

**Maryland Department of the Environment  
Water Management Administration  
National Pollutant Discharge Elimination System  
Municipal Separate Storm Sewer System Discharge Permit  
99-DP-3319 (MD0068331)**

**Composite Review of Carroll County's 2007 and 2008 Annual Reports**

Carroll County was reissued a National Pollutant Discharge Elimination System (NPDES) municipal separate storm sewer system discharge permit 99-DP-3319 (MD0068331) on July 14, 2005. This permit requires the County to prohibit non-stormwater discharges to and eliminate stormwater pollutants from its storm sewer system to the maximum extent practicable. Each year, Carroll County compiles an annual report for assessing the progress of its stormwater management programs. This review by the Maryland Department of the Environment (MDE) provides the County with NPDES permit compliance status and general guidance for the remainder of the permit term.

**Permit Administration:**

The legal responsibility for administering this NPDES stormwater permit rests with the Carroll County Board of Commissioners. The Board of Commissioners has delegated the daily operation of this permit to Carroll County's Office of Environmental Compliance. Additional field work, monitoring, watershed assessments, and enforcement associated with the NPDES stormwater permit is conducted by the County's Bureau of Resource Management. A detailed organizational chart and a description of staff roles in relation to NPDES stormwater tasks have been provided. These actions comply with NPDES stormwater permit conditions for Permit Administration.

**Legal Authority:**

Carroll County continues to maintain the necessary legal authority to control pollutants discharged from its municipal separate storm sewer system in compliance with the Clean Water Act (CWA) and the Code of Federal Regulations 122.26(d)(2)(i). Certification has been provided by the County Attorney's Office that appropriate authority exists to control storm drain discharges. This certification satisfies NPDES permit requirements for legal authority.

**Source Identification:**

Source identification in Carroll County focuses on gathering storm drain data and compiling these on a geographic information system (GIS). A priority has been to collect data from the most populated areas of the County, including eight incorporated municipalities. These municipalities are required to comply with MDE's general permit for discharges from small

municipal separate storm sewer systems. A memorandum of understanding has been executed between the County and the towns for sharing permit responsibilities. The County's GIS specialist from the Office of Environmental Compliance regularly visits each town to field verify data, conduct stormwater management facility inspections, and look for illicit connections.

Mapping is complete for Hampstead, Manchester, Mount Airy, New Windsor, Sykesville, Taneytown, and Union Bridge and has been provided to local municipal officials for verification and concurrence. Additionally, mapping is 70% complete for the town of Westminster. Once town data are complete, the County will work toward mapping the unincorporated urban area storm drain systems and discharges. For new storm drain systems, developers submit as-built data in a digital format compatible with Carroll County's GIS. Examples of source identification information have been submitted to MDE for Taneytown and for unincorporated areas of the County. These efforts meet NPDES stormwater requirements for source identification.

### **Management Program:**

Carroll County's permit requires the reduction of stormwater pollutants to the maximum extent practicable. County programs for this purpose include erosion and sediment control, post-construction stormwater management, controlling pollutants associated with County-owned property and roads, public education and outreach, and illicit discharge detection and elimination. A summary of these program elements is provided below.

The County's Inspection Division within the Bureau of Resource Management is responsible for erosion and sediment control enforcement. In the last 2 years, 342 grading permits have been issued and a list of those greater than one acre have been forwarded to MDE's Compliance Program to ensure coverage under the NPDES construction general permit. Over this period 6,432 inspections were made and 36 stop work orders issued. Additionally, the County has held 2 responsible personnel training courses at the Bear Branch Nature Center for 91 participants

The stormwater management program is the responsibility of the Carroll County Bureau of Resource Management. Proposed development is reviewed for adequacy under Chapter 191 of the County Code. In the past 2 years, 1,178 stormwater management plan reviews have been conducted and 193 as-built approvals made. As a result, an additional 541 acres of land have been developed with approved stormwater management. County-wide, a total to 8,076 acres of land are currently managed for stormwater, or approximately 3% of the County's total land area.

For existing stormwater best management practices (BMPs), 438 maintenance inspections were performed with 139 facilities requiring maintenance. Follow-up inspections show that 35 still require some level of work. A check of the County's BMP database found that numerous BMPs were in need of maintenance, triennial inspections, follow-up inspections, and as-built approvals. Discussion between MDE and County staff indicated that better documentation of BMPs and project status would resolve numerous backlog issues. More importantly however, some BMPs have lingering maintenance deficiencies that need to be resolved.

