



ROANOKE COUNTY, VIRGINIA

Municipal Separate Storm Sewer System (MS4) Annual Report Year Two

October 1, 2010

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compliance with Permit No. VAR040022.



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The City of Roanoke

The Town of Vinton

Virginia Save Our Streams Foundation

Roanoke Valley Television Station

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Executive Summary

Polluted stormwater runoff is a leading cause of impairment to nearly 40 percent of surveyed U.S. water bodies that do not meet water quality standards. Overland or via stormwater systems, polluted runoff is discharged into local water bodies. When left uncontrolled, this water pollution can result in the destruction of fish, wildlife, and aquatic life habitats; a loss of aesthetic value; and threats to public health due to contaminated food, drinking water supplies, and recreational waterways.

The County of Roanoke is committed to continuing in the development, implementation, and enforcement of a Municipal Separate Storm Sewer System (MS4) Program that is designed to reduce the discharge of pollutants from the regulated MS4 to the maximum extent practicable (MEP). The focus of this program is to protect water quality, and to improve waters into which the regulated small MS4 discharges. This program is also designed to satisfy the appropriate water quality requirements of the Clean Water Act, Virginia Stormwater Management Act, and associated regulations.

The County of Roanoke developed and implemented a comprehensive plan to meet the conditions of the MS4 permit. The permit is outlined in six minimum control measures (MCMs): Public Education and Outreach on Stormwater Impacts, Public Involvement and Participation, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post Construction Stormwater Management in New Development and Redevelopment, and Pollution Prevention and Good Housekeeping for Municipal Operations. Within each MCM, there are numerous best management practices (BMPs) being implemented by the County of Roanoke. This report is the second annual report for this MS4 permit.

Strong regional cooperation has been pursued in the MCM areas of Public Education and Outreach, Public Participation and Involvement, and Pollution Prevention/Good Housekeeping. The County intends to continue to participate in regional efforts to educate the public in coordination with the City of Roanoke, the Town of Vinton, Virginia Department of Transportation, and other regional environmentally responsible organizations such as the Upper Roanoke River Roundtable and the Clean Valley Council. Regional cooperation and discussion will not only be economically sound, but also instrumental in the consistent and continual education of the citizens of Roanoke County and beyond. This regional perspective is instrumental in the effective reduction of pollutants into our rivers and streams.

Roanoke County's commitment to establishing and sustaining a comprehensive program that protects the County's stormwater quality has been made and will continue over the permit term to provide the Roanoke Valley citizens with clean water now and into the future. The Minimum Control Measures and associated BMPs for this reporting period (July 1, 2009 – June 30, 2010) are described in the following document.



Strategies to Ensure Program Consistency with TMDL Assumptions

Roanoke County has several local streams that have a TMDL completed at the time when this MS4 permit was issued. The streams, associated pollutants, and waste load allocations are listed below. Roanoke County is committed to improving the quality of water that runs through the ridges and valleys of our region. This section will discuss the current ordinances, policies, and BMP's in this MS4 Program Plan that are applicable to reducing the pollutants that are impairing the quality of this regions waters. The existing policies have also been evaluated to determine the effectiveness of addressing the specific pollutants and determine procedures to ensure consistency with the TMDL.

TMDL Waterways and Tributaries		WLA
<i>Tinker Creek Watershed, 2004 - E-Coli (EC)</i>		
Carvin Creek		4.07E+12 cfu/yr
Glade Creek		8.02E+10 cfu/yr
Lick Run		3.29E+09 cfu/yr
Tinker Creek		5.36E+11 cfu/yr
<i>Roanoke River Watershed, 2006 - E-Coli (EC)</i>		
Ore Branch		1.07E+09 cfu/yr
Roanoke River		2.84E+11 cfu/yr
<i>Roanoke River Watershed, 2006 - Sediment (SED)</i>		
Roanoke River		1,823 tons/yr

The efforts which the County has developed to reduce these pollutants are listed below:

- **Measurable goals, schedules, and strategies to ensure Program Plan consistency with TMDL assumptions. (see *Minimum Control Measures 1 through 6, pages 6-31*)**
- **TMDL Specific Awareness campaign implementation. (see BMP 1-5, page 11)**
- **Summary of assumptions of the Roanoke County TMDL's**
- **List of ordinances and legal authorities, BMPs, policies, plans and procedures applicable in reducing pollutants identified in WLA**
- **Summary of Program Evaluation (ordinances, legal authorities, policies, plans and procedures)**
- **Implementation Schedule**
- **Annual Characterization of volume of stormwater and quantities of pollutants of concern**
- **Outfall reconnaissance for identification of potential sources of pollutant of concern**
- **Evaluation of all properties for potential sources of pollutant of concern**

Summary of Assumptions: Tinker Creek Watershed TMDL

The Tinker Creek Watershed TMDL, prepared on March 16, 2004, was approved by the Virginia Department of Environmental Quality (VDEQ). This study encompasses the waters of Tinker Creek, Glade Creek, Carvin Creek, Laymantown Creek and Lick Run. The water quality impairment was to the fecal coliform standard. This administration does not address the Waste Load Allocation (WLA) for Laymantown Creek, since the entire tributary resides in neighboring Botetourt County. *E. coli* is the new standard for bacterial impairment indicators. In this TMDL process, DEQ has translated fecal coliform values to *E. coli* values.

The Tinker Creek Watershed TMDL summarizes the potential point and non-point sources of fecal coliform. These sources include grazing livestock; pets; land application of manure; land application of bio-solids; urban/suburban runoff; failed/failing septic systems; uncontrolled discharges (straight pipes, dairy parlor waste, etc.) and wildlife.

Summary of Assumptions: Roanoke River TMDLs

The Roanoke River TMDLs, prepared on February 2006 and March 2006, were approved by the VDEQ. This study encompasses Wilson Creek, Ore Branch and the Roanoke River Watershed. Two impairments were cited in these TMDL's, *E. coli* and sediment. This administration does not address the WLA for Wilson Creek, since the entire tributary resides in Montgomery County.

The Roanoke River Bacterial TMDL summarizes the potential point and non-point sources of *E. coli*. These sources include: wildlife, human waste, livestock waste, and pets. The Roanoke River Benthic TMDL summarizes the potential sources for sediment. These sources include non-point sources: forested lands, agricultural lands, developed lands, wetlands, or barren lands. Other sources include point sources such as facilities that have discharge permits and in-stream bank erosion.



List of Ordinances, Legal Authorities, BMP's, Policies, Plans and Procedures Applicable to Reduce Pollutants Identified in WLA

Best Management Practices	EC/FC	SED.	Evaluated
BMP 1-1: Educational Programs Review	✓	✓	✓
BMP 1-2: Roanoke County Stormwater Informational Mailer	✓	✓	✓
BMP 1-3: Stream Monitoring and Education	✓	✓	✓
BMP 1-4: Stormwater Education Program	✓	✓	✓
BMP 1-5: Stormwater Public Awareness Program	✓	✓	✓
BMP 1-6: Roanoke County Stormwater Webpage	✓	✓	✓
BMP 1-7: Business Education Program		✓	✓
BMP 2-1: Storm Drain Stenciling Program	✓		✓
BMP 2-2: Stormwater Public Event	✓		✓
BMP 2-3: Stormwater Mgmt. Citizens Advisory Committee	✓	✓	✓
BMP 2-4: Annual Report Posted on Stormwater Website for Citizens to View	✓	✓	✓
BMP 3-1: Storm Drain Map	✓	✓	✓
BMP 3-2: Illicit Discharge Ordinance	✓		✓
BMP 3-3: Illicit Discharge Program	✓		✓
BMP 4-1: Erosion and Sediment Control Ordinance		✓	✓
BMP 4-2: Erosion and Sediment Control Certification		✓	✓
BMP 4-3: Land Development Procedures Review and Evaluation		✓	✓
BMP 5-1: Stormwater Management Ordinance and Manual		✓	✓
BMP 5-2: Stormwater Management Facility Inspection Program		✓	✓
BMP 5-3: Low-Impact Development Utilization		✓	✓
BMP 6-1: Spill Prevention and Control Plans	✓		✓
BMP 6-2: Household Hazardous Waste Events			✓
BMP 6-3: Storm Sewer Maintenance Program	✓	✓	✓
BMP 6-4: Pollution Prevention and Hazardous Waste Training		✓	✓

Ordinances	EC/FC	SED.	Evaluated
Chapter 23: Stormwater Management Ord.	✓	✓	✓
Chapter 8.1-1: Erosion and Sediment Control Ord.		✓	✓
Chapter 23-5.7: Illicit Discharge Ordinance	✓		✓
Chapter 30-82-13.1: Cluster Subdivision Ord.		✓	✓
Chapter 30-75.0: Roanoke River Overlay District Ord.		✓	✓
Policies & Procedures	EC/FC	SED.	Evaluated
Land Development Procedures		✓	✓
Stormwater Pond Inspection Protocol		✓	✓
Illicit Discharge Inspection Procedures	✓		✓

Summary of Program Evaluation

As shown in the table above, multiple best management practices listed in the Program Plan and many of the County's ordinances, policies and procedures address the reduction of the pollutants that are identified in the TMDL Waste Load Allocations. Roanoke County feels that these methods sufficiently address the pollutants of concern and if implementation continues the reduction of the pollutants will result. No weaknesses or limitations have been identified that would limit our programs consistency with the assumptions of the TMDL.

