

**MARYLAND DEPARTMENT OF THE ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION**

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT  
MD0068268**

**REVIEW OF HARFORD COUNTY'S 2008 ANNUAL REPORT**

Harford County was reissued a National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system discharge permit on November 1, 2004. NPDES regulations require permit conditions that effectively prohibit non-stormwater discharges and reduce the discharge of pollutants to the "maximum extent practicable." For each year of the County's permit, an annual report is required to help assess the County's stormwater program. The following is a review of Harford County's annual report that was submitted to the Maryland Department of the Environment (MDE) on June 16, 2010.

**Permit Administration**

The County submitted an updated contact list identifying key administrative and technical personnel responsible for permit compliance. No major changes were reported. Any additional or future changes should be immediately reported to MDE.

**Legal Authority**

Harford County is required to maintain legal authority to perform the activities described in 40 Code of Federal Regulations (CFR) 122.26(d)(2)(i) and permit MD0068268. The County Attorney submitted the required certification on October 29, 1999. In the event that any provision of its legal authority is found to be invalid, the County will need to make the necessary changes to maintain adequate legal authority.

**Source Identification**

Sources of pollutants in stormwater runoff are to be identified and linked to specific water quality impacts on a watershed-by-watershed basis. To demonstrate this capability, the County is to submit information regarding its storm drain system, urban best management practices (BMPs), impervious surfaces, monitoring locations, and watershed restoration locations in geographic information system (GIS) format. The County routinely updates these data as new information is obtained. The County reported that location point features (e.g., outfalls, inlets, etc.) were entered for 2.5 miles of roadway constructed during 2008. This includes 10 new storm drain outfalls and 52 inlets. Drainage areas were delineated for the three outfalls that were considered "major."

Stormwater management facility construction completion data were submitted on MDE's Urban

BMP Database. The County reported that a total of 60 BMPs were completed during 2008. Spatial and tabular data for these BMPs and their associated drainage areas were added to the County's geodatabase.

An impervious data layer, using 2007 aerial photography was submitted with controlled and uncontrolled impervious areas delineated. The current data have been compared to 2000 data and the results indicate that impervious cover has increased from 14,671 acres in 2000 to 18,982 acres in 2007. Roadways account for approximately 31 percent of the impervious surfaces while 33 percent is residential development including driveways and sidewalks. An analysis regarding controlled area remains to be completed.

The County also provided chemical, biological, and physical monitoring locations and watershed restoration areas. Forty-eight active monitoring locations were provided and this information is considered complete. No watershed restoration projects have been completed since 2005. As a result, the County has fallen well short of its restoration obligations and permit compliance. This issue is discussed further in the Watershed Restoration section below and will need to be addressed as future permit requirements become more arduous. Regarding source identification, the County continues to do well with its efforts and most requirements have been addressed. As noted above, the identification of impervious area treatment needs to be completed.

### **Management Program**

Preventative maintenance inspections are required for all stormwater management facilities at least on a triennial basis. Additionally, documentation identifying the facilities inspected, the number of inspections, follow-up inspections, and the enforcement action(s) used to ensure compliance are to be submitted in the County's annual report. The County reported that a total of 207 facilities were inspected during the reporting period. Ninety-eight of these facilities required some type of maintenance. Typically, two inspections were required to ensure that adequate maintenance was provided. However, work remained to be done at 32 of the 97 facilities found to be in need of maintenance. It is unclear what enforcement has been taken to ensure compliance at these remaining facilities.

The County continues to implement the stormwater management design policies, principles, methods, and practices found in the *2000 Maryland Stormwater Design Manual* (Design Manual). Modifications to the Harford County Code Chapter 214, Sediment Control and Stormwater Management that incorporated State stormwater regulations and the Design Manual criteria became effective on January 28, 2002. Currently, the County needs to modify its ordinance to comply with the provisions of Maryland's *Stormwater Management Act of 2007*.

Harford County continues to maintain an acceptable erosion and sediment control program. The County also conducts responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance. Program activity is recorded on MDE's "green card" database and submitted with annual reports. The County reported that it conducted six classes with 134 individuals receiving certification during the reporting period. The required database for identifying responsible personnel is routinely submitted after each class. Additionally, information regarding earth disturbances exceeding one acre or more is to

be reported quarterly. A total of 83 grading permits were issued in 2008. The County continues to submit this information consistently to MDE.