Carroll County owns and maintains facilities on its property and all residential property. Three new employees were hired in 2006 to help resolve the maintenance backlog and conduct maintenance inspections and follow-up. Public information has been provided on Carroll County's website (<http://ccgovernment.carr.org/ccg/projects/default.asp>) documenting significant maintenance and retrofit work planned and completed by the Bureau of Resource Management. Similar efforts need to ensure that the backlog of privately-owned commercial and industrial BMPs is resolved, especially where inspections have documented problems for some time.

Carroll County's permit requires the management of stormwater from County-owned property, buildings, and roads. In addition to following State laws for erosion and sediment control and stormwater management, the County performs numerous other tasks to ensure that stormwater is controlled. Outfall inspection data from the illicit discharge program are used to notify the Highway Department of failing storm drain systems that are in need of clean-out and repair. Additionally, winter weather deicing protocols include covering salt storage areas, calibrating the spreading equipment each Fall, and pre-wetting salt for more efficient use. Regarding pesticides, the County works with the Maryland Department of Agriculture's Cooperative Extension Service to employ integrated pest management (IPM). These strategies include personnel training, scouting for pests, spot applications, and notifying students and teachers when pesticides are used at schools.

Carroll County owns and operates 10 industrial facilities that require NPDES stormwater permit coverage. Four public wastewater treatment plants include stormwater requirements in individual discharge permits. Four landfills, a maintenance yard, and a regional airport are all covered by MDE's general permit for industrial stormwater discharges. All are required to have pollution prevention plans that address stormwater runoff. As part of these plans, the County has developed matrices outlining tasks associated with the pollution prevention plans. Some of these activities include ensuring that personnel are trained, hazardous materials are not exposed, spills are contained, IPM, and BMP maintenance. Additionally, sites are to be inspected after rain events to ensure that obvious sources of pollution are prevented and opportunities for improving infrastructure and stormwater quality are implemented.

In order to ensure that County-owned facilities are implementing pollution prevention plans the Office of Environmental Compliance conducts audits of its industrial facilities. In 2006, the County provided MDE with audit information and a task matrix for the County's Maintenance Facility. This audit was from 2003 and mentioned numerous tasks such as developing a pollution prevention plan; mapping buildings, storm drains, and topography; creating a team to inspect outfalls daily and annually to look for pollution; updating chemical use information lists; posting instruction signs in fueling and waste storage areas; and repairing the erosion crater in the asphalt behind the corporate hangers. While the County states that meetings and training sessions continue on a regular basis, nothing specific regarding the work being done at the County's Maintenance Facility for NPDES permit compliance has been submitted. Also, no audits, pollution prevention plans, or task matrices have been submitted regarding the other 9 industrial facilities owned by Carroll County. The County needs to ensure that its industrial facilities are permitted, have pollution prevention plans, document that audits are being

conducted, and provide adequate information in NPDES annual reports to reflect this work. Relevant information to be submitted with annual reports includes pollution prevention plans; inspection reports and County audits; updates on items in need of maintenance, repair, or capital improvement projects.

The Office of Environmental Compliance continues to offer IPM classes at Carroll Community College and teams-up with the Chamber of Commerce to educate business owners on developing and implementing pollution prevention plans. Both the Office of Resource Management and the Office of Environmental Compliance have updated their web pages with comprehensive information on the County's environmental regulatory programs. Missing was information on illicit connections and a hot line for citizens to call when problems are suspected. These additions could improve efficiency in a revamped illicit discharge program that relies upon citizen participation as well as targeted County inspections.

Carroll County has ramped-up its illicit discharge detection program and visually inspected more than 275 outfalls in the past two years, which more than meets permit obligations for screening 100 outfalls annually. However, no illicit detections were found and for the 28 outfalls that exhibited dry weather flow, a field test kit was not used to screen for pollutants. Additionally, it is unclear if visual observations regarding eroding culverts or excess algae noted in the County's NPDES database are used to investigate potential problems or make infrastructure repairs.

In summary, Carroll County performs numerous management programs County-wide for controlling stormwater discharges. Recent improvements to the County's stormwater management maintenance program include the identification of failing BMPs and the development of a capital budget for repairing these facilities. Dozens of facilities are planned or have been repaired in the past two years. The County is commended for successfully implementing this critical aspect of its stormwater management program. While these actions can arguably show the County's effort toward controlling stormwater to the maximum extent practicable, other County-wide programs need similar attention and resources in order to remain in compliance with NPDES stormwater permit conditions. More timely maintenance of privately-owned BMPs and follow through on the implementation of pollution prevention plans for County-owned facilities is warranted. Additionally, the County's illicit discharge detection program has complied with permit conditions yet few illegal connections have been found. The County should explore alternative procedures in an effort to increase the effectiveness of this program. MDE believes the County's reapplication for NPDES permit coverage should address these management concerns.