Implementation Schedule

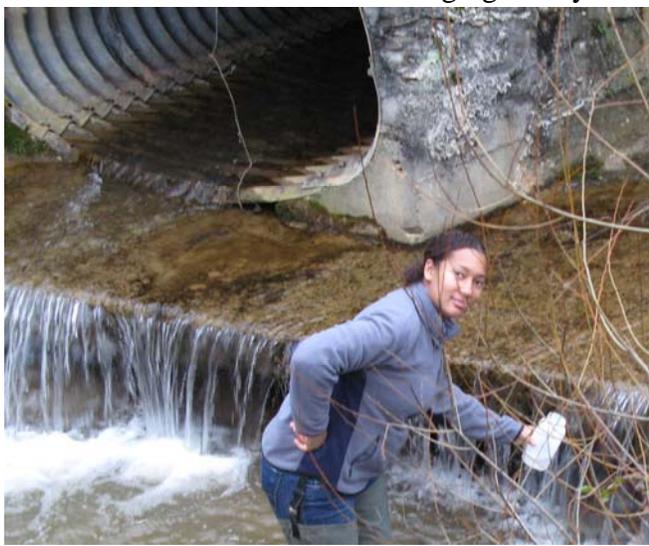
Due to the lack of clear weakness in the Program Plan and County ordinances, policies and procedures, no implementation schedule has been developed to address the Program weaknesses. Should any weakness be discovered during the continued implementation of these programs and policies, a schedule to implement these weaknesses will be included in the following Annual report.

Annual Characterization of volume of stormwater and quantities of pollutants of concern.

Roanoke County will be working closely with the Virginia Department of Conservation and Recreation in the development of a standard method with which to estimate the volume of stormwater discharged from the regulated MS4 and the quantity of pollutants identified in the WLA.

Outfall reconnaissance for identification of potential sources of pollutant of concern.

Roanoke County has determined that it has fewer than 250 total outfalls discharging to any of the identified surface waters of this region. Therefore, the County shall perform reconnaissance of all outfalls during the five-year permit period and shall annually conduct reconnaissance on a minimum of 15% of our known MS4 outfalls discharging to the surface water for which a TMDL has been completed and a WLA has been assigned.



The schedule of outfall reconnaissance performed is listed below:

Surface Water	Total Outfalls	Year 3 2010-2011	Year 4 2011-2012	Year 5 2012-2013
Carvin Creek	46	11	12	23
Glade Creek	51	12	13	26
Lick Run	13	3	3	7
Tinker Creek	46	11	12	23
Ore Branch	50	12	13	25
Roanoke River	52	13	13	26
	258	25%	50%	100%

Evaluation of all County Properties for Potential Sources of Pollutant of Concern

County Facility Illicit Discharge Inspection Schedule	Schedule	Inspected	Pollutant?
<i>Clearbrook Fire Station, Public Safety Building #7</i>	2009-10	YES	NO
<i>Hollins Fire Station, Public Safety Building #5</i>	2009-10	YES	NO
<i>Fort Lewis Public Safety Building #9, 3915 W. Main Street</i>	2009-10	YES	NO
<i>Cave Spring Fire Station, 4212 Old Cave Spring Road</i>	2009-10	YES	NO
<i>Masons Cove Public Safety, 3810 Bradshaw Road</i>	2009-10	YES	NO
<i>Catawba Public Safety, 5585 Catawba Hospital Road</i>	2009-10	YES	NO
<i>Mount Pleasant Public Safety, 2909 Jae Valley Road</i>	2009-10	YES	NO
<i>Bent Mountain Public Safety, 9606 Bent Mountain Road</i>	2009-10	YES	NO
<i>Roanoke County Safety Center, 5925 Cove Road</i>	2009-10	YES	NO
<i>Catawba Center, 4965 Catawba Creek Road</i>	2009-10	YES	NO
<i>Back Creek Public Safety, 7125 Bent Mountain Road</i>	2010-2011		
<i>North Roanoke Public Safety Center #1, 150 Hershberger Road</i>	2010-2011		
<i>Cave Spring Rescue Station, 3206 Valley Forge Avenue</i>	2010-2011		
<i>Camp Roanoke, 6498 Dry Hollow Road</i>	2010-2011		
<i>Public Safety Training Center, 6231 Twine Hollow Road</i>	2010-2011		
<i>Roanoke County Courthouse, 401 E Main Street, Salem</i>	2010-2011		
<i>Roanoke County Fleet Service Center, 5235 Hollins Road</i>	2010-2011		
<i>Roanoke County Public Service Center (P&R), 1206 Kessler Mill Road</i>	2010-2011		
<i>Roanoke County Public Safety Training Center, 1310 Kessler Mill Road</i>	2010-2011		
<i>Roanoke County Social Services Building – 220 East Main St, Salem</i>	2010-2011		
<i>Roanoke County Court Services Bldg 400 East Main St, Salem</i>	2010-2011		
<i>Library Headquarters, 3131 Electric Road</i>	2010-2011		
<i>Glenvar Library, 3917 Daugherty Road, Salem</i>	2010-2011		
<i>Hollins Library, 6624 Peters Creek Road</i>	2010-2011		
<i>Vinton Library, 800 East Washington Ave, Vinton</i>	2011-2012		
<i>Police Sub-Station, 3330 Valley Forge Ave (Behind Cave Spring Rescue)</i>	2011-2012		
<i>Whispering Pines Park, 3551 Absalom Smith Road</i>	2011-2012		
<i>Green Hill Park, 2500 Green Hill Park Road</i>	2011-2012		
<i>Camp Roanoke, 6498 Dry Hollow Road</i>	2011-2012		
<i>Wayside Park, 5880 West Main Street</i>	2011-2012		
<i>VRFA Land Donation from Explore Park, 6006 West Main Street</i>	2011-2012		
<i>Hanging Rock Memorial Battlefield Park/Greenway, 0 Kessler Mill Road</i>	2011-2012		
<i>Hanging Rock Memorial Battlefield Park/Trailhead, 0 Dutch Oven Road</i>	2011-2012		
<i>Sadler Park, 8166 Emerald Lane</i>	2011-2012		
<i>Hollins Park, 5688 Hollins Road</i>	2011-2012		
<i>Brookside Park, 20 Verndale Drive</i>	2011-2012		
<i>Walrond Park, 6842 Walrond Drive</i>	2011-2012		
<i>Green Ridge Recreation Center, 7415 Wood Haven Road</i>	2011-2012		
<i>Read Mountain Preserve, 6101 Crumpacker Drive</i>	2012-2013		
<i>Mount Pleasant Park, 3071 Pitzer Road</i>	2012-2013		
<i>M.A. Banks Park (Vinton), 131 Craig Avenue</i>	2012-2013		
<i>Stonebridge Park, 420 Swan Drive</i>	2012-2013		
<i>Goode Park, 1594 Good Park Road</i>	2012-2013		
<i>Vinyard Park (I), 150 Vinyard Park Dive</i>	2012-2013		
<i>Vinyard Park (I), 404 Berkley Road</i>	2012-2013		
<i>Craig Center, 900 Chestnut Street</i>	2012-2013		
<i>Wolf Creek Greenway, 0 Tulip Lane</i>	2012-2013		
<i>Clearbrook Park, 5335 Clearbrook Park Road</i>	2012-2013		
<i>Shell Park, 6318 Merriman Road</i>	2012-2013		
<i>Starkey Park, 5701 Crystal Creek Drive</i>	2012-2013		
<i>Merriman Soccer Complex, 6657 Merriman Road</i>	2012-2013		
<i>Brambleton Center, 3738 Brambleton Avenue</i>	2012-2013		
<i>Garst Mill Park, 2699 Willowlawn Street</i>	2012-2013		
<i>Happy Hollow Gardens, 6685 Mt. Chestnut Road</i>	2012-2013		
<i>Sugar Loaf Mountain, 5624 Longridge Drive</i>	2012-2013		



MCM 1: Public Education and Outreach on Stormwater Impacts

This minimum control measure is intended to implement a public education program to distribute educational materials to the community and conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies. These measures outline the steps that the public can take to reduce pollutants in stormwater runoff. The programs which the County has developed to meet these educational and outreach goals are listed below:

BMP 1-1: Educational Programs Review

BMP 1-2: Roanoke County Stormwater Informational Mailer

BMP 1-3: Stream Monitoring and Education

BMP 1-4: Stormwater Education Programs

BMP 1-5: Stormwater Public Awareness Program

BMP 1-6: Roanoke County Stormwater Webpage

BMP 1-7: Business Education Program

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

BMP 1-1: Educational Programs Review

Goal:

The goal of this BMP is to update and distribute a list of current publications, educational programs, websites, videos, maps, and training opportunities that directly address stormwater issues such as stormwater management, stormwater quality, floodplain management, pollution prevention, conservation practices and riparian habitat protection.

