

# **National Pollutant Discharge Elimination System**

**Municipal Separate Storm Sewer System Discharge Permit**

## **2013 Annual Report**

**Harford County, Maryland**

**Permit Number 99-DP-3310 MD0068268**

**November, 2013**

National Pollutant Discharge Elimination System  
Municipal Separate Storm Sewer System Discharge Permit  
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Annual Report 2013

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**MARYLAND DEPARTMENT OF THE ENVIRONMENT  
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT**

**PART I. IDENTIFICATION**

**A. Permit Number:** 99-DP-3310 MD0068268

**B. Permit Area**

*This permit covers stormwater discharges to and from the municipal separate storm sewer system owned and operated by Harford County, Maryland.*

**C. Effective Date:** November 1, 2004

**D. Expiration Date:** November 1, 2009

**PART II. DEFINITIONS**

*Terms used in this permit are defined in relevant chapters of the Code of Federal Regulations (CFR) or the Code of Maryland Regulations (COMAR). Terms not defined in CFR or COMAR shall have the meanings attributed by common use unless the context in which they are used clearly requires a different meaning.*

**PART III. STANDARD PERMIT CONDITIONS**

**A. Permit Administration**

*The County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) regarding permit issues. Additionally, the name, title, address, phone number, email address, and function of all primary administrative and technical personnel responsible for compliance with this permit shall be submitted to MDE. An organizational chart including the individuals identified above shall also be submitted and any changes immediately reported to MDE.*

An updated organizational chart is included in Appendix A.

**B. Legal Authority**

*Adequate legal authority shall be maintained in accordance with National Pollutant Discharge Elimination System (NPDES) regulations 40 CFR 122.26(d)(2)(i) throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall make the necessary changes to maintain adequate legal authority.*

Harford County Code Chapter 214 was updated in 2013 to incorporate MDE's updated Erosion and Sediment Control regulations.

Harford County Bill 13-12 as amended (Appendix B) became law in 2013 which established the Watershed Protection and Restoration Fund to collect fees for the implementation of the MS4 program. The Department of Public Works requested a fee that would have collected a total of \$10.5 M annually. The County Council amended the Bill to only collect 10% of the requested amount.

**C. Source Identification**

*Sources of pollutants in stormwater runoff shall be identified and linked to specific water quality impacts on a watershed basis. This process shall be used to develop watershed restoration plans that effectively improve water quality. The following information shall be submitted in geographic information system (GIS) format with associated tables as required in PART IV of this permit:*

1. **Storm drain system:** major outfalls, inlets, and associated drainage areas;

**Stormdrains**

New stormdrains were installed associated with the three and fifteen hundredths (3.15) miles of roadway accepted by Harford County during calendar year 2013.

All stormdrain features, including point features (ie. outfalls, manholes, inlets, etc.), stormdrain pipes, and stormdrain drainage areas were entered into the geodatabase stormdrains.mdb. The locations for the point features (ie. outfalls, manholes, inlets, etc.) were input into the geodatabase by georeferencing stormdrain design drawings. Associated attributes for the point features were also entered. A map of the outfall locations and the outfall attributes are included in Appendix C. All of the two hundred ninety (290) point features were input from rectified design drawings.

The county-maintained point features consist of twenty six (26) outfalls, one hundred fifty two (152) inlets, one hundred ten (110) manholes, and three (3) various other features (ie. inflows, stubs, joints, etc.). The twenty six (26) outfalls consist of twenty one (21) outfalls from closed systems, one (1) culvert, and four (4) water quality outfalls. Two (2) outfalls were from systems 36" or larger in diameter from non-industrial development, and no outfalls were from systems 12" or larger in diameter from industrial development.

Using the point features, arcs for the stormdrain pipe were added to the geodatabase and the associated attributes were entered. Two hundred ninety two (292) pipes were added. By

length, sixty four percent (64 %) are concrete pipe and seventy five percent (75 %) are fifteen (15) or eighteen (18) inches in diameter.

The enclosed CD contains the stormdrain geodatabase with feature classes for stormdrain points and stormdrain pipes.

### **Drainage Areas**

Two (2) drainage areas to major outfalls (36" or larger in diameter for non-industrial and 12" or larger for industrial) for roads accepted during calendar year 2013 were delineated (Appendix C).

The enclosed CD contains the stormdrain geodatabase with a feature class for the stormdrain drainage areas.

2. **Urban best management practices (BMP)**: *stormwater management facility data including locations and delineated drainage areas;*

### **Stormwater Management Facilities and Drainage Areas**

Thirty seven (37) stormwater management projects were as-built during calendar year 2013, including five (5) redevelopment, two (2) repairs, and one (1) retrofit. Twenty five (25) of the projects were approved under the 2002 regulations. Six of those included non-structural credits. Nine (9) of the projects were approved under 2010 regulations. Four of those included non-structural ESDs. The plans for each of these projects have been rectified.

The spatial and tabular data for each of the forty five stormwater practices excluding the non-structural practices were added to the stormwater geodatabase (Appendix D).

Drainage areas for the structural stormwater facilities (ie. excluding dry wells) completed during calendar years 2013 were completed and the spatial and tabular data were added to the stormwater geodatabase (Appendix E).



With the adoption of the 2000 Stormwater Design Manual stormwater management systems have become more complicated to inventory in the current database. With multiple devices on a single site, Harford County is unsure if full credit for water quality loadings are being applied towards the Chesapeake Bay Model. Harford County fully supports MDE's effort to update the database and hopes the final version will be implemented soon. In preparation for the migration of existing data into the new database, Harford County requests to meet with MDE to review a representative sample of recently approved stormwater management plans to ensure full water quality credit is correctly being inventoried. After this meeting takes place, Harford County anticipates reviewing and updating all of the stormwater management facilities completed under the 2000 Stormwater Design Manual and 2010 Supplement.

### **Stormwater Management Waivers, Exemptions, and Fees in Lieu**

Ten (10) waivers were approved during calendar year 2013, and the spatial and tabular data were added to the stormwater geodatabase (Appendix F).

Two (2) exemptions were approved during calendar year 2013, and the spatial and tabular data were added to the stormwater geodatabase (Appendix G).

Two (2) fees in lieu for stormwater management were approved during calendar year 2013, and the spatial and tabular data were added to the stormwater geodatabase (Appendix H).

The enclosed CD contains the stormwater geodatabase including feature classes for facilities, drainage areas, waivers, exemptions and fees in lieu.

3. ***Impervious surfaces:*** delineated impervious areas including those associated with BMP implementation;

Aerial photography was updated in 2013. With the 2013 photography, there will be updates to the LIDAR, topography and planimetrics in 2014. An updated impervious surfaces layer will be created from the planimetric layers for roads and structures.

4. **Monitoring locations:** *locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE; and*

A total of sixty one (61) monitoring sites including twenty nine (29) chemical, five (5) physical, sixteen (16) biological, nine (9) flow and two (2) rain fall sites were active during calendar year 2013. A table of the attributes and map of the locations for active monitoring sites are included in Appendix I.

The enclosed CD contains the monitoring geodatabase.

5. **Watershed restoration:** *restoration project descriptions and locations identified in PART III. G., below.*

Three (3) watershed restoration projects were constructed in 2013 and the spatial and tabular data were added to the CIP geodatabase (Appendix J).

**D. Discharge Characterization**

*Harford County and 10 other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990's. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Summaries of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. These data shall be used by Harford County for guidance to improve stormwater management programs and develop watershed restoration projects. Monitoring required under this permit is now designed to assess the effectiveness of stormwater management programs and watershed restoration projects developed by the County. Details about this monitoring can be found in PART III. H.*

**E. Management Programs**

*The following management programs shall be implemented in all areas served by the County's municipal separate storm sewer system. These jurisdiction-wide programs are designed to control stormwater discharges to the maximum extent practicable and shall be maintained for the term of this permit. Additionally, these programs are to be integrated with other permit requirements to promote a comprehensive approach toward solving water quality problems. The County shall address any needed program improvements identified as a result of periodic evaluation by MDE and annual self-assessment.*

**1. Stormwater Management**

*An acceptable stormwater management program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, the County shall:*

- a. Conduct preventative maintenance inspections of all stormwater management facilities at least on a triennial basis. Documentation identifying the facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement action(s) used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports;*

During calendar year 2013, a total of three hundred forty seven (347) stormwater management facilities were inspected for preventative maintenance. A total of one hundred fifty five (155) facilities were in compliance with Harford County's stormwater management regulations (Appendix K).

