected ultimate subwatershed imperviousness.
- Identify areas where the use of selected low-impact development (LID) techniques for promoting groundwater recharge is feasible.
- Map existing publicly maintained flood control only stormwater management facilities in each subwatershed and compute existing and future unit-area Total Phosphorus source loadings in the subwatersheds.
- Rank and prioritize protected, critical, and redevelopment subwatersheds for implementing LID techniques.
- Rank and prioritize subwatersheds with existing flood control only stormwater management facilities for retrofitting to provide water quality benefits.

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 will be implemented throughout an anticipated 6 year period. The watershed plans are expected to provide an assessment of management needs, encourage public involvement and prioritize solutions within each watershed. The overall goal for the development of watershed management plans is to 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.
Major milestones in the development of the County's watershed management plans in 2003 include:

- The Draft Little Hunting Creek Watershed Plan was unveiled to the community at a major public workshop in December 2003. An Issues Scoping Forum and Community Watershed Forum were also conducted in April and July respectively leading to the development of the draft plan.
- The Popes Head Creek Watershed citizen advisory group was formed in September 2003 to assist the County with the development of this watershed plan.
- The Cameron Run Watershed citizen advisory group was initiated in November 2003 to assist the County with the development of this watershed plan.

The development of comprehensive watershed management plans is expected to include but is not limited to the following tasks preliminarily identified:

1. Review and synthesis of previous studies, and data compilation

Previous studies - This task will entail a detailed review of previous studies performed for the watersheds. The results and recommendations from previous studies will be summarized and re-evaluated upon completion of this project. Previous studies include:

- Basin drainage plans (completed in 1979, based on projections through 2000)
- Regional Stormwater Management Plan (completed in 1988)
- Stream Protection Strategy (SPS) baseline study and follow-up Watershed Protection and Restoration Strategies study
- Northern Virginia Regional Commission's Occoquan Program and Watershed Model
- Fairfax County Water Authority's Source Water Assessments for the Occoquan and Potomac intakes
- Existing small watershed management plans
- Other *ad hoc* studies (e.g. Infill & Residential Development Study)

Data compilation - As part of this task, all available data to support the development of management plans for the watershed(s) under study will be complied, including:

- Physical Stream assessment data to be acquired through a concurrent consultant contract
- Baseline and on-going SPS study biological assessment data
- County GIS data layers
- County water quality monitoring data
- Other state and federal water quantity and quality monitoring data

2. Evaluation of current conditions, and a projection of ultimate development conditions

Conditions - This task will consist of technical analyses to identify flooding, channel erosion, and water quality problems in the watershed(s) under current and predicted ultimate development conditions. This will typically involve the development of appropriate hydrologic/hydraulic and water quality models to allow formalization of cause-effect relationships. The analyses should include:

- Selection of sub-watershed scale
- Soils, land-use and impervious cover characterization
- Non-point and point source pollution assessment
- Prediction of future land-use based on zoning and comprehensive plan
- Development of appropriate water quantity and quality models
- Identification of current and potential future problem areas
- Consideration of TMDL-listed streams and Virginia's tributary strategy for the Potomac

3. Development of non-structural and structural watershed management alternatives

Watershed management alternatives - Under this task, alternative strategies for mitigating potential problems identified previously under Task 2 will be evaluated. This will involve representation of alternative strategies within the models developed previously and assessment of predicted impacts. Structural and non-structural strategies may include:

- Density restrictions
- Land Acquisition
- Buffer zones
- Source controls
- Public outreach
- Low-impact development type controls
- Conventional structural controls

4. Capital Project implementation options including preliminary cost estimates, cost/benefit analysis, and prioritization

   Cost estimates, cost/benefit analysis - Under this task, an economic analysis of structural controls proposed under Task 3 will be performed. Each project will be characterized by the effectiveness in providing flood control, stream erosion control and water quality benefits. Costs associated with construction, land acquisition, and maintenance/operation will be determined. A ranking and prioritization scheme will be developed to provide preliminary project recommendations taking into consideration cost-effectiveness, implementation likelihood, and sustainability. Typical project types to be considered include but are not limited to:
   - Stream restoration
   - Stream day-lighting
   - Stream bank stabilization
   - Innovative BMP implementation
   - BMP Retrofits
   - House Flood-proofing
   - Flood Control
   - Regional stormwater controls
   - Log-jam removal

5. Public Involvement Program

   Public involvement program – Fairfax County is committed to engaging its citizens in planning because the County recognizes that better dialogue will lead to better decisions for protecting the environment. In the past, public dialog was limited to public presentations rather than engagement resulting in project oppositions, delays and unhappy customers. The County is more progressive and proactive by engaging the public at all levels of the watershed planning program. This will be an integral part of the development of watershed management plan(s). Input received from the public will be used to guide decisions at all stages of the watershed plan development. The public involvement program will include:

   - An advisory group representing a diversified community interests and stakeholders throughout the watershed is formed to frame the problems to be addressed, propose solutions and strategies for their implementation, investigate approaches and feasibility to achieve proposed solutions, engage all interested constituencies throughout the process, and achieve community buy-in and solidify support for the final plan(s).

   - Four public involvement meetings opened to all interested parties are scheduled at key milestones during the planning process. The four meetings include; issues scoping forum, community watershed forum, draft plan review workshop, and final plan review workshop.

   - The County encourages and offers assistance for the formation of community watershed groups (i.e., "Friends of..." groups) for each watershed to maximize community involvement in all phases of the watershed program and promote long-term stewardship.

   - The County is pursuing an overall Public Education Campaign (concurrent with watershed planning effort). An interactive watershed web page has been developed to provide citizens with help finding their watershed, learn the status of plan development

and gain information on how to get involved at

http://www.fairfaxcounty.gov/Watersheds

6. Documentation of watershed management plan

Documentation - The results of all previous tasks will be consolidated into a document detailing the recommended watershed management plan. The document will also define a process to monitor, measure the success of, and modify the watershed management plan as necessary in the short-term and long-term. The preferred method of final delivery will be a GIS-based analytical tool that encapsulates the data and methodology used in developing the watershed management plan.

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 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 which require that there shall be 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 2003, DPWES received 434 site, subdivision and public improvement plans for review and approval, of these, 210 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. The 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 2003, 14 soil and water quality conservation plans were developed for 1000 acres and included 23,348 linear feet of RPAs. Cumulatively, 9,859 acres and 260,091 linear feet of RPAs are covered by water quality conservation plans that have been developed since 1994 when the program began.

Regional Pollution Prevention Outreach Strategy **-** NVRC continues to work with several local governments (including Fairfax County) and the Potomac Watershed Roundtable's Public Education and Outreach Committee on the development of a regional pollution-prevention outreach strategy. Excess nutrients are a key threat to the health of the Chesapeake Bay and the Potomac River. In response, NVRC has targeted three nutrient pollution-causing behaviors: over-use of fertilizers, dog waste left on the ground, and car washing where soap suds drain to the storm sewer. NVRC is requesting information on any jurisdictional plans to address these and other targeted behaviors. This information will better enable NVRC to look at ways a regional strategy can supplement, support, or enhance local efforts in terms of timing, reach, and message.

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 to 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.

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, ***Figure 4***. 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.

Figure 4. SPS member stream gauging in TMDL Study

Based on the results of this initial study, DEQ developed and submitted a TMDL to the US-EPA in 2002 that included a goal to reduce the human sources of fecal coliform bacteria by 99%. The TMDL for Accotink Creek was approved by US-EPA in July 2002. As a follow-up step to the TMDL, USGS initiated another study in cooperation with Fairfax County Stormwater Planning Division (SWPD), City of Fairfax, and DCR to help identify the distribution of fecal coliform and locate the precise sources of human fecal coliform inputs to Accotink Creek. This second study began in mid-to-late 2001 and will continue for 3 years. The field-work portion of the study is anticipated to be completed in late 2004. Staff from the SWPD is currently assisting the USGS in the field sampling efforts and laboratory analysis for certain parameters.

So far, five sampling campaigns of the eight planned have been completed. In 2003, due to large amounts of rain throughout the entire year, scheduling sampling campaigns became extremely difficult. Because of this abnormally wet year, only one sampling campaign was completed. A few other sampling campaigns were started, but had to be abandoned due to the occurrence of rain in the middle of the campaign. The total number of samples as well as the breakdown of sample types taken within the watershed can be found in the following table:

Table 1. Breakdown of TMDL Sampling Campaigns

Dates of Campaign	***Total # of Samples Taken***	***# of Main Channel Samples***	***# of Storm Drain Samples***	***# of Tributary Samples***
December 3-7, 2001	110	15	40	55
April 2-5, 2002	123	16	52	55
July 8-12, 2002	96	16	41	39
October 21-24, 2002	90	15	29	46
April 14-17, 2003	123	19	48	56

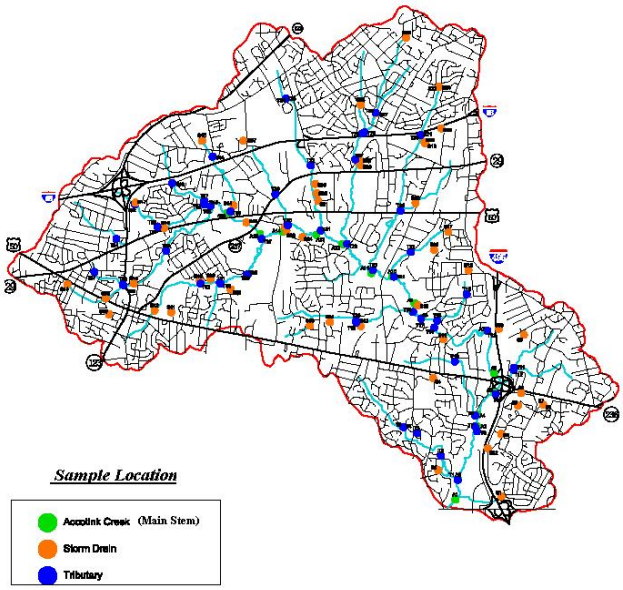
These first five sampling events are surveys of the watershed, and they help identify all potential contributing tributaries, storm drains, sewer lines, and septic systems. The range in total number of samples taken is due to the seasonal variability of natural stream flow. This is most obvious in the number of stormdrain samples collected during the October 21-24, 2002 campaign when the region was experiencing a severe drought. Only indicator tracers (such as Fecal Coliform bacteria, turbidity, surfactants, temperature, and dissolved oxygen) were applied during the first two sampling campaigns. Bacteria Source Tracking (BST) and organic tracers are used selectively during campaigns 3-8. In campaign #5, approximately 20 more sites were added to better describe water-quality conditions in certain portions of the study area. In future campaigns, sampling locations may be further refined to help identify more specific areas demonstrating contamination. During these campaigns, some sampling stations will be eliminated while new ones will be added. Throughout the final campaigns, there will also be continued focus on stormdrains that flow during dry periods, as well as sampling locations exhibiting elevated levels of fecal coliform and other contamination tracers.

The data compiled from this study will help provide the County with a better understanding of the transport mechanisms and sources of the human wastewater signal in Accotink Creek. Ultimately, this study will support a cost-effective implementation plan for a TMDL addressing water quality impairments based on violations of the state's fecal coliform and E. coli bacteria water quality standard. 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

The map found below, ***Figure 5***, was created by the USGS after their July 8-12, 2002 sampling event. The map shows the location of where all 96 samples were taken during this campaign. The color codes represent the type of sampling location: Accotink Creek (mainstem), a storm drain, or a tributary of Accotink Creek. Please note that this map only shows the upper portion of the Accotink Creek Watershed, from Braddock Road North because this is the area being studied.

