

## **EXECUTIVE SUMMARY**

The submission of this annual progress report to the Maryland Department of Environment (MDE) fulfills requirements specified under Frederick County's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. MD0068357. The permit took effect March 11, 2002 and remains in effect until a new NPDES MS4 permit is issued to Frederick County.

Continuing progress has been made in the County's NPDES programs since the 2008 Annual Report was submitted on March 10, 2009. Note however that MDE did not provide feedback on the 2008 report until one month before work on the current report was initiated. As such the County did not have the benefit of a substantive discourse with MDE on how to best tailor reporting. Nonetheless, the sections in this annual report follow specific sections presented under Part III, Standard Permit Conditions, of the County's NPDES Permit to document how required elements of the County's stormwater program are being implemented.

### **Permit Administration/Legal Authority**

This report documents certification from the County Attorney that Frederick County possesses the authority to perform the activities described in 40 CFR 122.26(d)(2)(i) and the County's NPDES permit.

The Frederick County Division of Public Works (DPW), the Division of Permitting and Development Review, Department of Planning & Zoning, and the Office of Environmental Sustainability support compliance with the County's NPDES Municipal Separate Storm Sewer System (MS4) permit.

### **Program Funding**

The NPDES program has consistently maintained adequate funding to support the requirements of the program. The FY 2009 budget year began July 1, 2008. The budget included \$183,140 in personnel expenses and \$460,097 in operating expenses for a total of \$643,237. This total was an increase of \$74,914 over the previous year.

The FY 2010 budget year began July 1, 2009 and is currently in effect. The budget included \$183,772 in personnel expenses and \$475,275 in operating expenses for a total of \$659,047. This request was an increase of \$15,810 over the previous year.

Staff continues to leverage funds and efforts through its partnerships with outside grantors and through its coordination of the Monocacy & Catoctin Watershed Alliance (MCWA).

### **TMDLs: Total Maximum Daily Loads**

Additional TMDLs for watersheds within Frederick County were added in 2009. TMDLs in Frederick County now cover 87.5% of the County's land area. All TMDLs except the ones for

Lake Linganore include Waste Load Allocations (WLAs). Staff continue to coordinate with MDE regarding upcoming changes to TMDLs.

## **Stormwater Management in Frederick County**

Frederick County continually evaluates its stormwater management programs in an effort to identify and bring about needed improvements as required under its NPDES permit. The County maintains its current Stormwater Management Program in compliance with Environmental Article, Title 4, Subtitle 2, Annotated Code of Maryland. The County will continue to do so through plan review and inspection of all developer projects and through implementation of the *2000 Maryland Stormwater Design Manual* and its latest modifications.

### **Stormwater Best Management Practices**

The County continues to participate with MDE to establish the necessary changes in law and design guidelines to meet the Stormwater Act of 2007, the latest modification to stormwater regulations enacted by the State of Maryland. Frederick County continues to commit to work with the state not only to improve the implementation of the existing regulations, but also to move forward with the implementation of environmental site design (ESD), once adopted. The County will also continue to educate both the development community and the general public in the proper design, implementation and maintenance of stormwater management.

### **Inspection and Compliance**

In 2009, the Environmental Compliance Section (ECS) made 131 maintenance inspections of Stormwater Management Facilities, which is on par with an average of 150 per year. Also during 2009, the County completed its Illicit Discharge Detection and Elimination Protocol that will serve as the field operations and data management manual for the NPDES dry weather screening program. The protocol establishes a system for consistent reporting, referral, and addressing of potential illicit discharges and develops a mechanism for tracking and reporting to satisfy the County's NPDES permit requirements. During screening conducted on June 25-26, 2009, field staff identified one potential illicit discharge, which was then reported to MDE for follow-up.

## **Erosion and Sediment Control Program**

A robust erosion and sediment control program to regulate site clearing and construction practices is an integral part of NPDES permit compliance. The County's program, implemented by ECS is currently undergoing field review by MDE. A formal determination of acceptability was expected by January 1, 2010. In the meantime, several modifications have been made to provide more ways to identify and improve inspector consistency including quality control inspections by the ECS inspection supervisor, dissemination of Standard Operating Procedures to inspectors, weekly staff feedback meetings, and changes in procedures to maximize inspection efficiencies.

Planned enhancements include: coordination with the local Soil Conservation District to enact a joint approach to plan review and clarify each agency's role in the process, in accordance with

the 2007 SWM ordinance; use of a newly developed PowerPoint Presentation for County Projects that outlines the requirements and expectations for permitting and maintenance; and more direct involvement of upper management in the workings of ECS.

