



ROANOKE COUNTY VIRGINIA

Municipal Separate Storm Sewer System (MS4) Program Plan

Updated January 2018

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Part I. Introduction to Stormwater in Roanoke County

BACKGROUND

According to the United States Environmental Protection Agency (US EPA), 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. Whether by overland flow or via stormwater systems, such as underground pipes, ditches, or open channels, polluted stormwater runoff is discharged into local receiving waters. Such untreated water pollution can result in the destruction of fish, wildlife, and aquatic life habitats; it can also cause a loss of aesthetic value, and can threaten public health due to its potential to contaminate food, drinking water supplies, and recreational waterways.



WHAT IS ROANOKE COUNTY DOING ABOUT STORMWATER POLLUTION?

The County of Roanoke is committed to continuing in the development, implementation, and enforcement of a Municipal Separate Storm Sewer System (MS4) Program, pursuant to the requirements of its MS4 permit (No. VAR040022). This program is designed to reduce the discharge of pollutants from the County's regulated MS4 area 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's stormwater management program includes elements that address six Minimum Control Measures (MCMs):

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands
6. Pollution Prevention and Good Housekeeping for Municipal Operations

When addressing these six MCMs, Roanoke County emphasizes the importance of lowering sediment, bacteria, and PCB discharges to the storm sewer system in accordance with the approved TMDLs within the County.

Roanoke County is committed to establishing and sustaining a comprehensive program to improve the quality of stormwater runoff for citizens within its boundaries and beyond; such commitment will continue over the permit term and well into the future.

A. *Roanoke County's Regulated MS4 Area*

Roanoke County is partially urbanized. As such, only the areas categorized as urban by the 2010 U.S. Bureau of the Census are included in the County's regulated MS4 area.

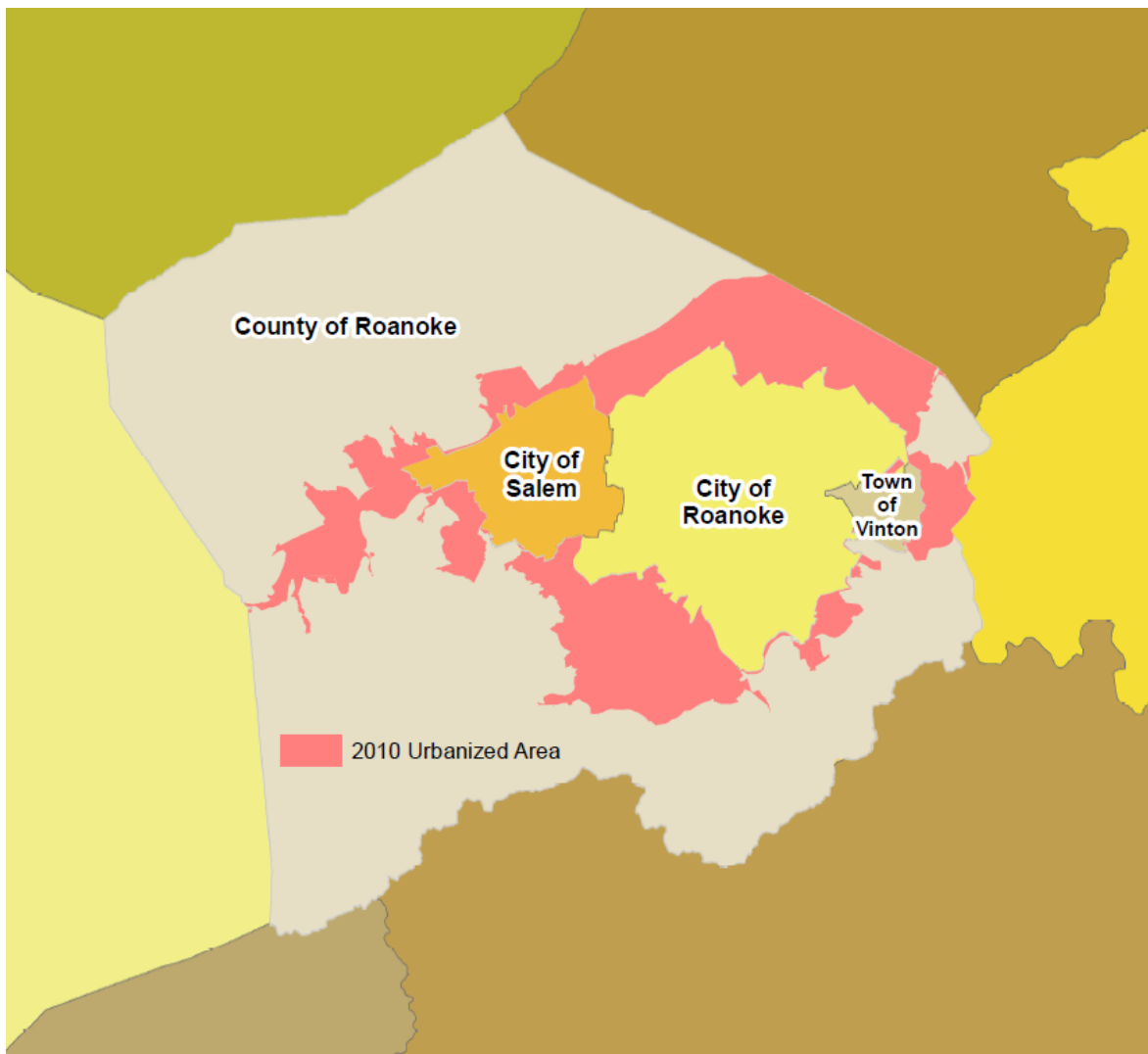


Figure 1: Roanoke County Urbanized Areas, as determined by the 2010 U.S. Census

B. Roanoke County's Physically-Interconnected MS4's

Roanoke County is located outside the limits of the City of Salem, the City of Roanoke, and the Town of Vinton; and adjacent to Botetourt County. All five localities are regulated small MS4's. The majority of Roanoke County's watersheds drain to the Roanoke River, which flows west-to-east through the Roanoke Valley, as shown in the map below. A portion of Roanoke County's runoff water drains north into the storm sewer regulated by Botetourt County. Additionally, most roads are maintained by VDOT, which is itself an MS4.

A letter has been sent to the City of Salem, the City of Roanoke, the Town of Vinton, Botetourt County, and VDOT notifying them of their interconnection to Roanoke County's MS4. A copy of each of these letters is provided in the Supporting Documents CD included with this report.

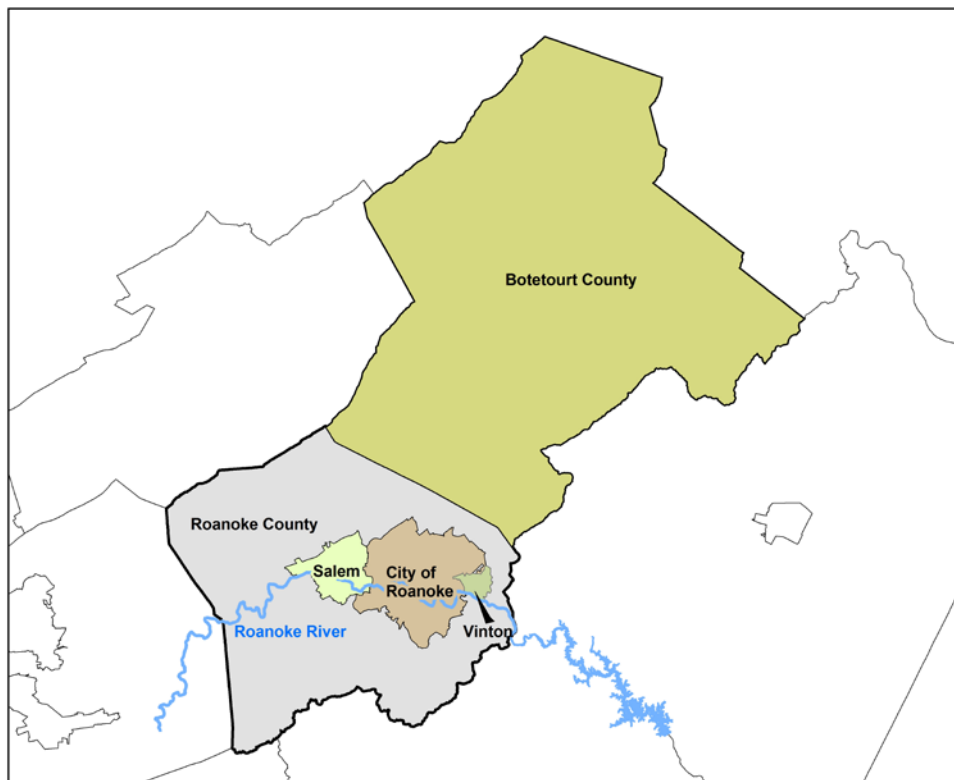


Figure 1: Map of Interconnected MS4's

C. Watershed Summary

Roanoke County is home to over 90,000 residents and occupies almost 250 square miles of land in the southwestern portion of Virginia along the western slopes of the Blue Ridge Mountains. The County contains the headwaters of many streams that flow to the Roanoke River. The Roanoke River flows in an easterly direction through the central part of Roanoke County, the neighboring City of Salem, City of Roanoke, and the Town of Vinton. Roanoke County's geography can be characterized as a mountainous region, complete with hilly terrain mixed with large valleys. Elevations range from over 3600 ft. to 900 ft. above sea level.