Figure 5. Accotink Creek TMDL Study Sampling Locations for July 8-12,



Four Mile Run TMDL / Implementation Plan

At the request of the Virginia Department of Environmental Quality (DEQ), the Northern Virginia Regional Commission (NVRC) entered into an agreement with the Commonwealth to prepare an Implementation Plan for the EPA-approved TMDL developed for bacteria in Four Mile Run. During 2003, NVRC worked with the four watershed jurisdictions, Fairfax and Arlington Counties and the Cities of Falls Church and Alexandria, to develop the implementation plan. A Technical Advisory Committee (TAC) was formed in May 2003 to provide input and guidance for the project. Staff from all four jurisdictions, various non-governmental organizations, the Virginia Department of Conservation and Recreation, DEQ and NVRC participated on the TAC.

Two public meetings were held during the project. The first public meeting was held in June to present the project to the public and solicit input. A second public meeting was held in December where a draft implementation plan was presented for public comment.

The draft implementation plan describes a ten-year strategy to reduce bacteria levels in Four Mile Run by targeting anthropogenic, or human-caused, sources. The strategy covers a wide array of actions from pollution reduction and mitigation efforts to outreach and education activities. Information regarding the project and copies of the TMDL and Implementation Plan are available at:

http://www.novaregion.org/bacteriaimplementation.htm

Other TMDLs in Fairfax County

A total of 17 waterbodies with drainage areas in Fairfax County are included in Virginia DEQ's Section 303(d) listing of impaired waters for 2002. Of the listed waterbodies, 11 are riverine systems totaling 51.85 mile, 5 are estuarine systems with a total area of 23.18 square miles, and 1 is a drinking water reservoir with an area of 1,700 acres. The cause of impairment for the majority of the riverine waterbodies is either fecal coliform or general standards (benthic). For the estuarine waterbodies, the cause of impairment for the majority of systems is PCBs in fish tissue. Nine of the 17 waterbodies are multi-jurisdictional i.e. include drainage areas outside Fairfax County. Twelve of the 17 waterbodies were listed for the first time in 2002. A fecal coliform TMDL study has been completed for two waterbodies, Accotink Creek (above Lake Accotink) and Four Mile Run, which were approved by EPA on 5/31/2002.

According to the current schedule, the next TMDLs to be developed include:

Year 2006
- Popes Head Creek
- Bull Run

Year 2008
- Accotink Creek (from confluence of Calamo Branch to the tidal waters of Accotink Bay)
- Difficult Run

The remaining impaired waters require TMDL studies to be completed by 2010 or 2014.

Innovative BMPs Fairfax County

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 D)*****.** These letters are one of the initial steps in adopting and encouraging the use of "Better Site Design" and "Low Impact Design" techniques for improving water quality control in the County. ***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. This letter details the application procedure, discusses the general design standards and application conditions, provides a list of Innovative BMPs and includes an "Innovative BMP Tracking Form." The second letter, ***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." The Planning and Design Division (PDD) in the Office of Capital Facilities (OCF) has undertaken an initiative to implement new and innovative approaches to addressing Best Management Practices on the sites of new and expanded County buildings, ***Figures 6 and 7***. The rain gardens/bioretention facilities, that are being designed and implemented by PDD, have a bioretention sand filter located at the ground surface. The sand filtering material is mixed with organic material to create a filtering material that will support vegetative life. Perforated underdrains are typically installed at the bottom of the sand filter layer(s) to convey filtered, stormwater runoff to an appropriate outfall location. The embankment material and the

periphery of the rain garden are then landscaped to provide a vegetated, environmentally sensitive BMP facility that is aesthetically pleasing. Nine rain garden facilities have been installed or are in the design stages. Four of the facilities have been completed, four facilities are in the construction phase, and one facility is in the design phase. These nine rain garden facilities will provide BMP for over ten acres of impervious land. ***Appendix E*** contains information on the construction of the facilities and there locations and drainage areas.

BMP Handbook NVRC

The Northern Virginia Regional Commission is working with local jurisdictions to evaluate and revise the

Figure 6. Rain Garden at Mclean Community Center (Photo courtesy of PDD)

Figure 7. Sand Garden at the Mt. Vernon Police Station taken on 2/12/04 (Photo courtesy of PDD)

1992 edition of the Northern Virginia BMP Handbook. A Technical Advisory Committee (TAC) has been formed to guide the project. Its membership includes stormwater mangers from all participating jurisdictions. The handbook revision will provide straightforward guidance for the developer and his engineering staff to create “reviewable” and “constructable” site plans regarding stormwater management facilities and for the locality to consistently and fairly review such site plans. BMP descriptions will also include expected maintenance efforts specific to individual measure to aid in managing the vast of array of stormwater treatment facilities typically encountered in Northern Virginia. Standard calculation methodologies will be addressed in the handbook including BMP sizing criteria, “Low Impact Development” technologies and the protection of downstream channels.

Stream Restoration (Partnerships)

Two stream bank stabilization projects, the Snake Den Branch in Reston and the Difficult Run mainstem in Oakton were sponsored and jointly constructed by VDOF, Reston Association (RA), NVSWCD and the Fairfax County DPWES. These stabilization projects were successful largely due to the partnership between the four organizations. The main purpose of these projects was the reduction of erosion for the protection of infrastucture and sediment reduction for the Chesapeake Bay watershed. Funds for these stabilization projects were made available from all the partners and the RA received grant and mitigating funds to help support the projects.

Snakeden Branch in Reston was the latest stream to benefit from a restoration plan designed and implemented by the Northern Virginia Soil and Water Conservation District and the Virginia Department of Forestry in August of 2003. This project marked the start of the implementation phase of the Reston Association's new watershed management plan. The upper 200-ft section was completed as a partnership project by the Northern Virginia Soil & Water Conservation District, Virginia Department of Forestry, Reston Association (RA), and the Fairfax County Department of Public Works and Environmental Services, Maintenance and Stormwater Management Division. The lower 800-ft was completed by RA working with private consulting firms. RA received grant and mitigation funding to support the project. The banks were severely eroded, and the roots of many large trees were exposed. The streambanks were re-graded to gentler slopes. In the upper section, large stones were strategically placed to help stabilize a large tulip poplar tree, and both single and two-tier rows of biologs were placed along a stretch. The series of pictures below, Figures 8-13, show the restoration process in various stages at the Snake Den site.

By the time the logs degrade in seven or eight years, a root network of plants will have been established through and behind it. In addition to nine biologs, other natural materials were used to stabilize the bank. Biodegradable coconut fiber matting, secured with 300 live stakes, held the soil on the banks until the

Figure 8. Root mat staking at the Snake Den stream restoration site. (Photo courtesy of NVSWCD)

Figure 9. Snake Den Restoration Project—Biolog installation. (Photo courtesy of RA)

Figure 10. Snake Den stream restoration site, after root mat's and biologs are put in place. (Photo courtesy of NVSWCD)

Figure 11. Snake Den Restoration project—replanting of vegetative stream buffer. (Photo courtesy of RA)

roots of native grass and more than 150 riparian vanes were built to concentrate the flow path to the erosion as well as increasing water depth and fish built throughout the project. More information on plants became established. Several rock cross middle of the stream thereby reducing bank habitat. Other similar in-stream structures were the restoration project can be seen at:

www.fairfaxcounty.gov/nvswcd/snakedenbranch.htm

In October 2003, a stretch of ***Difficult Run*** in the Hunter Valley area of Oakton was stabilized. A trail and the Hunter Mill riding ring were being threatened by an eroding streambank. The cost of the project

Figure 12. Snake Den Restoration Project—replanting of vegetative stream buffer. (Photo courtesy of RA)

Figure 13. Snake Den Restoration Project, after its banks were revegetated. (Photo courtesy of RA)

was minimal. NVSWCD and VDOF collaborated on the analysis design and installation. VDOF provided some of the materials and DPWES-MSMD provided heavy equipment. The primary technique for this project was incorporating root wads into the streambanks.

The ***Accotink Creek*** and ***Cinnamon Creek*** stabilization projects, which were installed last year, continue to perform well and have proven themselves during the excessive amounts of rain in 2003, approximately 1.5 times the average annual amount and has survived Hurricane Isabel. It was also a joint stabilization project. Cinnamon Creek before and after photos are below, ***Figures 14 and 15.***

During 2003 the Kingstowne stream restoration project did not require maintenance. A brochure ***(Appendix F)*** about the project, encouraging the neighboring homeowners to be good stewards of the

Figure 14. Eroded Banks, Cinnamon Creek Stabilization Project - BEFORE (Photo courtesy of NVSWCD)

Figure 15. Cinnamon Creek Restoration Project, 2003 - AFTER (Photo courtesy of NVSWCD)

stream was produced and distributed in 2002. The Kingstowne project was initiated in 1998 as a partnership among Fairfax County, NVSWCD, the NRCS, and two citizen groups, (Citizens Alliance to Save Huntley – CASH and Friends of Huntley Meadows Park) and was completed in 1999. This

restoration project used bioengineering techniques to restore and stabilize a severely degraded stream segment in the Kingstowne area (Dogue Creek watershed). It continues to function as designed, carrying all storms successfully, and has become an attractive amenity for the community.

Occoquan Watershed

On July 7, 2003, County staff presented the Board of Supervisors with an implementation plan responding to each of the 29 recommendations of the report prepared by the New Millennium Occoquan Watershed Task Force co-chaired by NVRC. The task force was established as part of the 2002 Board of Supervisors celebration of the 20th anniversary of the downzoning of nearly 41,000 acres of land in the Occoquan Watershed for the purpose of protecting the Occoquan Reservoir (one of the County's major sources of drinking water) from nonpoint source pollution. The Task Force's report ***(Appendix G),*** which presented a series of recommendations addressing watershed management issues, was presented to the Board of Supervisors on January 27, 2003. The mission of the Task Force was to provide an assessment of issues facing the Fairfax County portion of the Occoquan watershed, to examine gaps in programs being carried out by local, State, and regional agencies, to define the role of volunteer organizations that have interests in the watershed, and to provide a vision for the future management of the watershed. The Environment and Development Review Branch of DPZ was an active participant in the Task Force's efforts as well as other County offices: the Environmental Coordinator, the Park Authority, the Health Department, the Chairman's Office, and DPWES. Continued progress on implementation of the report's recommendations is anticipated.

***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 supply sources of the majority of Northern Virginians. Six jurisdictions within the watershed, including Fairfax County, as well as various stakeholders participate in this program. NVRC has outlined a watershed planning process for the Occoquan basin. The intent of NVRC's work is to coordinate and strengthen the individual components of each jurisdiction, to identify gaps and to provide a planning and implementation tool for filling those gaps. In addition to the advantages associated with basin-wide planning, the interjurisdictional and multi-stakeholder nature of the project is expected to facilitate funding for subwatershed planning, for example, implementation of Fairfax County's watershed management plans for the Occoquan basin subwatersheds.

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 to develop TMDLs for bacteria in Occoquan subsheds of Licking and Cedar Run. NVRC has started to coordinate with key staff from the affected localities that share the watershed. The State mandated deadline for development of the TMDL is May 1, 2004. To-date, NVRC's primary focus has been the development of a water quality model using the U.S. EPA's BASINS software.

Because of this continued high growth, 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. NVRC is identifying any stream assessment activities underway or planned, along with activities that support long-term watershed management planning for the Occoquan watershed area of each jurisdiction. NVRC expects to craft a watershed management plan over the next several years that will support local goals and objectives, lead to the funding of missing links, and further the implementation of subwatershed plans.

Occoquan Watershed Storm Drain Markers - NVRC purchased more than 700 storm drain markers and 5,000 door hangers for installation by volunteers in the Occoquan watershed. The markers warn residents not to dump anything down a storm drain, and the door hangers provide information on the dangers of dumping pollutants and alternative disposal methods. Fairfax County Stream Protection Strategy staff led teams of volunteers, who installed almost 100 storm drain markers and 750 door hangers in the Centreville area of the Occoquan watershed.