Measurable Goals:

Roanoke County has created and maintained this educational programs review in the form of a stormwater programs database. The database documents educational programs, brochures, pamphlets, videos, maps, and training opportunities related to stormwater quality, stormwater management, floodplain management, pollution prevention, conservation practices and riparian habitat. The database is accessible through Roanoke County's website and includes instructions on accessing the variety of educational materials located on the site. The address of the webpage where the educational programs list can be found is:

<http://www.roanokecountyva.gov/Departments/Engineering/1Stormwater/9Stormwater+Resources.htm>

Based on the website statistics, it shows that the stormwater programs database has been viewed **160** times between July 1, 2009 and June 30, 2010. This is a decline from Year One statistics which show the database being viewed **793** times. A list of items in this database is included in Appendix A.

TMDL Consistency:

Many of the sources available on our webpage provide extensive educational material concerning the damage that livestock and pet waste can do to our waterways. For example, links are provided to the local Soil and Water Conservation Districts and Cooperative Extensions for landowners that are interested in agricultural cost-sharing options, among others. (EC/FC)

Many of the sources available on our webpage also provide extensive educational material concerning the damage that sediment can do to our waterways. For example, links are provided to the local and state erosion and sediment control regulations for developers that are interested in ways to stabilize a construction site. (SED)

Evaluation and Modification:

The number of times that the database has been viewed illustrates that while the website is an effective format to distribute the information concerning educational programs, the usage can fluctuate greatly. Modifications to this BMP for year three include the addition of new locations where this database is accessible, therefore increasing the amount and variety of information distributed.

Year	Viewing Statistics
2008 - 2009 (YEAR ONE)	793
2009 - 2010 (YEAR TWO)	160



BMP 1-2: Roanoke County Stormwater Informational Mailer

Goal:

The goal of this BMP is to create a stormwater informational mailer on an annual basis, which will educate residents of the County of Roanoke about local stormwater issues. The mailer will be designed as a regional document and will touch on the County's Stormwater Program, general stormwater quality education, updates on local impaired water bodies, and TMDL's. The mailer will be based on the unique issues and concerns for the Roanoke River Watershed.

Measurable Goals:

For Year Two, Roanoke County developed a spring informational mailer that was sent out on March 1, 2010. This mailer discussed several water quality issues such as the stormwater pond maintenance and inspection program, local stormwater infrastructure projects, stormwater-related news, and information regarding locally impaired streams and approved TMDL's. The mailer also included contact information for stormwater concerns in the form of a phone number, email address, and website location.

This informational mailer was sent to over **50,000** out of 90,000 residences and generated 12 citizen emails to ask stormwater questions or voice concerns about maintenance. The stormwater website listed in the mailer received 6,084 views. In addition, multiple phone calls to the County were generated by this mailer; unfortunately the County does not have the capability to track the number and source of incoming phone calls.

TMDL Consistency:

This mailer which was sent out to over 50,000 County residences includes information listing all of the waterways that are impaired by bacteria, sediment, temperature, dissolved oxygen and PCB's in fish tissue (EC/FC) and (SED).

Evaluation and Modification:

The number of emails, phone calls, and website hits shows that the mailer is an effective format to distribute stormwater information. Because of the large number of citizens impacted by this mailer is so large, no modifications are planned for this BMP. The County's goal is to continue to distribute the mailer to its residents and utilize it as an effective outreach method.

How Clean is Your Stream?

What is an impaired waterway?
A stream or river that does not meet State Water Quality standards because pollutant amounts are too high. The Virginia Department of Environmental Quality (VDEQ) maintains a list of impaired waters that is updated periodically. Roanoke County has 13 streams that are impaired.

What is TMDL?
TMDL stands for Total Maximum Daily Load. VDEQ establishes a TMDL for streams to restore and maintain the water quality of the stream. A TMDL is the total amount of pollutant a stream can receive and still meet water quality standards. A TMDL has been completed for 7 of the 13 impaired streams in Roanoke County.

Impaired Streams

Impairment	Waterways	How can YOU help?
Bacteria	Back Creek, Carrin Creek, Glade Creek, Tinker Creek, Lick Run, Murray Run, Mason Creek, Mudlick Creek, Ore Branch, Peters Creek, Roanoke River	Collect & recycle leaf litter and animal waste from your yard before it reaches storm drains.
Temperature	Bottom Creek	Avoid clearing and grading directly adjacent to waterways and plant vegetation along stream banks in your yard.
Sediment	Mason Creek, Mudlick Creek, Roanoke River	Cover piles of dirt or mulch being used in landscaping projects and use proper erosion controls for large land disturbance projects.
Dissolved Oxygen	Roanoke River	Apply fertilizers and pesticides sparingly and try not to apply right before a heavy rain.
PCB's in Fish Tissue	Roanoke River	Report known historical releases to VDEQ.

Year	Distribution Statistics
2008 - 2009 (YEAR ONE)	Aprox. 50,000
2009 - 2010 (YEAR TWO)	Aprox. 50,000

BMP 1-3: Stream Monitoring and Education

Goal:

In cooperation with the local Virginia Save Our Streams chapter, Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County residents. The goal of this BMP is to educate citizens on the field procedures that have been established to determine water quality, in addition to motivating citizens to monitor waterways in their neighborhood and enhance grass roots cooperation to promote the importance of stream monitoring within the County. These seminars and monitoring sessions will provide some field exposure to aquatic habitats, update citizens on local, state, and federal water quality regulations, and keep citizens updated on local stream health.

Measurable Goals:

During this annual period Roanoke County, in cooperation with Save Our Streams and Clean Valley Council, provided six informational stream seminars and 24 local stream monitoring sessions. The six stream school seminars targeted both adults and school age kids between 3rd and 10th grade and had a total of 681 in attendance. The stream monitoring sessions targeted adult citizens and a total of 24 stream segments were monitored with 94 citizens participating. A report showing each segment that was monitored and the score each reach received is attached in Appendix A.



TMDL Consistency:

This activity allows citizens to have an understanding of the many factors that can affect the life in a stream. The affects of pet waste, stream bank erosion and agricultural runoff are discussed during the monitoring sessions as important impacts to water health (EC/FC) and (SED).

Evaluation and Modification:

The number of seminars, monitoring events, and participating citizens show that the stream monitoring and education BMP is an effective method to educate citizens and enhance the grass-roots monitoring effort throughout the County. The County's goal is to continue to provide stream seminars and monitoring sessions to continue to educate citizens and encourage cooperation in regional water quality health.

Year	Streams Monitored	Attendance
2008 - 2009 (YEAR ONE)	52	491
2009 - 2010 (YEAR TWO)	24	775

BMP 1-4: Stormwater Education Program

Goal:

Roanoke County will develop a stormwater educational program for Roanoke County school age children. Educators will develop and provide programs addressing storm water and related water quality issues. Different programs will target appropriate grade levels and will be SOL correlated.

Measurable Goals:

For this annual period, Roanoke County in conjunction with Clean Valley Council has continued to provide the stormwater education program to school age children. The education programs were held in **31** different County schools and reached **6871** students between first grade and 12th grade. The Storm Water Education Program descriptions and program statistics for each educational event are located in Appendix A.

TMDL Consistency:

Several of the educational programs that are presented to Roanoke County Schools target sources of bacteria such as, "Who Polluted the River?", "Drains to Rivers!", and "After the Storm". (EC/FC)

Several of these school programs also target potential sources of sediment such as, "Watersheds to Ocean", "Watershed Connections", and "Water: Nature's Recycling System". (SED)

Evaluation and Modification:

The number of school programs and participating students show that the stormwater educational programs are an effective method to address stormwater and related water quality issues in the school system. The County will continue to provide these programs and continue to target appropriate grade levels and be SOL applicable. The specific educational programs will continue to be evaluated and new programs may be incorporated into the group of programs to address new issues that impact the community.



Year	Schools Participating	Students Reached
2008 - 2009 (YEAR ONE)	20	4011
2009 - 2010 (YEAR TWO)	31	6871

BMP 1-5: Stormwater Public Awareness Program

Goal:

Roanoke County will develop a Stormwater Public Awareness Program that includes the distribution of stormwater merchandise, public service announcements, and other high visibility educational media to utilize social mass marketing methods to bring storm water quality issues to the attention of the citizens of Roanoke County.

Measurable Goals:

In this annual period, Roanoke County distributed book bag tags, bookmarks, books, erasers, lanyards, litter bags, pencils, rulers, stickers, and trash bags, all promoting the importance of water quality to the citizens of Roanoke County. The County also provided informational signs and mapping of local watersheds for several water quality events.