Two hundred fifty six (256) sites were new for 2013. Ninety eight (98) of these facilities were in compliance with Harford County's stormwater management regulations.

Two hundred thirty three (233) sites were not in compliance at the end of 2012. Ninety one (91) of these sites were re-inspected in 2013; fifty seven (57) are now in compliance. One hundred forty three (143) sites that were not in compliance at the end of 2012 were not re-inspected in 2013. These sites will be reinspected in 2014

Ratings, which reflect the condition of the stormwater facility, were provided for each inspection. One hundred ninety seven (197) or fifty four percent (54%) of the overall inspections were rated a 1 or 2 which consists of minimal maintenance such as mowing and/or clearing debris from the barrel or storm drain outfalls.

Fifty four (54) or fifteen percent (15%) of the overall inspections were rated with a 3 required a moderate amount of work such as brush or tree removal from the dam.

Four (4) sites had a rating of 4 which included major problems with the principal spillways.

Twelve (12) sites had a rating of 7 which indicates the facility does not require further inspection (rooftop disconnect/buffer credits).

On average, two (2) inspections along with notices were sent to the owner before compliance was achieved. Correction action will be pursued on the remaining sites in the 2014 calendar year. Four hundred eighty (480) maintenance inspections were conducted.

Three (3) principal spillway replacements were performed: Fairwind Farms Sec 5 & 6, Philadelphia Station and Amyclae Estates Sec 2 Pond 3.

During 2013, one hundred twenty two (122) field meetings were conducted with homeowner associations (HOAs), contractors, management companies and developers, and two (2) SWM training classes were held for HOAs contractors and County employees.

- b. *Implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE;*
  
- c. *Track the progress toward implementing the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE and report annually the modifications needed to address any programmatic problems; and*

In 2010, the County began to require the use of ESD practices and implement Supplement 1 of the 2000 Design Manual. During 2013, the County continues to issue Administrative Waivers for the transition to the new regulations. Nine (9) administrative waivers were issued (Appendix L).

Modifications to the program that need to be resolved are the contradictions in Supplement 1 of the Design Manual. There are several areas where there is one requirement on one page and a different requirement indicated on a different page. One example of this is in the Micro-bioretenion section where on one page the drainage to the practice shall not exceed 20,000 sq. ft. but on the preceding page the manual states that if the drainage area exceeds ½ acre the practice effectiveness weakens.

Harford County also recommends that MDE facilitate meetings with all of the jurisdictions to discuss implementation, maintenance and inspection of ESD practices. These discussion could lead to the “Do’s and Don’ts for ESD” and additional information on landscaping could be included in the Design Manual.

- d. *Maintain programmatic and implementation information according to the requirements established as part of MDE’s triennial stormwater program review.*

All records and information for design, construction, and maintenance are being maintained as required for the triennial stormwater program review. The County's stormwater program has not been reviewed since the new design manual went into effect. When the program is reviewed by MDE the County will make any necessary revisions to its program. Harford County Stormwater Programmatic and Information is presented in Appendix M.

2. **Erosion and Sediment Control**

*An acceptable erosion and sediment control program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. At a minimum, the County shall:*

- a. *Address any needed program improvements identified during MDE's evaluation of the County's application for the delegation of erosion and sediment control enforcement authority;*

Delegation review was conducted in January 2013. The review determined that Harford County's sediment and erosion control program was adequate and delegation was granted through June 30, 2015. No programmatic changes were required.

- b. *At least twice per year, conduct responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance. Program activity shall be recorded on MDE's "green card" database and submitted as required in PART IV of this permit; and*

In 2013, Harford County conducted two (2) Responsible Personnel Certification classes on 5/8/2013, and 6/8/13. Seventy seven (77) individuals received "Green Card" certification (Appendix N).

The enclosed CD contains the MDE Access database with the course attendees.

- c. *Report quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information shall be specific to the permitting activity for the preceding three months.*

In 2013, fifty one (51) grading permits were issued (Appendix O). Quarterly reports were submitted to MDE. The enclosed CD contains the MDE Access database with the above information.

3. **Illicit Discharge Detection and Elimination**

*The County shall implement an inspection and enforcement program, or other alternative methods approved by MDE, to ensure that all discharges to and from the municipal separate storm sewer system that are not composed entirely of stormwater are either permitted by MDE or eliminated. At a minimum, activities shall include:*

- a. *Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit;*

Harford County contracted with Versar, Inc. to conduct illicit discharge inspections for a minimum of one hundred (100) outfalls located within the County for 2013 (Appendix P). From October 2013 to February 2014, one hundred five (105) outfalls were investigated during dry weather periods. All investigated outfalls were physically inspected and were sampled using a chemical test kit if the outfall was discharging during dry weather periods. Physical inspections of each outfall must include qualitative parameters (color, vegetative conditions, sedimentation etc.) and visual inspection of the outfalls including photographs. The chemical and/or sonde testing of each outfall include the quantitative parameters; chlorine, color, copper, phenols, surfactants (detergents), temperature, pH, conductivity, and dissolved oxygen. All outfall inspections were performed using the Illicit Discharge Detection and Elimination: A Guidance Manual as the criterion.

Of the one hundred five (105) outfalls that were inspected, only twenty (20) outfalls had flow during dry weather periods. All twenty (20) outfalls were chemically and sonde tested. Eight (8) outfalls had measured water quality parameters within acceptable ranges and are not considered illicit discharge. The source of the dry weather flow is believed to be groundwater flow or snowmelt entering the system. All of the outfalls were physically inspected.

Eight (8) of the flowing outfalls were found to have low potential for illicit discharge due to water quality parameters minimally exceeding the acceptable ranges. All eight (8) low potential outfalls exceeded the threshold for color parameters while two (2) low potential outfalls minimally exceeded the threshold for phenols. None of the flowing outfalls were found to have medium potential for illicit discharge.

Four (4) of the flowing outfalls were found to have high potential for illicit discharge due to exceeding the acceptable range for surfactants (detergents). Two (2) high potential outfalls minimally exceeded the acceptable range for surfactants (detergents) on the retest, but not the initial test. Two (2) high potential outfalls exceeded the acceptable range for surfactants (detergents) on both the initial test and the retest. The source of the surfactants has not been located. Follow-up field visits and outfall monitoring will attempt to locate and eliminate the illicit discharge.

In addition to the inspection and monitoring of illicit discharge potential at the one hundred and five (105) outfalls, the outfalls were also inspected for possible maintenance issues. Twenty four (24) outfalls were identified for needing maintenance and have been referred to Highways for maintenance.

*b. Conducting routine surveys of commercial and industrial watersheds for discovering and eliminating pollutant sources;*

Harford County contracted with Versar, Inc. to conduct surveys of commercial and industrial sites for identifying and eliminating potential pollutant sources. From March 2014 to April 2014, fifty (50) commercial/industrial facilities were inspected for potential pollutants (Appendix P). The majority of the facilities are located in Forest Hill, Bel Air, Churchville and Aberdeen. Windshield inspections were performed at all fifty (50) facilities. All facility



inspections were performed using the Illicit Discharge Detection and Elimination: A Guidance Manual as the criterion. Additionally, the field investigation hot spot inspection form used for all facility inspections was developed by the Environmental Protection Agency (EPA).

Of the fifty (50) facilities that were inspected, ten (10) were not hotspots. Thirty three (33) facilities were potential hotspots. The remaining seven (7) inspected facilities were determined to be confirmed hotspots. The majority of the findings included uncovered dumpsters with overflowing trash, uncovered storage, or vehicle storage on site. All potential and confirmed hotspot facilities will receive follow-up site visits by County personnel.

*c. Maintaining a program to address illegal dumping and spills;*

Water Resources continues to implement and improve several initiatives to address illegal dumping and spills. Coordination continues with Harford County Division of Water and Sewer, Harford County Health Department and Harford County Emergency Operations Hazmat Team to ensure the public has adequate resources for reporting illegal dumping, spills and stormwater pollutants.

The public has several phone numbers to report these activities. They can utilize Water Resources (24hr) hotline number (410.638.3400) to report illegal dumping, spills and stormwater pollutants. This phone number is staffed by Harford County Emergency Operations Personnel. The staff is trained in emergency operations. Water Resources developed an emergency phone tree so that the staff can direct phone calls to the appropriate agency. This number is published in water and sewer bills, websites and public education literature. Citizens can also use the following phone numbers for reporting purposes: Harford County Government main phone numbers (410.638.3000 or 410.879.2000) and Water Resources Office phone number (410.638.3545). All reports of illegal spills, dumping and stormwater pollutants are referred to Emergency Operations. They perform the follow-up and document the calls in the Hazmat Responses Report (Appendix Q). If the illegal dumping or spill requires enforcement action this is done through The Local Emergency Planning Committee (LEPC). They conduct investigative hearings. Representatives from Emergency Operations serve on the LEPC.