Mosquitoes

In a proactive approach to mosquito surveillance and management a Mosquito Surveillance and Management Sub-committee was formed which 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 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 was a type of mosquito that primarily bread in storm drainage catch basins and isolated containers. Therefore, the surveillance and treatment activities focused on catch basins and citizen awareness. Surveillance and biological pesticide treatments were contracted to treat 10,000 suspect catch basins three times in 2003. County inspection crews supported this effort 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 found the contractor's work consistent with program needs. Information collected from first round of surveillance and treatments provided data to effectively define areas of WNV activity and zero in on appropriate locations. The second round of treatments focused more closely on the areas identified from the first round of surveillance. Based on data from the first two rounds of treatment and surveillance, the Health Department made the recommendation to treat these same areas a third time later in the season. Treatment activities were suspended due to unseasonably cold weather followed by Hurricane Isabel which was associated with heavy rains.

A program was initiated to educate citizens about WNV and informational handouts were developed to provide citizens and stormwater management facility owners/operators with background mosquito information and the do’ and don’t of mosquito management. County staff became certified by the State Office of Pesticide Services to proctor exams and to certify field staff, who were then qualified to apply biological herbicides in storm drainage conveyance systems. In 2003 approximately 6 stormwater management ponds were found to have mosquito larvae present and were treated by field staff outside of the regularly scheduled County WNV treatment program. This proactive approach/integrated approach resulted in a community more educated in stormwater, WNV, and contributed to an overall reduction of WNV in the County.

Floodplain Management

The floodplain management program in Fairfax County, in addition to reducing flood risks, provides water quality benefits in several ways. In any floodplain served by a drainage area of greater than 360 acres (major floodplains), development and disturbance is strictly limited. Considered in every proposed use in a floodplain, including minor floodplains with drainage areas between 70 and 360 acres, are the environmental impacts resulting from the proposed work. The overall effect of this program, together with the restrictions in Fairfax County’s Zoning Ordinance which prohibit increases in the 100-year water surface elevation except for road crossings and certain county-driven improvements, is to preserve and to

limit the disturbance to large areas within floodplains. The ability of these undisturbed floodplain areas to provide water quality benefits in "filtering" sheet flow from adjacent properties and in temporarily storing overbank flows in larger storm events is thus being maintained as a result of Fairfax County's floodplain regulations and policies.

a.1) Structural and Source Controls

Figure 16. Rock Sediment Trap a few hours after a rain event at Sunset Ridge, Centreville (Photo Courtesy of MSMD)

Figure 17. Rock Sediment Trap a few days after rain event at Sunset Ridge, Centreville (Photo Courtesy of MSMD)

DPWES conducts inspections and maintenance of regional ponds and dry ponds located within residential developments, along with certain underground chambers, and percolation trenches within residential developments. In addition, DPWES conducts inspection and enforcement of maintenance agreement terms for the privately maintained facilities, including wet and dry ponds, culvert storage areas, sand filters, oil/grit separators, percolation trenches, inlet treatment devices, rooftop storage, and all commercial and/or industrial detention facilities.

County Maintained Stormwater Management Facilities

There are 1,093 stormwater management facilities maintained by the County. The current inventory includes 971 on-site ponds, 33 regional ponds, 47 underground chambers, 32 percolation trenches, 5 wet ponds, 3 bio-retention areas and 2 manufactured BMP's. In 2003, the county inspected each facility at least once, mowed 802 dam embankments, and performed 251 maintenance work orders at 203 facilities. No state or federal permits were required to perform this work. Retention and detention facilities had their mowing areas reduced to just mowing dam embankments and other critical areas to increase nutrient and absorption rates. To increase program effectiveness, a visual inspection of each facility was conducted during each visit. Complex issues were identified and additional field investigations were performed.

Privately Maintained Stormwater Management Facilities

Figure 18. Stormwater Pond at the Government Center Complex, Feb. 2004 (Side view picture taken just above outlet point)

Figure 19
Stormwater Pond at the Government Center Complex, Feb. 2004 (Photo taken from one end of oblong-shaped pond)

In 2003 the Private Inspection Program underwent a rigorous review of the inventory which resulted in an increase of 300+ facilities to the inventory. In addition to the County maintained facilities, there are 2,164 privately maintained facilities in the County. The current inventory includes 285 wet ponds, 473 dry ponds, 113 sand filters, 49 manufactured BMPs', 322 percolation trenches, 496 roof top detention areas, 44 parking lot detention areas, 376 underground detention facilities, and 6 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. A total of 550 facilities (25%) were inspected in 2003. A detailed inspection report, with photographs and GIS maps, is provided to each owner upon completion of each inspection. The goal is to have the County ramp-up its efforts to ensure privately maintained facilities are maintained and operated consistent with industry standards to be in full compliance with permit requirements. Education of owner/operator of stormwater managed facilities has proven effective in getting the desired level of service for these facilities.

State-Regulated Dam Facilities

There are six state-regulated dams maintained by the County; all are located within Pohick Creek Watershed. Combined, the six facilities serve a watershed area of 22,690 acres with an estimated population of 100,000 residents. DPWES staff and representatives from 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 scheduled five times per year.

a.2) <u>Areas of New Development and Significant Redevelopment</u>

Comprehensive Land Use Plan

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 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 LID 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 reviewed 214 rezonings and related applications (e.g., amendments), 80 special exceptions and amendments, and 80 special permits, in 2003, for environmental considerations.

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

During the last decade in the County, stormwater management has received increased attention relating to water quality issues. This attention, coupled with development patterns, has generated significant challenges to the County's ability to deal effectively with stormwater. An effort to address these challenges was the "Infill and Residential Development Study" requested by the Board of Supervisors in May 1999. This study was completed and recommendations were accepted by the Board of Supervisors at a public hearing January 22, 2001. The infill study provides a framework for discussion of issues as well as policy and regulatory reform concerning residential development in the County. Many of the storm water and erosion and sedimentation control elements of this study are more encompassing and apply to other types of development in the County as well.

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:

- An enhanced erosion and sediment control program involving improvements in education, policy, regulations, and enforcement as well as implementation of innovative practices;
- 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 the 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; and
- 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:

- 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; and
- Established 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.

Progress is continuing in all remaining areas and further completion is anticipated over the next year.

Zoning Ordinance and Subdivision Ordinance

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. During 2003, 434 site, subdivision and public improvement construction plans were reviewed for code compliance; of these, approximately 197 were approved for construction.

The Zoning Enforcement Branch of the Department of Planning and Zoning investigates complaints of possible Zoning Ordinance violation issues. The complaint investigation activity of 2003 for the complaints related to stormwater issues and the status of follow-up are summarized in ***Table 2***. 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.

Table 2. 2002 Zoning Ordinance Complaint Cases

	Complaints Received	Cases Closed	Cases Pending
Drainage	25	21	4
Junk Yards	30	22	8
Outside Storage	477	436	41
Storage Yards	16	11	5
Total	548	490	58

a.3) Roadways and Parking Lots

The County maintains public facilities such as: libraries, fire stations, governmental centers, park and rides, and a number of road segments totaling approximately 5 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. Strategies are being developed to use other deicing chemicals which are even more environmentally acceptable.

Due to the widespread use of the public parking facilities in the County, routine sand and deicing materials treatment is provided during snow clearing operation with sand and deicing materials 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.

a.4) Retrofitting

Retrofitting of Watersheds with New Flood Control Facilities

Given limited funding sources, implementation of detention pond retrofit projects rely 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 which have or will achieve retrofit benefits. ***Table 3*** lists those projects, which have been bonded or were completed during calendar year 2003. ***Table 4*** lists those projects which 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. ***Figure 20*** is a typical regional pond.

Table 3. *Regional Facilities Bonded or Completed During 2003*

Facility Name	New facility	Retrofit existing 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-151)	yes		134	na
Regional Pond (H-9)	yes		100	60
Regional Pond (R-8)	yes		100	20
Regional Pond (R-161)	yes		235	50
Total			772	220

na = not available

Table 4. *Regional Facilities in Design or Land Acquisition Phase During 2003*

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 D-46	yes		277	180
Regional Pond H02	yes		101	15
Regional Pond R-16	yes		120	105
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			**4,549**	**3,239**

na = not available

Figure 20. New Extended Dry Regional Pond, created wetlands will be added in the spring of 2004.

Rehabilitation and Retrofit of County Maintained Stormwater Management Facilities

In 2003, ten (10) stormwater management ponds, serving a total drainage area of 436 acres, were rehabilitated and/or retrofitted, ***Tables 5 and 6***. Rehabilitations consisted of repair, replacement, or modification of the facility to meet or exceed safety and functional requirement 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 water absorption and transpiration. A secondary effect of wetland marshes and naturally vegetated pond floors is the creation habitat for wildlife. Below is a summary of the sites:

Table 5. Retrofitted and Rehabilitated Facilities with Enhancements

Pond Name	Tax Map	Access Address	Drainage Area (Ac)	Season Completed
Donegal Oaks Pond 1	89-4	Open outlot at Donegal La/ Springtree La	10	Summer 2003
Beaufort Park Sec. 1	21-3	914 Helga Place	22	Spring 2003
Sequoia Farms Sec 10	44-3	7828 Lakeland valley Dr.	11	Summer 2003
Sully Station Phase 1 Pond 3	43-4	14815 Harvest Ct.	34	Winter 2003
Little Rocky Run Pond 2 (Sec 45)	65-2	13827 Springstone Dr.	26	Winter 2003
Little Rocky Run Pond 1 (Sec 41)	65-4	13640 South Spring Drive	8	Winter 2003
		Total	111	

Table 6. Rehabilitated Facilities with Enhancements

Pond Name	Tax Map	Access Address	Drainage Area (Ac)	Season Completed
Foxfield Sec 13 Pond D	35-3	3775 Maxewood La (rear)	154	Fall 2003
Sully Station Phase 1 Pond 2	44-3	Westfields Bv. : Opposite Sully Sta.	95	Summer 2003
Sully Station Phase 1 Pond 6	44-3	14317 Brookmere Dr.	19	Winter 2003
South Run Forest Basin 2 (sec 3)	97-2	7828 Lakeland valley Dr.	57	Summer 2003
		Total	325	

Fairfax County is currently in the process of repairing many publicly maintained residential stormwater

Figure 21. Retro-Fitted Pond in Little Rocky Run, Completed Summer 2002. (Photo Courtesy of MSMD)

Figure 22. Retro-fitted pond in Little Rocky Run, One Year later, photo taken in Summer, 2003 (Photo Courtesy of MSMD)

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

Reston 913 Retrofit and DCR Water Quality Study

Reston 913, a 1.8 ha 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 which is due to expire in February 2004. DPWES plans to continue the project, as it will provide a wealth of information on the benefits of wetlands in stormwater management facilities, and is planning on applying for an extension to the grant. There are a number of options to fulfill the requirements of the grant if given a 2 year extension, the most promising of which is to reduce the scope of the construction project so that it can be completed within one year, while not reducing the scope of the monitoring, which would take place the following year. The reduced scope project would consist of installing a BMP weir at the outlet to the pond with a drawdown time of 24 to 48 hours as previously stipulated in the grant. The difference would be in the treatment of the larger storms. At present, the design was to take into account the 100 year storm which required the design and construction of additional outlet pipes going under the W&OD Trail and a large parking.

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.

Lake Barcroft Watershed Improvement District's (LBWID) Retrofits

LBWID continues its involvement in watershed management by assisting Falls Church City in forming a street sweeping operation that is more directed toward improving stream water quality as well as being an effective esthetic tool in community appearance. LBWID also did a fish flesh study by sending edible portions of fish removed from Lake Barcroft for analysis of toxins and heavy metals. The official report is in the process of being produced but none of the counts were over the EPA warning levels. The fish studied were Largemouth Bass, Bluegill and Black Crappie. Operations have focused heavily on removal of lake debris as well as a number of fallen trees in the lake.

The recently designed and constructed a diversion debris trap over Tripps Run at Potterton Road has undergone some changes since it was first placed in. Most of the fixed barrier boards were removed and a Tuffboom ® (floating) barrier has been chained in place just upstream. This allows the debris to be diverted and held back throughout a storm, unless the storm water overwhelms the structure.