### **Watershed Restoration**

Carroll County is required to assess water quality within all of its watersheds and develop action plans to maximize water quality improvement. The County has decided to focus its management effort on protecting and restoring tributaries that flow to local and regional drinking water reservoirs. The County has a total of 11,344 acres of impervious surface area and its permit requires that 10% of this area be restored during the permit term. Therefore, by July 15, 2010, Carroll County is required to complete the restoration of 1,134 acres of impervious surface area.

Additionally, planning requirements for future permit work require the County to propose another 10% of imperviousness for restoration.

Carroll County has established a clear and concise accounting system for tracking stormwater restoration activity. Projects are separated into those planned, those being bid or under construction, and those that have been completed. A table is included in the annual report that summarizes information by watershed name, drainage area, and impervious acres so that progress toward the 10% restoration goal can be shown.

Twelve projects associated with the Longwell Branch Watershed Restoration Plan have been completed, including the Winter Street shallow marsh; the Longwell County Park headwall stabilization, channel restoration, and wetlands creation; the East Middle School water quality facility; the Carroll County Times stormwater basin retrofit, sand filter, and stream channel restoration; the District Court shallow marsh; the Ralph Street water quality marsh; and a municipal parking lot water quality facility. These projects are located in the Liberty Reservoir watershed and account for the restoration of 208 impervious acres.

Other projects within the Liberty Reservoir watershed include Eldersburg Elementary, the Chung Property, Marriott Wood, Englar Business Center, Hickory Ridge, and the Bateman Pond for a total of 106 acres of impervious surfaces restored. The Carroll County Airport Business Park Watershed Restoration Project has also been completed. This included converting a concrete-lined channel into a naturalized stream; installing inlet forebays and outfall stilling basins; creating wetlands and buffers; and modifying the existing pond's discharge control structure to provide downstream channel protection. All told, these projects amount to an additional 254 acres of impervious area restored in the Liberty Reservoir watershed.

In the Piney Run in Hampstead, which drains to the Loch Raven Reservoir, 5 projects have been completed that include stream channel restoration and buffer creation; Robert's Field stormwater pond retrofit; North Woods Trail stormwater pond retrofit; and Hampstead Valley II stormwater pond retrofit. These projects account for an additional 107 acres of impervious area restored. The County-wide stormwater restoration total is 569 acres of impervious area, or 50% of the 1,134 acre requirement for this permit term. Other projects under construction, out for bid, or in design account for an additional 25 acres of impervious surface. This proposed schedule of work falls short of watershed restoration requirements. The County needs to provide an additional 540 acres of impervious surface area for restoration to remain in compliance with its NPDES stormwater permit. Additionally, planning efforts will need to identify an additional 10% of impervious surface area for the next permit term.

#### **Assessment of Controls:**

Carroll County conducts representative monitoring on a small headwater stream that runs through the Airport Business Park on either side of Route 97 north of Westminster. The stream eventually flows into the North Branch of the Patapsco River and is targeted by Carroll County because it is a source of drinking water. An outfall from a stormwater management pond is monitored along with an in-stream station approximately a mile downstream. The watershed

area above the outfall is 275 acres, 80% of which is impervious. The downstream watershed is an additional 287 acres that is a mix of agricultural and residential land use. The entire drainage area is zoned for commercial and residential development. The stormwater management pond was restored last year to meet the recharge, water quality, channel protection, and other stormwater management requirements found in the 2000 Maryland Stormwater Design Manual.

Biological sampling has been conducted since 1997 downstream of the County's Airport Business Park. Carroll County's monitoring protocols follow those of the Department of Natural Resources' (DNR) Maryland Biological Stream Survey (MBSS). The use of MBSS protocols allows County data to be compared with over 100 local sites sampled by the DNR. Data analysis includes translating indices of biological integrity into narrative descriptions (e.g., very poor, poor, fair, good). While the most recent DNR analyses determined that the overall health of streams in Carroll County is fair, the County's 2008 monitoring showed that the outfall changed from poor to fair and the in-stream station went from fair to good. These are the best results recorded yet and may be attributable to efforts to control stormwater in the watershed. Because biological conditions in this stream fluctuate from year to year between poor and good, continued biological monitoring and trend analysis will be necessary to confirm any biological improvement.