This section details a list of all known waters, currently located within the urbanized portion of the County, that receive discharges or that have the potential to receive discharges from the MS4 area. Table 1 lists the names of the waterways, the Hydrologic Unit Codes (HUCs), as identified in the most recent version of the Virginia's 6th Order National Watershed Boundary Dataset, the estimated drainage area in acres, served by the regulated small MS4 discharging to these surface waters, and the downstream impaired receiving waters into which the waterway directly discharges.



Following the table is a description of the approximate land use for each drainage area in Roanoke County that was studied in the 1997 Roanoke Valley Regional Stormwater Management Plan. In addition to the land use descriptions, there is a summary of all local Total Maximum Daily Load (TMDL) studies that have been completed and the appropriate wasteload allocations for Roanoke County, the regulated MS4.

Table 1
Roanoke County Watersheds, HUC's, Impaired Receiving Waters, and Drainage Areas

Watershed	HUC	Impaired Receiving Waters	MS-4 Urbanized Watershed Drainage Area (Acres)
Back Creek	RU15	Back Creek	3,750
Barnhardt Creek	RU14	Roanoke River	830
Big Bear Rock Branch	RU09	Roanoke River	1,039
Bowman Hollow	RU09	Roanoke River	162
Butt Hollow Creek	RU09	Roanoke River	499
Callahan Branch	RU09	Roanoke River	763
Carvin Creek	RU12	Carvin Creek	1,672
Cole Hollow Branch	RU09	Roanoke River	168
Cook Creek	RU13	Glade Creek	679
Cove Hollow	RU09	Roanoke River	4
Deer Branch	RU12	Carvin Creek	2,191
Dixie Caverns	RU09	Roanoke River	44
Dry Branch	RU09	Roanoke River	489
Dry Hollow	RU09	Roanoke River	221
Garnand Branch	RU14	Roanoke River	343
Gish Branch	RU10	Mason Creek	282
Glade Creek	RU13	Glade Creek	1,688
High School Branch	RU09	Roanoke River	46
Lick Run	RU13	Lick Run	328
Mason Creek	RU10	Mason Creek	357
Mill Branch	RU09	Roanoke River	80
Mill Creek	RU09	Roanoke River	461
Mudlick Creek	RU14	Mudlick Creek	3,995
Murray Run	RU14	Murray Run	798
Ore Branch	RU14	Ore Branch	883
Paint Bank Branch	RU09	Roanoke River	169
Peters Creek	RU14	Peters Creek	1,625
Roanoke River & Unnamed Tributaries	RU05, 09, 14&16	Roanoke River	2,101
Snyders Branch	RU09	Roanoke River	201
Stypes Branch	RU09	Roanoke River	267
Tinker Creek	RU11	Tinker Creek	2,687
Twelve O'Clock Branch	RU09	Roanoke River	557
West Dry Branch	RU09	Roanoke River	69
West Tinker Creek	RU13	Lick Run	141
Wolf Creek	RU14	Roanoke River	1,471

D. Descriptions of Land Use for Each Watershed Discharging to Impaired Receiving Waters

Back Creek:

The Back Creek watershed contains fourteen existing specific land uses, but three are more prevalent: woods, agricultural, and residential. Approximately 75% of the watershed is wooded; agricultural and residential areas comprise about 10% of the watershed. The remaining 5% of the watershed consists of pasture, brush, and open space. Back Creek has been listed as an Impaired Water (Category 4A) for E-coli..

Barnhardt Creek:

The Barnhardt Creek watershed is a 4.2 square mile drainage basin located in south central Roanoke County, southern Salem, and southwestern Roanoke City. The Barnhardt Creek watershed originates on Poor Mountain, at an elevation approximately 2700 feet above sea level, and flows in a northeasterly direction to its confluence with the Roanoke River at the boundary of the City of Salem and City of Roanoke.

The Barnhardt Creek watershed contains fifteen existing land uses, but four are more prevalent: woods, 1/2- acre residential lots, 1/4- acre residential lots, and open space. Approximately 50% of the watershed is comprised of wooded areas, especially in the upstream reaches of Barnhardt Creek. The 1/2- acre residential lots comprise close to 20% of the watershed. Open space and 1/4- acre residential lots each comprise about 10% of the watershed area. The remaining 10% of the watershed consists of agricultural, commercial, and residential areas of various densities. Barnhardt Creek discharges to the impaired receiving waters of the Roanoke River after it passes out of Roanoke County into the cities of Roanoke and Salem.

Barnhardt Creek has been listed as an Impaired Water (Category 5C) for pH and (Category (4A) for E-coli.

Big Bear Rock Branch:

The Big Bear Rock Branch watershed is a 2.1 square mile drainage basin located in west central Roanoke County. The Big Bear Rock Branch originates on Ft. Lewis Mountain, at an elevation approximately 3250 feet above sea level, and flows in a southeasterly direction to its confluence with the Roanoke River.

The Big Bear Rock Branch has four major land uses: woods, 1/3-, 1/2- and 2-acre residential, commercial, and industrial uses. Approximately 45% of the watershed is wooded areas, 30% is residential lots of various sizes, 20% is industrial businesses, and 5% is commercial. Big Bear Rock Branch directly discharges to the impaired receiving waters of the Roanoke River.

Bowman Hollow:

The Bowman Hollow watershed is a 2.3 square mile drainage basin located in south central Roanoke County and southern Salem. The Bowman Hollow watershed originates on Poor Mountain near Twelve O'clock Knob, at an approximate elevation of 2600 feet, and flows in a northeasterly direction until its confluence with the Roanoke River.

The Bowman Hollow watershed contains thirteen existing land uses, but four are more prevalent: woods, 1/2- acre residential lots, 1/4- acre residential lots, and open space. Approximately 50% of the watershed is comprised of wooded areas, especially in the upstream reaches of Bowman Hollow. The 1/2- acre residential lots comprise close to 20% of the watershed. Open space and 1/4- acre residential lots each comprise about 10% of the watershed area. The remaining 10% of the watershed consists of agricultural, commercial, and residential areas of various densities. After it passes out of Roanoke County and into the City of Salem, Bowman Hollow discharges to the impaired receiving waters of the Roanoke River.

Butt Hollow Creek:

The Butt Hollow Creek watershed is a 2.7 square mile drainage basin located in north central Roanoke County and western Salem. The Butt Hollow Creek watershed originates on Fort Lewis Mountain, at an elevation of 3260 feet above sea level, and flows southeasterly to its confluence with the Roanoke River.

The Butt Hollow Creek watershed contains ten existing land uses. Woods comprise approximately 80% of the watershed area. Residential areas of various densities comprise about 15% of the watershed. The remaining 5% of the watershed area contains agricultural, open space, and commercial uses. Butt Hollow Creek directly discharges to the impaired receiving waters of the Roanoke River.

Callahan Branch

The Callahan Branch watershed is a 3.4 square mile drainage basin located in west central Roanoke County and western Salem. The Callahan Branch watershed originates on Fort Lewis Mountain, at an elevation of 3000 feet above sea level, and flows southeasterly to its confluence with the Roanoke River.

The Callahan Branch watershed contains six predominate land uses 33% is mixed residential, 25% commercial, 25% wooded, 10% industrial, and the remaining 10% of the watershed area is impervious area and open space. Callahan Branch directly discharges to the impaired receiving waters of the Roanoke River.