The six-year EPA grant under Section 319 of the Clean Water Act to identify and demonstrate appropriate urban BMPs has concluded with a Final Report in the form of an interactive CD-ROM containing voluminous text and hundreds of digital color pictures. A copy of this CD is attached ***(Appendix H)***. Numerous BMPs are appropriate for urban or urbanizing communities. Some such as street sweeping or temporary stormwater detention tend to minimize pollution discharge to stream. Others such as sediment dredging and debris catchment are pollutant removal systems

The LBWID dam has a new PLC (logic controller / computer) that regulates the level of the bascule gate relative to the amount of water in the lake. It is cutting edge technology and the operating staff are quite

pleased with its performance The dam also had some equipment repairs and upgrades and a few more are pending, like the upgrade of the water level sensors.

a.5) Pesticide, Herbicide and Fertilizer Application

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

A PH&F Application program ***(Appendix I)*** was submitted on January 24, 2003 in accordance with the permit requirement section I.B.1.e. The goal of the program plan is to evaluate current methods of application and prepare recommendations that are designed to reduce the quantity of pollutants that may enter the MS4 and streams in the County. This information will be used to ensure that all involved are in concert with each other and are striving for a reasonable goal.

A questionnaire and a list of agencies was developed to be used in compiling data necessary to determine current pest management and fertilizer application practices being implemented in the County. The survey is currently underway with good success to date. Once the survey data is complete it will be compiled and the data used to determine the degree that mechanical, cultural, or biological methods are currently being implemented in conjunction with, or in lieu of, chemical methods to manage pests and maintain properties. The data will also be used to identify areas where the use of pesticides, herbicides and fertilizers can be reduced on county owned properties by implementing non chemical or reduced chemical management practices. Recommendation for a county wide approach to reduce the use of chemicals for the control of pests and management of vegetation will prepared. The questionnaire and list of agencies surveyed is in ***(Appendix J).***

The survey is being conducted of agencies in Fairfax County that maintain public right of ways, parks and other municipal property in the County, to establish current procedures for application of PH&F. These agencies include the Park Authority (FCPA), Facilities Management Division (FMD), Maintenance and Stormwater Management Division (MSMD) and Public Schools (FCPS). In addition, non-government organizations are also being surveyed. The procedures are being reviewed in an effort to identify areas where the discharge of pollutants can be reduced.

Northern Virginia Soil and Water Conservation District

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 two golf courses, and provided comments and recommendations to the Department of Planning and Zoning.

In October, NVSWCD hosted a Green Breakfast on Environmentally Friendly Lawn Care, with speakers from Virginia Cooperative Extension and DCR.

Northern Virginia Regional Commission

The Northern Virginia Regional Commission completed its "Water Friendly Lawn Care Contractor Promotion Program." With partial funding from the Chesapeake Bay Restoration Fund, NVRC developed a data base of lawn care contractors. NVRC provided lawn care contractors with information on the Virginia Department of Conservation and Recreation's (DCR) Water Quality Improvement Agreement program. Contractors responded directly to DCR, and DCR staff worked with contractors to meet program requirements.

NVRC compiled a data base of citizens associations and notified each organization of the WQIA program. An updated list of approved contractors was sent to more than 200 associations. The program was also publicized through the press, governmental agencies, e-mail networks and the internet.

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 (VT) 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 VT 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 2003, more than 885 people received professional training

at the annual 3-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). One training session prepared over 65 landscape professionals and local government employees for testing with VDACS to become certified Pesticide Applicators or Registered Technicians. In addition, more than 500 horticultural professionals and members of the structural pest control industry received recertification training and credit at the annual Greens Industry Seminar.

EHD offers technical support to other agencies on demand, for example, 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).

a.6. Illicit Discharge Improper Disposal

Ordinances and Enforcement

The Fire and Rescue Department's Hazardous Materials and Investigative Services aggressively enforces County Code Chapters 105 and 106 and has issued criminal citations during the investigations of Hazardous Materials Incidents. Chapters 105 & 106 contain the provisions, which 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 L)*** 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 from groundwater contamination. The CAPs may involve the discharge of treated groundwater to the storm sewer system. The Fire & Rescue Department's Hazardous Materials Services Section acts as an agent of the Director of the Department of Public Works and Environmental Services to permit and enforce actions on these activities. The Hazardous Materials Technical Support Branch currently monitors 43 active sites undergoing remediation activities.

In 2003 response incidences, which had the potential to discharge hazardous materials into storm drains or surface water, included: 32 improper disposals, 16 pipeline incidents, 39 various types of product release and 191petroleum releases. Storm drains and creeks/streams were reported to have been directly contaminated in 43cases. There were 7 cases involving products released from transportation accidents that did not reach storm drains or surface waters in the County. Hurricane Isabel accounted for 10 incidents where petroleum products or vessels were impacted by floodwaters or emergency generator operations. The incidents involving potential hazardous materials entering the storm sewer system and areas of surface water runoff are summarized in ***Appendix M***.

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:

Figure 23. Wastewater Collection Division inspects a line using their Closed Circuit Television (CCTV) System
(Photo Courtesy of Wastewater Collection Division)

- Sewer system evaluation survey 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 2003, 187 miles of old sewer lines and 34 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 2003, approximately 139,000 feet of sanitary sewer lines were rehabilitated and over the past six years this adds up to over 901,000 feet (170 miles).
- In addition 25 dig-up repairs and 91 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.

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 2003, three E&I projects were completed consisting of 11,638 linear feet of 8-inch sewer line, 3500 linear feet of 4-inch force main, two pump station, and providing sanitary sewer service connections for 94 existing homes.

Public Reporting

Through their *Adopt-A-Stream* program the Health Department has served as a resource for concerned citizens, by answering questions and investigating stream related complaints, including sewer line breaks, fish kills, and illegal dumping. In July 2003, this program became the responsibility of DPWES along with the Water Quality monitoring program and is done in conjunction with answering stream related questions as result of the SPS study. DPWES has actively encouraged the development of "friends of" watershed groups in at least the 30 major watersheds located within county boundaries.

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, who monitor 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.

NVSWCD Associate Director Christa Hellberg-Cook visually inspects the Little Hunting Creek Watershed for problems stemming from water pollution, litter, and inadequate E&S controls on construction sites; she calls the appropriate agencies when she observes a problem.

Ned Foster, president of the Friends of Little Rocky Run, keeps a lookout for threats to the 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, and reports to DPWES pollution problems such as sediment plumes, and illegal activities such as clear-cutting.

a.7) 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.

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 which are exposed to stormwater. Select groups are also trained in the proper handling of hazardous wastes and operate the Household Hazardous Waste collection program.

a.8) Industrial and High Risk Runoff

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 Disposal and Resource Recovery is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road, Lorton, Virginia 22079 and the I-66 Transfer Station/Closed Landfill, located at 4618 West Ox Road, Fairfax, Virginia 22030. Both facilities are located on County property. Each facility has a separate VPDES General Permit. The I-95 Landfill is permitted under VPDES permit VAR530115, expiration date June 30, 2004; and the I-66 Transfer Station/Closed Landfill is permitted under VPDES permit VAR530113, expiration date June 30, 2004.

The I-95 Landfill's Closure Plan (document entitled Closure/Post Closure Plan, I-95 Landfill Permit No.103, Closure Phases III and IV of MSW Unit) was submitted and is conditionally approved by the Virginia Department of Environmental Quality in accordance with the Waste Management Act, Code of Virginia Title 10.1, Chapter 14. . The closure work will be performed in four phases (Phase III A, Phase III B, Phase IV A and Phase IV B). The closure work will include the placement of 18" thick low permeability soil cap and construction of stormwater management features. The closure will minimize the need for future maintenance of the landfill and it will safely control the flow of stormwater to surface water features around the landfill. Presently, Phase III A of closure construction is under progress. The entire closure capping will be completed in four years.

Division staff performs quarterly visual inspections at storm water outfalls located at the I-95 Landfill and the I-66 Transfer Station/Closed Landfill. The quarterly visual inspections are performed in each of the following three-month periods: January through March, April through June, July through September, and October through December. Semi-annual sampling is performed in March and September of each year at both facilities. 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 due to the fact that most of the activities required by the VPDES permit are also required to be performed under the operating permits granted by the Virginia Department of Environmental Quality. Test results and inspection reports are maintained at the Division's main office and copies are on file at the respective field offices.

Training in pollution prevention for facility staff is provided regularly and is part of each facility's waste disposal permit. 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 tests for the VPDES permit have been satisfactory and are within acceptable limits.

The Division maintains a website at:

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

This website provides the public with information regarding the waste disposal activities of the Division in general, and the Household Hazardous Waste (HHW) Collection Program. During FY 2003, 16,149 customers participated in disposal of HHW. During this period 59,840 lbs of HHW, 5,350 gallons of antifreeze, 71,842 gallons of used motor oil, and 107,212 gallons of latex paint was collected.

a.9) Construction Site Runoff

During 2003 a total of 328 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 N***. In addition, 29,017 E&S inspections were conducted by the Environmental and Facilities Inspections Division (EFID) during 2003 on all sites under construction in Fairfax County. This amounted to providing E&S inspections on over 3,000 projects each month. Approximately 45 percent of the 3,000 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 Environmental and Facilities Inspections Division of DPWES organized and conducted a forum in partnership with the United States Environmental Protection Agency, the Virginia Department of Conservation and Recreation, the Virginia Department of Environmental Quality, the Northern Virginia Soil and Water Conservation District, and the Heavy Construction Contractors Association on Federal, State, and Fairfax County requirements pertaining to E&S controls and the protection of natural resources during the land development process. The Environmental and Facilities Inspections Division also provided additional training on Fairfax County's erosion and sediment control requirements to the engineering industry.

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, contact the Code Enforcement Division at (703) 324-1937. For problems with the removal and addition of soil without a construction permit, 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, 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

The Office of Site Development Services of DPWES implemented several policies through letters to the land development industry aimed at improving the quality of E&S control plans and performance in the field. In April 2003, a letter to industry was issued to improve compliance with existing regulations relating to adequate outfall and stormwater detention by clarifying the minimum outfall narrative requirements. In May 2003, a letter to industry was issued that required the submission of a detailed checklist on erosion and sediment controls with each erosion and sediment control plan. In July 2003, a letter to industry was issued that established the County's policies pertaining to the use of chemical erosion and sediment controls on construction sites.

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. 56 site plans were reviewed in 2003 and comments were provided to DPWES.

NVSWCD reviewed 233 re-zoning and special exception applications during 2003, with particular attention to the properties of soils, the potential for erosion, and the impact on drainage, stormwater management, and the surrounding environment. Comments were provided to the Department of Planning and Zoning; and provided technical advice and information to 292 developers, consultants, and engineers on the properties of soils in the County and on potential erosion and drainage problems.

In addition, the NVSWCD serves as independent judges in the E&S controls category for the County's annual "Land Conservation Awards." The awards are designed to encourage excellence in the installation and maintenance of E&S controls and management of stormwater. In 2003, there were two sessions when sites were nominated and judged--one in the summer and one in the fall. Awards were given in six categories of land development. Also, awards were given to a construction firm site superintendent, an engineering firm, a contractor, and one of the County's Inspectors.

A hotline was established by DPWES to handle complaints about erosion of soil from construction sites and sediment carried off site. 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, contact the Code Enforcement Division at (703) 324-1937. For problems with the removal and addition of soil without a construction permit, 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, 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

A class and a workshop were conducted on E&S controls, constructibility issues pertaining to the implementation of E&S controls and E&S regulations through the Engineers and Surveyors Institute. The class and workshop were attended by both the private and public sector employees.

a.10) Stormsewer Infrastructure Management

A Stormsewer Infrastructure Management Plan and Schedule ***(Appendix O)*** was submitted on July 24, 2002 in accordance with the permit and updated on February 4, 2004

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 four hundred and forty (440) tax map grids; each grid encompassing 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, 2003, 114 tax map grids have been finalized (130% of this year's 87 grid permit requirement). There are an additional 54 tax map grids currently in progress. Starting July 1, 2004 (subject to approved funding of $250,000), the remaining 326 tax map grids (54 in progress plus 272 new) is expected to be digitized and finalized.