The Harford County Health Department assists the Division of Water and Sewer with sewer overflows. They determine appropriate forms of public notification, identifying downstream users, directing stream testing and assessing adequacy of site cleanup. Water and Sewer is responsible for placing signs, issuing press releases, contacting downstream users, conducting stream testing and implementing cleanup.

The Health Department responds to citizen reports of leaking or overflowing septic systems and private sewer lines. Most of these calls are placed directly to the Health Department offices. A portion of citizen reports are routed from Emergency Operations. The Water Resources staff continues to work with sanitarians from the Bureau of Environmental Health to coordinate preventive and clean-up protocol regarding discharges (oil, grease, leaky dumpsters) from restaurants that impact the stormdrain system. Emergency Operations coordinates with the Recycling Office in distributing information on household hazardous waste disposal. They also schedule dates for citizens to drop off household hazardous waste.

During calendar year 2013, Hazmat conducted one hundred eighty six (186) responses. One hundred three (103) of the responses had a potential water quality impact (Appendix Q).

Water Resources coordinated with appropriate agencies such as Sediment Control and the Soil Conservation District in developing a “Numbers to Know” for the Environment brochure. This brochure is now distributed as a public education tool. Harford County has utilized the Environmental Protection Agency Door Hanger: “*Stormwater Pollution Found in Your Area*” to inform and educate residents on stormwater pollution. Harford County has developed a brochure “*When it Rains it Drains (Stormwater Pollution)*” for public education. This brochure is now distributed as a public education tool. The video “Municipal Storm Water Pollution Prevention Storm Watch” was purchased as an in house training tool. Water Resources will use this video to train municipal employees in Stormwater Pollution Prevention and Illicit Discharge Detection in the field. We continue to update the database established for public education materials distributed to commercial/industrial facilities.

- d. Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and*

The Local Emergency Planning Committee (LEPC) is responsible for the enforcement of all reported illegal dumping and spills that take place in Harford County that are not classified as criminal activity. They work in conjunction with Harford County Government Hazmat Operations Team to address these issues. They establish monetary fines and conduct hearings on reported environmental incidents. During calendar year 2013, five (5) incidents resulted in a Notice of Violation and fines were assessed. Meeting minutes for the LEPC are included in Appendix R.

The Environmental Crimes Unit is a part of the Emergency Operations Center. They are responsible for investigating and enforcement of all civil actions involving environmental crimes. Any environmental crime requiring criminal enforcement is referred to the Sheriff's Department. This unit is extensively trained in the investigation of illegal hazardous materials and waste dumping, transportation (DOT) violations, cleanup and reporting of accidental spills and enforcement of all federal, state and local laws. They routinely inspect numerous commercial activities within the county for compliance with federal, state and local laws. This unit also assists with planning for Hazardous Materials Response in Harford County through the Local Emergency Planning Committee (LEPC). The team is equipped with the necessary chemical / biological protective equipment to respond, analyze, and neutralize environmental threats in Harford County.

Harford County Emergency Operations is responsible for implementing SARA Title III. SARA Title III supports local emergency planning efforts by informing the public, state and local governments of potential chemical hazards in their community. Owners/operators of potential hazardous chemicals are required to submit the following information: inventory list, hazardous waste storage, spills and response to hazardous waste spills. Reports of spills are received through the 911 center and are directed to the Hazmat Team as appropriate.

- e. Reporting illicit discharge detection and elimination activities as specified in PART IV of this permit. Annual reports shall include any requests and accompanying justifications for proposed modifications to the illicit discharge detection and elimination program.*

The Illicit Discharge monitoring program again has seen significant improvements in the areas of inspection, remediation and public education. Consistently, the mandatory number of outfalls and facilities has been inspected. A database is maintained that documents suspected illicit discharges and tracks corrective action and maintenance for outfalls.

Commercial/industrial facilities information is also maintained in a database. This information provides a valuable picture of the extensiveness of the stormdrain system and how facilities have an important impact. A few illicit discharges have been obtained from these activities, but most from windshield surveys and emergency situations.

Public education has been an invaluable tool for increasing community awareness of the stormwater system. Along with public education programs addressing illegal dumping and spills the County also targets stormwater pollutants such as car washing, pet waste, lawn waste and swimming pools.

#### 4. **County Property Management**

*The County shall identify all County-owned and municipal facilities requiring NPDES stormwater general permit coverage and submit Notices of Intent (NOI) to MDE for each. The status of pollution prevention plan development and implementation shall be submitted annually.*

Eight (8) County properties have been determined to require NPDES stormwater general permit coverage (Appendix S). NOIs have been submitted for each of the facilities and pollution prevention plans have been completed. All eight facilities will need to update their pollution prevention plans and submit NOIs in 2014 in response to the new general permit for stormwater discharges.

The implementation of the pollution prevention plans for the various facilities involves the use of best management practices such as good housekeeping, preventative maintenance, inspections, spill prevention and response, sediment and erosion control, management and runoff, and employee training.

Monthly evaluations are conducted to identify if:

- pollutants are entering the drainage system,
- the measures to reduce pollutant loading are effective, :
- the structural measures, sediment controls, and other storm water BMPs are operating properly, and

spill response equipment is located in areas susceptible to pollutants entering the storm water.

5. **Road Maintenance**

*A plan to reduce pollutants associated with road maintenance activities shall be developed and implemented. At a minimum, an annual progress report shall be submitted that documents the following activities:*

- a. *Street sweeping;*
- b. *Inlet cleaning;*
- c. *Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetation management through the use of integrated pest management (IPM); and*
- d. *Controlling the overuse of winter weather deicing materials through continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making.*

During 2013, Harford County Bureau of Highways continued its road maintenance operations to ensure public safety in a cost-efficient manner.

### **Street Sweeping**

Harford County maintains 1,058 miles of roadway. Approximately 80% of all public streets are swept annually with a mechanical brush vacuum truck. Additionally, certain major collector roads may be swept monthly. In 2013, 2,727 lane miles of hard surface roads were swept. Dirt roads are not swept. In 2013, 1,848 tons of material was collected during street sweeping. Material collected during street sweeping is disposed of in the local landfill or maintenance yard.

### **Inlet Cleaning**

In 2013, inlets are scheduled to be cleaned every three years. Inlets may be cleaned more frequently if needed. Inlets may be cleaned with vacuum sweepers, backhoes, or manually. In calendar year 2013, 8,175 inlets were inspected and were cleaned as needed resulting in 4,087 cubic yards of material removed from the stormdrain system.

### **Roadside Vegetation Management**

The only pesticides that Harford County utilizes for roadside maintenance are herbicides and continue to minimize their use. Harford County only applies Roundup to areas beneath guardrails which cannot be mowed. No herbicides are applied immediately adjacent to stream crossings. For calendar 2013, Harford County Bureau of Highways reported no herbicide usage. Harford County Bureau of Highways does not use fertilizer as part of the road maintenance operations.

### **Deicing**

During 2013, Harford County Highways Division did not apply any sand/aggregate mix. Traction control and ice melting was achieved from a combination of salt application and Ice Ban. In

2013, two thousand two hundred (2,200) tons of salt and five hundred (500) gallons of Ice Ban was applied. Harford County does not track the amount of material applied to State or municipal roads. County staff evaluates road conditions for each storm to determine the most effective treatment for the conditions of the particular storm and for the area of the County affected. Harford County Bureau of Highways has an internal employee training program for equipment operators at the beginning of each snow season. The training includes equipment operation, safety, maintenance, inspection and record-keeping.