Carvin Creek:

The Carvin Creek watershed is a 28 square mile drainage basin located in northeast Roanoke County, northern Roanoke City, and the northern part of the watershed is located

in Botetourt County. The watershed originates on Tinker Mountain, at an approximate elevation of 3200 feet above sea level, and flows northeast to the Carvin Cove Reservoir, which is a public supply for drinking water. The creek then flows southeast to its confluence with Tinker Creek.

Two streams drain the Carvin Creek watershed, West Fork Carvin Creek and Deer Branch. The **West Fork Carvin Creek** sub-watershed is primarily undeveloped but has some development consisting of residential ¼-acre lots and commercial uses. The **Deer Branch** sub-watershed is has residential development (mostly ¼-acre lots) and some commercial and wooded areas.

The Carvin Creek watershed, as a whole, contains fifteen land uses, but only five major land uses: woods, agriculture and pasture, open water, ¼-acre residential lots, and commercial. Approximately 75% of the watershed is wooded, 10% is residential, 5% of the watershed is pasture, 5% is open water, and 5% is commercial. Carvin Creek has a wasteload allocation for E-coli from a TMDL report that was completed in 2004.

Cole Hollow Branch:

The Cole Hollow Branch watershed is a 5.9 square mile drainage basin located in north central Roanoke County, with the southern portion of the watershed located in the City of Salem. Cole Hollow Branch originates on Ft. Lewis Mountain, at an approximate elevation of 3020 feet above sea level, and flows south to its confluence with the Roanoke River. There is only one significant stream that drains the Cole Hollow Branch watershed: **Paint Bank Branch**. This stream also originates on Ft. Lewis Mountain and its sub-watershed is primarily undeveloped.

The Cole Hollow Branch watershed contains several specific land uses, but five major uses: woods, open areas, residential areas, agriculture, and commercial development. Approximately 70% of the watershed is woods and open areas, 20% of the watershed is residential development, 5% is agriculture, and 5% is commercial. Cole Hollow Branch discharges to the impaired receiving waters of the Roanoke River after it passes out of Roanoke County into the City of Salem.

Cove Hollow:

The Cove Hollow watershed is a 3.3 square mile drainage basin located in the western part of Roanoke County. Cove Hollow originates on Poor Mountain, at an approximate elevation of 3100 feet above sea level, and flows north to its confluence with the Roanoke River.

Dry Branch:

The Dry Branch watershed is a 4.5 square mile drainage basin located primarily in north central Roanoke County and the southern portion of the watershed is located in northern

Salem City. Dry Branch originates on Ft. Lewis Mountain, at an approximate elevation of 2900 feet, and flows southeasterly to its confluence with the Roanoke River.

The Dry Branch watershed contains eight land uses, but only 2 major uses: woods and 1/4-acre residential lots. Approximately 75% of the watershed is comprised of wooded areas. The 1/4-acre residential lots comprise approximately 10% of the watershed. The remaining 15% of the watershed consists of open space, commercial, agricultural and residential areas of various densities. Dry Branch directly discharges to the impaired receiving waters of the Roanoke River.

Dry Hollow:

The Dry Hollow watershed is a 3.96 square mile drainage basin located in the western part of Roanoke County. Dry Hollow originates on Poor Mountain, at an approximate elevation of 3200 feet above sea level, and flows north to its confluence with the Roanoke River.

Garnand Branch:

The Garnand Branch watershed is a 3.2 square mile drainage basin located in the Garden City area of Roanoke City and the Mount Pleasant area of Roanoke County. Garnand Branch originates in Garden City and flows north to its confluence with the Roanoke River at the base of Mill Mountain in the City of Roanoke.

Gish Branch:

The Gish Branch watershed is a 2 square mile drainage basin located in north central Roanoke County and the City of Salem. The watershed originates on Ft. Lewis Mountain, at an elevation of 3080 feet, and flows in a southeasterly direction until its confluence with Mason Creek.

The Gish Branch watershed contains eight existing land uses, but 2 predominate: woods and commercial areas. Approximately 60% of the Gish Branch watershed is comprised of wooded areas, especially in the upstream sub-basins of Gish Branch. Commercial development comprises 20% of the watershed. The remaining 20% consists of agricultural, open space, paved areas, and residential areas of various densities. Gish Branch discharges to the impaired receiving waters of Mason Creek after it passes out of Roanoke County into the City of Salem.

Glade Creek:

The Glade Creek watershed is a 33 square mile drainage basin located in northeast Roanoke County, northeast Roanoke City, and northwest Vinton; it also stretches into Botetourt County. Glade Creek originates in the Blue Ridge Mountains near Curry Gap and flows southwesterly until its confluence with Tinker Creek. **Cook Creek** is a tributary on the northwestern reach of Glade Creek.

The Glade Creek watershed contains fifteen land uses, but the four major ones are: woods, agriculture, ½-acre and ¼-acre residential lots, and commercial development. Approximately 50% of the watershed consists of wooded areas, 20% is agriculture, 15% is residential, and 5% is commercial. The remaining 10% of the watershed consists of pasture, brush, industrial development, and open space. Glade Creek has a wasteload allocation for E-coli from a TMDL report that was completed in 2004.

High School Branch:

The High School Branch watershed is a 1.8 square mile drainage basin located in the western part of Roanoke County and the City of Salem. High School Branch originates on Little Brushy Mountain, at an approximate elevation of 1400 feet above sea level, in Roanoke County and flows south to its confluence with the Roanoke River in the City of Salem.

Lick Run:

The Lick Run watershed is a 7.8 mile drainage basin located in north central Roanoke County and Roanoke City. The Lick Run watershed originates at the intersection of Interstate 81 and U.S. Route 11. Lick Run flows southeasterly until its confluence with Tinker Creek.

The Lick Run watershed contains thirteen land uses, but the six major land use types are: 1/4- acre residential lots, open space, industrial development, agriculture, commercial, and paved areas. Approximately 25% of the watershed is comprised of 1/4- acre lots. Open space comprises 20% of the watershed. Industrial and agriculture each comprise about 15% of the watershed. Commercial and paved areas each comprise about 10% of the watershed. The remaining 5% of the watershed includes residential areas of various densities, railroad yards, and wooded areas. Lick Run has a wasteload allocation for E-coli from a TMDL report that was completed in 2004.

Mason Creek:

The Mason Creek watershed is a 29.6 square mile drainage basin located in north central Roanoke County, eastern Salem, and western Roanoke City. The Mason Creek watershed originates on Ft. Lewis Mountain, at an elevation of 3260 feet, and flows in a northeasterly direction to Masons Cove, where it turns and flows southeasterly to its confluence with the Roanoke River. Mason Creek has two significant streams that drain the watershed, **Gish Branch** and **Jumping Run**.

Mason Creek watershed consists of 14 different land uses. The most predominant one is wooded area, which comprises 80% of the watershed. Approximately 10% of the land use is residential development of various densities, and the remaining 10% is open space, commercial or agriculture areas. Mason Creek has been listed as an Impaired Water (Category 5A) for Benthic, and (Category 4A) for E-coli; and has a wasteload allocation for PCBs from a TMDL report completed in 2010.

Mill Branch:

The Mill Branch watershed is a 1.1 square mile drainage basin located in the western part of Roanoke County. Mill Branch originates near the foot of Poor Mountain, at an approximate elevation of 1700 feet above sea level, and flows north to its confluence with the Roanoke River.

Mill Creek:

The Mill Creek watershed is a 1 square mile drainage basin located in the western part of Roanoke County. Mill Creek originates near the bottom of Twelve o'clock Knob, at an approximate elevation of 1600 feet above sea level, and flows north to its confluence with the Roanoke River.

Mudlick Creek:

Mudlick Creek is a 9.6 square mile drainage basin located in east central Roanoke County and southeast Roanoke City. The basin originates on Long Ridge near Poor Mountain, at an elevation of approximately 2300 feet, and flows in a southeasterly direction until its confluence with the Roanoke River. There are two significant streams that drain the Mudlick Creek watershed: **West Mudlick Creek** and **Murdock Creek**.

