

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

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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.

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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](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*

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.



**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

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<sup>2</sup>) 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 (orthophotography, 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 Program has not changed much since being switched over to SWPD; however, in the future, it is SWPD's



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

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) Bioassessment Monitoring Program***

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



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