6. **Public Education**

*A public education and outreach program shall be implemented to reduce stormwater pollutants. Outreach efforts are to be integrated with all aspects of the County's activities. These efforts are to be documented and summarized in each annual report. At a minimum, the County shall:*

- a. Establish and publicize a compliance hotline for the public reporting of suspected illicit discharges, illegal dumping, and spills.*
- b. Provide information regarding the following water quality issues to the general public:*
  - i. Water conservation;*
  - ii. Stormwater management facility maintenance;*
  - iii. Erosion and sediment control;*
  - iv. Household hazardous waste;*
  - v. Lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);*

- vi. *Litter control, recycling, and composting;*
  - vii. *Car care, mass transit, and alternative transportation;*
  - viii. *Private well and septic system management; and*
  - ix. *Pet waste management.*
- c. *Provide information regarding the following water quality issues to the regulated community when requested:*
- i. *NPDES permitting requirements;*
  - ii. *Pollution prevention plan development;*
  - iii. *Proper housekeeping; and*
  - iv. *Spill prevention and response.*

### **Public Outreach Events**

In 2013, staff participated in various public outreach events. These events include the Upper Western Shore Wade-In in June and the National Estuaries Day in September. During each event, staff promoted the importance of healthy watersheds, the need for proper erosion and sediment control measures, the impacts of impervious surfaces, the benefits of recycling, native plants, proper lawn care, best management practices, and rain gardens, the importance of proper disposal of hazardous household materials and pet waste, along with additional nonpoint source pollution and stormwater related materials. Staff offered promotional items such as t-shirts, pencils, and environmentally themed toys, balls and recycled frisbees. Staff engaged the public in conversation about relevant environmental and watershed issues and enticed the youth with watershed and insect puzzles, games and water conservation coloring books.



## **Wheel Creek Watershed Public Outreach Events**

In 2013, staff gave a presentation to the Harford County Master Gardeners highlighting the Wheel Creek Restoration Project, biological, physical and chemical monitoring efforts in the County, and the importance and value associated with stream and habitat restoration.

In 2013, staff partnered with Maryland DNR, the University of Maryland Sea Grant Extension Program, Harford County Master Gardener's and the Harford County Library to conduct a Rain Garden Workshop at the Abingdon Library. The focus of the workshop was how homeowners can create a rain garden in their own backyard. Topics included a description of rain gardens, how they work and why they are valuable, the role of native plants in the landscape, the importance of improving wildlife habitat, "bayscaping" and how each benefits our local streams. There was also a tour of the rain garden constructed at the library in the fall of 2010.

## **School Activities**

In March 2013, staff participated as a judge and mentor for the St. Stephen School annual science fair. Activities included classroom presentations on types of experiments to perform, principles of the scientific method, ways to effectively collect and display data and communicate results.

In May 2013, staff conducted an aquatic insect demonstration for preschool, 1<sup>st</sup> and 2<sup>nd</sup> grade students at North Harford Elementary School. Staff utilized preserved specimens and live specimens collected in Falling Branch and the Little Gunpowder River to demonstrate the importance of aquatic communities. The discussion included explanations of insect life cycles, food webs, ecosystems and watersheds, what they are and why they are important. The discussion explained how everyday human activities and land use changes impact our watersheds and water quality in addition to stressing what we can do to improve water quality.

In May 2013, staff participated in a Family Reading Night Camp Out at North Harford Elementary School. The evening focused on reading, learning and conducting activities all related to what happens at night. The students and their families followed a trail through the

school stopping at various locations to learn about bats, insects, frogs, stars, camp fire safety and family fun.

In 2013, staff met several times with the Environmental Club at Forest Hill Elementary School and discussed the water cycle, impervious surfaces, water quality monitoring, and watershed restoration. The purpose of the presentations was to prepare the students for a day long field trip on the Bay. The Environmental Club also assisted staff in a spring cleanup of the rain gardens at the school.

### **Stormwater Management Workshops for Homeowners Associations and Property Management Companies**

Stormwater management facilities located on County property are the only stormwater management facilities in Harford County that are not privately-owned. Many of them are owned by Homeowners Associations (HOAs). As part of our effort to improve maintenance of these facilities, stormwater management inspection staff routinely offers to meet with HOAs and professional property management companies to describe the purpose of and maintenance requirements of their stormwater management facilities. In 2013, staff conducted two (2) stormwater management training class with HOAs and contractors, and fifty eight (58) field meetings with HOAs, contractors, management companies and developers regarding pond maintenance requirements, barrel replacement issues, and beneficial user agreements.

### **Capital Project Community Meetings**

From June to September, 2013, staff met with property owners along the Woodbridge Stream Restoration Project. The project required easements from these property owners. The easement process was discussed, along with specific information on the project details and schedule.

In September 2013, staff met with the Country Walk Community Association to discuss the Lower Wheel Creek restoration project and the Country Walk Ponds A and B Retrofits. The HOA supported the County's preliminary plans for the projects.

## **Miscellaneous Outreach**

In September 2013, staff, along with park naturalists and natural resources professionals, participated in the seventh annual BioBlitz at the Anita C. Leight Estuary Center. The event was designed to increase the public's understanding of the variety of wildlife at the park by conducting a two-day survey of the park for plants and animals and then documenting the different species that make their home at the park and Bosely Conservancy. Sessions were conducted on inventories of marsh plants, submerged aquatic vegetation, insects, birds, herpes (snakes, turtles, and lizards), fish, trees, and bats.

During 2013, staff continued to serve on the board of directors for the Maryland Water Monitoring Council (MWMC). MWMC serves as a state-wide collaborative body to help achieve effective collection, interpretation, and dissemination of environmental data related to issues, policies, and resource management involving the Maryland water monitoring community. The MWMC addresses the full range of aquatic watershed resources in Maryland including ground and surface waters, freshwater, estuarine and marine environments, and associated watershed resources in Maryland.

During 2013, staff continued to serve on the board of directors for the Otter Point Creek Alliance (OPCA). OPCA is a non-profit organization dedicated to the support of the research, education, and conservation goals of the Otter Point Creek Component of the Chesapeake Bay National Estuarine Research Reserve in Maryland through raising money, securing volunteers, sponsoring special events and aiding staff in implementing the Reserve's Management Plan.

In 2013, staff continued to participate in the Bush River Partnership. This partnership was formed for the purpose of providing information about existing programs and projects occurring within the Bush River Watershed; to explore areas of collaboration; and outline steps to improve and enhance the watershed. The partnership includes individuals representing federal, state and local agencies and various non-profit organizations that focus on three sectors: Research and Monitoring; Management, Protection, and Restoration; and Education/Outreach & Training.

**F. Watershed Assessment and Planning**

*The County shall continue the systematic assessment of water quality within all of its watersheds. These watershed assessments shall include detailed water quality analyses, the identification of water quality improvement opportunities, and the development and implementation of plans to control stormwater discharges to the maximum extent practicable. The overall goal is to ensure that each County watershed has been thoroughly evaluated and has an action plan to maximize water quality improvements.*

***At a minimum, the County shall:***

- 1. Continue to perform detailed assessments of all watersheds in Harford County. These assessments shall be performed according to priorities established previously by the County and at an appropriate scale (e.g., Maryland's hierarchical twelve-digit sub-basins). At a minimum, watershed assessments shall:*
  - a. Determine current water quality conditions;*
  - b. Identify and rank water quality problems;*
  - c. Identify all structural and non-structural water quality improvement opportunities;*
  - d. Include the results of a visual watershed inspection;*
  - e. Specify how the restoration efforts will be monitored; and*
  - f. Provide an estimated cost and a detailed implementation schedule for those improvement opportunities identified above.*

2. *Perform watershed assessments until all land area in Harford County is covered by a specific action plan to address the water quality problems identified. At a minimum, the County shall perform a detailed watershed assessment for one County watershed during this permit term.*
  
3. *Provide, in the first annual report for this permit, a description of the progress made toward performing detailed watershed assessments for all land area in the County. Subsequent annual reports shall continue progress reporting and the detailed watershed assessment required in PART III. F.2. above shall be submitted no later than the fourth annual report.*

In 2008, Harford County completed a small watershed assessment of Wheel Creek. A smaller scale assessment than had been completed in the past is more manageable and more likely to achieve measurable results from restoration. In 2013, many of the restoration projects proposed in the assessment were under design (Lower Wheel Creek Stream Restoration, Festival at Bel Air Stormwater Retrofit) or were constructed (Gardens of Bel Air Stormwater Retrofit, Calverts Walks Stream Restoration).

Small watershed assessments have also been completed for Plumtree Run (1,400 acres, 2011), Sam's Branch (370 acres, 2012) and Foster Branch (1,400 acres, 2012). Harford County anticipates continuing to use the Wheel Creek Small Watershed Assessment as a model to pursue additional small watershed assessments in other areas with the inclusion of pollutant load and impervious treatment calculations in accordance with the most recent guidance documents.