On July 30, 2009, August 31, 2009 and May 24, 2010 Roanoke County made presentations to local groups regarding local water quality issues. In total, Roanoke County gave out **5,244** pieces of merchandise to the citizens of the County.



TMDL Consistency:

Roanoke County and our educational partners give out thousands of pieces of merchandise that have reminder slogans on them to be conscious of day to day items such as picking up after their pets (EC/FC) and ways to be conscious of day to day items such as filling bare spots in their yards to prevent erosion (SED).

Evaluation and Modification:

In the second year, Roanoke County successfully distributed a variety of media bringing stormwater quality issues to the attention to the public through merchandise and informational sessions. The County finds this BMP to be effective and intends to continue to distribute stormwater issues through a variety of media sources to continue to meet the goals of this permit.

Year	Media Distributed	Media Sources
2008 - 2009 (YEAR ONE)	2,811	STUDENT MERCHANDISE, TELEVISION SPOTS,
2009 - 2010 (YEAR TWO)	5,244	STUDENT MERCHANDISE, PRESENTATIONS, WATERSHED MAPS

BMP 1-6: Roanoke County Stormwater Webpage

Goal:

Roanoke County will maintain and monitor the Roanoke County Stormwater webpage, where citizens can continue to get information concerning the County's Stormwater Management Program, ordinances, design guidelines, general information, contact information, pollution prevention information, educational programs and links to other organizations and sites. The website will also inform the citizens about on-going community based projects such as: storm-drain stenciling, Save Our Streams monitoring, regional clean-ups, and other local water quality educational programs.

Measurable Goals:

In this annual period, Roanoke County maintained and monitored the Roanoke County Stormwater webpage. This 17 page website is devoted to stormwater management, water quality, floodplain management and local water quality issues and information. These web pages continue to inform the citizens about the current issues of this region while giving phone, email, and web information to contact a stormwater professional for further information. There were a total of 6,084 views to the stormwater webpage between July 1, 2009 and June 30, 2010. This is a decrease of 70% from last year. The number of visitors to each webpage for the first year of this permit has been monitored and submitted with this report in Appendix A.



TMDL Consistency:

The website highlights a page discussing "Nonpoint Source Pollution". This page illustrates how agriculture and straight pipes can contribute to the overall pollution problem. (EC/FC) This page also illustrates how a citizen can prevent non-point source pollution through planting riparian buffers along creeks. (SED)

Evaluation and Modification:

For Year Three, the County plans on redesigning the webpage to make it easier to find frequently requested items and make this BMP a more effective method of information distribution and outreach. In the redesign process, Roanoke County will look at the pages that are least viewed and utilize this information to determine if the content of some of the pages needs to be changed. Roanoke County plans to also re-evaluate the most viewed web pages on the stormwater website to maximize on their popularity and get more information on those pages.

Year	Webpage Views	Most Popular/Least Popular Page
2008 - 2009 (YEAR ONE)	21,035	(MP): STORMWATER MANAGEMENT HOMEPAGE (LP) : STORMWATER PROGRAMS DATABASE
2009 - 2010 (YEAR TWO)	6,084	(MP): STORMWATER MANAGEMENT HOMEPAGE (LP) : STORMWATER PROGRAMS DATABASE

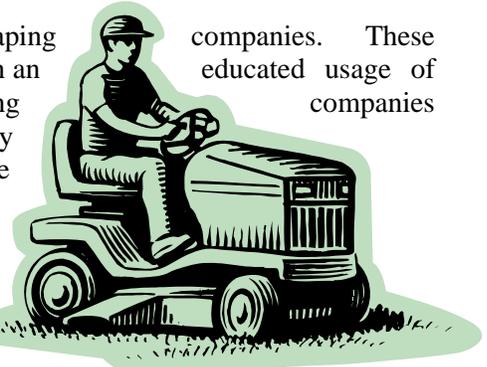
BMP 1-7: Business Education Program

Goal:

The goal of this program is to develop a stormwater quality education program for specific commercial businesses within the County of Roanoke to provide information to these businesses in an effort to increase business owner awareness of the impact of discharges into the County's storm sewer system. These education programs are directed toward groups of commercial, industrial, and institutional organizations that are most likely to have significant impacts to local stormwater quality. Target businesses will be chosen so that the awareness message can be specific and most effective.

Measurable Goals:

For Year Two, the businesses in our target group were local landscaping businesses can have a direct positive impact on local water quality with an fertilizers, landscaping, and grading. A letter was sent to **86** landscaping detailing how they may be able to enhance our local water quality by educating customers on enhancing natural waterways, using alternative lawn maintenance practices, and collecting and reusing rainwater. A copy of this letter and a list of the second year target businesses has been included in Appendix A.



companies. These educated usage of companies

TMDL Consistency:

The program targets local landscaping businesses by educating them on sediment run-off reduction, water quality protection and citizen education. This is done through proper riparian grading practices, reducing runoff and by water reuse and illustrating how they may be able to educate citizens on preventing non-point source pollution through planting riparian buffers along creeks. (SED)

Evaluation and Modification:

In this first annual period, Roanoke County successfully distributed letters to 86 commercial businesses as an educational item. The County finds this BMP to be effective and intends to continue to distribute letters to local commercial businesses as an educational item. To make this BMP more effective, Roanoke County intends to expand the number of target businesses in which to educate to continue to meet the goals of this permit.

Annual Period	Type of Educational Material	Target Group	Number of Businesses in Group
2008 - 2009 (YEAR ONE)	Stormwater Facility Information	Commercial Businesses Owning a Stormwater BMP	16
2009 - 2010 (YEAR TWO)	Improving Water Quality by Smart Landscaping	Local Landscaping Companies	86



MCM 2: Public Involvement and Participation

This minimum control measure is intended to implement a program that helps to inform and educate County residents about the Roanoke County Stormwater Program. Support from the citizens is critical for the success of the storm water management plan. To garner this support, the County has coordinated several programs to engage the citizen's interest in storm water quality. The BMP's that have been established to complete this measure are listed below:

BMP 2-1: Storm Drain Stenciling Program

Coordinate a storm drain stenciling program designed to engage group involvement and educate people about the consequences of dumping waste into the storm drain system.

BMP 2-2: Stormwater Public Event

Conduct a public event to bring attention to current stormwater issues and allow feedback from citizens on the condition of the County's stormwater program, from a citizen's point of view.

BMP 2-3: Stormwater Management Citizens Advisory Committee

Conduct a stormwater management program citizen's advisory committee to provide an approachable environment where ideas and concerns regarding the County's stormwater program may be shared and discussed. A member of the County's stormwater management team must be present.

BMP 2-4: Annual Report Posted on Stormwater Website for Citizens to View

Continue to post Roanoke County's Stormwater Discharge permit and annual report on the County's website for citizens to download and read.

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

BMP 2-1: Storm Drain Stenciling Program

Goal:

The goal of this program is to coordinate a storm drain stenciling program with local schools, neighborhoods, businesses, and other groups, to stencil messages on storm drains that educate people about the consequences of dumping waste into the storm drain system.



Measurable Goals:

In the second year of this permit cycle, the County hosted two storm drain stenciling events. The first event held at Hidden Valley Middle School and the second event occurred at Cave Spring Middle School, Cave Spring High School and Tanglewood Mall Parking Lot here in Roanoke County. The attendance for these events totaled 59 participants and they stenciled over sixty-five storm drains.

TMDL Consistency:

The storm drain stenciling program is an outreach method to inform and remind citizens that what goes into the storm drain goes directly to local creeks and streams. Roanoke County believes that when citizens understand that the storm drains are not treated by the sanitary sewer, they will be less likely to allow their pet waste or other non-stormwater waste to enter the storm drain through the road-side inlets. (EC/FC)

Evaluation and Modification:

The County finds this BMP to be an effective method of information distribution and outreach. The County proposes to continue to coordinate a storm drain stenciling program that will stencil storm drains within the County. By continuing to expand the areas being stenciled, the education and outreach value is enhanced.

Year	Storm Drains Stenciled	Attendance
2008 - 2009 (YEAR ONE)	-	26
2009 - 2010 (YEAR TWO)	+65	59

BMP 2-2: Stormwater Public Event

Goal:

At least once a year, Roanoke County will hold a public event to address stormwater issues, the County's progress towards storm water quality improvements and to receive input from the public on the County's Stormwater management program.

Measurable Goals:

On November 5, 2009 Roanoke County helped hold an Earth Summit where a panel of local water quality professionals could talk with 100 high school students and share their views on economic development, energy conservation, water protection and controlling storm water runoff. One hundred local high school students attended.

On October 3, 2009, Roanoke County sponsored the Fall Waterways Cleanup and Celebration and maintained a booth for the event. Roanoke County staff was available for questions and comments regarding our stormwater and water quality programs. Recent projects were listed at the booth, as well as tips for ways a resident can prevent negative water quality impacts in their home and property. Approximately 549 attended.