Storm Sewer Survey

In 2003, sixty five (65) tax map grids, containing 167.5 miles of storm drainage pipe, were field verified as to location and inspected for deficiencies and maintenance items. The yearly permit requirement is 162 miles of storm drainage pipe (one fifth of the total inventory).

a.11) Public Education

Fairfax County Health Department

Environmental Health Specialists presented 4 public awareness programs to 250 County residents during the year, each about the Chesapeake Bay requirement to pump septic tanks every 5 years. Other programs have been given which incorporate a stream awareness component to alert residents to possible stream health hazards and provide information on how to report stream pollution problems.

Fairfax County Public Schools

The Fairfax County Public Schools curriculum for its approximately 12,000 7th grade students includes a course in "Investigations in Environmental Sciences." During this course, the students study basic ecology concepts and how to apply them to the Chesapeake Bay Watershed ecosystem. The curriculum for its approximately 10,000 9th grade students includes "Biology 1" in which ecology is addressed. Other courses available are "Chemistry 1" which addresses chemistry in the community and water quality issues, and "Geosystems" which includes a section on the hydrologic cycle. Many schools also offer advanced environmental science courses. In addition to the courses offered, there are school-based projects, which examine geomorphologic changes, nonpoint source pollution, and stream monitoring.

In 2003, 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 SRAPbook) 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. Finally, a contest was held to name the new county recycling mascots – the Recycle Guys. Nearly 500 FCPS students entered the contest.

Fairfax County Recycling

During 2003, Clean Fairfax Council provided information on litter prevention and recycling to FCPS 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 Council offered a program called "Critters Don't Need Litter" which stressed the havoc

roadside litter causes wild animals that come to the roadside. The Council distributed litter/recycling newsletters to all 5th and 6th grade students. Each year the Council sponsors the Fairfax County Earth Day/Arbor Day celebration and participates in Fall for Fairfax and Celebrate Fairfax. Additionally, the Council sponsors two countywide cleanups (spring and fall) which involved 20,000 volunteers.

During 2003, SWMP kicked off a new recycling awareness program featuring the Recycle Guys. The Recycle Guys are seven characters that have been used widely by local governments throughout the country to promote recycling. Roll out activities included a contest to name the recycle guys, extensive press releases resulting in three articles in the Washington Post and local papers and an appearance by the Guys at our America Recycles Day/volunteer recognition event in November.

Figure 24. The Recycle Guys—the mascots of Fairfax County's Recycling Program. The Recycle Guys appear courtesy of the S.C. Department of Health and Environmental Control's Office of Solid Waste Reduction and Recycling

Also, new this year, was SWMP's participation in the NIKE Reuse A Shoe program which collects used athletic shoes to be recycled into new surfaces for playgrounds and athletic fields. Through the Reuse A Shoe program, SWMP has initiated partnerships with 40 organizations including schools, youth groups, community service groups and businesses. Events promoting Reuse A Shoe included collection bins at Fairfax County RECenters, a Reuse A Shoe 1K ramble at Earth Day Arbor Day, and collections at various fairs and festivals during the year.

The SWMP continued its innovative and productive partnership with ServiceSource to recycle used computers. ServiceSource is a non profit group that employs people with disabilities to disassemble and recycle computers. The program has co-sponsored and advertised several community collection events in partnership with nearly a dozen schools, businesses, and non profit organizations. Advertisements were placed on the radio, on cable TV, and in local newspapers. Over the course of the partnership, nearly 350 tons of computers have been recycled at Fairfax County events. The partnership was recognized with a NACO award and selected as a finalist for a Northern Virginia Leadership Award.

Figure 25. Computer Recycling in partnership with ServiceSource. (Photo courtesy of SWMP)

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, Rocktoberfest, and Raytheon Earth Day. Additionally, information on recycling was made available to citizens as part of the 80 presentations made as part of the outreach for the 2004 -2024 Fairfax County Solid Waste Management Plan. The Solid Waste Management Program's booth was awarded a blue ribbon for content 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 of the winner's sites to present the awards at a staff gathering and maximize program exposure.

Internally, the Employee Recycling Committee has continued to thrive. The ERC has increased its membership by 1/3 in 2003 and has sponsored several events to encourage employees to recycle including contests for Clean Your Files Day, and an intranet site with county employee recycling information.

The Recycling Ambassadors program continues with over 100 people volunteering over the course of 2003. New this year is a "Junior Ambassador" program. 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 2-week period. 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. One of the regional prizes was awarded to a FCPS student in Springfield. Our traditional Recycle Right (beautiful bin) contest selected the best bin from some very creative digital photos contributed by County residents. Additionally, the County sponsored a highly successful Community Recycling Road Show where we collected over 20 tons of computers, 100 bicycles, 500 cell phones and nearly 300 pairs of eyeglasses. Nearly a dozen community groups were involved in the effort which was heavily advertised throughout Fairfax County. The 2003 event was recognized as one of the top ARD efforts in the country by the national America Recycles Day organization.

The Solid Waste Management Program maintains a web site which includes information on residential, office, and yard waste recycling, buying recycled content products and reducing waste. It also provides electronic versions of most Division publications. New information about recycling education opportunities and events is constantly being added to the website. This year, the office established a listserv for county residents interested in news about recycling.

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

Virginia Department of Forestry

The Virginia Department of Forestry (VDOF) works with Fairfax County to present educational opportunities. Stream restoration workshops 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 association, and professionals. Brochures and exhibits have been developed for public outreach at festivals, Arbor Day, and other environmental celebrations. There were 20 such activities in 2003 presented by VDOF. VDOF assisted Daniel's Run Elementary School with the installation of a rain garden in 2003. This particular garden will capture parking lot surface flow before it enters Daniel's Run. 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.state.va.us/rfb/rain-gardens.shtml

Northern Virginia Soil and Water Conservation District (NVSWCD)

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

During 2003, NVSWCD received 205 public information inquiries and distributed approximately 3,953 brochures and flyers related to the reduction of nonpoint source pollution. NVSWCD revised and reformatted the ***Citizens Water Quality Handbook***, updated the contact list, renamed it the **Water Quality Stewardship Guide,** and placed it on the web page. It contains a great deal of useful information about water and watersheds, water quality, 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 inter-active watershed model provided by NVSWCD are aimed at teachers, youth, schools, Scout groups, and the general public. The watershed model, ***Enviroscape***, is used to demonstrate the sources and methods for controlling non point source pollution from various land uses. During 2003, the watershed model was used during 14 presentations to educate 351 people.

NVSWCD provided technical advice to 595 homeowners and homeowner associations, including 217 on-site visits to advise on erosion, drainage, and other environmental problems and 67 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, 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.

NVSWCD hosts quarterly Green Breakfasts to provide an opportunity for the community to hear about topics of environmental interest and discuss environmental issues. Watersheds and stormwater management were the topics of two Green Breakfasts. In March, the Findings and Recommendations of the New Millennium Occoquan Task Force were presented. In May, the Findings and Recommendations

of the study of *The Role of Regional Ponds in Fairfax County's Watershed Management* were presented. The study committee chartered by the county's Environmental Coordinating Committee and carried out under the auspices of DPWES, included representatives from DPWES, Planning and Zoning, NVSWCD, and the Environmental Quality Advisory Council. Sixty-one recommendations were made for improving the county's stormwater management program.

Public Outreach and Environmental Education
Stormwater Planning Division, DPWES

Figure 26. SWPD participated in Celebrate Fairfax 2003. Such outreach activities help to foster public awareness & involvement in protecting our streams.

Figure 27. Outreach opportunities--SPS team member, Shannon Curtis, helps out at the 2003 Envirothon Event for Virginia high school students. (Photo courtesy of NVSWCD)

Watershed Planning Initiative

Throughout 2003, the public involvement component of the watershed planning efforts being conducted by the Stormwater Planning Division (SWPD) grew considerably as plans were initiated. The Little Hunting Creek watershed plan was initiated in the spring, Popes Head Creek and Cameron Run watershed plans were initiated in the fall of 2003. Each watershed plan will incorporate a diversified community-based advisory group to help perform outreach to the residents in their communities, enhance public participation at the large public forums, and oversee the full development and implementation of the plan. More information concerning the public involvement component of the plans can be obtained by visiting:

http://www.fairfaxcounty.gov/dpwes/watersheds/

During 2003, the Stormwater Business Area of DPWES completed the development of its long-ranged Strategic Plan. As part of this effort, several tactical items were identified for which action plans will be developed. A tactical plan relating to the development of an effective outreach, education and communication program was initiated in fall of 2003. The goal of this action item is to engage stakeholders and partner agencies in defining a unified approach towards fulfilling long-term outreach requirements.

Explore Your Watershed Walks

The Audubon Naturalist Society, Fairfax County Stream Protection Strategy, and Northern Virginia Soil and Water Conservation District partnered together again to provide opportunities for citizens to learn

more about the organisms living in Fairfax County's stream valleys and pollution threatening them, by leading Explore Your Watershed Walks. Approximately 25 people attended three walks along Accotink Creek, Big Rocky Run (in the Cub Run watershed), and Nichol Run.

Perennial Stream Identification and Mapping Workshop

Approximately 60 people participated in the two day perennial stream identification and mapping workshop at the Fairfax County Government Center in June 2003. The workshop was geared towards environmental professionals who would potentially be performing perennial stream threshold surveys. However, interested citizens were also welcomed. Presentations were made by Stormwater Planning Division staff on the Fairfax County efforts, in addition to Jim Gregory of North Carolina State University and Dave Penrose of North Carolina Division of Water Quality, on the initial efforts made by the North Carolina. The protocol for identifying the break between intermittent and ephemeral streams served as the template for Fairfax County's Perennial Stream Identification Field Protocols. Catherine Harold of the Chesapeake Bay Local Assistance Department presented pertinent information concerning the Commonwealth's amended Chesapeake Bay Preservation Ordinance requirements. The second day consisted of a field visit to a stream at Ellanor C. Lawrence Park, in the Cub Run watershed, displaying ephemeral, intermittent and perennial characteristics.

Celebrate Fairfax/Fall for Fairfax

SWPD along with the Maintenance and Stormwater Management Division shared booths at the annual Celebrate Fairfax and Fall for Fairfax fairs this year displaying project and related contact information. SWPD also displayed the Enviroscape, watershed model, and live fish and benthic macroinvertebrates. Approximately 130,000 people attended both of these events, which are considered to be some of the county's largest tradeshows.

Fairfax Watershed Network

Over the past five years public awareness of watershed-related issues has risen exponentially through the advent of the Volunteer Stream Monitoring programs organized by the Audubon Naturalist Society and Northern Virginia Soil and Water Conservation District, as well as numerous other efforts made by a multitude of other non-profit and volunteer organizations located in Northern Virginia. To recognize these efforts and take advantage of the high interest in watershed issues, the Fairfax Watershed Network was formed to organize the many individual groups and citizens interested on working towards the improvement and protection of Fairfax County's streams and watersheds.

Beginning in the early summer of 2003, monthly meetings were held with representation from approximately 12 of the county's 30 watersheds. At each meeting, presentations were made by volunteer groups, non-profit organizations, and/or county programs. A staff member from SWPD presented detailed information concerning the state of the county's streams based on the January 2001 Stream Protection Strategy Baseline Study report. SWPD staff continues to serve as an active member of this network.

Regional Outreach Campaign

Spearheaded by the Northern Virginia Regional Commission and Arlington County Department of Environmental Services, SWPD staff has participated in many preliminary meetings concerning a coordinated outreach effort. This regional outreach campaign will target three citizen behaviors, which are major contributors to non-point source pollution. These behaviors include improper pet waste disposal, improper car maintenance and washing, and over-fertilization. The activities that will occur with this program will potentially meet the goals of many other programs including tributary strategies, TMDL implementation plans, watershed management plans, Stormwater (MS4) measures, and Chesapeake Bay 2000 Agreement requirements.