The Mudlick Creek watershed contains 13 distinct land uses, but only four major uses: woods, agriculture, 1/3- and 1/4- acre residential and commercial lots. The woodland areas cover 25% of the watershed. The 1/4- acre residential areas consist of 50% of the entire watershed and 5% of the watershed is used for agricultural, 5% for commercial, and 5% for 1/3- acre residential lots. The remaining 10% of the watershed consists of pasture, brush, open space, paved areas, and 1/8-, 1/2-, 1-, and 2-acre residential lots. Mudlick Creek has been listed as an Impaired Water (Category 5A) for Benthic, and (Category 4A) for E-coli.

Murray Run:

The Murray Run watershed is a 2.9 square mile drainage basin mostly located in south central Roanoke County and southeast Roanoke City. The watershed originates south of Roanoke City and north of Starkey, at an elevation approximately 1400 feet, and flows in a northeasterly direction until its confluence with the Roanoke River.

The Murray Run watershed consists of 10 specific land uses, with 6 major uses: 1/4-, 1/3- and 1/8-acre residential lots, woods, open space, and commercial development. Approximately 40% of the watershed is comprised of 1/4-acre residential lots. The rest of the watershed consists of the following: 10% for 1/3-acre lots, 10% for 1/8-acre residential lots, 10% for wooded areas, 10% for open space and 10% for commercial development. The remaining 10% of the watershed consists of industrial development, paved areas, 1/2-acre residential lots, and brush.

Murray Run has been listed as an Impaired Water (Category 5A) for Benthic, and (Category 4A) for E-coli.

Ore Branch:

The Ore Branch watershed is a 4.1 square mile drainage basin mostly located in south central Roanoke County and south central Roanoke City. The watershed originates south of Roanoke City near Chestnut, at an elevation of 1700 feet, and flows northeasterly until its confluence with the Roanoke River.

The Ore Branch watershed contains fourteen different land uses, but four are predominant: woods, commercial development, 1/4- acre, and 1/2- acre residential lots. Approximately 30% of the watershed is comprised of wooded areas. Commercial areas comprise approximately 20% of the watershed. Together, 1/4- and 1/2- acre residential lots comprise approximately 30% of the watershed. One Eighth- acre residential lots comprise 5%, 1/3- acre residential lots comprise 5%, and paved areas comprise 5% of the watershed. The remaining 5% of the watershed consists of open space and 1 acre lots. Ore Branch has a wasteload allocation for E-coli from a TMDL report that was completed in 2006.

Peters Creek:

The Peters Creek watershed is a 9 square mile drainage basin located in central Roanoke County, northwest Roanoke City and northeast Salem. The watershed originates on Brushy , at an elevation of approximately 2380 feet, and flows in a southeasterly direction to its confluence with the Roanoke River. There are three significant streams in Roanoke County that drain the Peters Creek watershed: Peters Creek Tributaries A, B, and C.

The Peters Creek watershed contains fourteen different land uses, only two of which predominate: 1/4- acre lots and woods. Approximately 40% of the Peters Creek watershed consists of 1/4-acre residential lots. Wooded areas comprise approximately 35% of the watershed. Agricultural, commercial, open space, and paved areas each comprise 5% of the watershed. The remaining 5% of the watershed is a combination of brush, industrial areas, and 1- and 2-acre residential lots. Peters Creek has been listed as an Impaired Water (Category 4A) for E-coli and has a waste load allocation for PCBs from a TMDL Report that was completed in 2010.

Snyders Branch:

The Snyders Branch watershed is a 2.9 square mile drainage basin located in the western part of Roanoke County. Snyders Branch originates north of Interstate 81, at an approximate elevation of 1600 feet above sea level, and flows south through the City of Salem to its confluence with the Roanoke River.

Stypes Branch:

The Stypes Branch watershed is a 3.5 square mile drainage basin located in the Glenvar area of Roanoke County. Stypes Branch originates on Fort Lewis Mountain, at an

approximate elevation of 2700 feet above sea level, and flows south to its confluence with the Roanoke River.

Tinker Creek:

The Tinker Creek watershed is a 112 square mile watershed located in northeast Roanoke County, northeast Roanoke City, northwest Vinton, and southeast Botetourt County. The Tinker Creek watershed originates on Tinker Mountain near Mt. Union, at an elevation of approximately 2400 feet, and flows in a southerly direction until its confluence with the Roanoke River. There are four significant streams that drain the Tinker Creek watershed: **Carvin Creek, Glade Creek, West Tinker Creek, and Lick Run.**

The Tinker Creek watershed consists of sixteen existing land uses but only 3 predominate: woods, agriculture, and 1/4- acre residential lots. Approximately 50% of the watershed is wooded. Agricultural land use comprises approximately 25% of the watershed. Approximately 10% of the watershed is comprised of 1/4- acre residential lots. The remaining 15% of the watershed consists of mainly open space, commercial areas, 1/2- acre residential lots, and industrial areas. Tinker Creek has been listed as an impaired water (Category 5A) for Benthic, (Category 5C) for temperature; and has a TMDL wasteload allocation for E-coli from a TMDL report completed in 2004, and a wasteload allocation for PCBs from a TMDL report completed in 2010.

Twelve O’Clock Branch:

The Twelve O’Clock Branch watershed is a 1.7 square mile drainage basin located along the western City of Salem/Roanoke County Boundary. Twelve O’Clock Branch originates near Twelve O’Clock Knob, at an approximate elevation of 2200 feet above sea level, and flows north through the City of Salem to its confluence with the Roanoke River.

West Dry Branch:

The West Dry Branch watershed is a 5 square mile drainage basin located in the western part of Roanoke County. West Dry Branch originates on Poor Mountain, at an approximate elevation of 2600 feet above sea level, and flows north to its confluence with the Roanoke River.

Wolf Creek:

The Wolf Creek watershed is a 4.9 square mile drainage basin located in eastern Roanoke County and east Vinton. The Wolf Creek basin originates in the Blue Ridge Mountains at Stewart Knob, at an approximate elevation of 2435 feet, and flows in a southwesterly direction until its confluence with the Roanoke River.

The Wolf Creek watershed contains eleven land uses, but only 5 predominate: woods, agriculture, and 1/2-, 1/3-, and 1/4-acre residential lots. Approximately 40% of the

watershed is comprised of wooded areas, 20% is agricultural, and 25% is 1/4-acre residential. One half- and 1/3-acre residential land uses each comprise about 5% of the watershed. The remaining 5% of the watershed consists of the other 6 land uses: pasture, commercial, open space, 1- and 2- acre residential, and paved areas. Wolf Creek directly discharges to the impaired receiving waters of the Roanoke River.

Wolf Creek has a wasteload allocation for PCBs from a TMDL report completed in 2010.

Following, in Table 2, is a listing of all current wasteload allocations for Roanoke County.

Table 2
Wasteload Allocations for Roanoke County Watersheds with Completed TMDL's

TMDL Waterways and Impaired Tributaries*	Year Completed	Parameter	WLA
<i>Tinker Creek Watershed</i>	2004	E. Coli	
Carvin Creek			4.07E+12 (colony forming units/yr)
Glade Creek			8.02E+10 (colony forming units/yr)
Lick Run			3.29E+09 (colony forming units/yr)
Tinker Creek			5.36E+11 (colony forming units/yr)
<i>Roanoke River Watershed</i>	2006	E. Coli	
Ore Branch			1.07E+09 (colony forming units/yr)
Roanoke River			2.84E+11 (colony forming units/yr)
<i>Roanoke River Watershed</i>	2006	Sediment	
Roanoke River			1,823 (tons/yr)
<i>Roanoke River Watershed</i>	2009	PCBs	
Roanoke River			47.9 (mg/yr)
Masons Creek			0.1 (mg/yr)
Peters Creek			4.7 (mg/yr)
Tinker Creek			38.4 (mg/yr)
Wolf Creek			10 (mg/yr)
Unnamed Tributary to Roanoke River			0.5 (mg/yr)

*This information is based upon DEQ's list of approved and draft TMDL's at <http://www.deq.state.va.us/tmdl/develop.html> for streams located within the urbanized portion of Roanoke County, as defined by the 2010 U.S. Census.

E. Schedule to Update Roanoke County MS-4 Program Plan

This Program Plan, revised July 1, 2014, contains updates as required by the 2013 General Permit for Discharges of Stormwater from Small MS-4s. Roanoke County intends to continue to update its MS4 Program Plan as required by Table 1 of the 2013 General Permit for Discharges of Stormwater from Small MS-4s.