### **Declaration Run and Riverside Area**

The Declaration Run (930 acres) and Riverside (320 acres) watersheds are located in the lower portion of the Bush River Basin between US Route 40 and MD Route 7. A scope of work was developed and all field related activities and desktop analyses for the small watershed assessment were completed in 2013 and is included in Appendix T. The final report for the small watershed assessment is anticipated to be completed in 2014.

The Declaration Run and Riverside Area Small Watershed Assessment under development in 2013 include pollutant load calculations using the Center for Watershed Protection's watershed treatment model and calculations for impervious surfaces. This will be the first time this model has been used for a small watershed assessment. If proven to be an effective model for planning it will continue to be used for future assessments and completed assessments will be updated as necessary. Completed assessments either contained no pollutant load calculations or used the Simple Method.

### **Future Small Watershed Assessments**

Over the next five years, small watershed assessments will be pursued in watersheds with the greatest percentage of impervious surface and potential for restoration. These include the unofficially-named watersheds of Mariner Run & Rumsey Island (711 acres), Heavenly Waters (850 acres), Spenceola Run (3,260 acres), and Shamrock Run & Wright Creek (2,240 acres) and Lower Winters Run (3,220 acres). The format for watershed assessments will follow that of previously completed small watershed assessment with the inclusion of pollutant load and impervious treatment calculations in accordance with the most recent guidance documents.

In 2013, Harford County continued to investigate land management practices on County owned properties. The purpose of the investigation was to determine if alternative land management practices could be implemented such as conversion of turf grass to meadow grass or forest. Additional structural practices were also included in the investigation. A cursory evaluation was completed for all County owned properties and more detailed evaluations were completed for representative categories of properties including schools, fire departments, and parks. The report is anticipated to be completed in 2014.

Harford County will continue to pursue these types of non-structural programs to determine the potential for lower cost alternatives to traditional structures measures.

### **USGS Stream Gages**

Harford County Department of Public Works and the United States Geological Survey (USGS) has partnered for the installation and the continued operation of the following gages through

2013. The operation of these gages will support the ongoing efforts to create a state-wide stream gaging network and the data will supplement information recorded at other gages throughout the County that the County does not provide funding. Data collected at all of the County gages is presented in 'real-time' at <http://waterdata.usgs.gov/md/nwis/rt>.

- Bynum Run at Bel Air (01581500) – restarted 1999
- Plumtree Run near Bel Air (01581752) – installed 2001
- James Run near Belcamp (01581649) – installed 2004
- Swan Creek at Swan Creek (01580700) – installed 2007
- Wheel Creek near Abingdon (0158175320) – installed 2009

In July 2013, the County partnered with the USGS to develop a water quality monitoring strategy for the Plumtree Run Watershed. The County has developed a long term restoration plan for this watershed with the intent to approach the monitoring activities through a single, coordinated strategy rather than by monitoring each individual stream restoration project in the watershed. All water quality monitoring is conducted at the Plumtree Run gage (USGS monitoring station 01581752), and site operation is designed to be compatible with the Chesapeake Bay Nontidal Monitoring Network (NTN) to maintain the ability to compare conditions observed at this station to those measured across the region. The monitoring plan consists of samples collected on a monthly fixed-frequency interval augmented with samples collected during eight to ten storm events that are analyzed for nutrients, suspended sediment, dissolved chloride and *E. coli* bacteria. Continuous water quality monitoring data for water temperature, specific conductance and turbidity is also collected and displayed in near real time on the USGS web page. Data collected for this study will be used to detail current water quality conditions in Plumtree Run and document improvements to water quality as watershed restoration activities are implemented in the watershed. All data is reviewed and posted in the USGS National Water Information System (NWIS) and published in the USGS annual data report of the MD-DE-DC Water Science Center available at <http://wdr.water.usgs.gov/>.

**G. Watershed Restoration**

*The County shall implement those practices identified in PART III. F. above to control stormwater discharges to the maximum extent practicable. The overall goal is to maximize the water quality in a single watershed, or combination of watersheds, using efforts that are definable and the effects of which are measurable. At a minimum, the County shall:*

- 1. Complete the implementation of those restoration efforts that were identified and initiated during the previous permit term to restore ten percent of the County's impervious surface area. The watershed or combination of watersheds where the restoration efforts are implemented shall be monitored according to PART III. H. below to determine effectiveness toward improving water quality.*
  
- 2. Within one year of permit issuance, begin to implement restoration efforts in a watershed, or combination of watersheds, to restore an additional ten percent of the County's impervious surface area. These efforts shall be separate from those specified in PART III. G.1. above and shall be monitored according to PART III. H. below to determine effectiveness toward improving water quality.*
  
- 3. Report annually:*
  - a. The progress toward meeting the goals established in PART III. G.1. and 2. above;*

Harford County has been implementing structural restoration projects since 2001 including new stormwater management facilities, retrofitting existing stormwater management facilities and stream restorations. Restoration has focused on providing the maximum management possible considering site constraints and property owner limitations. Stormwater management facilities are privately owned and there are no easements along streams. Therefore, extensive property owner coordination and construction easements are required for all restoration projects.



Local stream bank erosion has been the focus for Harford County's watershed restoration program; maximizing opportunities for channel protection first and water quality second. Prior to the adoption of the "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated" (June 2010), guidelines for credits towards restoration goals have been informal and somewhat vague. Harford County calculated full credit for restoration projects regardless of the level and type of management provided since the opportunities on a site by site basis were maximized.

As a result of the Bay TMDL, the focus has been on achieving regional water quality and less on water quantity. Because of the aggressive schedule and level of management proposed within the Bay Implementation Plan, Harford County is forced to focus away from local quantity issues and towards improving water quality. Restoration projects are very costly and should focus on restoring local problems, not just an urgency to tabulate credits for modeling purposes.

The 2000 Design recognizes the need for increased flow reductions to reduce stream bank erosion and improve stream ecology stating "recent research and experience indicate that the two-year peak discharge criterion is not capable of protecting downstream channels from erosion." Harford County contends that watershed restoration should focus on water quantity as well as quality. Likewise, the Chesapeake Bay Program efficiency rates while marginal do account for nutrient and sediment load reductions for extended detention. Therefore, Harford County proposed that impervious credits should be applied for both scenarios.

### **Watershed Restoration Projects**

During Calendar Year 2013, Harford County completed construction of three watershed restoration projects, all of which had designs initiated prior to the first version of the Accounting Document. A stormwater retrofit within the Foster Branch Watershed and a stream restoration and stormwater retrofit located within the Wheel Creek Watershed and identified in the *Wheel Creek Small Watershed Action Plan* completed in 2008 and.

Both stormwater retrofits focused on providing channel protection volume as the priority and provide little or no water quality volume. Both are conversions of dry detention facilities to extended dry detention, although some wet ponds were able to be constructed at Woodbridge. Based on the

Approved CBP BMP Efficiency Rates for Retrofit Analysis (Table A-5, “Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects (2012)”), load reductions for dry detention are 5% nitrogen, 10% phosphorus, and 10% TSS and extended dry detention are 20% nitrogen, 20% phosphorus, and 60% TSS.

Therefore, a retrofit from dry detention to extended dry detention should be the difference between the two or 15% nitrogen, 10% phosphorus, and 50% TSS. Using the rate adjustor curves and the associated percent reductions on the y axis and the stormwater treatment curve, a runoff depth treated per impervious acre can be obtained for each pollutant, or 0.12 inches for Nitrogen, 0.08 inches for phosphorus, and 0.45 inches for TSS. The average for all three pollutants would be 0.22 inches, which could convert to 0.22 acres of impervious credit for each impervious acre treated (Appendix U).

### **Structural BMPs**

#### Woodbridge Stormwater Retrofit (Foster Branch)

The Woodbridge Stormwater Retrofit Project involved converting an existing dry detention facility, designed to manage the 2- and 10-year storm events, to a facility that provides channel protection volume and water quality features. A forebay and micropool were added to the facility and the riser was replaced. Two new stormdrains were added which diverted previously-untreated roadway runoff to the facility. The facility now provides full channel protection volume.

Based on the Accounting Document 1.59 acres impervious credit would be applied to this project. Using the rationale discussed above, Harford County proposes that an additional 2.19 acres of impervious credit should apply.

The drainage area to the pond is 30.75 acres with 32.3% impervious or 9.95 acres of impervious area. The restoration project provides 16% of the required water quality volume and 100% of the required channel protection volume. Therefore, for the water quality volume, the impervious area treatment should be  $(0.16 \times 9.95) = 1.59$  acres. Proposing 0.22 impervious credit for each acre treated for 100% channel protection volume, as described above, would result in 2.19 acres additional acres of impervious credit. Therefore, the impervious acres treated by this retrofit are 3.78 acres.