It is planned that promotion for this campaign could potentially incorporate many different forms of media, including, radio, television, newspapers, etc.

Thomas Jefferson High School for Science and Technology – Dead Run Watershed Adoption

A coordinated effort between SWPD and the Thomas Jefferson High School for Science and Technology (TJHSST) to engage freshman students in the adoption of the Dead Run watershed strengthened in 2003. Three teachers from Thomas Jefferson organize this program in partnership with SWPD and a representative from the Federal Emergency Management Authority. This experiential learning course focuses on incorporating each of the disciplines in collecting and analyzing Dead Run's water quality characteristics, and promoting the results to the community. Two presentations for approximately 150 freshman students on the state of the Dead Run watershed, based on information collected during the SPS Baseline Study, took place in the spring and fall semesters. SWPD also provided Geographic Information System maps of the study area.

Public Presentations

Approximately eight presentations were made to environmental groups throughout Fairfax County on watershed specific information or SWPD projects.

Master Watershed Stewardship Certification Program

Potomac River Greenways Coalition, Inc., a non-profit group dedicated to improving watershed awareness in Fairfax County was awarded a grant through the National Fish and Wildlife Service to develop a Master Watershed Stewardship Certification Program in Fairfax County. The certification program incorporates eight modules on watershed specific topics, in addition to 30 hours of volunteering in watershed stewardship activities. SWPD serves as a major partner in this effort, contributing staff time to program development and presentations during the modules. For more information, please visit:

http://www.fallschurchenvironment.org/mwsp_info.doc

Burke Centre Conservancy's Earth Day Stream Clean-up

A representative from SWPD presented watershed stewardship information to approximately 100 children and adults at the Burke Centre Conservancy's annual Earth Day stream clean-up event, in the Pohick Creek watershed.

Volunteer Stream Monitoring

Stream monitoring data collected through two volunteer stream monitoring programs organized by the Audubon Naturalist Society and Northern Virginia Soil and Water Conservation provide an invaluable source of reliable water quality information concerning the state of Fairfax County's streams. SWPD continues to actively support and participate in the efforts made by both programs and use the information in addition to that collected under the Stream Protection Strategy program for monitoring the conditions of county streams.

The Virginia Envirothon (regional competition) 2003

Staff from SWPD developed the aquatics section of the 2003 regional Virginia Envirothon competition and earlier in the spring held an overview of water quality and benthic macroinvertebrate identification training session. The Envirothon, a natural resources competition for high school students, is hosted by the Northern Virginia Soil and Water Conservation District.

a.12) Monitoring Programs

a.12.a) Dry Weather Screening Program

Fairfax County's Dry Weather Screening program has been a part of the permit for the past 7 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 2003 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 screening outfalls. So far, the watershed has been sampled five times, a total of eight are planned. In 2003, due to large amounts of rain throughout the entire year only one sampling event was completed and it consisted of 123 locations, including outfalls, tributaries, and main channels. A few other sampling campaigns were started, but had to be abandoned due to the occurrence of rain in the middle of the campaign.

The Dry Weather Screening Program will continue in the following years (***Appendix P*, "**Monitoring Programs, Field Procedure Manual and Sampling Protocol February 2003"). It is summarized as follows: Perform field investigation of stormsewer outfalls in dry weather (less than 0.1 inches rain in the past 72 hours), taking photos and noting types of land use and identifying possible sources of pollution; Perform water quality analysis if water is flowing according to the Water Quality Criteria; Document all sites with site ID, Tax Map Number, address, watershed and landuse and other pertinent data using the MS4 NPDES Monitoring Data Sheet; and Enter all data into a database and generate summary reports.

a.12.b) Wet Weather Screening Program

Fairfax County's program for Wet Weather Screening is a new requirement in the permit. 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.

The Wet Weather Screening Program will use the sites identified from DEQ that have industrial stormwater permits as the starting point for possible collection of wet weather manual grab samples, see ***Appendix P*, "** Monitoring Programs, Field Procedure Manual and Sampling Protocol February 2003". Sampling at these sites could be representative of the first flush, and the sampled storm hydrograph's rising limb, peak, and receding limb. Pollutants to be analyzed for will be specific to the land-use in the outfall's drainage area to determine whether the "hot-spot" identified could be contributing excessive pollutant levels to the MS4 system. The first-flush concentration and the storm event mean concentration (EMC) will be evaluated and compared with median values for the specific land-use. A GIS-based screening procedure for identifying potential "hot-spots" in the wet weather screening program, based primarily on intensity of land-use (imperviousness and land-use type) will be developed as part of the comprehensive monitoring program referred to previously. Under this task, areas identified as "hot-spots" will be ranked and prioritized for field screening.

a.12.c) Industrial and High Risk Runoff Program

Fairfax County's program for Industrial and High Risk Runoff Monitoring, which may include monitoring for pollutants in stormwater discharges to the MS4, is a new requirement in the permit. 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 2003 a list of all VPDES permitted stormwater industrial facilities that discharge into the Fairfax County's MS4 was obtained from DEQ. Currently there are 34 permitted such facilities and a database was developed showing the facility location and the facility type, including the EPA Source Identification Code (SIC), ***Appendix Q.***

This list will be expanded in the 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. Facilities that fall into this category will be located and possible pollutants identified and the water quality measures that are in place will be determined. Coordination with FRD HMIS and DEQ will determine locations of possible industrial pollution, based on their database and records of recent violations. If violations are determined, appropriate action will be taken as necessary to comply with the MS4 permit. This may require water quality analysis or "no exposure" certification and an onsite inspection every five years, or additional monitoring, see ***Appendix P,*** "Monitoring Programs, Field Procedure Manual and Sampling Protocol February 2003".

a.12.d) Watershed Monitoring Program

Figure 28. Wet weather sampling equipment: Isco automatic sampler with bubble flow module and pH and temperature monitors; and American Sigma tipping bucket rain gauge

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. The Watershed Monitoring Program ***(Appendix R)*** was submitted on January 24, 2003 in accordance with the permit.

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 mi^2) 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 (i) predominantly low density residential, and (ii) predominantly medium to high density residential, were identified. These subwatersheds have been evaluated using GIS layers (orthophotophography, street, streams and stormwater, and storm sewer inventory) to determine locations for field investigation. During the field investigation one of the most important aspects will be "site access" not only for construction but for maintenance and placement and recovery of the automated sampling equipment and water samples.

Water Quality Monitoring

Automated sampling equipment will be used to collect stormwater for water quality monitoring. Collection will be 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. The wet weather outfall sites will have permanent type housing structures with locking mechanisms to deter vandalism. Sampling equipment will be rotated between the sites and will consist 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. 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 5-minute data intervals) for rain and flow. The Isco Pal pH monitor will measure pH during the entire monitoring period; readings are recorded every 15 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. Continuous rainfall recordings will be achieved only prior to the sampling event, since the equipment will be rotated from station to station. Continuous rainfall data is also obtained from the Wastewater Collection Division that maintains 10 continuously recording (15 minute intervals) rain gauge stations located throughout the County. These records will be used to verify that collected storm event samples met the storm event sample collection criteria of this permit.

Fecal Coliform Monitoring Program

In July 2003, the Department of Public Works and Environmental Services, SWPD took over the responsibilities of the Water Quality Monitoring Program that the Fairfax County Health Department maintained for the past 20 years. This program entails sampling stream mainstems and major tributaries for fecal coliform and chemical parameters, including dissolved oxygen, pH, specific conductance, and temperature. Other parameters which are measured in lab include Nitrate, Nitrogen and Total Phosphorous. The Water Quality Monitoring is currently being conducted by the staff from SWPD, and all lab analysis is still conducted by the Fairfax County Health Department Lab. The Water Quality Monitoring

Figure 29. SPS Team member taking a sample for the Fecal Coliform Monitoring Program.

Program has not changed much since being switched over to SWPD; however, in the future, it is SWPD's goal to integrate this sampling regime into the Stream Protection Strategy Program's current, overall watershed studies. SWPD is currently evaluating the use of optical brighteners to supplement this monitoring as well.

Kingstowne Environmental Monitoring Program

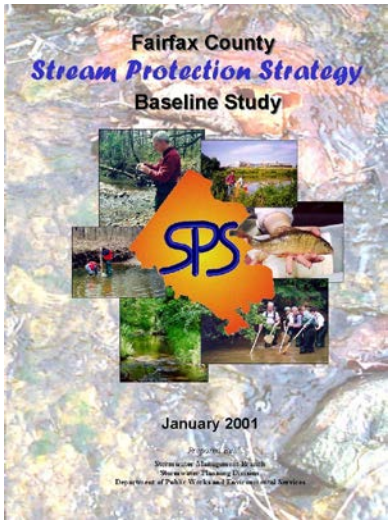
Fairfax County initiated the Kingstowne Environmental Monitoring program in 1986 to evaluate water quality impacts on Dogue Creek from the 1,170-acre development. The purpose of the monitoring program is to estimate pollutant loadings and sediment removal efficiencies of the site's erosion and sedimentation controls. Continued operation of this program is necessary to ensure that sediment wash-off from the Kingstowne development is minimized to protect the environmentally sensitive wetlands located downstream in Huntley Meadows Park. The water quality monitoring includes wet-weather and base flow sampling. During 2003, a total of 19 storm events and 12 baseflow samples were collected and analyzed. Based on the results, the sediment removal efficiencies of the controls were adequate and no stop work orders were issued to the developer.

Figure 30. New Dogue Creek monitoring station, installed July 2002 150 feet downstream of Telegraph Road adjacent to Huntley Meadows Park

The Kingstowne Environmental Monitoring program was expanded in 2002 to include the Monitoring and Maintenance Plan for the South Van Dorn Street Phase III project as required by U.S. Army Corps of Engineers Permit No. 91-0247-15. The Monitoring and Maintenance Plan includes the maintenance and operation of a second water quality monitoring station to evaluate phosphorus loading from the entire Silver Springs segment of Dogue Creek. The new monitoring station was installed in July 2002 and is located on Dogue Creek approximately 150 feet downstream of Telegraph Road adjacent to Huntley Meadows Park. The monitoring data will be used to evaluate the performance of the stormwater management program that includes the monitoring and maintenance of BMP ponds within the watershed. During 2003, a total of 20 storm events and 12 baseflow samples were collected and analyzed.

a.12.e) <u>Bioassessment Monitoring Program</u>

A Bioassessment Monitoring Program ***(Appendix S)*** was submitted on July 24, 2002 in accordance with the permit and details Fairfax County's Biological Monitoring Program, otherwise known as the Stream Protection Strategy (SPS) program. The SPS program is an ongoing assessment of the physical stability and 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. 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. 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.htm

Figure 31. SPS Team member jab sampling for benthic macroinvertebrates.

For much of 2003, the SPS Program and its team members were involved extensively in the surveying and mapping of all perennial streams in Fairfax County as a part of the effort to comply with the new Chesapeake Bay Regulations regarding streams with perennial flow. With the aid of two outside, consultant groups as well as FCPA staff, the team was able to complete all field mapping by the end of October, 2003. During the next month, the team was entering all field data into the database and creating

the maps which would ultimately be used as the Chesapeake Bay Preservation Area Guidance Maps. Because of this special project, biological monitoring only occurred on a reduced scale during 2003. However, sampling of benthic macroinvertebrate of reference sites in Prince William Forest National Park was completed. In addition, benthic sampling in the Popes Head Creek watershed was also completed as part of an effort to establish a baseline for benthic macroinvertebrates in this area. This was initiated because stream segments of this watershed are listed on the TMDL List for Benthic Impairment.

A program of long-term monitoring now samples approximately 20% of the County annually. Sampling efforts at all locations are identical to those made during the baseline study, and involve detailed field and laboratory examinations of living stream communities (benthic macroinvertebrates and fish), an assessment of in-stream and riparian zone habitat characteristics, and spatial analyses of land use patterns countywide.