F. Inter-Jurisdictional Cooperation

Roanoke County regularly meets with Roanoke and Salem Cities, and the Town of Vinton to discuss our common water quality issues and to coordinate our MS4 activities to the extent that is appropriate.

Roanoke City, Vinton, and Roanoke County have jointly contracted with a local non-profit organization (Clean Valley Council (CVC)) to provide region-wide education and outreach programs. See the contract with CVC in the Supporting Documents (CD).

Part II. Minimum Control Measures for Stormwater Quality

The following Minimum Control Measures (MCMs) describe the actions that Roanoke County intends to use to develop, implement, and enforce its MS4 Program, which are all designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practical (MEP). The measures will also be employed to protect water quality and comply with the current water quality standards and requirements determined by the Clean Water Act and its attendant regulations.

MCM 1: Public Education and Outreach on Stormwater Impacts

MCM 2: Public Involvement and Participation

MCM 3: Illicit Discharge Detection and Elimination

MCM 4: Construction Site Stormwater Runoff Control

MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands

MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations

TMDL: Special Conditions for Approved TMDLs other than Chesapeake Bay

This Plan has been revised in accordance with the General Permit requirements. Items in italics are required to be completed by the end of permit year 1. Other requirements are due as noted.

MCM 1 - As required by Section II B 1 of the General Permit,

1. *Revise Public Education and Outreach Plan*
 - a. *Identify 3 high-priority water quality issues.*
 - b. *Identify and estimate the population size of target audiences for each high-priority water quality issue.*
 - c. *Develop relevant messages and associated outreach strategies to reach target audiences.*
 - d. *Provide for public participation during public education and outreach program development.*
 - e. *Annually conduct sufficient education and outreach activities to reach 20% of each target audience.*

MCM-2 – As required by Section II B 2 of the General Permit

1. *Increase the number of public events from one per year to four per year.*

MCM 3 – As required in Section II B 3 of the General Permit,

1. *Provide written Illicit Discharge Detection and Elimination Procedures.*
 - a. *The Program Plan includes all procedures developed by the operator to detect, identify, and address non-stormwater discharges to the MS4.*

MCM 5 – As required in Section II B 5 of the General Permit,

1. *Individual Residential Lot Criteria*

- a. *The County may develop and utilize strategies other than maintenance agreements, such as periodic inspections, homeowner outreach and education, and other methods targeted at promoting the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual residential lot.*
2. *Stormwater Management Inspection Procedures.*
 - a. *A list of the applicable legal authorities to ensure compliance with post-construction stormwater management in new development and development on prior developed lands.*
 - b. *Written policies and procedures utilized in conducting design reviews.*
 - c. *Written inspection policies and procedures utilized in conducting inspections.*
 - d. *Written procedures for inspection, compliance and enforcement to ensure maintenance is conducted on private stormwater facilities.*
 - e. *Written procedures for inspection and maintenance of County owned stormwater facilities.*
 - f. *Roles and responsibilities of each of the County's departments in implementing requirements associated with post-construction stormwater management in new development and development on prior developed lands.*
3. *Progressive Compliance and Enforcement*
 - a. *By the end of permit year 2, the County may develop a written progressive compliance and enforcement policy.*

MCM 6 – As required in Section II B 6 of the General Permit,

1. *Stormwater Pollution Prevention Plans (SWPPPs)*
 - a. *Identify all municipal high-priority facilities.*
 - b. *Identify which of the municipal high-priority facilities have a high potential for discharging pollutants.*
 - c. *By the end of permit year 4, prepare and implement SWPPPs for each municipal high-priority facility that has a high potential for discharging pollutants.*
 - d. *Keep each SWPPP updated and utilize as part of staff training.*
2. *Nutrient Management Plan*
 - a. *Identify all lands of 1 acre or more where nutrients are applied.*
 - b. *By the end of permit year 2, 15% of identified acreage must be covered by a Nutrient Management Plan.*
 - c. *By the end of permit year 3, 40% of identified acreage must be covered by a Nutrient Management Plan.*
 - d. *By the end of permit year 4, 75% of identified acreage must be covered by a Nutrient Management Plan.*
 - e. *By the end of permit year 5, 100% of identified acreage must be covered by a Nutrient Management Plan.*
3. *Training Schedule and Program*

- a. *Annual written training plan.*
 4. *Daily Good Housekeeping Procedures*
 - a. *By the end of permit year 2, develop and implement written procedures to minimize or prevent pollutant discharge from daily operations such as road, street, and parking lot maintenance; equipment maintenance; and the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers.*

TMDL – As required in Section I B of the General Permit

1. *By the end of permit year 2, develop updated TMDL Action Plans for Sediment and E-coli.*
2. *By the end of permit year 3, develop updated TMDL Action Plan for PCBs.*



MCM 1: Public Education and Outreach on Stormwater Impacts

This minimum control measure is intended to implement a public education program, which includes the distribution of educational materials to the community and various outreach activities designed to inform citizens about the impacts of polluted stormwater discharges on water bodies. These measures outline the steps that the public can take to reduce pollutants in stormwater runoff. The BMPs developed by the County to meet these educational and outreach goals are listed below:

BMP 1-1: Educational Programs Review

Update and distribute a comprehensive review of existing stormwater educational programs available to Roanoke County and the Roanoke Valley area. Revised to coordinate with BMP 1-5.

BMP 1-2: Roanoke County Stormwater Informational Mailer

Develop and distribute a Roanoke County Stormwater Informational Mailer to Roanoke County Residents. Revised to coordinate with BMP 1-5.

BMP 1-3: Stream Monitoring and Education

Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County residents.

BMP 1-4: Stormwater Education Program

Develop and implement a stormwater educational program for Roanoke County school age children. Different programs will target appropriate grade levels. Revised to coordinate with BMP 1-5.

BMP 1-5: Stormwater Public Awareness Program

Develop and implement a Stormwater Public Awareness Program that includes the distribution of stormwater merchandise, public service announcements, and other high visibility educational media.

This program has been revised by identifying at least 3 High Priority Water Quality Issues and their respective Target Audiences; and development of appropriate messages and media to target these issues and audiences.

BMP 1-6: Roanoke County Stormwater Webpage

Maintain and expand a Roanoke County Stormwater webpage that informs the public about water quality, community-based outreach and local projects. Revised to coordinate with BMP 1-5.

BMP 1-7*: Targeted Education Program

Implement a stormwater quality education program for specific target audiences. Revised to coordinate with BMP 1-5.

***Note – BMP 1-7 has been renamed from “Business Education Program” to Targeted Education Program to reflect activities that are aimed at Targeted Audiences that are identified by BMP 1-5.**

This report provides a detailed description of each BMP, the objective, the measurable goals and implementation schedules, the responsible parties, and all County supporting documents.

BMP 1-1: Educational Programs Review

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. The target audiences and messages shall be coordinated with BMP 1-5.

Responsible Party:

Department of Community Development, in conjunction with Clean Valley Council (CVC).

Schedule and Evaluation

Roanoke County will continue to maintain and update this stormwater programs database. The database will continue to document 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 will be made accessible through Roanoke County's and CVC's websites and will include instructions on accessing these educational materials.

At the end of each annual period, the County will analyze website usage to determine the most effective format in which to distribute the list of programs. In addition, the County will distribute theme-specific program lists and relevant handouts to libraries, schools, or public organizations. The County will submit a copy of this database, documentation of the number of visits, and provide the website where the stormwater programs database can be found.

Supporting Documents:

Clean Valley Council Cooperative Agreement

Measurable Goals:

Success for this BMP will be measured by tracking website usage, and documentation of the numbers of program lists distributed.

Items to be reported in the Annual Report:

Listing of documents available in the database, documentation of number of visits, and website address. Evaluation and modifications to this BMP based on results of analysis of the measurable goals.

BMP 1-2: Roanoke County Stormwater Informational Mailer

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 and beyond about local stormwater issues. The mailer will be designed as a regional document and may touch on the County's Stormwater Program, general stormwater quality education, updates on local impaired water bodies, and TMDL's. The mailer will be designed as a regional document based on the unique issues and concerns for the Roanoke River Watershed. The messages for the mailer will be coordinated with the high-priority water quality issues identified in BMP 1-5.

Responsible Party:

Department of Community Development, in cooperation with Department of Parks, Recreation and Tourism.