### **Spill Response**

During 2009, the Watershed Management Section (WMS) worked with its NPDES consultant, Versar, to develop a standard set of procedures for responding to all citizen complaints of spills and illicit discharges, as part of the County's IDDE protocol. The procedures will help citizens report spills to the correct agencies with a minimum of internal transfers. An additional element to the spill response program is the establishment of standard procedures for internal and external reporting. The County's protocol establishes a system for consistent reporting, referral, and addressing of potential illicit discharges, dumping, and spills. This protocol is complete and is undergoing internal review.

Frederick County has maintained an active program to respond to spills, including expanding its procedures for public reporting and responding to citizen complaints. The County responded to three spill complaints in 2009. The County continues to develop procedures for public and environmental health and safety.

### **Frederick County Recycling Program**

The Frederick County Recycling Program was able to divert a growing proportion of solid waste from the landfill by promoting recycling among county residents. In FY 2009, 16,323.23 tons of waste were collected and recycled from the County's residential curbside and satellite drop off programs. In 2009, Frederick County reported a recycling rate of 41.39% and a source reduction credit rate of 3% for a combined waste reduction rate of 44.39%.

### **Private Well and Septic System Management**

Septic systems or Onsite Sewage Disposal Systems (OSDS) contribute 9 pounds per person per year of nitrogen compared to only 2 pounds per person per year of nitrogen for centralized wastewater treatment facilities (MDE DVD "Onsite Sewage Disposal Systems"). Throughout Frederick County, 35 OSDS were upgraded to reduce the concentration of nitrogen in the OSDS effluent by 50% or more. The Canaan Valley Institute (CVI) worked with the Health Department to identify and prioritize potential sites, coordinate with homeowners, select appropriate technologies, oversee installation, and establish a management framework.

### **Public Transportation Improvements**

TransIT ridership increased for the 13th consecutive year to 791,961 passenger trips, an increase of 7%, and experienced record ridership between July and October. Ridership has more than tripled since 2007 and more than doubled since 2003. TransIT adjusted its Meet-the-MARC shuttle to accommodate changes in the MARC schedule to provide better service for commuters. TransIT adjusted other route schedules to improve time transfers made by commuters between routes and dispatch hours were extended to cover evenings, Saturdays, and holidays.

Additionally, TransIT offered free rides on Code Red air quality days to help reduce emissions from vehicles.

### **Road Maintenance Activities**

During 2009, Frederick County continued to implement recommendations from its 2002 Assessment of Road Maintenance Practices (Versar 2002) which evaluated the effects of road maintenance activities on stormwater runoff and resulting impacts on surface water quality. They include the following:

- **Street Sweeping:** A total of 382 acres (196.93 miles) of road were swept, with special attention paid to bridges. A total of 212 cubic yards of debris were collected.
- **Litter Control:** The Office of Highways and Transportation removed a total of 153.63 tons of trash and 1,036 tires during 2009.
- **Deicing:** Caliber M1000, a liquid deicer which is a 30% Magnesium Chloride solution with an additional agricultural by-product, is used in 41 of 51 of the County's trucks, when the temperature is  $\leq 20^{\circ}\text{F}$ . Caliber M1000 enhances the effectiveness of road salt application. A total of 25,615 gallons of Caliber M1000 was used in 2009 in addition to 13,942.63 tons standard road salt, and 3,796.83 tons Anti-Skid in 2009, for all watersheds.
- **Inlet Cleaning:** A total of 717 inlets were cleaned in 2009. 30 inlets were “vactored”.
- **Reducing the Use of Pesticides, Herbicides, Fertilizers and Other Pollutants:** In 2009, the Office of Highway Operations applied no herbicides, pesticides, or fertilizers.

### **Stream Quality Monitoring**

From 1999-2007, Frederick County made efforts to identify and evaluate water quality problems in its priority watersheds by conducting, on a rotating basis, stream monitoring using both biological and physical habitat methods during designated index periods. Beginning in 2008, the County modified its monitoring program to contain two separate monitoring efforts. The first involves targeted monitoring in specific watersheds to support on-going and potential restoration and community outreach efforts. The second involves a County-wide, randomly stratified, stream sampling program called the Frederick County Stream Survey (FCSS). Sampling includes collection of water quality data, determining indexes of biological integrity (IBI) via benthic macroinvertebrate and fish sampling, and quantitative assessment of physical habitat.