On March 26-28, 2010, Roanoke County maintained a booth at the Better Living Expo, held at the Salem Civic Center and presented by the Roanoke Regional Home Builders Association. At the Roanoke County booth, a poster was displayed that targeted the County's programs regarding water quality, stormwater drainage, and local stormwater improvements. Citizens were encouraged to ask questions and comment on our program.

On March 27th, 2010, Roanoke County held a Spring Clean-up Event and 38 people attended. Trash was picked up along the Mason's Creek banks adjacent to a County Facility. County employees were available for questions and comments on our stormwater program.

TMDL Consistency:

At least once a year, the County is involved in one or more public events that celebrate our commitment to regional water quality. Pet waste is a common theme at each of these events since it is such a regional water quality issue. (EC/FC)

Evaluation and Modification:

Based upon the attendance at these public events, Roanoke County finds this BMP to be an effective method of allowing the citizens to address issues and allowing the County to receive input from the public. No modifications are planned for this BMP.

Year	Public Event(s)	Attendance
2008 - 2009 (YEAR ONE)	PUBLIC MEETING, VOLUNTEER PLANTING DAY, BETTER LIVING EXPO, GARST MILL PARK CELEBRATION, FALL WATERWAYS CLEANUP	1,102
2009 - 2010 (YEAR TWO)	EARTH SUMMIT, BETTER LIVING EXPO, FALL WATERWAYS CLEANUP	687

BMP 2-3: Stormwater Management Citizens Advisory Committee

Goal:

The goal of this program is to establish a group of citizens that meet with local stormwater management officials to review ordinances, TMDL's, local projects, informational materials and educational components of the Stormwater Management program. This group will also provide an approachable environment where ideas and concerns regarding the County's stormwater program may be shared and discussed.

Measurable Goals:

Roanoke County has held three citizens advisory committee meetings this year, on August 26, 2009, May 24, 2010 and June 22, 2010. The meetings discussed the industrial stormwater permitting process, the future of stormwater in the region, local water quality projects, and covered the work of the stormwater educators in schools across the Roanoke Valley.

For the August 26th meeting, the speaker was Kip Foster, who discussed the role of Industrial Stormwater permits in the Roanoke River watershed. Kip covered what kind of activity constitutes the need for an industrial stormwater permit and discussed the PCB in Fish Tissue TMDL that was scheduled to be completed in the following months. Eleven of the twenty members of the committee attended.

For the May 24th meeting, the speaker was Dr. M. Rupert Cutler, a Roanoke City Council member and an environmental advocate for the natural resources of this valley. Dr. Cutler spoke about the problems with our waterways, some of the organizations that exist to help us clean up our waterways, and how the region should have better regional stormwater management. Seventeen of the twenty-four members of the committee attended.

TMDL Consistency:

During each of these citizen advisory committee meetings, topics are chosen that target specific issues that educate our committee members on local issues such as excess bacteria in our waterways (EC/FC) and ways to prevent and minimize the sediment loss to our streams (SED).

Evaluation and Modification:

Roanoke County proposes to continue this citizen's advisory committee. Based on the survey results, the citizens find this committee to be an effective method of allowing them to address issues and speak to the County. The County will continue to meet with the committee. The meetings will be on a quarterly basis and will meet four times a year.

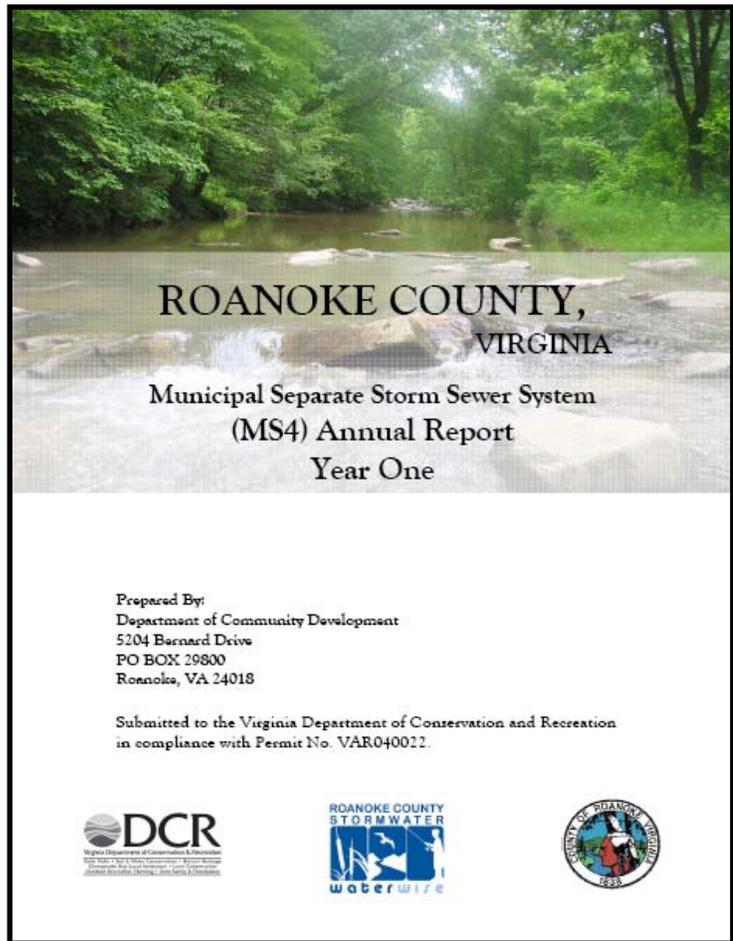
BMP 2-4: Annual Report Posted on Stormwater Website for Citizens to View

Goal:

The goal of this program is to post the Roanoke County's Municipal Separate Storm Sewer Program on the website where citizens may view and comment on it. This form of public viewing will allow citizens of Roanoke County to become knowledgeable about the goals of the program and have information with which to comment on existing issues and influence changes in future programs. Each annual report will be posted on the website to keep citizens current on annual evaluations of program effectiveness and proposed changes.

Measurable Goals:

The general registration statement was posted to the Roanoke County Stormwater website on December 3, 2008. This will continue to be available on the website until the five year permit period is complete on June 30, 2013. The first year annual report was posted to the website on October 9, 2009. Roanoke County has also made the Stormwater Program Plan and Year One annual reports available in hard copy at the Engineering front desk. No comments were received from the citizens regarding the Program Plan.



TMDL Consistency:

Access to our Stormwater Program Plan and Annual Reports gives Roanoke County Citizens a hefty education about all of the local streams and rivers, their impairments, and any approved TMDL's. In addition, the Program Plan and Annual Report details the efforts that the County is taking to address these issues. This will aid citizens on ways to get involved with current programs in addition to minimizing any impact that they may have to these areas of concern (EC/FC) & (SED).

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that these locations for viewing are successful in allowing interested citizens to become more familiar with the stormwater program.

Year	Items Posted to Website	Posted Date
2008 - 2009 (YEAR ONE)	GENERAL REGSITRATION STATEMENT	12/3/2008
2009 - 2010 (YEAR TWO)	ROANOKE COUNTY ANNUAL REPORT (YEAR ONE)	11/1/2009



MCM 3: Illicit Discharge Detection and Elimination

The goal of this minimum control measure is to develop, implement, and enforce a program to detect and eliminate illicit discharges to the storm sewer system. The BMP's that have been established to complete this measure are listed below:

BMP 3-1: Storm Drain Map

A County-wide Storm Sewer Map in the GIS database has been completed for all known locations of municipal storm sewer systems. The Roanoke County Storm Sewer Database will be maintained so that a map of all the public storm sewers in the County will be available to the public.

BMP 3-2: Illicit Discharge Ordinance

A Roanoke County Illicit Discharge Program will be established which will include policy, procedures, reporting, and enforcement measures for illicit discharges.

BMP 3-3: Illicit Discharge Program

Roanoke County will design and enforce an illicit discharge program to target and inspect areas of high risk potential for illicit connections.

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

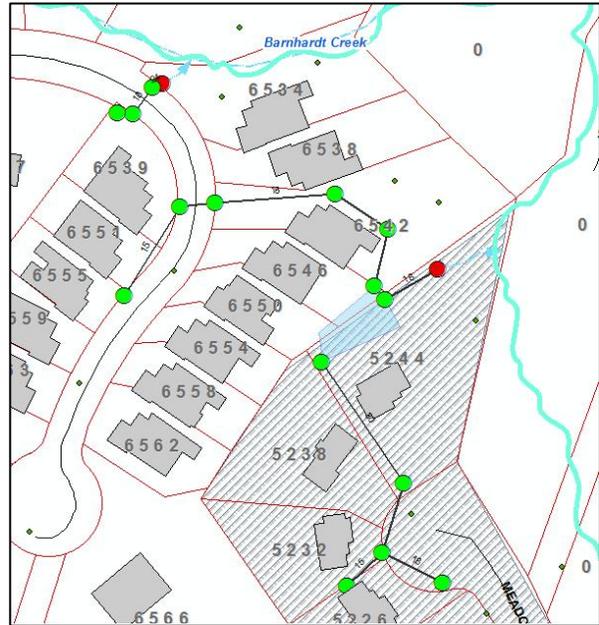
BMP 3-1: Storm Drain Map

Goal:

The goal of this program is to continue to develop a storm drain map which identifies all of the municipal separate storm sewers within the County of Roanoke which discharge to a natural drainage way.