The County is required to implement an inspection and enforcement program 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, the County is to field screen 100 outfalls annually, conduct routine surveys of commercial and industrial watersheds for discovering and eliminating pollutant sources, maintain a program to address illegal dumping and spills, use appropriate enforcement procedures for investigating and eliminating illicit discharges, and report significant discharges to MDE for enforcement and/or permitting.

Harford County has contracted EA Engineering (EA) to conduct illicit discharge and facility inspections. During the reporting period, 100 outfalls were screened. Dry-weather flow was observed at 18 outfalls during the initial screening with 14 having flow upon reinspection. Field chemical tests were performed during reinspection and the results indicate that groundwater was the source of discharge at all but one of the outfalls. The County reported that source-tracking is being conducted for the remaining outfall. Additionally, visual inspection found that more than one-half of the outfalls screened during 2008 exhibited a need for maintenance (e.g., erosion or structural repair, vegetative control, etc.). The County needs to address the maintenance of these outfalls.

EA also inspected 59 industrial/commercial facilities during the reporting period. Fourteen of the facilities exhibited the potential for illicit discharge. Most problems were a result of improper material storage or poor waste management. The County reported that corrective action has occurred at these facilities. Overall, commercial and industrial facilities may benefit from targeted outreach to improve their environmental footprint. Additionally, the County expressed a need for inspection training and coordination with MDE inspection staff to avoid duplicative effort regarding site compliance. MDE recommends that the County contact the Water Management Administration's Compliance Program staff to further discuss coordination.

Response to dumping and spills is a coordinated effort by Harford County's Division of Water and Sewer, Health Department, and Emergency Operations (HCEO) Hazmat Team. During the reporting period, Harford County established a phone number (410.638.3400) for reporting dumping and spills. The phone is staffed by the HCEO 24 hours a day, 7 days a week. During 2008, the County responded to 241 calls regarding illicit discharges, dumping, and spills. The County reported that approximately 55 percent of the responses had a potential for adverse water quality impacts.

The County is required to identify all County-owned facilities requiring NPDES stormwater general permit coverage and submit Notices of Intent (NOI) to MDE for each. Additionally, the status of pollution prevention plan development and implementation shall be reported annually. The County has identified seventeen facilities as being required to have a discharge permit. Except for two, all of the facilities have been permitted. NOIs have been submitted for the remaining two and pollution prevention plans are being developed.

Harford County maintains 1,045 miles of roadway. Approximately 80 percent of these roadways are swept annually. Some larger collector roads are swept monthly using a mechanical brush vacuum truck. During 2008, 2,221 lane miles were swept with approximately 2,173 tons of material being collected. Additionally, 1,190 cubic yards of material was removed from the 2,380 drainage structures that were cleaned. The County reported that 7,892 tons of salt were applied for deicing during 2008. In 2007, 18,600 tons of salt were applied and only 1,755 tons during 2006. The County should better explain these variations in use. Roadside vegetation maintenance is done mostly by mowing and limited the use of Roundup® herbicide while fertilizer is reported to be not used at all. Harford County should continue its efforts regarding pollutant reduction and road maintenance activities.

Public education and outreach efforts are to be integrated with all aspects of the County's NPDES activities, documented, and summarized in each annual report. At a minimum, the County is to establish and publicize a compliance hotline for public reporting of suspected illicit discharges, illegal dumping, and spills. As mentioned above, Harford County has established an emergency phone number (410.638.3400) for reporting dumping and spills. The phone is staffed by HCEO who also responds to 911 calls. The County is also required to provide information regarding various water quality issues to the general public. The County continues to implement a diverse public outreach program that focuses on pollution prevention. Recent activities include participating in numerous public, school, and community events. This includes disseminating information regarding pollution prevention, recycling, lawn care, and household hazardous waste. As described above, commercial and industrial facilities may benefit from targeted outreach.

Harford County has successfully implemented the stormwater management program elements required by its NPDES permit. A noteworthy effort has been put forth to implement stormwater management, erosion and sediment control, and public outreach requirements. Program improvement will be gleaned from improved outreach to the industrial and commercial community.