Schedule and Evaluation:

Roanoke County proposes to continue to educate residents on the County's Stormwater Program through informational mailers. The County will post a version of the mailer(s) on the website for additional outreach.

At the end of each annual period, the County will document annual distribution totals.

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured through the documentation of the numbers and types of mailers.

Items to be reported in the Annual Report:

Copies of mailers and number distributed. Evaluation and modifications to this BMP based on the results of analysis of the measurable goals.

BMP 1-3: Stream Monitoring and Education

In cooperation with the Clean Valley Council (CVC), Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County residents. The goal of this BMP is to educate citizens on field procedures for biological stream monitoring, in addition to motivating citizens to monitor waterways in their neighborhood and enhance grassroots 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.

Responsible Party:

Department of Community Development, in conjunction with the CVC.

Schedule and Evaluation:

Roanoke County proposes to cooperate with the Clean Valley Council to educate citizens by holding stream education seminars and monitoring sessions. Special emphasis will be placed on monitoring stream segments with a TMDL designation. The County will create a database to track the names of monitored streams and the number and type of groups participating. The database will be submitted to DEQ in the annual report.

Supporting Documents:

Clean Valley Council Cooperative Agreement

Measurable Goals:

Success for this BMP will be measured by tracking the number of citizens involved in streams monitored activities. In addition, Roanoke County will track the number of stream schools given by CVC, the number of participating students and their grade level(s).

Items to be reported in the Annual Report:

- Names of streams monitored in Roanoke County using the benthic macroinvertebrate method.
- Number of participants in stream monitoring.
- Number of stream schools provided.
- Number of attendees present at each stream school.
- Modifications to this BMP based upon results of analyses of measurable goals.

BMP 1-4: Stormwater Education Program

Develop a stormwater educational program for Roanoke County school-age children. Educators will develop and provide programs addressing stormwater and related water quality issues. Different programs will target appropriate grade levels and will be correlated with the applicable SOLs. The messages for the programs will be coordinated with the high-priority water quality issues identified in BMP 1-5.

Responsible Party:

Department of Community Development, in conjunction with the CVC.

Schedule and Evaluation:

Roanoke County proposes to continue this program. The Stormwater Education Program for school children will be submitted in the Annual Report. The County will document how many children have been educated on stormwater quality by tracking the number of programs provided and the number of children reached.

At the end of each annual period, the County will analyze the statistics of how many programs were provided and how many children were reached to determine the most effective method.

Supporting Documents:

Clean Valley Council Cooperative Agreement

Measurable Goals:

Success for this BMP will be measured by tracking the number of programs that were provided and the number of children that were reached.

Items to be reported in the Annual Report:

Program names, brief description of each program and their goals, dates and locations of each program, number of participants on each program. Evaluation and subsequent modifications to this BMP based on results of analysis of measurable goals.

BMP 1-5: Stormwater Public Awareness Program

Roanoke County has developed a Stormwater Public Awareness Program that targets three high-priority water quality issues that contribute to the discharge [and degradation] of stormwater. The three selected water quality issues are excess bacteria, sediments, and nutrients. Target audiences, along with their estimated population number, have been selected for each high-priority water quality issue. To address these issues, the County's Public Awareness Program will focus on (1) ways to increase the target audience's knowledge about ways to prevent these pollutants from getting into stormwater runoff and (2) the hazards and legal implications of illegal discharges and improper disposal of wastes.

After the high-priority water quality issues, target audiences, and messages were identified by the County; they were posted on the County's website and public comment was requested. The public comments were reviewed; however, none were suitable for incorporation into the program.

The County will develop relevant messages and materials and associated outreach materials (e.g., public service announcements, printed brochures and newsletters, billboard and mass transit advertisements, signage at select locations, radio advertisements, television advertisements, and use of websites and social media) for message distribution to the selected target audiences within and beyond Roanoke County.

Responsible Party:

Department of Community Development, in cooperation with the CVC.

Schedule and Evaluation:

The County proposes to operate a Public Awareness Program that will incorporate the development and distribution of printed materials, billboard and mass transit advertisements, signage at select locations, radio and television advertisements, newspaper articles, and use of websites and social media. The County will track the number and types of materials that are distributed and posted on websites/social media and size of audience exposed to such materials, as appropriate.

To supplement this effort, the County purchased a set of video programs that were designed for educating the general public on Illicit Discharge Detection and Elimination (IDDE) to the storm drainage system; such discharges include the selected three high-priority water quality issues: excess bacteria, sediment, and nutrients in stormwater. The kit includes five videos of varying run times, as shown below, which are designed to be used in specific medium/media or to reach a specific audience.

- 30 sec, for local public media (as a Public Service Announcement)
- 60 sec, for broad community audiences
- 2 min, for short presentations booths, fairs, public events
- 5½ min, for short speaker presentations or young audiences
- 10½ min, in-depth for full understanding of illicit discharge and what can be done

The County will track the size of audiences exposed to the various videos and evaluate the response it receives from the public.

Supporting Documents:

See Stormwater Public Awareness Program in Supporting Documents (CD attached to this plan).

Measurable Goals:

Document the type of public awareness method that was utilized, including the size of the audience and any impact indicators that show what effect the method had on behavior.

Items to be reported in the Annual Report:

- Annual activities.
- Proposed program changes over the permit year.
- Conclusion of effectiveness of and any modifications to this BMP based on the analysis of effectiveness.

BMP 1-6: Roanoke County Stormwater Webpage

Roanoke County will maintain and monitor its Stormwater webpage, which enables citizens to get information concerning the County's Stormwater Management Program, ordinances, design guidelines, general information, contact information, stormwater pollution prevention information, educational programs, and links to other organizations and sites. The website also helps to inform the citizens about on-going community-based projects, including storm drain stenciling, Save Our Streams and other similar stream monitoring, regional clean-ups, and other local water quality educational programs and events. The messages for the website will be coordinated with the high-priority water quality issues identified in BMP 1-5.

Responsible Party:

Department of Community Development, with assistance from the Department of Communications/Information Technology.

Schedule and Evaluation:

Roanoke County proposes to continue to expand and update its stormwater website and document webpage usage, including the annual number of visits to each page. In addition, with the recent purchase of the IDDE Public Outreach kit (discussed in BMP 1-5), the County will add the appropriate videos to the website in an effort to inform the public about the hazards and legal ramifications of illicit discharges.

The County will monitor the most and least visited page to determine how to best make changes to expand the audience. Roanoke County will submit page statistics and intended changes to DEQ with the annual report.

Supporting Documents:

None.

Measurable Goals:

Webpage statistics including the most and least popular material will be analyzed for effectiveness of the website.

Items to be reported in the Annual Report:

- Website address
- Page statistics.
- Intended changes.
- Evaluation and resulting modifications to this BMP based on results of analysis of measurable goals.

BMP 1-7: Targeted Education Program

The goal of this BMP is to develop a stormwater quality education program for specific target audiences, identified in BMP 1-5. Education activities shall reach 20% of each target audience per year. The intention is provide information to these target audiences that increase their awareness of high-priority water quality issues.

Targeted audiences will receive specific materials and messages that are designed specifically for their type of operations (such as car wash operations) to ensure the program is effective. The target audience and messages will be coordinated with the high-priority water quality issues and target audiences identified in BMP 1-5.

Responsible Party:

Department of Community Development, in conjunction with the CVC.

Schedule and Evaluation:

Targeting audiences will begin with permit year 2. Roanoke County proposes to continue this program by developing a list of targeted businesses and distributing information to business owners and personnel or conducting events that involve them.

Supporting Documents:

Clean Valley Council Cooperative

Measurable Goals:

Review the target audience and indicators of the effectiveness of the objectives.

Items to be reported in the Annual Report:

- Target audiences population number and number reached each permit year.
- Summary of outreach activities and materials.



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 citizenry is crucial for its success. To garner this support, the County has and will continue to coordinate programs to engage the citizen's interest in stormwater quality. The programs are listed below:

BMP 2-1: Storm Drain Stenciling Program

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

BMP 2-2: Stormwater Public Event

Conduct public events 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. The 2013 General Permit increased this requirement from 1 event per year to 4 events per year.

BMP 2-3*: Stormwater Program Information Posted on Stormwater Website for Citizens to View

Post Roanoke County's Stormwater Discharge permit, MS4 Program, and Annual Reports on the County's website for citizens to download and read.