Measurable Goals:

Roanoke County has continued this program by expanding and updating the storm sewer map of Roanoke County. In addition to locating any new storm sewer outfalls, the map has been updated to show the current outfalls and their associated Hydrologic Unit Code (HUC) of the waters that are being discharged to, the names and locations of all the impaired surface waters that receive discharges from these systems and the estimated acreage draining to the storm sewer outfall. This has been completed for **40%** of the known outfalls within the County. Two hundred twenty-four (224) new structures have been located. **One hundred and twenty three (128) outfalls have been analyzed. These have been analyzed for the corresponding HUC, impaired water, and drainage acreage.**



TMDL Consistency:

An updated and accurate storm drain map which identifies all of the municipal separate storm sewers will greatly aid Roanoke County in the discovery of illicit connections (EC/FC) and the locations where sediment may be entering the regulated MS4 (SED).

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that the process of mapping the storm drain is an appropriate method to aid in the enforcement, detection and elimination of illicit discharges to the storm sewer system.

Year	New Mapped Structures	Stormwater Facilities	Outfalls Mapped	% of Known Outfalls Completed
2008 - 2009 (YEAR ONE)	21	461	235	25%
2009 - 2010 (YEAR TWO)	224	511	128	40%

BMP 3-2: Illicit Discharge Ordinance

Goal:

To establish a program to detect and eliminate illicit discharges in to the Municipal Separate Storm Sewer System by developing and adopting regulations and an enforcement program to prevent illegal discharges into the storm drain system.

Measurable Goals:

Roanoke County has developed and evaluated the Illicit Discharge Ordinance and determined that is in compliance with current state regulations of the Virginia Department of Conservation and Recreation. Suitable measures for effective enforcement are included in the Illicit Discharge Ordinance.

TMDL Consistency:

An Illicit Discharge Ordinance will greatly aid in the enforcement of illicit discharges to the MS4 system. This legal method can aid the County in discontinuing existing connections and discouraging future illicit discharges to the system. (EC/FC)

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that the creation and evaluation of the Illicit Discharge Ordinance is an appropriate method to aid in the enforcement, detection and elimination of illicit discharges to the storm sewer system. New Stormwater regulations are in the process of being approved at the State level. As the State Stormwater standards change, our illicit discharge program will remain in compliance.



BMP 3-3: Illicit Discharge Program

Goal:

To develop, implement, and enforce a program to detect and eliminate illicit discharges, as defined at 4VAC50-60-10, into the regulated municipal separate storm sewer system. The Illicit Discharge Program will include the following components:

1. Procedures for locating priority areas likely to have illicit discharges.
2. Procedures for tracing the source of an illicit discharge.
3. Procedures for removing the source of the discharge.
4. Procedures for program evaluation and assessment.
5. Procedures for reporting discharges to the MS4.

Goals:	
Determination of Screening Factors	YEAR 1
Desktop Determination of Illicit Discharge Potential	YEAR 2
Begin Field Screening and Indicator Monitoring	YEAR 3
Continue Field Screening and Indicator Monitoring	YEAR 4

Measurable Goals:

Roanoke County has developed procedures to detect, address, and report illicit discharges that enter the municipal separate storm sewer system. The Illicit Discharge Ordinance (BMP 3-2) includes procedures to address illicit discharges through the enforcement process. In year one, Roanoke County determined the screening factors for high illicit discharge potential.

In year two, Roanoke County utilized the screening factors developed in year one to complete a desktop determination of illicit discharge potential. The areas highlighted in this desktop determination will be targeted for field screening and indicator monitoring for year three. These areas are illustrated on a map in Appendix C.

TMDL Consistency:

An Illicit Discharge Program will greatly aid in the location of illicit discharges to the MS4 system. This method can give staff the methodology needed to screen, target and monitor the storm drain system in the efforts to discover existing illegal connections to the municipal storm drain system. (EC/FC)

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that the Illicit Discharge Program is a critical component in the detection and elimination of illicit discharges to the storm sewer system.

Steps in Illicit Discharge Program	Schedule	Status
Determination of Screening Factors	YEAR 1	COMPLETE
Desktop Determination of Illicit Discharge Potential	YEAR 2	COMPLETE
Begin Field Screening and Indicator Monitoring	YEAR 3	
Continue Field Screening and Indicator Monitoring	YEAR 4	



MCM 4: Construction Site Stormwater Runoff Control

Roanoke County recognizes that construction sites can deposit significant amounts of silt and sediment in stormwater runoff due to the large areas of land disturbances. The goal of this minimum control measure is to implement and enforce a program that will reduce pollutants in stormwater runoff to the regulated municipal separate storm sewer system from construction activities. The BMP's that have been established to complete this measure are listed below:

BMP 4-1: Erosion and Sediment Control Ordinance

Establish and maintain an Erosion and Sediment Control Ordinance to require erosion and sediment control best management practices, as well as sanctions to ensure compliance, under local law for all land disturbances of 2,500 square feet or more.

BMP 4-2: Erosion and Sediment Control Certification

Identify County positions that require Erosion and Sediment Control training and track employees to ensure their training is received and updated.

BMP 4-3: Land Development Procedures Review and Evaluation

Develop and maintain procedures for site plan review which incorporate consideration of potential water quality impacts, flooding and erosion, and site inspection and enforcement procedures.

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

BMP 4-1: Erosion and Sediment Control Ordinance

Goal:

The goal of this BMP is to maintain an Erosion and Sediment Control Ordinance that will reduce pollutants in storm water runoff to the storm sewer system from construction activities. These regulations, included in the Erosion and Sediment Control Ordinance, require erosion and sediment controls as well as sanctions to ensure compliance under local law. This ordinance requires E&S controls for all land disturbances of 2,500 square feet or more and an engineered Erosion and Sediment Control Plan for any land disturbance greater than 10,000 square feet. The E&S Plan will require construction site operators to implement appropriate erosion and control best management practices specific to the site. Site inspection and enforcement actions are also incorporated into the County's Erosion and Sediment Control Ordinance.



Measurable Goals:

Roanoke County has evaluated the **Virginia Department of Conservation and Recreation, MS 1-18 Presentation** Erosion and Sediment Control Ordinance to keep it in compliance with any changes to regulations being made at the State level. No changes have been made in the past year on the state level, and the Roanoke County Erosion and Sediment Control Ordinance is still in compliance with the regulations set forth and enforced by the Virginia Department of Conservation and Recreation.

The County has had **313** regulated land-disturbing activities, and a total of **252** acres disturbed. The monthly count of land disturbing activities, both residential and commercial are shown in Appendix D.

TMDL Consistency:

This ordinance targets reducing sediment in stormwater runoff from construction sites. These regulations require erosion and sediment BMPs on the site as well as sanctions to ensure compliance, under local law. (SED)

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that the Erosion and Sediment Control Ordinance is a critical component in reducing pollutants in stormwater runoff to the regulated small municipal separate storm sewer system from construction activities. It is critical that it remain in compliance with the Virginia Erosion and Sediment Control Regulations.

Year	Action	Land Disturbances	Acres Disturbed
2008 - 2009 (YEAR ONE)	E & S Ordinance Reviewed No changes or modifications.	103	140
2009 - 2010 (YEAR TWO)	E & S Ordinance Reviewed No changes or modifications.	313	252

BMP 4-2: Erosion and Sediment Control Certification

Goal:

The goal of this BMP is to identify current Erosion and Sediment Control certified employees and develop a program for additional certifications and cross-training.

Measurable Goals:

Two county departments, Community Development, and Parks and Recreation were identified as having positions whose job responsibilities necessitate erosion and sediment control training and certification. Currently the county utilizes training and certification through the Department of Conservation and Recreation's Virginia Erosion and Sediment Control training and certification program. Additional employees hired into positions whose job responsibilities have already been determined as needing training in erosion and sediment control will be certified using this program. A table of the positions within each department, the employee(s) in the positions, and their level of certification can be found in Appendix D.