### **Watershed Assessment and Planning**

Harford County is required to conduct a systematic assessment of water quality within its 10 identified watersheds. The goal is to have all land area in Harford County covered by a specific action plan to address the water quality problems identified. At a minimum, the County is to perform a detailed watershed assessment for one County watershed during this permit term.

The County reported that Stream Corridor Assessments (SCAs) have been completed for approximately 75 percent of the County. Previous annual reports have included water quality and stream restoration studies for the Deer Creek, Swan Creek, Bynum Run, Winters Run, Foster Branch, Little Gunpowder River, and Church Creek watersheds. Potential restoration and retrofit opportunities have been identified and ranked for these watersheds. Many of these opportunities have been placed on the County's capital improvement project (CIP) schedule and are in various stages of design or construction.

More detailed assessments were undertaken during 2007 and 2008 in several watersheds. These

include Woodland Run and Farnandis Branch (Bynum Run watershed), Plumtree Run and Wheel Creek (Winters Run watershed), Sam's Branch (Otter Point Creek watershed), and Mariner Run (Little Gunpowder River watershed). Most notably, a management plan was completed for the Wheel Creek watershed during 2008.

Wheel Creek is a second order tributary to Winters Run that eventually discharges to Atkisson Reservoir in the Bush River watershed with a total drainage area of 435 acres, 117 (27%) being impervious surfaces. Commercial and high-density residential developments are the dominant land uses. Four stream restoration and five stormwater retrofit projects have been identified for the watershed. Project implementation, public outreach, and monitoring totals approximately \$5 million. A total of \$210,000 in grant monies was secured in 2009 and 2010 from the Chesapeake and Atlantic Coast Bays 2010 Trust Fund for project implementation in the Wheel Creek watershed.

In cooperation with the United States Geologic Survey (USGS), four stream gages are maintained in Harford County. These gages are located in the Bynum Run, Plumtree Run, James Run, and Swan Creek watersheds. In addition to flow, monthly surface water quality samples are obtained for nutrients and bacteria (e.g., e. coli) at all but the Swan Creek gage. In 2007, monthly bacteria samples taken in Bynum Run and Plumtree Run exceeded EPA's water quality criteria of 200 MPN seven and five times, respectively. Monthly samples taken in 2008 exceeded these criteria five and three times, respectively. The County also established ten e. coli monitoring sites within its development envelope in August 2006. Monthly baseflow grab samples are collected at each site. In 2007, a little more than 40 percent of the samples exceeded the 200 MPN threshold. During 2008, approximately 25 percent of the samples exceeded water quality criteria. The County needs to identify and implement water quality opportunities to address bacteria.

Lastly, the Bush River Shallow Water Monitoring Project has been conducted by the Maryland Department of Natural Resources (MDNR) since 2003. In Harford County, this project includes continuous water quality sampling in the Lauderick Creek and Otter Pond Creek. During 2008, monitoring was discontinued in Lauderick Creek and the sampling equipment relocated to Church Point. The 2008 results found that water clarity is generally at levels considered to be detrimental to submerged aquatic vegetation (SAVs) growth. Nutrient and sediment discharges augmented by increased precipitation and two large sanitary overflows accounted for the decrease in water clarity. Interestingly, SAVs were reported to have declined from 1,024 acres in 2004 to 321 acres in 2006, increased to 643 acres in 2007, and decreased to 519 acres in 2008. As indicated above, the status of plan development relative to monitoring results is unclear.

The County continues to do very well with its watershed assessment efforts. Quite a few of the planned restoration and retrofit projects are nearing the design and/or construction phase. The County needs to move forward to identify and implement water quality projects to address the adverse impacts discovered as a result of its monitoring efforts. As previously noted the success of the County's assessment and planning efforts will be gauged by implementation of restoration projects and ultimately improved water quality.

## **Watershed Restoration**

Harford County is required to implement the water quality projects identified in its watershed plans. The 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 is to 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 restoration efforts are implemented are to be monitored to determine effectiveness toward improving water quality. Additionally, the County is required to implement restoration efforts to restore an additional ten percent of the County's impervious surface area during this permit term. The progress toward meeting the goal is to be reported annually. Annual reports are to include the estimated cost and the actual expenditures for program implementation and the monitoring data and surrogate parameter analyses used to determine water quality improvements.