Stream habitat assessments have been conducted since 1998 in the same location as the biological monitoring. MBSS habitat surveys show that conditions at the pond's outfall waiver from year to year but have changed recently from poor to marginal (scale: poor, marginal, sub-optimal, and optimal). The in-stream conditions are more consistently in the sub-optimal range. Both outfall and in-stream sites show evidence of sediment deposition, a lack of epifaunal substrate, embeddedness, a lack of vegetative protection, and the dominance of one velocity/depth regime.

Physical monitoring of the stream began in 2000 at the same location. Originally, 6 permanent cross-sections were measured. For cross-section 1 located at the pond's outfall, measurements indicate that the left bank has eroded by 2 feet since 2000. At cross-section 6, the stream channel has widened from 5 feet to 9 feet. Bank soils are Manor Series, which are highly erodible. The County has increased its cross-section monitoring to 28 locations evenly spaced at 200 foot intervals. Overall, the slope of the stream channel is gentle, only exceeding 2% at station 28. Increased gradient at station 28 is likely a contributing factor to the stream bank scour located in this area. Continued cross-sectional monitoring of this reach may shed light on the effectiveness of the channel protection management provided by the retrofit of the Airport Business Park's stormwater management pond.

Chemical monitoring has been conducted since 2001 at the Airport Business Park along with biological, and physical monitoring. A total of 77 events have been sampled. In the last 2 years, the County has captured a total of 13 events. This is shy of the 16 storm/base flow event requirement in its permit, which the County claims was primarily due to equipment failure. The County should increase its monitoring effort and collect more events in subsequent years to make up for this shortfall. Event mean concentrations (EMCs) for common stormwater pollutants have been recorded and analyzed.

Nitrite plus nitrate concentrations tend to be greater during base flow than storm flow. This is probably due to remnant and past agricultural land use where the use of soluble chemical fertilizers is common. Suspended solids and E. coli show increased concentrations during storm events, probably emanating from bank scour and failing septic systems. All other parameters remain relatively consistent regardless of base flow or storm conditions. Seasonal pollutant load estimates were calculated and the analysis shows phosphorus spiking in Spring and Fall and nitrogen spiking in Summer and Winter.

Carroll County will need to expand its pollutant load analysis in the future to sum runoff from its entire storm drain system. The County may fortify its limited monitoring data with additional data from surrounding jurisdictions, MDE's statewide NPDES database, Chesapeake Bay Program data, or national stormwater sources. The goal will be to estimate County-wide stormwater pollutant loads and reductions due to management and watershed restoration programs. These exercises will become increasingly important as local governments will be required to show progress toward meeting local and regional water quality goals.

In summary, Carroll County conducts a successful stormwater monitoring program. Background conditions have been thoroughly characterized using chemical, biological, and physical monitoring. Because the Airport Business Park watershed is targeted for numerous stormwater management retrofits and stream buffer restoration projects over the next several years, these efforts can be monitored and compared to the well established characterization data. Ultimately, analyses will improve the understanding of pollutant removal efficiencies associated with Carroll County's watershed restoration activities and the effectiveness of Maryland's 2000 Design Manual.

### **Program Funding**

Carroll County's fiscal analysis details the funding of its NPDES stormwater program. Approximately a dozen staff have at least some direct responsibility for NPDES stormwater permit tasks. An analysis of staff time, monitoring contracts, and supplies estimates an annual operating budget of \$333,580. A five year capital improvement budget of \$11,692,400 has been proposed. Considering that the combined cost of the Longwell Branch, Piney Run, and Airport Business Park watershed restoration projects was \$2,150,000 to treat 546 acres, the five year capital budget that has been proposed will reasonably ensure continued water quality improvement. This funding level also shows the County's commitment to meeting the current 10% impervious surface restoration requirements and sets a strong foundation for meeting future and potentially more extensive restoration requirements.

### **Summary**

Carroll County has continued to comply with NPDES municipal stormwater permit requirements for permit administration, legal authority, and source identification. The County has nearly

finished mapping the storm drain systems in all of the incorporated towns and is poised to use these data for better watershed and restoration planning. In the last couple of years the County has made significant strides in maintaining BMPs and perhaps more importantly, exploiting routine maintenance tasks for retrofit opportunities and improving water quality. Other County-wide programs need similar attention and resources in order to remain in compliance with NPDES stormwater permit conditions. More timely maintenance of privately-owned BMPs and follow through on the implementation of pollution prevention plans for County-owned facilities is warranted. The County has performed considerable work to retrofit 569 acres of impervious surface, however permit conditions require an additional 540 acres of impervious surface area to be restored by the end of the permit term. While 5 year restoration budget proposals have increased significantly to reflect the magnitude of work necessary for meeting permit conditions, proposed restoration projects continue to fall short of current permit requirements leaving the County in jeopardy non-compliance.