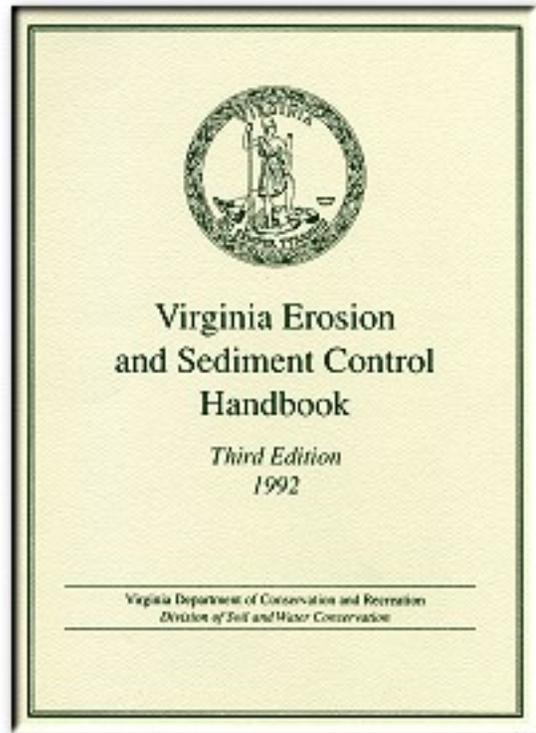
TMDL Consistency:

This program identifies County employees that need Erosion and Sediment Control training and tracks their certifications to determine if they have lapsed in their required training and certifications. This program minimizes County site erosion potential by educating our employees on correct E&S procedures and policy (SED).

Evaluation and Modification:

In examining the employee's job responsibilities and certifications, **one** position was identified as needed additional certification. This certification is scheduled to be completed in Year Three of the permit period, see Appendix D.

No modifications are planned for this BMP. Roanoke County believes that the certification of all County employees that could significantly impact erosion through land disturbance is a critical component in reducing pollutants in stormwater runoff.



BMP 4-3: Land Development Procedures Review and Evaluation

Goal:

The goal of this BMP is to ensure that the procedures for site plan review incorporate considerations for water quality impacts by addressing the most current local stormwater management regulations which are outlined in the Roanoke County Stormwater Management Ordinance.

Measurable Goals:

Roanoke County has evaluated the Land Development Procedures to keep them in compliance with any changes to the Roanoke County Stormwater Ordinance and Manual or to regulations being made at the State level. No changes have been made in the past year on the state level, and the Roanoke County Land Development Procedures are still in compliance with the regulations set forth and enforced by the Virginia Department of Conservation and Recreation.

TMDL Consistency:

The Land Development Procedures lists the steps needed for a site plan to meet the State and local Erosion and Sediment Control and permanent Stormwater requirements. Keeping these procedures in compliance with any changes at the state level guarantees that new site plans are reviewed by the County with the most current regulations available. This program minimizes erosion and flooding potential due to the benefit of an educated engineering design team and construction crew on all Roanoke County public and private land development sites. (SED)

Evaluation and Modification:

No modifications are planned for this BMP. Roanoke County believes that continuing the process in updating the Land Development Procedures is important to make sure that Roanoke County's site plan review is consistent with the most recent stormwater management regulations. As state stormwater management regulations change, the local ordinances must change, and keeping the Land Development Procedures up to date with our ordinances makes the procedures a useful tool to utilize when developing land.

Year	Action	Changes and Modifications
2008 - 2009 (YEAR ONE)	Land Development Procedures Reviewed	No changes or modifications.
2009 - 2010 (YEAR TWO)	Land Development Procedures Reviewed	No changes or modifications.



MCM 5: Post Construction Stormwater Management in New Development and Redevelopment

Roanoke County recognizes that addressing water quality in post construction runoff is an important way to prevent the deposition of sediment and other pollutants into our streams and rivers. The BMP's that have been established to complete this measure are listed below:

BMP 5-1: Stormwater Management Ordinance and Manual

Roanoke County has developed a Stormwater Management Ordinance and Design Manual which addresses storm water runoff from new development and redevelopment. This manual includes regulations and design standards for the design, construction, and maintenance of water quantity and quality best management practices.

BMP 5-2: Stormwater Management Facility Inspection Program

The County has developed a program to identify, track, and inspect all known permanent stormwater management facilities that discharge to the municipal storm sewer system.

BMP 5-3: Low Impact Development Utilization

The County will also encourage and track any developments to be designed utilizing low impact development principles.

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

BMP 5-1: Stormwater Management Ordinance and Manual

Goal:

The goal of this BMP is to adopt and enforce an ordinance and design manual that requires stormwater runoff to be addressed. These documents ensure that controls are in place that would prevent or minimize water quality and quantity impacts due to new development and redevelopment projects.

Measurable Goals:

Roanoke County began enforcing the Stormwater Management Ordinance and Manual on January 1, 2008. The Stormwater Management Ordinance regulates new development and redevelopment projects of 5,000 square feet and larger. The Stormwater Management Design Manual details structural and non-structural best management practices (BMPs) that are appropriate for this region. The Ordinance requires the designation of a responsible party who is legally bound to inspect and maintain the best management practices for the life of the BMP.

For year two, these documents have been evaluated to ensure continual compliance with the goals of this BMP and compliance with Federal and State Regulations. The Ordinance and Manual have been found to be consistent with State regulations and consistent with the prevention or minimization of water quality and quantity impacts.

TMDL Consistency:

This legal document and design manual targets reducing the quantity and improving the quality of stormwater runoff from new development, re-development, and existing developed areas. This manual and ordinance protects against erosion from stream banks, construction sites, developed areas, and re-developed areas. (SED)

Evaluation and Modification:

No changes are planned for this BMP. New State Stormwater Regulations are in the process of being approved. It is vital that Roanoke County continues to keep its local Stormwater Management standards in compliance with these new regulations.

Year	Action	Changes and Modifications
2008 - 2009 (YEAR ONE)	Stormwater Ordinance and Manual Reviewed	No changes or modifications.
2009 - 2010 (YEAR TWO)	Stormwater Ordinance and Manual Reviewed	No changes or modifications.

BMP 5-2: Stormwater Management Facility Inspection Program

Goal:

The goal of this BMP is to enforce procedures for the Stormwater Management Facility Inspection Program.

Measurable Goals:

In the first annual period, Roanoke County developed a Stormwater Management Facility Inspection Program and implemented the program. Background information, design plans, and contact information was gathered and the inspection program was begun. Currently Roanoke County has a total of 499 known permanent stormwater facilities.

In this second annual period, Roanoke County inspected 62 permanent stormwater facilities. For each inspected pond, the County determined the treated acreage, HUC, and downstream impaired water body. This information is included in Appendix E in table format.

TMDL Consistency:

This program ensures that all permanent stormwater facilities are adequately maintained and functioning properly. The proper function of these facilities is critical for flood protection and erosion prevention. (SED)

Evaluation and Modification:

Currently the County is on schedule with the Inspection Program and no changes are planned for this BMP.

Continuing to track and inspect permanent stormwater facilities is vital for the long-term success of the facilities and the prevention of the transport of sediment and other pollutants into our streams and rivers.



Year	Stormwater Facilities Inspected	Total Number of Stormwater Facilities
2008 - 2009 (YEAR ONE)	56	461
2009 - 2010 (YEAR TWO)	62	511

BMP 5-3: Low-Impact Development Utilization

Goal:

The goal of this BMP is to encourage and identify development projects that utilize Low Impact Development strategies.

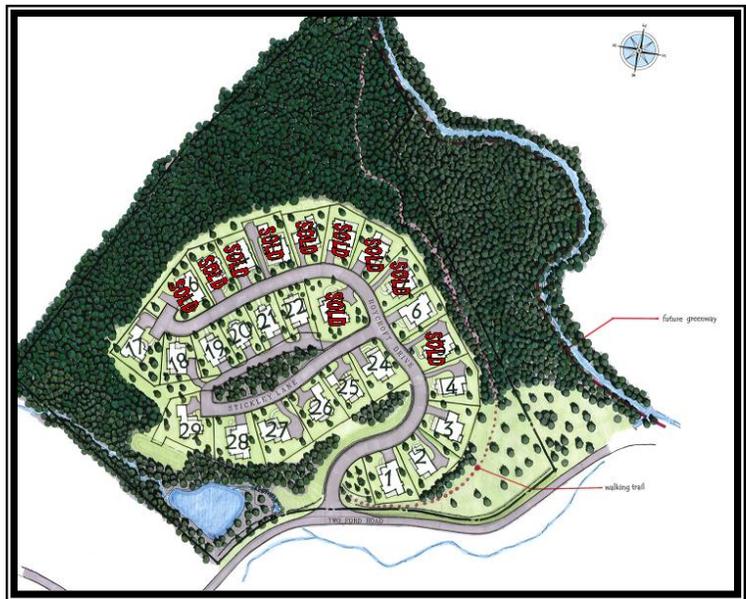
Measurable Goals:

In this annual period, Roanoke County has tracked the number of development projects and total acreage that has been developed using Low Impact Development principles for each HUC. One of the newest development projects to utilize LID strategies is called The Preserve at Two Ford. This sixteen acre parcel utilized pervious driveways, narrow streets, sensitive land conservation and dedicated 50% of the total subdivision land area to be dedicated to open space.

Roanoke County continues to encourage Low Impact Development practices to be used in conjunction with or in place of structural measures for the reduction of stormwater runoff. The County understands that Low Impact Development strategies will help to minimize the reliance on expensive structural practices that require ongoing maintenance to remain effective.