The watersheds in which targeted monitoring efforts are occurring are Ballenger Creek, Bennett Creek, and Linganore Creek. Ballenger Creek was selected as the second watershed to be assessed under Frederick County's NPDES stormwater permit because of substantial growth in the north-central and eastern portions of the watershed, near the City of Frederick. Bennett Creek and its tributaries were chosen because they have been classified by MDE as Class IV Recreational Trout Waters. A portion of the aquifer in the Bennett Creek watershed has been designated as a sole-source aquifer by the U.S. EPA. Linganore Creek is considered a high priority for assessment because of its close proximity to the City of Frederick, concerns for Lake

Linganore water quality, and recent, significant residential development in the Lake Linganore area.

Water quality sampling, conducted in April and September 2009, generally showed good results. Overall physical habitat using the Maryland Biological Stream Survey (MBSS) habitat evaluation method indicated habitat quality was very good. The Index of Biological Integrity (IBI) ratings for both benthic macroinvertebrate communities and fish communities yielded a range of ratings of stream condition across all sites.

### **Long Term Monitoring: Peter Pan Run**

In May 1999, the County initiated a long-term physical, chemical and biological monitoring program at Peter Pan Run; its headwaters are located within the county's top-priority watershed, Bush Creek Watershed. The purpose of the program is to monitor and assess the effects of storm-water runoff stemming from development in the Villages of Urbana PUD. The area has been monitored to establish baseline, pre-construction conditions in the catchment and subsequently to monitor conditions as development progresses within the Peter Pan Run watershed in order to assess potential long-term impacts associated with the new land use. Following NPDES permit requirements, baseflow and storm flow samples from both instream and outfall locations are analyzed for a slate of chemical parameters, including metals, nitrogen, phosphorus, oil and grease, biochemical oxygen demand, fecal coliform, and others.

#### Water Chemistry at Peter Pan Run

During water year (WY) 2009, average annual storm event mean concentrations (EMCs) of all pollutants at the instream station increased from WY 2008 levels, except for phosphorus, TPH, and oil and grease. Baseflow mean concentrations that declined compared to WY 2008 included BOD, copper, zinc, TSS, and nitrate and nitrite. At the outfall, average annual storm EMCs decreased compared to last year for eight of 12 pollutants.

During WY 2009, storm flow EMCs for BOD, copper, zinc, and TSS were significantly higher than corresponding baseflow concentrations at the instream station while nitrate and nitrite and oil and grease concentrations in baseflow were significantly higher than corresponding storm flow concentrations. Average annual storm flow EMCs for lead, nitrate and nitrite, TSS, and fecal coliform at the instream station were significantly higher than corresponding average annual storm EMCs at the outfall. Time series data on the individual storm EMC data showed a statistically significant, declining trend for nitrate and nitrite over time at both the instream and outfall stations and a significant, declining trend for TSS at the outfall.

Annual, estimated pollutant loadings at the instream station increased compared to estimates in WY 2008 for all parameters except zinc and phenols. At the outfall, estimated polluting loadings declined for 10 of 12 parameters, in most cases by over 80%, compared to prior year levels.

## Biological Indicators at Peter Pan Run

In 2009, the benthic IBI (BIBI) ratings were in the Poor category for all sites, except for PPAN-04, which rated as Very Poor. Numeric fish IBI (FIBI) scores at all sites changed only slightly from prior years, either remaining in the same category or moving back and forth between the same two categories each year.

## Physical Stream Condition at Peter Pan Run

Physical stream conditions within Peter Pan Run in 2009 were generally similar to those in years past, though certain stream parameters are beginning to show a pattern of incremental change over time. Physical habitat, namely increased bank erosion and sediment deposition, appears to be the most substantially affected element within the monitoring program as a result of disturbance from upstream construction. While construction impacts are likely to be short term, no signs of recovery were noted in the field data. The channel does not presently appear to be morphologically stable.

Although FIBI scores have shown some improvement in recent years, the continued depressed scores of the benthic community appear to reflect the noted changes in physical habitat, in particular the highly mobile substrate and bed features, which can make recolonization difficult.

## **Pollutant Loadings for Municipal Storm Outfalls & Removal by Associated BMPs**

Between 2008 and 2009, total evaluated drainage area decreased from 13,559 to 13,391 acres and total managed drainage area increased from 10,591 to 10,935 acres. In 2009, 78.5% of the total evaluated drainage area was managed and that value increased slightly from 78.1% in 2008.