Figure 32. SPS Team sorting benthic macroinvertebrate samples in the field.

Other ongoing SPS program activities include:

- Conducting a quality assurance/quality control (QA/QC) survey on the perennial stream data and then updating the maps with any necessary changes.
- Collaborating with George Mason University in an US-EPA jointly-funded assessment of wetlands within Fairfax County, with a special emphasis on their relative degree of correspondence with National Wetland Inventory (NWI) maps.
- Assisting U.S. Geologic Service staff in sample collection and discharge assessment in an ongoing fecal coliform source tracking study within the Accotink Creek watershed.
- 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 on results of stream assessments.

In an effort to better integrate County stream monitoring efforts, the water quality assessment program previously directed by the Health Department was transferred to SWPD in 2003. The transfer of responsibilities allows for a more efficient use of County resources, as well as better integration of watershed management decisions and recommendations. The information collected will be made available to Heath Department staff for inclusion in their own annual reports on stream quality as it relates to human health.

a.12.f) Floatable Monitoring Program

Fairfax County's Floatable Monitoring Program has in the past been met through the Adopt-A-Stream Program. The County's Adopt-A Stream program promotes stream awareness and public reporting of illicit discharges and was until July 2003 administered through the Health Department. DPWES is

currently answering stream related inquiries that deal with watershed problems and specific question about the SPS program and perennial stream study. Inquiries regarding sanitary sewer breaks, fish kills and hazardous material discharges are referred to other county agencies.

The County is an active participant in Virginia's DCR Adopt-A-Stream Program through which County's Stormwater Management Branch (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 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 all the DCR sponsored Adopt-A-Stream organizations in Fairfax County was obtained from DCR, a survey questionnaire was developed and contact was made with all the organizations collecting 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 draft floatables study is presented in ***Appendix T.***

a.13) Other Monitoring Activities

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 U***). 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 analysis 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 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 SPS program as well as provides other services to the environmental community in Fairfax County. In addition to providing monitoring data, NVSWCD also 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 2003, NVSWCD led fifty-four stream monitoring training sessions or watershed programs, with over 1700 participants. (Note: The same person can attend multiple programs and therefore is counted multiple times. 1700 accounts for each attendee not for 1700 different individuals). Watershed programs include: indoor stream ecology program 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 2003, 30 sites were monitored in the winter, 35 were monitored in the spring, 55 sites were monitored in the summer, and 38 sites were monitored in the fall. 65 monitors collected winter data, 95 monitors collected spring data, 107 monitors collected summer data, and 127 monitors 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. It tracks volunteer time.

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

Newsletters and calendars are sent to about 500 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/%7Ejarcisze/StreamMonitoring/index.html

In 2003, partners included: George Mason University's New Century College, Arlington County's Environmental Services Department, Reston Association, Stream Protection Strategy – 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, and Flint Hill School – Upper School. In 2003, 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 steam monitoring and adopt-a-stream programs.

The Potomac Conservancy

The Potomac Conservancy has an active program of visually monitoring the Potomac River, including monitoring by volunteers in canoes and small boats and sponsors cleanups of stream segments in Difficult Run, Sugarland Run, Pimmit Run, and the Potomac River. More information is available at their web address:

http://www.potomac.org

Fairfax Trails & Streams

In 2003, Fairfax Trails & Streams, a volunteer group formed primarily to work on the Pimmit Run and Cross-County Trails, conducted their annual spring clean-up of Pimmit Run, continue to lobby against inappropriate development in the Pimmit watershed, publicize guidance for homeowners on proper stewardship of backyard streambanks, and direct press attention to discharge of toxic material into a Pimmit tributary. In 2002 they published a historical/environmental map of the Pimmit Run watershed. More information is available at their web address:

http://www.fairfaxtrails.org

a.14) Other Water Quality Enhancement Measures

South Van Dorn Street Extension

Fairfax County has acquired approximately 102 acres of undeveloped land between Hayfield Farm subdivision and Dogue Creek. This is one of the conditions of the U. S. Army Corps of Engineers permit to allow the extension of South Van Dorn Street to Telegraph Road. The construction of South Van Dorn Street will disturb existing wetlands which are under Corps of Engineers jurisdiction. The acquisition of the 102 acres will partially compensate for the loss of wetlands caused by the South Van Dorn Street construction by preserving the 102 acres in its natural state in perpetuity. The 102 acres is composed of approximately 59 acres of natural wetlands and 90 acres of floodplain. There are also about 12 acres of property above the floodplain, some of which could have been developed. The developable property would have been accessed off the end of Helmsdale Lane. This threat of development has been eliminated by the County's acquisition of the 102 acres. The property will be transferred over to the Fairfax County Park Authority to be added to Huntley Meadows Park.

Water quality improvements were also provided as part of the permit conditions. Improvements were made to six stormwater management ponds on Greendale Golf Course by dredging to extend the capacity and providing new outlet structures. A new extended dry pond, DC 106 was constructed adjacent to South Van Dorn Street. The stormwater management improvements were designed to provide an annual phosphorus removal efficiency of 50%. A monitoring and maintenance program is being provided for a period of ten years.

Roadway construction on the extension of South Van Dorn Street is by the developer of Kingstowne and started in September 2002. Construction was delayed due to wet weather during 2003. Completion is anticipated in summer 2004.

Fairfax County Park Authority

Fairfax County Park Authority (FCPA) sponsored and organized clean up days in Stream Valley Parks, drawing many citizens into the creeks and woods and providing excellent learning opportunities as well as removing over 60 bags of trash. FCPS cooperated with citizen groups looking for places to plant or enhance riparian buffers.

The silted in stock pond at Mason District Park was converted into a half acre Best Management Practice facility with the capacity to control the 1.5 year storm event runoff from the densely developed 60+ acre watershed. This facility includes vegetated wetland benches along the pond edges and along the inflow channel, a forebay to remove sedimentation and road sand. In addition educational displays are planned for installation along the boardwalk and trails surrounding this functional amenity. FCPA supplied the following photos in ***Figures 33 to 37***. A number of FCPA construction projects included the use of innovative Storm Water Management (SWM) practices such as raingardens, wetlands, Delaware Sand filters and the creation of a Conservation Easements.

Several Resource Management sites participate in the county stream quality monitoring program directly, as well as through training and sponsoring citizen volunteer monitors. FCPA staff also participated in the Resource Protection Area mapping project related to the revised Chapter 118 regulations.

Figure 33. Old Park Authority Property Pond which was silted in, full of debris, and causing erosion downstream

Figure 34. Up close photo of the old pond, notice the bank erosion, trash, and overall, unattractive appearance.

Figure 35. New Forebay Area containing recently planted trees. A forebay traps litter and sediments before they reach the pond.

Figure 36. New boardwalk that crosses channel from forebay to pond to allow visitors to cross channel without getting wet.

Figure 37. New Pond with graded banks, as seen on Sept. 5, 2003. At this point, the crews have graded about ¾ of the pond's edge.

Northern Virginia Soil and Water Conservation District

The old farm pond at Mason District Park on Columbia Pike is getting a major face lift. Construction began in January 2003. The new pond design will help control stormwater runoff from the 56 acres of drainage area above it, resulting in reduced pollution and downstream erosion. In 1998 the voters of Fairfax County approved a Park Authority Bond Referendum that included a pond renovation project for the Mason District Park. The goals of this project were to replace the existing pond outlet structure and construct amenities to compliment the pond, making it more of a focal point for the park. Further scrutiny

of the pond by the Park Authority found that the dam and outlet structure needed significant structural repairs beyond those originally anticipated. When funds originally allocated for an erosion control project became available, there was a sufficient amount to reconstruct the dam and outlet structure, convert the pond into a BMP facility, and still beautify the pond area. NVSWCD is documenting the project for the Fairfax County Park Authority and the Mason District. An article about the project and pictures of the step-by-step construction can be viewed at the following web sites:

http://www.fairfaxcounty.gov/nvswcd/newsletter/masonpark.htm

http://www.fairfaxcounty.gov/nvswcd/newsletter/masonpond1.htm

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 2003, 6,068 tree and shrub native plant seedlings, mostly in 412 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 5,000-6,000 visitors each month and is credited with increasing the county's environmental presence on the web. By the end of 2003 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 web address is as follows:

http://www.fairfaxcounty.gov/nvswcd

NVSWCD published and circulated Conservation Currents, an eight-page newsletter, five times in 2003. 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; Green Roof at Yorktowne Square; Stormwater Pond Construction at Mason District Park; Looking Out for Poison Ivy, and Controlling English Ivy. Other topics included Perennial Stream Mapping, Fall Lawn Care, Identifying and Preventing Nonpoint Source Pollution; Managing Soil, Not Turf; Polymers as Erosion and Sediment Control Tools; and the Fairfax County Soil Survey. See ***Appendix V*** for the 2003 Conservation Currents issues.

In 2003, the NVSWCD web site and the *Conservation Currents* newsletter each won a first place award in the National Association of Conservation Districts Outreach Awards program. There are 3,000 conservation districts nation-wide.

More than 3705 Earth Team volunteer hours were logged by citizens doing stream monitoring, tree plantings, and stream cleanups, participating in a program to control the geese 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.

The Virginia Agricultural BMP Cost-Share program, administered locally by NVSWCD, provides up to 75% of the funding for approved agricultural practices that protect and improve water quality. In 2003, one manure waste storage structure was installed for a horse-keeping operation. This will prevent the manure from becoming part of stormwater runoff to nearby streams and the composted material will be used to help improve pastures. The landowner received $5,890 to install this structure.

Yorktowne Square, a condominium community in Fairfax County, in partnership with Eco-Stewards Alliance, has installed a green roof. This vegetated roofing system demonstrates an innovative way of managing stormwater runoff. Instead of increasing impervious surface like a conventional roof, a "green" roof can absorb up to 70% of stormwater, which is similar to the absorption rate of a healthy, aerated lawn. The 4,200 square foot roof is planted with three varieties of sedum plugs, all common to the mid-Atlantic region. The plants intercept and delay rainfall runoff and the peak flow rate, reducing the erosive potential of stormwater and eventually returning water to the surrounding atmosphere by evaporation and transpiration. Two grants, from the Virginia Department of Conservation and Recreation and the National Fish and Wildlife Foundation, helped to fund this project.

Virginia Department of Forestry

The Virginia Department of Forestry (VDOF) in 2003 worked with volunteers from organizations such as the Chesapeake Bay Foundation, Difficult Run Community Conservancy, 4-H Clubs and Potomac Conservancy, to plant approximately 2000 seedlings along 1300 linear feet of stream corridors.
The protection of forest cover and water quality are both promoted in the Agricultural and Forestal management plans.

Stream bank stabilization projects took place in Difficult Run watershed on the Difficult Run mainstem in Oakton and Snake Den Branch in Reston. For the two stream bank stabilization projects VDOF partnered with Fairfax County Department of Public Works-Stormwater Management Division and Northern Virginia Soil and Water Conservation District. The purpose of the projects was the reduction of erosion for the protection of infrastucture and sediment reduction for the Chesapeake Bay watershed. Approximately 1000 linear feet of stream bank was stabilized using natural materials: root wads, coconut fiber matting, and vegetation and instream structures.

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. Each year DOF personnel review approximately 12 such plans.

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. Reston has an active citizens stakeholders group, the Reston Watershed Action Group (ResWAG) that provides a grass-roots link to the community for the Association's resource management staff.

In 2003, RA began implementation of their Watershed Plan. A 1000-ft stream restoration project was conducted in the headwater section of Snakeden Branch. The upper 200-ft section was completed as a partnership project, conducted by the RA, between Northern Virginia Soil & Water Conservation District, Virginia Department of Forestry, and the Fairfax County Department of Public Works and Environmental Services. The lower 800-ft was completed by RA working with private consulting firms. RA received grant and mitigation funding to support the project.

The ResWAG continues to meet on a monthly basis to discuss ways to education and engage the Reston community in watershed improvements efforts.