TMDL Consistency:

This program encourages development projects that utilize Low Impact Development strategies which is an important way to prevent the deposition of sediment and other pollutants into our streams and rivers. (SED)



Evaluation and Modification:

No changes are planned for this BMP. Roanoke County will continue to encourage Low Impact Development in its region. The County will also continue to track the number, size, and HUC of Low Impact Developments in the region. The use of Low Impact Development will help to minimize the reliance on expensive structural practices which is an important way to prevent the deposition of sediment and other pollutants into our streams and rivers.

Year	LID DEVELOPMENTS	SIZE	HUC
2008 - 2009 (YEAR ONE)	0		
2009 - 2010 (YEAR TWO)	1. THE PRESERVE AT TWO FORD ROAD	16.64 Ac	RU14



MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations

Roanoke County's goal for the pollution prevention and good housekeeping program is to reduce pollutant runoff from Roanoke County Municipal operations. To perform this measure, the County needs to continue to evaluate our facilities and also provide education and programs that will educate the County employees about pollution prevention and hazardous waste. The BMP's that have been established to complete this goal are listed below:

BMP 6-1: Spill Prevention and Control Plans

Roanoke County has developed Spill Prevention and Control Plans for all of its municipal facilities. These plans will be updated and annual training will be completed.

BMP 6-2: Household Hazardous Waste Event

Roanoke County will participate in Household Hazardous Waste Collection events to help citizens dispose of household materials that could be hazardous to dispose of in landfills.

BMP 6-3: Storm Sewer Maintenance Program

Roanoke County will continue to provide a program for the maintenance and upgrade of the regulated municipal storm sewer system.

BMP 6-4: Pollution Prevention and Hazardous Waste Training

Roanoke County will continue the pollution prevention and hazardous waste training for County employees, maintenance workers, and landscaping crews, and encourage additional pollution prevention training to be attained by County employees.

Included with this document is a detailed description of the objective and measurable goals of each BMP, the strategies to ensure consistency with local TMDL's, the status of the County's compliance with each BMP, and an evaluation of the BMP and any proposed modifications needed to better achieve the goals of the program. The TMDL compliance is broken down by impairment type: e. coli and fecal coliform (EC/FC) or sediment (SED).

BMP 6-1: Spill Prevention and Control Plans

Goal:

The goal of this BMP is to develop and update Spill Prevention and Control Plans for all of its municipal facilities. Each facility will be evaluated for the potential for illicit discharges from storage yards, outdoor storage areas, waste transfer stations, fleet or maintenance shops and other municipal facilities. The disposal method for waste materials will be evaluated. Soluble or erodible materials will be analyzed and protected from exposure to precipitation. The application of fertilizers will be examined to meet manufacturer's recommendations. Any operation that has potential to discharge material into the municipal separate storm sewer system will be examined for potential for unwanted discharge. These plans will be updated and annual training will be completed.

Measurable Goals

In the second year of this permit, Roanoke County inspected and evaluated existing Spill Prevention Plans to determine areas that need additional information. The County also determined what new facilities are in need of Spill Prevention Plans. A list of the facilities in need of an evaluation for potential of illicit discharge has also been included in the list. A copy of this evaluation list is included in Appendix F.

Roanoke County inspected **10** facilities, updated **4** existing Spill Prevention Plans, and determined that **one** new Spill Prevention Plan is needed. All contact information was verified and any changes to the facilities were noted.

TMDL Consistency:

This program minimizes the potential for pollution spills to enter the municipal storm drain system. Having updated Spill Prevention Plans will aid in the education of County Employees that are in areas with some risk of pollution spills. This program also expands to evaluate any new County facilities, so that all working municipal facilities are educated and protected (EC/FC).

Evaluation and Modification:

No changes are planned for this BMP. Roanoke County will continue to update existing Spill Prevention and Control Plans and develop new plans according to the schedule listed in Appendix F. This BMP is considered to be an effective method of evaluating and eliminating potential illicit discharges from Municipal facilities, and preventing spills from entering the MS4 from a County facility.

BMP 6-2: Household Hazardous Waste Event

Goal:

The goal of this BMP is to encourage and identify strategies and events to help citizens dispose of household materials that could be hazardous to dispose of in bulk landfills.

Measurable Goal

The County of Roanoke participated in eleven Household Hazardous Waste Collection events. In year two, Roanoke County increased the frequency of the events from a quarterly event to a monthly event. A total of 487 people participated in the Household Hazardous Waste Collection days this year and 264 of the participants were residents of Roanoke County. The waste that was collected consisted of oil, antifreeze, paint, aerosols, pesticides, gasoline, kerosene, hydrochloric acid, phosphoric acid, ammonia, batteries, strippers, cleaners, fluorescent bulbs, and mineral spirits.



Evaluation and Modification:

The participation for the Household Hazardous Waste events has fallen this year. In year two, the County had a 46% drop in attendance from the previous year. This may have been due to the change in location and frequency of the Hazardous Waste Events. Roanoke County plans to advertise these events to increase attendance. These events are an important way to keep these hazardous wastes from being disposed inappropriately into our streams and rivers.

Year	HHHW Events	Attendance
2008 - 2009 (YEAR ONE)	3	482
2009 - 2010 (YEAR TWO)	11	264

BMP 6-3: Storm Sewer Maintenance Program

Goal:

The goal of this BMP is to actively maintain the County's storm sewer system. Keeping the storm sewer system properly maintained is high on the County's priority list because it keeps the regulated storm sewer working as designed, minimizing the potential for flows to surcharge or surpass the capacity of the regulated storm sewer system. In addition, the maintenance crews also have the potential of discovering illicit connections and citing additional areas where hazardous waste may be entering the regulated storm sewer system.

Measureable Goals

The Stormwater Division of the Department of Community Development employs two stormwater construction and maintenance crews with a total of 7 men. These crews perform a large variety of duties including storm water pond maintenance, installation of pipes and structures, repair of damaged structures, emergency response to flooding problems and all other county storm drain system maintenance.

This year **54** projects were completed. A total of 14,420 labor hours were committed towards storm sewer system maintenance and improvements to the Municipal Storm Sewer System. The value of these improvements was estimated to be **\$241,600**.



TMDL Consistency:

This program is responsible for maintaining the regulated storm sewer system. This includes the improvement of eroding stream banks and channels. This program directly remediates existing areas where sediment is eroding and stabilizes the system, removing the input of sediment to the streams and channels (SED). This program also increases the potential for discovering illicit connections to the storm drain system (EC/FC).

Evaluation and Modification:

The total value of improvements has dropped by 64% from last year's value. This is primarily due to budget cuts during this past fiscal year. The program continues to maintain the County's stormwater system and has completed more projects than in the previous year. The program simply adjusted to the cuts by focusing on more less costly projects. For the third annual period, no changes are planned for this BMP. Roanoke County plans to continue to maintain the County's storm sewer system. This action of maintaining the storm drain system will keep it functioning properly and is an important opportunity to discover potential illicit connections to the storm drain system.

Year	Total Projects	Annual Period Improvement Value	Total in Improvements
2008 - 2009 (YEAR ONE)	24	\$661,800	\$661,800
2009 - 2010 (YEAR TWO)	54	\$241,600	\$903,400

BMP 6-4: Pollution Prevention and Hazardous Waste Training

Goal:

The goal of this BMP is to develop and maintain pollution prevention and hazardous waste training for County employees, grounds maintenance workers, and landscaping crews.

Measureable Goals

The County of Roanoke currently maintains basic hazardous waste training for employees in Fire and Rescue. The County’s Environmental Assessment Team (EAT) is a team responsible for establishing and maintaining the environmental management and ensures its conformance with state laws. The County’s EAT is also involved in specifying hazardous waste training for applicable positions within the County.

All County employees receive environmental awareness and management training. Human Resources ensures this training is delivered to all County full and part-time employees. The training includes: the County’s environmental policy and system to manage environmental resources, identification of potentially significant environmental impacts, environmental objectives and targets, and employee roles and environmental responsibilities. In this past year, eighty new employees received this training.

TMDL Consistency:

This program makes sure that all Fire and Rescue staff maintains basic hazardous waste training to prevent any mishandling of hazardous materials in ways that could be detrimental to the environment. This program is also responsible for educating County Employees on environmental awareness and management training. This effort targets every employee, whether they are in a high risk field or not about some good housekeeping practices. This program trains every County employee to be the eyes and ears of pollution prevention. This will increase the likelihood that any potentially hazardous situation will be brought to the attention of a supervisor and adequately addressed. (SED)

Evaluation and Modification:

Due to the economic recession in the State of Virginia, Roanoke County has hired fewer employees in the most recent years. Even with this decrease in new hires, Roanoke County still considers this BMP to be successful and proposes to continue this program. Roanoke County will continue the pollution prevention and environmental awareness training for all County employees and encourage additional pollution prevention training to be attained by County employees in grounds maintenance and landscaping areas.

Annual Period	Number of New Employees Trained	Total Employees Trained
2007 - 2008	141	
2008 - 2009 (YR1)	95	819
2009 - 2010 (YR2)	80	899