Extended Dry Detention Ponds, Infiltration Trenches, Dry Ponds, and Extended Wet Detention Ponds make up 65.6% of the structural BMPs in Frederick County (31.9%, 14.8%, 9.7%, and 9.1%, respectively). Extended Wet Detention Ponds are most efficient, removing an average 24.7% of all pollutants considered.

These results show that 48% of total suspended solids are removed by these facilities, with only 23% and 31% of total nitrogen and phosphorus being removed, respectively. These facilities also remove 16% of dissolved phosphorus and 22% of carbon (BOD and COD). Removal of metals ranged from 25% to 42%.

## **Restoration Efforts in Frederick County**

### Regulatory Drivers

In Frederick County, there are currently five main regulatory drivers that influence restoration efforts. The primary regulation driving restoration projects is the NPDES Program of the Clean Water Act, addressed in this Annual Report. Under the County's NPDES permit for its municipal separate storm sewer system (MS4), it is required to reduce discharges to the MS4 in urban areas. The County is also required to restore areas degraded by urban stormwater and to treat

10% of the untreated urban impervious areas. Other regulatory drivers include: Total Maximum Daily Load (TMDL) regulations of the CWA which require sources of pollutants in impaired water bodies to limit their releases; the Safe Drinking Water Act regulations which set higher standards for water bodies, such as Linganore, that are used as a public drinking water supply; the Chesapeake Bay 2000 Agreement (C2K) which calls for voluntary reductions of bay pollutants and increased restoration activities such as riparian buffer plantings; and lastly, House Bill 1141 (HB1141) which requires the development of water resource elements in Comprehensive Plans to protect sensitive resources.

### Restoration Projects

Frederick County Government has taken a role in a wide variety of watershed restoration efforts, which can be organized into three primary categories:

- **Frederick County NPDES Capital Improvement Program (CIP) Projects** are conducted through the County's CIP program and are conducted primarily as a result of NPDES requirements. The projects must cost over \$100,000 and impact county property or county-owned infra-structure.
- **Frederick County Community Restoration Projects (CCRP)** count towards NPDES goals. These projects are sponsored by Frederick County Government.
- **Monocacy & Catoctin Watershed Alliance (MCWA) Partnership Projects** may include participation and/or facilitation by Frederick County Government, but the lead partner is outside the County government.

To date, stormwater retrofit and stream restoration assessments have been completed in Lower Bush Creek, Ballenger Creek, Linganore Creek, and Bennett Creek Watersheds. Restoration project locations, type, watershed, status, and contaminant or impervious area reduction are detailed in Table 7-5. Current, planned, and completed watershed restoration projects within Frederick County show reductions of 1,944 lbs/yr of nitrogen, 155 lbs/yr of phosphorus, and 62,156 lbs/yr of suspended sediments and a gain of 989 treated impervious acres. The County has met the 10% impervious area requirement and is therefore in compliance with the permit.

### GIS Improvements and Pollution Source Identification

The NPDES MS4 Permit requires source identification as well as tracking of new and existing Best Management Practices for stormwater control. Much of the source identification is made and documented via use of Geographical Information Systems (GIS).

#### 2009 Enterprise GIS Data Activities

Efforts to improve capability by the Enterprise GIS Section were made in six areas:

1. Countywide Roadway Imaging Data Collection (eRoadway Web Viewer) is being used to "virtually drive" county roadways from the desktop.

2. Pictometry Data allow for viewing of aerial image features in four different directions, and measurement of ground features in height, depth, width, and distance.
3. 2007 Orthophotography data are now available to the County as part of a Maryland State cooperative contract.
4. Parcel Data collection is complete, available to County staff, and is under maintenance.
5. Frederick County Unified Roadway Centerline is conflated with the Maryland SHA centerline and will be ready to be periodically uploaded to the SHA database when completed.
6. A County-wide Address Points Database is being developed and reviewed.

#### GIS at the Division of Public Works

In 2009, the Division of Public Works made numerous enhancements in its GIS tracking capabilities relevant to the Permit. These enhancements to GIS capability are furthering the necessary digital infrastructure necessary for comprehensive stormwater control in the County and include:

- Updating GIS data on the County's storm drain system.
- Quick and easy access to roadway sinkholes, roadway assets, bridges and division base map, digital document access of approved development and bridge plans, as well as recreational park master plans and additional Intranet and Internet map services via the DPW GIS Gateway Application.
- Snow Plow Data Download Project allows wireless data downloads of snow plow truck operational parameters (brine applications, quantity and location of salt applied to roadways, roadway surface temperatures, etc.) and ability to map them, post storm event, within the existing snow routes map service.
- Enhancement of the Bridges Database with the addition of the bridge spans of 20 feet or less (totaling more than 400 bridges).
- Enhancement of Roadway Assets Data with features such as traffic light, street light, and speed hump locations.
- Scanning and georeferencing of archival aerial imagery from period of 1987 to 1991 creating the ability to detect land use changes.