At the end of 2003, RA staff and volunteers began discussing long-term solutions to dredge material disposal. The group brainstormed on developing another partnership with Fairfax County to establish regional dredge material disposal areas within the County that could be used by entities like Fairfax County DPWES, FCPA, and private associations like RA that conduct dredging activities. This effort would reduce the amount of time and costly expenses associated with finding disposal locations in close proximity to dredge sites. Feasibility studies could be developed to identify potential locations in the County. The regional sites could be used for temporary storage. Material, once dried, could be sifted and recycled for other uses.

In 2003, RA continued its volunteer stream monitoring program in conjunction with the Northern Virginia Soil and Water Conservation District, VA Save Our Streams program. The District provided valuable assistance through in-kind support this past year.

Figure 38. Indoor Benthic Macroinvertebrate Identification Class sponsored by RA & NVSWCD.

RA completed the annual water quality monitoring for Reston's four lakes (Anne, Newport, Thoreau, and Audubon) and two ponds (Bright and Butler) from April through September.

Several shoreline and stream bank stabilization projects using biologs, erosion cloth, and native plantings were conducted in 2003. RA staff worked with several clusters and individual homeowners on shoreline stabilization projects. RA continued to promote natural shoreline stabilization and encouraged the use of more environmentally sensitive materials for bulkheads and docks as opposed to conventional pressure-treated timber, which is commonly used.

In April 2003, RA staff and volunteers participated in the 15th Annual Potomac Watershed Cleanup by hosting numerous cleanup sites along Snakeden Branch, The Glade, and Colvin Run tributaries in Reston. RA staff members and 128 volunteers removed 242 bags of trash, weighing in at approximately 5,566 pounds, from the streams as well as other items including shopping carts, chairs, mattresses, bikes, a computer monitor, and various car parts. Over 2 miles of stream were cleaned up in three hours.

ResWAG and RA staff developed a Rain Barrel brochure and new guidelines were incorporated into RA's covenants documents. RA continued work on educating the public about the need and importance of on-site stormwater control / LID. RA received grant funding to develop an LID manual for homeowners.

DPWES

In support of the 1999 interim policy regarding tree preservation and planting in and around stormwater management ponds, DPWES continued with the revised pond-mowing program first implemented during the summer of 2000. These non-mowed areas are quickly returning to a natural state, improving functionality through enhanced sediment removal and nutrient uptake and improving biologic diversity with the emergence of wet meadow and wetland habitats.

b.) Proposed Changes to the Stormwater Management Program

The County has completed field studies of all the 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 in each of the County's 30 watersheds. 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. The overall goal is the development of a Countywide Watershed Protection and Restoration Strategy which provides 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.

Regional Pond Study: 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, economical and social concerns while working in concert with better site designs and low impact development practices. The Subcommittee is currently coordinating the development of an implementation plan for all recommendations, including a time line and assignments. Several of the recommendations address the need to make modifications to the County's Public Facilities Manual (PFM), stormwater policies, codes and ordinances.

The results of all these efforts may lead to significant changes to the Stormwater Management Program.

c.) 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 maintains water quality and discharges in compliance with the MS4 permit requirements. As the County approaches built-out conditions, it will become increasingly challenging to mitigate the impacts of impervious area and non-point source pollution on streams. Several efforts through the existing stormwater management program is 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.

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 revised Potomac 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. Any attempt to quantify the potential pollutant load reductions resulting from the stormwater control program remains speculative due to limited data collected thus far, the uncertainty of obtaining capital construction funding, the pace of new development activity, and various other factors. The ongoing County programs are funded through June 30. The costs associated with the stormwater control program are segmented into four categories, i.e., currently funded programs, costs associated with the wet weather monitoring and field screening programs, costs associated with implementation of capital improvement projects, and costs of private organization programs.

Currently funded programs

It is anticipated that the ongoing programs within the various County agencies (DPWES, FRD, FCPS, etc.) will continue to receive funding through current sources. Funding for maintenance of public facilities, inspections of private facilities, and DPWES staff support is currently appropriated through the County General Fund. Other programs are funded by a combination of state and County funds such as the Department of Health and NVSWCD programs.

The ongoing County programs are funded through June 30, 2004, the end of the County's Fiscal Year 2004. The continuation of the General-funded portion of these ongoing programs requires subsequent annual appropriations from the County General Fund. The remaining programs will likewise require a continuation of their funding sources. Overall, it is anticipated that the currently funded water quality programs will continue to be funded through the life of the permit.

The costs for VPDES monitoring, inspection and testing as well as maintenance and preventive measures are included as part of the annual operations budget for each landfill facility and are not a separate item. Funding for VPDES-related activities at the landfills will continue to be funded in this manner. This is partially due to the fact that many of the activities required under the individual VPDES permits for inspection, monitoring, and remediation at the landfill facilities are also required by the various operating permits granted by the VA DEQ.

Costs associated with the implementation of capital improvement projects

It is generally recognized that additional funding sources are needed to implement capital improvement projects for water quality due to the limited availability of funds for stormwater control in recent years.

It is estimated that more than $40,000,000 per year would be required to aggressively implement stream restoration and stabilization projects, regional stormwater management facilities, flood control improvements, an enhanced stormwater maintenance program, and retrofit BMPs throughout the County. However, this estimate is subject to refinement after detailed needs can be assessed with the completion of watershed management plans for all County watersheds. Watershed Management Plans will identify improvements and their costs which will help support the need for a dedicated funding source such as a Stormwater Utility.

In the interim, three methods to fund capital construction of water quality control improvements are used. They include storm drainage pro rata share funds, proffer agreements by developers, and General Fund appropriations. During Fiscal Year 2004, approximately $3.7 million of new pro rata share revenues were appropriated to capital projects and $1.4 million were available to support watershed planning from the

General Fund. Additional funds are anticipated for fiscal year 2005 that would continue the support for comprehensive Watershed Management Plans.

d.) Annual Expenditures for the Reporting Period

Funding for the County's stormwater control program is primarily through General Fund appropriations, with some pro rata share revenue for capital improvement projects. Ongoing programs within the various County agencies continue through current sources. Several County and non-governmental organizations provide support of various monitoring programs, water quality improvements, and public awareness programs. Funding for maintenance and inspections of both public and private facilities and DPWES staff support continues primarily through the County General Fund and some service charge revenues. Other programs are funded by a combination of state, County, and grant funds. The non-government organizations which conduct water quality programs are for the most part privately and/or grant funded.

The Stormwater Planning Division, DPWES cost center operating budget is currently set at $1,450,000 for FY 04 and is estimated to be $2,420,00 for FY 05. Major activities relating to the implementation and execution of stormwater control policies include: developing the Watershed Management Plans, the Countywide Watershed Protection and Restoration Strategy, a long term watershed 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 Division of Environmental Health expended approximately $43,000 in conducting the sampling of 84 stream sites for the Annual Stream Water Quality Report, for writing/publishing the Annual Stream Water Quality Report and for the investigation of the 7 stream complaints conducted in 2002. The *Annual Stream Water Quality Reports for 1997 to 2002 are available from the* Health Department's web page; the 2003 report will be available by June 2004, and will contain data up to July 2003 when the program was transferred to DPWES.

http://www.fairfaxcounty.gov/service/hd/strannualrpt.htm

The Maintenance and Stormwater Management Division, DPWES, expended $950,418 in 2003 for maintenance and inspection of the stormwater management systems. The following is an itemized expenditure of the stormwater management program: Maintenance of the stormwater management facilities $742,727; Inspection of the privately maintained stormwater management facilities $93,498; and Engineering support and program management $114,193. In 2003 MSMD inspected all the publicly maintained stormwater management ponds, the PL-566 dams, and approximately 25% of the privately maintained stormwater management facilities. Mowing of the dam embankments was completed on all the publicly maintained regional SWM facilities and approximately 60% of the publicly maintained onsite SWM facilities. The remaining 40% of the publicly maintained facilities are mowed by property owners. Engineering inspection of the public ponds resulted in 203 maintenance work orders to perform repairs. Work required on privately maintained facilities was performed by the property owners.

There are three full-time professional positions in the Environment and Development Review Branch, Department of Planning and Zoning (DPZ), devoted to environmental planning, and additional staff resources from other DPZ branches or divisions will occasionally address water quality issues. The environmental planning function in DPZ was funded at approximately $195,000 in FY 2003 and

$200,000 in FY 2004.

The Division of Solid Waste Disposal and Resource Recovery, DPWES is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road, Lorton, Virginia 22079 and the I-66 Transfer Station Landfill (closed), located at 4618 West Ox Road, Fairfax, Virginia 22030. Annual VPDES expenditures are estimated to be $26,000 for the I-95 facility and $17,000 for the I-66 facility (closed). Total cost of operation of Household Hazardous Waste program is approximately $450,000 annually.

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 2003 was approximately $423,887 with Fairfax County contributing $296,779 and the state contributing $81,156. Several grants were received, including $1,200 for the stream monitoring program, and $2,900 to develop educational panels for a display, and $5,000 to provide technical assistance on stream projects. In addition, the value of volunteer services provided to Fairfax County is approximately $194,000 of which $74,419 is contributed by stream monitors.

The estimated Northern Virginia Regional Commission 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). A $1,250 grant from DCR paid for storm drain stenciling in the Occoquan watershed during FY 2003; an additional 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).

In 2003, RA spent over $350,000 on watershed and stormwater management initiatives including: implementation of the Reston Watershed Management Plan, lake, dam and stream maintenance, shoreline and stream bank stabilization, erosion and nutrient control project design and implementation, lake and stream water quality monitoring, invasive exotic weed control, technical/professional consultation, educational programs and workshops, development and distribution of watershed improvement educational literature. In 2004, it is estimated that RA will spend over $300,000 on watershed and stormwater management initiatives involving implementation of the watershed plan.

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 NPDES Phase I permit for the last seven years. Participation by non-government agencies in stormwater management play a significant role in achieving this. During 2003, the Stormwater Management Program has focused on the Perennial Stream Survey and Mapping, the development of Watershed Management Plans, 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 most significant achievement was the extensive perennial stream survey and mapping which resulted in an increase of 330 miles of perennial streams, a 52% increase, 638 miles to 968 miles. This increase in stream miles established 17.06 square miles (or 10,921.57 acres) of new RPA in the county, an increase of 31% from 55.3 square miles to 72.3 square miles.

The development of Watershed Management Plans for all 30 watersheds, including, sub-watersheds, and/or groupings of watersheds is in the process and will continue over the next 6 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. Major milestones in the development of the County's watershed management plans in 2003 include: Draft of Little Hunting Creek Watershed Plan was prepared; Popes Head Creek Watershed citizen advisory group was formed; and Cameron Run Watershed citizen advisory group was started.

The development of watershed management plans for the County 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 Program. 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 in the new permit 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 as well as a High Risk and Industrial monitoring component have been added.

A total of 17 TMDLs are currently on the 2002 impaired waters listing (DEQ's 303(d) list) with others to be added by an imminent 2004 listing. These TMDLs will require development between 2006 and 2014 and implementation of mitigating plans following their approval. In addition, the threat of a Chesapeake Bay and Potomac River Basin wide TMDLs 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.

The County's stormwater business area's core leadership team which was formed in 2001 to help define long-term strategic planning and thinking for stormwater management in the County completed the development of an environmental scan and strategic plan in 2003. This core leadership team will continue to pursue the implementation of action steps from the strategic plan for the stormwater business area. It is generally recognized that the future stormwater management program 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 and TMDLs. Strategic efforts will have to focus on how to maximize existing resources and obtain new resources to keep pace of this increasing demand to improve 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.
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.
MWCOG: Metropolitan Washington Council of Governments.
NPDES: National Pollutant Discharge Elimination System.
NPS: Nonpoint Source.
NRCS: Natural Resources Conservation Service

NVCT: Northern Virginia Conservation Trust.
NVRC: Northern Virginia Regional Commission.
NVRPA: Northern Virginia Regional Park Authority.
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.
SWM: Stormwater Management.
SWMP: Sold 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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