In Harford County, there are approximately 8,300 acres of impervious surface that require treatment. Therefore, approximately 1,660 acres of impervious surface were to be treated during this permit cycle. For the period 2001-2009, the County completed 11 structural projects that treated 214 impervious acres (approximately 13 percent of the 1,660 acre goal). As stated above, no watershed restoration projects have been completed since 2005. As a result, the County has fallen well short of meeting its restoration obligations.

Future restoration efforts will concentrate on small watersheds such as Wheel Creek described above. The County stated that it believes the ten percent restoration goal is excessive for medium jurisdictions and has requested that future permit requirements be limited to five percent. The County estimates that it will cost approximately \$25 million to implement structural practices to meet the ten percent goal. MDE is cognizant of financial and resource implications and believes that impervious surface is more appropriate than population to establish the level of restoration effort. It should be noted that a higher level of effort will be necessary to address pollutant reductions associated with both local and Chesapeake Bay total maximum daily loads during the next permit cycle. This also brings up an issue regarding accounting for impervious surface treatment. The County reported that, upon completion of the planned restoration projects in Wheel Creek, it will be taking credit for treating all 117 acres of impervious surfaces within the watershed although all of these areas do not drain to the proposed practices. MDE believes that impervious surfaces should be hydrologically connected to structural restoration projects in order to receive full credit. This issue deserves further discussion between the County and MDE.

As discussed in previous annual report reviews, accounting for nonstructural implementation (e.g., tree planting, turf conversion or soil conditioning, street sweeping, inlet cleaning, and pet waster management) is essential and will help quantify the County's efforts to address impervious surface treatment goals. The ongoing discussions between MDE and Maryland's NPDES stormwater community will go a long way toward establishing load reductions for nonstructural practices.

Pre and post-construction monitoring continues for many of the restoration projects. Post-

construction monitoring reports were submitted for the Mt. Royal, Box Hill South, and Winters Run restoration projects. Results indicate that the projects are stable for the most part and functioning according to their design goals and objectives. Post-construction results continue to indicate little or no change in the biological community. Additionally, concept plans or design have been initiated for twelve projects.

With the exception of accounting for nonstructural activities, Harford County's efforts to determine water quality improvements are noteworthy. Much of Harford County's restoration work has been structural and results have been well quantified. However, given the pace of implementation, compliance with NPDES watershed restoration goals has not been met.

### **Assessment of Controls**

Chemical, biological, and physical monitoring are to be used to document work toward meeting the watershed restoration goal. The County chose to monitor a land use specific outfall and an associated in-stream station in the Winters Run watershed. The outfall drainage is comprised of 50 acres of medium-density and 15 acres of high-density residential land use and 14 acres of open space. The in-stream station drains 169 acres, 27 being impervious.

For chemical monitoring, at least three discrete samples determined to be representative of each storm event are to be analyzed for ten specified parameters. Eight storm events are to be monitored each year, two during each quarter with quarters based upon calendar year. For periods of extended dry weather, baseflow samples are to be taken once per month. Continuous flow monitoring is required at the in-stream station to develop stage and discharge relationships and pollutant load estimates. Temperature and pH are also to be recorded. Presently, the County collects monthly baseflow samples and EA is under contract to conduct the storm event monitoring. Atlantic Coastal Laboratory has been contracted to conduct sample analyses for all parameters except bacteria. Community Environmental Laboratories, Inc (CEL) performs the bacteria analyses.

The County reported that eight storm event and ten baseflow samples were collected during the 2008 reporting period. Storm event sampling was well-represented for each quarter. Rainfall depths for the 2008 sampled storm events ranged from 0.03 to 1.44 inches. EMCs were calculated and reported on MDE's Chemical Monitoring Storm Event Database as required. Annual and seasonal pollutant loads were calculated as well. EMCs from 1998 through 2008 were compared to Maryland's water quality criteria and copper concentrations were found to exceed acute and chronic criteria for storm flow samples. The average yearly EMCs were also compared to the results from Maryland's NPDES community (Bahr 1997) and the Nationwide Urban Runoff Program (EPA, 1983). Nitrate plus nitrite concentrations were above the Maryland and EPA results. Additionally, elevated concentrations were exhibited for total petroleum hydrocarbons (TPH) and total phosphorous during Spring and Summer months, respectively.