#### GIS at the Division of Planning

Planning GIS staff has been preparing parcel-level, detailed analysis in order to update to the Countywide Comprehensive Plan. This update to the Countywide Comprehensive Plan will incorporate much more accurate and detailed information than previous updates, mainly due to the use of GIS. Other improvements included analysis of the developed and undeveloped areas within each of 24 community growth boundaries. The Division of Planning GIS staff has also continued to update major datasets relevant to the NPDES permit. For the Water Resource Element, staff aided in the mapping and modeling of pollutant loads and impervious surface areas for current and 20-year development projections.

## **Public Outreach and Education**

In 2009, WMS staff continued to update and improve the County's public outreach and education program and WMS staff also coordinated with various County divisions and outside agencies to enhance and track their outreach efforts. Frederick County addressed permit-suggested outreach topics and met its own goals and objectives from its 2003 Strategic Plan to Improve Water Quality through Public Outreach in Frederick County, Maryland. Public outreach and education activities included such topics as:

- Water conservation initiatives;
- Stormwater management facility maintenance guidelines dissemination;
- Erosion and sediment control information dissemination;
- Watershed-appropriate lawn care and landscape maintenance;
- Updated household hazardous waste disposal information;
- Recycling and composting activities;
- Volunteer trash pick-up events;
- Watershed-friendly car care;
- Efforts to increase use of public transportation alternatives and visibility in the community;
- Information on proper well and septic system inspection and maintenance;
- Encouraging the public to report illegal or illicit discharges; and
- Outreach by WMS staff to regulated municipalities within Frederick County and sister agencies in nearby counties.

Details of many additional outreach and education activities and coordinating activities with federal agencies are available in Tale 6-5.

### **Monocacy & Catoctin Watershed Alliance**

County staff continued to organize the Monocacy & Catoctin Watershed Alliance (known as MCWA or the Alliance), a group born of the two Watershed Restoration Action Strategy (WRAS) Steering Committees. The bimonthly meeting schedule enables attendees to discuss educational outreach opportunities as well as to develop restoration and protection projects to support water quality and habitat initiatives. In 2009 MCWA members gathered for six bi-monthly meetings held throughout the County and hosted by various partners including numerous local and regional organizations, funding agencies, higher education institutions as well as local, state and federal government agencies. Public outreach efforts implemented by the Alliance during 2009 included the Watershed Steward Program, quarterly E-newsletters, participation in the 2009 Frederick County Fair, and the continued expansion of the Alliance website ([www.watershed-alliance.com](http://www.watershed-alliance.com)).

## **Conclusion**

Frederick County continues to significantly build upon and strengthen the various components of its NPDES stormwater management programs. As detailed throughout this report, the past year brought continued progress in many areas, based on program improvements noted over the past year and in relation to the County's program objectives, goals, and NPDES permit requirements.

Frederick County government has been particularly effective in leading well-coordinated efforts involving multiple agencies and organizations working toward common goals for water quality improvements and better management of the County's watersheds. The County has continued to capitalize on opportunities to leverage substantial funding for outreach and restoration. This has allowed the County to accomplish program goals most cost-effectively, despite having a small in-house staff.

Frederick County embraces Environmental Site Design in accordance with the Stormwater Management Act of 2007 as well as education of the development community on these modifications to stormwater management requirements. Frederick County ECS staff continues to strengthen erosion and sediment control measures. The County's program is currently undergoing field review by MDE. A formal determination of acceptability was expected by January 1, 2010

County staff has actively sought opportunities for numerous restoration projects, successfully attracting outside funding and establishing key partnerships with other organizations and in the process has exceeded its 10% impervious surface treatment goal and had significant impact on sediment, phosphorus and nitrogen loading.

Ongoing implementation of Lower and Upper Monocacy WRAS recommendations, along with projects proposed through the County's restoration and retrofit evaluations, have furthered the County's progress in watershed restoration and will continue to include substantial public involvement. Frederick County has now completed its initial restoration projects through its CIP program as well as supporting and promoting a number of highly effective community restoration projects.