## Gardens of Bel Air Stormwater Retrofit (Wheel Creek)

The Gardens of Bel Air Stormwater Management Retrofit project is located in Bel Air, Maryland south of Darby Lane and west of Tollgate Road in Harford County. This pond is on-line with the Upper Main Stem of Wheel Creek which drains to Atkisson Reservoir and Winters Run in the Bush River watershed. The pond, an online facility, was originally designed for detention and management of the 2 and 10 year storm events under an earlier generation of stormwater management requirements. It consists of a 15' high embankment, 60" BCCMP principal spillway pipe, a CMP riser and adjacent emergency spillway gabion weir. The pipe and riser were both significantly corroded and near the end of the design life for CMP structures.

The purpose of the proposed project was to replace the aging spillway pipe and riser and to incorporate channel protection volume management to the maximum extent practicable without exceeding freeboard limits or increasing the discharge of the higher storm events downstream. This stormwater retrofit provided 61% of the required channel protection volume while upgrading the deteriorating spillway pipe and riser. This volume was achieved by excavating ~1.2 acre-ft. of material from the existing pond bottom, constructing of a new, multi-stage concrete riser, and constructing of a concrete weir that elevates and constricts the existing emergency spillway.

Based on the Accounting Document no impervious credits could be applied to this project since there is no water quality volume provided. Using the rationale discussed above, Harford County proposes that 4.79 acres of impervious credit should apply.

The drainage area to the pond is 104.15 acres with 34.2% impervious or 35.7 acres of impervious area. The restoration project provides 61% of the required channel protection volume. Therefore, the impervious area should be 61% of 35.7 impervious acres or 21.78 acres. Proposing 0.22 impervious credit for each acre treated results in 4.79 acres of impervious credit.

## Alternative BMPs

### Calvert's Walk Stream Restoration (Wheel Creek)

The Calvert's Walk Stream Restoration Project is located at the headwaters of the Wheel Creek watershed. This project was identified and ranked as a high priority for restoration in the Wheel Creek Watershed Assessment. This high priority ranking was due to the excessive amount of stream bank erosion adding to sediment loads and to the proximity to adjacent properties and concerns for safety.

The restoration project involved stabilizing 800 linear feet of stream. This was accomplished by reestablishing the stream's geomorphology through grading the banks and eroded areas, installing boulder step pools and riffle grade control structures. Additionally, an imbricated wall was constructed to protect an existing community pool. The riparian floodplain was revegetated with over 200 native trees and shrubs and over 300 live stakes.

Based on the Accounting Document, 8 acres of impervious credit apply for this 800 linear foot of stream restoration.

A summary for each project completed is included in Appendix J including design and construction costs and proposed impervious credits. The total cost for the three projects construction was \$875,818 with \$327,994 or 38% grant funded. Projects continue to average approximately 30% of the total cost for design and 70% of the total cost for construction. Based on the proposed credits for channel protection volume, 16.6 acres of impervious credits applied for an average of \$53,000 per impervious acre treated.

- b. The estimated cost and the actual expenditures for program implementation; and*

Harford County's total impervious surface for 2002 excluding the municipalities and State highways is 9,880 acres including estimated reductions for completed restoration, agriculture, large lot residential (5+ acres) and industrial permits. Stormwater management facilities constructed through 2002 only provided quantity management and thus provide no reductions

to the impervious surface; although based on the discussions above could be considered. Watershed restoration for 20% of the impervious surfaces (as proposed in the draft MS4 permit for Harford County) would therefore be 1,976 acres. Based on actual expenses and cost estimates from the King and Hagan report, an estimate of \$55,000 per acre of impervious area treated would require \$110 M over the five year permit or approximately \$22 M per year. (Appendix U)

In response to the approval of House Bill 987 (2012), Harford County Bill 13-12 was introduced on February 19, 2013 which recommended the establishment of a watershed restoration fee to collect a total of \$10.5 M. The bill was passed with amendments and became law on April 23, 2013. Some of the amendments included collecting only 10% of the \$10.5 M requested, or \$1.05 M and the creation of a Watershed Protection and Restoration Task Force to report back to the County Executive and County Council. Final recommendations from the Task Force will be completed in 2014.

- c. *The monitoring data and surrogate parameter analyses used to determine water quality improvements.*

### **Water Resources Engineering Division Capital Project Monitoring and Assessment**

During this permit term, Harford County established a capital project monitoring program. The goal of the program is to quantitatively establish improvements in water quality, habitat quality and/or bank stability over pre-construction conditions. In some instances, the scope and duration of monitoring is dictated by requirements of the waterway construction permit. Each project site is unique, with its own set of goals and expectations. The monitoring plans for each site must reflect the goals of the individual project. The capital project monitoring program has allowed the County to improve upon the design and construction of a variety of restoration techniques.

**Box Hill – South Tributary Stream Restoration**

*Box Hill Long-term Monitoring Plan*

Beginning in 2009, Harford County monitored the project at a reduced effort. The goal of the long-term monitoring program is to ensure the stability and functionality of the channel stabilization structures and assess the impact, if any on the biological community. This effort includes visual inspection and photographic documentation semi-annually, in the Spring and Fall. Macroinvertebrate sampling and habitat assessment is conducted biennially in the Spring. Fish surveys will be conducted once every five years, beginning in 2012.

*Box Hill Five-Year Monitoring Schedule*

Activity	2009		2010		2011			2012			2013	
	Spr	Fall	Spr	Fall	Spr	Summer	Fall	Spr	Summer	Fall	Spr	Fall
Visual Inspection	X	X	X	X	n/a		X	X		X	X	X
Macroinvertebrate/ habitat					X						X	
Fish						Postponed to 2012			X			

The photo documentation for Calendar Year 2013 is included in the enclosed CD as Appendix V.

**Laurel Valley Stormwater Retrofit and Bioretention Project and Laurel Valley Stream Restoration Project**

Construction of the Laurel Valley Stormwater Retrofit and Bioretention Project began in October 2004, and was completed in spring 2005. In December, 2008, construction began on

the Laurel Valley Stream Restoration Project, immediately downstream of the stormwater retrofit. The stream restoration was complete in Spring 2009. Three years of post-construction monitoring was completed and the monitoring report was included in the 2012 Annual Report.

In early 2013, Harford County performed minor stream maintenance near Sta 10+25 where some of the rock had slumped. Additionally, boulders were repositioned at several log drop structures to alleviate excessive scour.

Annually, Harford County will inspect the site and photo document existing conditions. The photo documentation is provided in Appendix W.

### **Heavenly Pond Dam Removal / Stream and Wetland Creation**

The Heavenly Pond project involves the removal of a dam and conversion of a recreational pond into a stream and wetland complex. The area of the instream pond is approximately 1.5 acres and the drainage area is approximately 76 acres. The pond is located on County owned property approximately one mile west of the Town of Bel Air. The pond embankment and barrel are failing and in need repair, and the pond does not provide stormwater management. Harford County Water Resources in coordination with the Department of Parks and Recreation determined that removing the dam and reestablishing a stream channel and wetland complex would be the best alternative. In 2011, the County contracted with Parsons Brinkerhoff to develop a concept plan for the dam removal and the stream and wetland creation. Three alternatives were developed. The first includes a partial breach of the dam embankment and installing a 12'x 8' concrete box culvert, the second is a partial breach with a 90' notched opening with a pedestrian bridge, and the third is a partial breach with a 50' notched opening with a pedestrian bridge and pedestrian path along the existing embankment. The monitoring plan for this project includes monthly baseflow sampling upstream and downstream of the project site. Parameters collected will be total and dissolved nitrogen and phosphorus. A draft report is provided on the enclosed CD as Appendix X.

## H. **Assessment of Controls**

*Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. Therefore, the County shall use chemical, biological, and physical monitoring to document work toward meeting the watershed restoration goals identified in PART III. G. above. Additionally, the County shall continue physical stream monitoring in the Church Creek watershed to assess the implementation of the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE. Specific monitoring requirements are described below.*

### 1. **Watershed Restoration Assessment**

*The County shall continue monitoring in the Winters Run watershed, or, select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. An outfall and associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:*

#### a. **Chemical Monitoring:**

- i. *Eight (8) storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;*
- ii. *Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;*



- iii. *At least three (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:*

*Biochemical Oxygen Demand (BOD<sub>5</sub>) Total Lead*

*Total Kjeldahl Nitrogen (TKN)*

*Total Copper*

*Nitrate plus Nitrite*

*Total Zinc*

*Total Suspended Solids*

*Total Phosphorus*

*Total Petroleum Hydrocarbons (TPH) Oil and Grease\**

*Fecal Coliform or E. coli*

*(\*Optional).*

- iv. *Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and for the calibration of watershed assessment models;*

### **Wheel Creek Watershed 2013**

In 2009, Water Resources staff and MDE selected the Wheel Creek watershed to monitor ambient conditions. The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately three (3) miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDEDIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703) in the Bush River watershed (MDE6DIGIT 021307). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high density residential land use dominate

the headwaters, along with a mixture of medium and low density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is located in the lower reaches of the watershed and is predominately forest.