***Note - Old BMP 2-3 Stormwater Management Citizens Advisory Committee has been discontinued effective July 1, 2014 due to its ineffectiveness. Old BMP 2-4 Annual Report Posted on Stormwater Website for Citizens to View has been renamed and renumbered to BMP 2-3 Stormwater Program Information Posted on Stormwater Website for Citizens to View.**

This report provides a detailed description of each BMP, the objective, the measurable goals and implementation schedules, the responsible parties, and all County support documents that include: contracts, policies, ordinances, schedules, inspection forms, written procedures, or other documents necessary for the implementation of the BMP.

BMP 2-1: Storm Drain Stenciling Program

The goal of this BMP is to coordinate a storm drain inlet stenciling program with local schools, neighborhoods, businesses, and other groups, to stencil messages on storm drain inlets in an effort to educate people about the consequences of dumping waste into the storm drainage system.

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:

The County proposes to continue to implement this BMP without change. The county will continue to coordinate a storm drain stenciling program that will stencil storm drains within the County. The County will document the stenciling of a minimum of 50 storm drains, year within the County of Roanoke.

Supporting Documents:

Clean Valley Council Cooperative Agreement

Measurable Goals:

The County will document the number of storm drains stenciled and the groups participating. Using these numbers as indicators, the County will evaluate the effectiveness of this BMP and make adjustments to annually increase attendance.

Items to be reported in the Annual Report:

- Number of storm drains stenciled.
- Number of groups participating.
- Evaluation and proposed modifications to this BMP based on results of analysis of attendance record.

BMP 2-2: Stormwater Public Events

At least four times a year, Roanoke County will hold a public event to address stormwater issues, to inform the citizenry regarding the County's progress towards stormwater quality improvements, and to receive input from the public on the County's Stormwater Management Program.

Responsible Party:

Community Development, in conjunction with Clean Valley Council

Schedule and Evaluation:

The County proposes to hold at least four public event to address stormwater issues and the County's progress towards stormwater quality improvements. The County will have an informational booth at the event to allow time for the County to receive input from the public on their concerns about stormwater issues and the County's Stormwater Management Program. The County will document the event, the participants (from CVC or the County), and the number of citizens who attended. Using attendance as an indicator, the County will evaluate the effectiveness of the public event and how it supports the achievement of the goals of the event.

Supporting Documents:

Clean Valley Council Cooperative Agreement

Measurable Goals:

The County will document the details of the events, the number of County or CVC participants, and the number of people in attendance. Success for this BMP will be measured by an increase in public attendance.

Items to be reported in the Annual Report:

- Program (and agenda, if applicable)
- County or CVC participants
- Citizen attendance.
- Adjustments that are proposed to be made for the next annual period.

BMP 2-3: Stormwater Program Information Posted on Stormwater Website for Citizens to View

The goal of this BMP is to post the Roanoke County's Municipal Separate Storm Sewer System (MS4) Program documents on the website for citizen review and comment. The documents consist of MS4 General Permit, MS4 Program Plan, and Annual Reports. This form of public viewing allows Roanoke County citizens to become knowledgeable about the goals of the program and to obtain information so as to become better informed such that they can comment on existing issues and influence changes in future programs and direction. Each annual report will be posted on the website to keep citizens current on annual evaluations of program effectiveness and proposed changes.

Responsible Party:

Community Development

Schedule and Evaluation:

Roanoke County proposes to post the General Registration Statement for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (the MS4 permit application), the actual MS4 permit, the MS4 Annual Report, and the MS4 Program Plan on the stormwater website. The permit application will be posted no more than 30 days after the County receives the evidence of permit coverage letter from DEQ. Each Annual Report and updated Program Plan will be posted to the website no more than 30 days after their October 1 submittal date. Any appropriate correspondence between Roanoke County and DEQ will also be posted to the website for public viewing.

Supporting Documents:

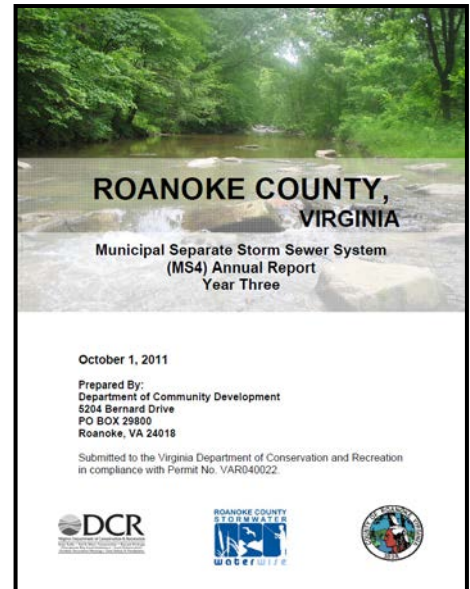
None.

Measurable Goals:

Success for this BMP will be measured by the successful posting of the MS4 permit and evidence of permit coverage letter within 30 days of receipt. In addition, the updated MS4 Program Plan and MS4 Annual Report will be posted within 30 days following their submittal to DEQ.

Items to be reported in the Annual Report:

- Website Address
- Date of posting - Coverage Letter and MS4 Permit.
- Date of posting - Annual Report and Program Plan.
- Comments received from citizens regarding website-posted MS4 documents.





MCM 3: Illicit Discharge Detection and Elimination (IDDE)

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

BMP 3-1: Storm Drain Map

A Countywide 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 Ordinance has been adopted and will be maintained to provide authority to address illicit discharges. It includes language prohibiting non-stormwater discharges into the storm drainage system.

BMP 3-3*: MS4 Outfall Inspections

Roanoke County will design and implement a program to inspect a minimum of 50 storm drain outfalls, within its MS4 area, annually.

BMP 3-4*: Illicit Discharge Detection and Elimination Program

Roanoke County will prepare and implement written procedures to detect, identify, and address nonstormwater discharges to the MS4 system.

***Note – BMPs noted with * are new BMPs effective July 1, 2014 that replaces the previous BMP 3-3: Illicit Discharge Program.**

Included in this report is a detailed description of each BMP, the objective, the measurable goals, and implementation schedules, the responsible parties, and all County support documents that include: policies, ordinances, schedules, inspection forms, written procedures, or other documents necessary for the implementation of the BMP.

BMP 3-1: Storm Drain Map

The goal of this program is to develop, and keep updated, a storm drain map which identifies all of the municipal separate storm sewers and components thereof within the County of Roanoke that discharge to a natural drainage conveyance or waterway.

The GIS information shall include the location of MS4 outfalls, unique identifier, name and location of waters receiving discharges from the MS4 outfalls and the associated HUC, estimated MS4 acreage served, indication as to whether the receiving water is listed as impaired, and the name of any applicable TMDL(s).

Responsible Party:

Department of Community Development, with the assistance of the Department of Communications/Information Technology.

Schedule and Evaluation:

Roanoke County proposes to continue this BMP by expanding and updating the storm sewer map of Roanoke County as needed.

Supporting Documents:

GIS database

Measurable Goals:

Success for this BMP will be measured by tracking the number of new structures added, to include BMPs, outfalls, pipes, ditches and other conveyances, and drainage inlets.

Items to be reported in the Annual Report:

- Number of new structures located.
- Analysis of progress.
- Adjustments needed to be made to the program, based on analysis of the progress.

BMP 3-2: Illicit Discharge Ordinance

The goal of this BMP is to adopt regulations that prohibit illicit discharges into the County's Municipal Separate Storm Sewer System and that also provide the County with an enforcement mechanism

Responsible Party:

Department of Community Development, in cooperation with the County Attorney.

Schedule and Evaluation:

Roanoke County adopted a new Illicit Discharge Ordinance on April 22, 2014 that is compliant with stormwater regulations. Enforcement measures and penalties are included in the Illicit Discharge Ordinance. The County will update the ordinance when necessary to maintain the effectiveness of the program.

Supporting Documents:

See copy of adopted Illicit Discharge Ordinance in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success of this BMP will be measured by the continued compliance of the County's Illicit Discharge Ordinance with the MS4 General Permit.

Items to be reported in the Annual Report:

- Analysis of compliance of the Roanoke County Illicit Discharge Ordinance with the MS4 General Permit.
- Any changes to Ordinance.

BMP 3-3: MS4 Outfall Inspections

The goal of this BMP is to detect dry weather illicit discharges so that actions may be taken to eliminate them.