Historically, sample results have indicated elevated fecal coliform concentrations. During 2008, a study through the University of Salisbury was completed to identify the sources of bacteria within the watershed. The study included the collection of storm and baseflow samples and

collection of animal droppings and sewage. Based on the findings of the study, over 40 percent of the bacteria are attributed to wildlife and another 30 percent to human sources. The County is currently coordinating with various agencies to identify locations of the input from human sources in the watershed.

Biological and physical assessments are conducted between the outfall and in-stream stations. Benthic macroinvertebrate sampling occurs at three locations along this stream segment during the Spring of each year. Samples are collected and sorted by County staff and the MDNR conducts genus specific identification. Similar to the chemical data, biological data analyses were provided. During 2008, a regression analysis was performed on the Benthic Index of Biological Integrity (B-IBI) and Hilsenhof Biotic Index (HBI) scores to determine temporal trends and seasonal trends at each of the stations. No trends were evident and results continue to indicate a “fair” to “poor” biological community with “partially degraded” to “degraded” habitat.

For physical assessment, a stream profile and three monumented cross-sections were established in 1999. Measurements and a comparative analysis are to occur annually. During the 2008, a longitudinal profile and cross-section survey was conducted and the results were represented graphically. Results indicate that minor aggradation within the lower reach has occurred in the channel invert over time.

As described above, steps are being taken to identify bacterial and nutrient sources. The County has contracted Biohabitats, Incorporated to develop a plan to address water quality impacts within the watershed. The scope of work will include data collection and assessment, community outreach, a workshop and public meeting, and a management plan for the Brentwood Park and Woodland Hills communities.

Lastly, Harford County was required to select a watershed to monitor in order to evaluate the effectiveness of stormwater management system implementation for stream channel protection. The County has selected a 181 acre drainage area that includes Wexford (a new 134-lot single-family residential development) for monitoring. Land use changes will include commercial redevelopment and new residential development designed to meet the Design Manual criteria. In addition to a longitudinal profile, four monumented cross-sections were established and surveyed in 2003. During 2008, a physical stream assessment was performed including cross-sectional surveys and a longitudinal profile. In 2006, it appeared that cross-section three was experiencing a shift in the thalweg. The 2008 data confirm a permanent shift in the location of the thalweg, likely caused by a debris jam in 2007. It is unclear what, if any, landform changes have occurred during the reporting period.

The County’s efforts with regard to the long-term monitoring requirements continue to be strong. Bacteria source tracking and implementing a management plan for the Brentwood Park and Woodland Hills communities should result in improved water quality. The County should investigate whether future land use changes within the Wexford area justify continued monitoring in this area.

## **Program Funding**

Adequate funding is required in order to comply with all conditions of its NPDES stormwater permit. Funding for the County's NPDES program is provided through general funds distributed to the Department of Public Works (DPW). The DPW's operating budget for FY09, specific to NPDES implementation, is approximately \$695,000. Capital budget allocations for watershed restoration and stream gauge operation total \$1.62 million.

Using Wheel Creek as an example, approximately \$24 million would be needed to meet a ten percent restoration goal using structural measures. Harford County's NPDES stormwater program is funded through its general fund, which competes with public safety and education programs. Excluding these activities, the general fund for FY10 is \$16.5 million. Therefore, approximately one-third of the general fund, excluding public safety and education programs, would need to be allocated to stormwater capital improvement projects in order to meet a ten percent restoration goal for the next permit cycle,. This level of funding is larger than the total funding over the past four years. As stated in previous reviews, the County should consider developing a dedicated funding source for its NPDES stormwater programs.

## **Summary**

Harford County is commended for its continued efforts toward NPDES stormwater program implementation. Overall, the commitment put forth to comply with the myriad of permit conditions is outstanding. As described above, delineating the drainage area for BMPs, identifying impervious area treatment, and accounting for nonstructural activities should be a priority for the County. Addressing these issues may result in a decrease in the level of effort necessary to meet impervious surface treatment restoration goals. More importantly, the pace of implementation needs to improve in order to achieve compliance with NPDES watershed restoration goals. Considering that permit requirements will become more vigorous to meet local and Chesapeake Bay waste load allocations associated with total maximum daily loads, the County should strongly consider developing a dedicated funding source for its NPDES stormwater programs.