This watershed was selected based on the channel instability, sedimentation, pond retrofit and stream restoration opportunities and implementation recommendations outlined initially in the *Bush River Water Restoration Action Strategy* and more detailed in the *Wheel Creek Watershed Assessment*. Five (5) stormwater retrofits and four (4) stream restoration projects are proposed for this watershed to improve water quality, decrease stormwater discharges and improve stream habitat. Project development and success will be evaluated through a pre and post construction monitoring effort that includes chemical, biological and physical monitoring components.

Three permanent water quality monitoring stations were established in the Wheel Creek watershed between the summer of 2010 and the spring of 2011. Station WC002 is an instream station located on the mainstem of Wheel Creek just downstream of Wheel Road. Station WC003 is located on the Middle Branch of Wheel Creek at the outfall of the SWM facility located on Cinnabar Lane. Station WC004 is an instream station located upstream of WC003 on the Middle Branch just off of Wheel Court.

In 2013, Harford County contracted with Versar, Inc. to collect the stormflow samples at the three (3) long-term monitoring stations. During 2013, samples were collected during ten (10) sampling events. Three samples were collected and composited at each station over the course of the storm hydrograph. The instantaneous discharge, level, velocity, water temperature and pH were recorded at the time the samples were collected. Harford County staff collected discrete baseflow samples at each station during eleven (11) events in 2013.

To supplement baseline water quality conditions, a spring synoptic survey was conducted in the Wheel Creek and a reference watershed. Samples were collected at eight (8) stations located at each tributary and confluence throughout both watersheds to provide coverage of the entire area and were analyzed for dissolved nitrogen and phosphorus. Samples were collected in the spring to coincide with the period of maximum nitrogen concentration in the stream.

Harford County contracted with QC Laboratory and Enviro-Chem Laboratory to analyze the water quality samples. Standard Methods or EPA methods are currently being used for the analysis. *Harford County requests that MDE review these methods and detection limits and provide alternatives if found to be unacceptable.* Each sample was analyzed for the parameters listed in the table below.

Parameter	Method	Reporting Limit
5-day Biological Oxygen Demand (BOD5)	SM 5210 B	4.00 mg/L
Total Suspended Solids (TSS)	SM 2540 D	4.00 mg/L
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	0.200 mg/L
Nitrate (NO3)	EPA 300.0	0.100 mg/L
Nitrite (NO2)	EPA 300.0	0.0500 mg/L
Ammonia (NH3)	SM 4500NH3-G	0.200 mg/L
Total Phosphorus (TP)	EPA 351.2	0.0500 mg/L
Ortho Phosphate (PO4)	SM 4500P E	0.0100 mg/L
Total Petroleum Hydrocarbons (TPH)	EPA 1664ASGT@PHC	5.00 mg/L
Total Copper (Cu)	EPA 200.8 Rev 5.4	0.005 mg/L

Total Zinc (Zn)	EPA 200.8 Rev 5.4	0.01 mg/L
Total Lead (Pb)	EPA 200.8 Rev 5.4	0.005mg/L
Total Hardness	CALC (200.8)	0.500 mg/L
Turbidity	SM 2130 B	0.100 mg/L
Total Nitrate (NO3) + Nitrite (NO2)	EPA 300.0	0.500 mg/L
Dissolved Total Kjeldahl Nitrogen (TKN)	EPA 351.2	0.200 mg/L
Total Dissolved Nitrogen (TDN)	LAB CALC	0.200 mg/L
Total Dissolved Phosphorus (TDP)	EPA 365.2	0.0500 mg/L
<i>E. coli</i>	SM 9223B	1.0 MPN/100mL

Monitoring data consisting of precipitation, stream flow, and water quality were used to conduct the following analyses:

1. Calculation of storm event mean concentrations (EMCs)
2. Estimation of annual constituent loading
3. Comparison of EMCs to Maryland Department of the Environment (MDE) ambient water quality criteria

4. Spatial comparisons and temporal trend analysis of EMCs

A draft interpretive report of the water quality data is presented in Appendix Y.

b. **Biological Monitoring:**

- i. *Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an approved study design; and*
- ii. *The County shall use the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.*

**Wheel Creek Watershed 2013**

In support of Chesapeake and Atlantic Coastal Bays Trust Fund monitoring, the Maryland Biological Stream Survey (MBSS) sampled seven (7) stations in Wheel Creek and one (1) station in a reference watershed during the spring and summer sampling periods. During the spring, temperature loggers were deployed in the stream at each site then sites were sampled for water chemistry, physical habitat, and presence of vernal pools, herpetofauna, and benthic macroinvertebrates. These same sites were also sampled in the summer for fish, crayfish, freshwater mussels, reptiles, amphibians, invasive riparian vegetation, and instream habitat. Sampling was conducted following the Maryland Biological Stream Survey Sampling Manual: Field Protocols (Stranko, et. al, 2010). A report summarizing MBSS's baseline biological data is included in Appendix Z.

c. **Physical Monitoring:**

- i. *A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on an approved study design. This assessment shall*

*include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;*

### **Wheel Creek Watershed 2013**

Harford County contracted with Versar, Inc. to conduct the physical stream assessment in the Wheel Creek Watershed. The primary goal of the monitoring was to assess the geomorphic stability of the stream channels throughout the watershed as they respond to restoration activities. Assessment techniques included a survey of permanently-monumented channel cross-sections, a longitudinal profile survey, particle size analysis, and assessment of bank pins and scour chains. Four assessment reaches were established for geomorphic monitoring based on the following treatments:

1. within a proposed stream stabilization reach (WC-01);
2. downstream of a stream stabilization reach and BMP retrofit location (WC-02);
3. downstream of a BMP retrofit location only (WC-03); and
4. a control site with no proposed restoration activities (WC-04).

Cross-sectional and longitudinal profile surveys were conducted to establish baseline conditions of channel geometry and slope, to which subsequent data can be compared in determining whether lateral or vertical migration of the channel is occurring. Bank and bed pins were monitored to determine rates of potential bank and channel bed erosion or aggradations, while scour chains were used to quantify the extent of bed material scouring. Pebble counts were conducted to assess substrate particle size distribution and track changes in channel roughness. Detailed methodologies and results of the physical assessment are presented in Appendix AA.

- ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and*

## Wheel Creek Watershed 2013

The physical habitat assessment was conducted by the MBSS utilizing MBSS protocols and Stream Habitat Assessment Data Sheets. Metric selection and data analysis followed the guidance document A Physical Habitat Index for Freshwater Wadeable Streams in Maryland, Final Report, (Paul, et al. 2002). Eight metrics were used to calculate the Physical Habitat Index (PHI) for the Piedmont or Non-Coastal Plain ecoregion. These metrics include percent embeddedness, remoteness, percent shading, epifaunal substrate, instream habitat, instream woody debris and rootwads, bank stability and riffle run quality. A report summarizing MBSS's baseline biological data is included as Appendix Z.

- iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*
  
- d. **Annual Data Submittal:** The County shall describe in detail its monitoring activities for the previous year and include the following:*
  - i. EMCs submitted on MDE's long-term monitoring database as specified in PART IV. A.2.d. below;*
  
  - ii. Chemical, biological, and physical monitoring results and a combined analysis for the Winters Run or other approved monitoring locations; and*
  
  - iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.*

## 2. Stormwater Management Assessment

*The County shall continue monitoring the Church Creek Watershed for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:*

- a. An annual stream profile and survey of permanently monumented cross-sections at an unnamed tributary to Church Creek to evaluate channel stability in conjunction with the residential development of Wexford;*
- b. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and*
- c. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.*

Harford County continued to monitor the Wexford development to assess the best management practice criteria found in the Maryland Stormwater Design Manual. The 181-acre drainage area includes commercial redevelopment and new a residential development. Approximately twenty percent (20%) of the watershed was developed under the new design criteria while forty percent (40%) has existing development. Wexford is a single-family detached residential subdivision located along the south side of Route 7. The project is adjacent to the Riverside Commercial Park on its southern and eastern boundaries and borders the Bristol Forest Townhome Community to the west. The project is located on tax map 57, parcel 97. Construction of the Wexford Development was substantially completed in 2004.

The project site is served by two stormwater management facilities. Each pond is a micropool-type design with extended detention. In addition, one rain garden and two swales were constructed to provide water quality treatment. The combined facilities meet the 2000 Design Manual guidelines.



Beginning in 2003, the receiving channel has been surveyed annually for longitudinal profile and four permanently-monumented channel cross sections. Note that previous annual reports incorrectly stated that five cross-sections were surveyed instead of four. The profiles and cross-sections for Calendar Years 2009 through 2013 are provided in Appendix BB. The channel is surveyed annually to assess any changes in the channel profile and width.

The 2013 data is generally consistent with data collected in previous years. While still degraded, the channel does not seem to be degrading more. In 2006, it appeared that Cross Section 3 was experiencing a shift in the thalweg. The 2007, 2008 and 2009 data indicate that this is, in fact, occurring and is not simply a function of normal variability in the survey. The 2008 data appear to confirm a permanent shift in the location of the thalweg and this shift continues in 2009 through 2013. It is probable that the debris jam first noted in 2007 has caused the shift in the thalweg. No new substantive changes in planform were noted in 2013. In 2010, it was noted that there appears to be some change in the bed elevation at the cross sections, indicating a shift in sediment as it is transported downstream. This continues to be evident in 2013, particularly for Cross Section 4.

**I. Program Funding**

1. *Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in PART IV below.*
  
2. *Adequate program funding to comply with all conditions of this permit shall be maintained.*

In July 2013, Harford County began collecting fees through the Watershed Protection and Restoration Fund for the implementation of the MS4 program. A total of \$1,065,725 was projected to be collected for fiscal year 2014. An additional \$300,000 was budgeted for the program from the General Fund. The approved FY 14 operating budget, \$1,259,991, includes personnel costs, office equipment and supplies, vehicle charges, laboratory services, public outreach, and chemical/physical/ biological analysis. The FY14 operating budget was \$33,482 more than the approved FY13 budget.

With the completion of the Swan Creek, Bynum Run, Foster Branch, Winters Run and Little Gunpowder Falls and Church Creek Stream Assessments, along with the Bush River Watershed Restoration Action Strategy, the Deer Creek Watershed Restoration Action Strategy, the Sam's Branch Watershed Assessment and the Plumtree Run Watershed Assessment, Harford County has identified numerous potential capital projects. In FY14, Harford County reallocated funding to complete several existing projects and to initiate new capital projects in the Joppatowne area.

<b>Activity</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>FY14</b>
Stormwater Enhancement	\$0	\$0	\$0	\$0	\$0
Watershed Restoration Improvement Projects	-\$500,000	-\$215,911	\$0	\$0	\$0
Bynum Ridge Stabilization	\$0	\$0	\$0	\$0	-\$70,000
Laurel Valley Stream Restoration	\$0	-\$68,639	\$0	\$0	\$0
Plumtree Run @ Tollgate Rd Stream Restoration	\$0	\$0	\$75,000	\$0	\$0
Woodbridge SWM Retrofit and Stream Restoration	\$0	\$0	\$0	\$300,000	\$150,000
Stream Valley Buffer Enhancement	\$0	-\$72,272	\$0	\$0	
Watershed/Stream Assessment Studies	-\$150,000	\$0	\$125,000	\$250,000	\$50,000
Stream Gage Stations	-\$75,000	\$0	\$0	\$0	
Maintenance/Repair of Dams	\$0	\$0	\$0	\$20,000	\$50,000
Sunnyview Stream Restoration	\$0	\$0	\$650,000	\$0	-\$300,000

Bel Air Acres	-\$250,000	-\$0	\$0	\$0	
Sam's Branch Assessment	\$0	\$0	\$52,922	\$250,000	\$0
Woodland Run	\$0	\$0	\$0	\$250,000	\$0
Edgewood Plaza	\$250,000	\$0	\$0	\$0	-\$240,000
Wheel Creek	\$725,000	\$0	\$401,000	\$400,000	\$85,000
Bynum Run @ St Andrews Way		\$260,000	\$0	\$0	\$50,000
Deer Creek Watershed Restoration		\$0	\$0	\$0	\$0
Plumtree Run Watershed Restoration			\$0	\$0	\$0
Stormwater Pollution Prevention			\$131,395	\$280,000	\$0
Joppatowne Area Watershed Restoration				\$150,000	\$225,000
Lily Run Watershed Restoration				\$150,000	\$0
<b>Total by Fiscal Year</b>	\$0	\$335,000	\$1,434,317	\$2,050,000	\$0

Fiscal year 2012 was also updated from previous reports to reflect funds reappropriated from other departments.

### **Grant Requests**

In an effort to supplement the capital projects program, Harford County applies for grant funding from various sources. A summary of grant request for Calendar Year 2009 through 2013 is provided in Appendix CC.

**J. Total Maximum Daily Loads**

*Stormwater BMPs and programs implemented as a result of this permit must be consistent with available waste load allocations (WLA's) [see 40 CFR 122.44(d)(1)(vii)(B)] developed under a Total Maximum Daily Load (TMDL). MDE has determined that owners of storm drain systems that implement the requirements of this permit will be controlling stormwater pollution to the maximum extent practicable. Therefore, satisfying the conditions of this permit will meet WLA's specified in TMDL's developed for impaired water bodies. If assessment of the stormwater management program indicates TMDL WLAs are not being met, additional or alternative stormwater controls must be implemented to achieve WLAs.*

Harford County has been actively cooperating with MDE on the development and review of TMDLs. In addition, Harford County is collecting, analyzing and reporting supplemental water quality data for the purpose of TMDL development. Harford County acknowledges that stormwater management is an integral part of the implementation component of a TMDL.

**PART IV. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING**

**A. Annual Reporting**

1. *Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of Harford County's NPDES stormwater program.*

*The County shall submit annual reports on or before the anniversary date of this permit that include:*

- a. *The status of implementing the components of the stormwater management program that are established as permit conditions;*

- b. *A narrative summary describing the results and analyses of data, including monitoring data that is accumulated throughout the reporting year;*
  - c. *Expenditures for the reporting period and the proposed budget for the upcoming year;*
  - d. *A summary describing the number and nature of enforcement actions, inspections, and public education programs; and*
  - e. *The identification of water quality improvements or degradation.*
2. *To further judge the effectiveness and progress of implementing this permit, the following information shall be submitted on databases (in a format) consistent with Attachment A. Annually, except where noted, the following shall be submitted:*
- a. *Storm drain system mapping (PART III. C.1.);*
  - b. *Urban BMP locations (PART III. C.2.);*
  - c. *Impervious surfaces (PART III. C.3.);*
  - d. *Chemical monitoring (PART III. C.4. and PART III. H.1.);*
  - e. *Watershed restoration project locations (PART III. C.5.);*
  - f. *Responsible personnel certification information (PART III. E.2.);*
  - g. *Grading permit information – quarterly (PART III. E.2.);*

- h. *Illicit Discharge Detection and Elimination activities (PART III. E.3.); and*
- i. *Fiscal analyses - cost for NPDES related implementation (PART III. I.).*

**B. Program Review**

*In order to assess the effectiveness of the County's NPDES program for eliminating non-stormwater discharges and reducing the discharge of pollutants to the maximum extent practicable, MDE will review program implementation, annual reports, and periodic data submittal on an annual basis. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland's Sediment Control and Stormwater Management Laws. Additional periodic evaluations will be conducted to determine compliance with permit conditions.*

**C. Reapplication for NPDES Stormwater Discharge Permit**

*Continuation or reissuance of this permit beyond November 1, 2009 will require the County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. As part of this application process, Harford County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how water quality goals set by the County are being achieved. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:*

1. *Harford County's NPDES stormwater program goals;*
2. *Program summaries for the permit term regarding:*
  - a. *Illicit connection detection and elimination results;*
  - b. *Watershed restoration status including County totals for impervious acres,*

*impervious acres controlled by stormwater management, and the current status of watershed restoration projects and acres managed;*

*c. Pollutant load reductions as a result of this permit; and*

*d. Other relevant data and information for describing County programs;*

*3. Program operation and capital improvement costs for the permit term; and*

*4. Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.*