Responsible Party:

Community Development.

Schedule and Evaluation:

Roanoke County proposes to continue its MS4 Outfall Inspection program to detect, dry weather illicit discharges that enter the municipal separate storm sewer system.

Supporting Documents:

GIS database.

Measurable Goals:

Success for this BMP will be measured by field screening a minimum of 50 outfalls per year and documenting the results of these inspections.

Items to be reported in the Annual Report:

- The number of MS4 Outfall Inspections performed
- A summary of the inspection results.

BMP 3-4: Illicit Discharge Detection and Elimination Program

The goal of this BMP is to detect, identify, and address nonstormwater discharges to the MS4 as defined at 4VAC50-60-10, into the regulated municipal separate storm sewer system. The Illicit Discharge Detection and Elimination Program will have written procedures for the following components:

1. A prioritized schedule of field screening activities,
2. Minimum number of field screening activities to be performed annually,
3. Methodologies to collect general information,
4. A time frame upon which to conduct an investigation to identify and locate the source of any observed continuous or intermittent non-stormwater discharge.
5. Methodologies to determine the source of all illicit discharges.
6. Mechanisms to eliminate identified sources of illicit discharges.
7. Methods for conducting a follow-up investigation to verify that the discharge has been eliminated.
8. A mechanism to track all investigations to document the date(s) that the illicit discharge was observed and reported, results of investigation, any follow-up to the investigation, resolution of the investigation, and the date that the investigation was closed.

Responsible Party:

Community Development.

Schedule and Evaluation:

This is a new BMP effective July 1, 2014.

Supporting Documents:

See copy of program written procedures in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by compliance with written procedures.

Items to be reported in the Annual Report:

- A summary of each illicit discharge investigation including the date the suspected discharge was observed or reported, how the investigation was resolved, the resolution of the investigation, and the date the investigation was closed.



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 small municipal separate storm sewer system from construction activities. The programs 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 controls during construction activities, 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 employees that require DEQ Erosion and Sediment Control training and track employees' certifications to ensure they remain current.

BMP 4-3*: Erosion and Sediment Control Plan Review

Develop and maintain written procedures for site plan review which addresses construction site stormwater runoff.

BMP 4-4* Erosion and Sediment Control Inspection

Develop and maintain written procedures for site inspections to confirm that construction complies with approved plans and that construction site stormwater runoff is properly addressed.

BMP 4-5* Erosion and Sediment Control Compliance and Enforcement

Develop and maintain written procedures for compliance and enforcement when necessary to compel compliance with construction site stormwater runoff requirements.

***Note – BMPs noted with * are new BMPs effective July 1, 2014 that replaces the previous BMP 4-3: Land Development Procedures Review and Evaluation.**

Included in this report is a detailed description of each BMP, the objective, the measurable goals, and implementation schedules, the responsible parties, and all County support documents that include: policies, ordinances, schedules, inspection forms, written procedures, or other documents necessary for the implementation of the BMP.

BMP 4-1: Erosion and Sediment Control Ordinance

The goal of this BMP is to maintain an Erosion and Sediment Control (E&S) Ordinance that will reduce pollutants in stormwater runoff from construction activities, as a means to keep such pollutants from entering the County's MS4. 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 sediment control practices. Site inspection and enforcement actions are also incorporated into the County's Erosion and Sediment Control Ordinance.

Responsible Party:

Community Development.

Schedule and Evaluation:

Roanoke County proposes to annually evaluate this ordinance to ensure its compliance with Virginia's Erosion and Sediment Control regulations. The County will track the total number of regulated land-disturbing activities and the total acreage disturbed.

Supporting Documents:

See copy of the Roanoke County Erosion and Sediment Control Ordinance in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the E&S Ordinance and its continued compliance with Virginia Erosion and Sediment Control regulations.

Items to be reported in the Annual Report:

- Analysis of the Roanoke County Erosion and Sediment Control Ordinance and any proposed changes to the Ordinance.
- Total number of regulated land disturbing activities.
- Total acreage disturbed.

BMP 4-2: Erosion and Sediment Control Certification

The goal of this BMP is to identify employees that require DEQ training and certification as Erosion and Sediment Control Administrators, Plan Reviewers, and/or Inspectors; and track certifications to ensure that they are kept current.

Responsible Party:

Community Development.

Schedule and Evaluation:

Roanoke County proposed to continue this program.

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured by maintaining current E&S Certifications for all County positions that are identified as requiring a certified E&S employee.

Items to be reported in the Annual Report:

- Number and Title of positions requiring an E&S certified employee.
- List of Employees and Titles that have current E&S certification, with certification expiration dates.
- Total number of positions identified for which appropriate certifications have not been obtained, or have expired certificates.

BMP 4-3: Erosion and Sediment Control Plan Review

The goal of this BMP is to develop and maintain written procedures for site plan review which addresses construction site stormwater runoff to ensure consistency of reviews.

Responsible Party:

Community Development.

Schedule and Evaluation:

Written procedures have been developed for site plan review.

Supporting Documents:

See copy of the Erosion and Sediment Control plan review written procedures in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written plan review procedures.

Items to be reported in the Annual Report:

- Analysis of the site plan review procedures and any proposed changes.

BMP 4-4: Erosion and Sediment Control Inspection

The goal of this BMP is to develop and maintain written procedures for inspections to confirm that construction complies with approved plans and that construction site stormwater runoff is properly addressed.

Responsible Party:

Community Development.

Schedule and Evaluation:

Written procedures have been developed for site inspections.

Supporting Documents:

See copy of the Erosion and Sediment Control inspections written procedures, including the state approved alternative inspection program, in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written site inspection procedures.

Items to be reported in the Annual Report:

- Analysis of the site inspection procedures and any proposed changes.
- Total number of construction site stormwater runoff inspections.

BMP 4-5: Erosion and Sediment Control Compliance and Enforcement

The goal of this BMP is to develop and maintain written procedures for compliance and enforcement, in order to ensure program consistency.

Responsible Party:

Community Development.

Schedule and Evaluation:

Written procedures have been developed and implemented for compliance and enforcement.

Supporting Documents:

See copy of the Erosion and Sediment Control compliance and enforcement written procedures in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written plan review procedures.

Items to be reported in the Annual Report:

- Analysis of the compliance and enforcement procedures and any proposed changes.
- Summary of enforcement actions taken, including the total number and type of enforcement actions.



MCM 5: Post-Construction Stormwater Management in New Development and Development on Prior Developed Lands

Roanoke County recognizes that addressing water quality and quantity in post-construction stormwater runoff is an important way to prevent the deposition of sediment and other pollutants into its streams and rivers; and control excessive streambank erosion. The programs that have been established to complete this measure are listed below:

BMP 5-1: Stormwater Management Ordinance and Manual

Roanoke County has adopted a Stormwater Management Ordinance and Design Manual, which complies with the July 1, 2014 state requirements.

BMP 5-2*: Stormwater Management Plan Review

Develop and maintain written procedures for site plan review which addresses post-construction stormwater.

BMP 5-3* Stormwater Management Facility Construction Inspection

Develop and maintain written procedures for site construction inspections to confirm that construction complies with approved plans.

BMP 5-4* Stormwater Management Facility Post-Construction Inspection

Develop and maintain written procedures for post-construction inspections of privately-owned and County-owned stormwater management facilities.

BMP 5-5* Stormwater Management Facility Tracking

Develop and maintain a GIS-based system to track Stormwater Management Facilities to ensure that proper post-construction inspection and maintenance is occurring.

BMP 5-6* Strategies to Encourage Long-Term Maintenance of Single Family Residential Structure Stormwater Control Measures

Develop and implement strategies to promote the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely

from the individual residential lot. These strategies would be used to replace recorded maintenance agreements and required County post-construction inspections.

***Note – BMPs noted with * are new BMPs effective July 1, 2014. Previous BMP 5-2 Stormwater Management Facility Inspection Program has been discontinued and replaced by new BMPs 5-2, 5-3, 5-4, and 5-5). Old BMP 5-3 Low-Impact Development Utilization has been discontinued due to lack of relevance with the new stormwater management requirements that became effective on July 1, 2014.**

Included in this report is a detailed description of each BMP, the objective, the measurable goals, and implementation schedules, the responsible parties, and all County support documents that include: policies, ordinances, schedules, inspection forms, written procedures, or other documents necessary for the implementation of the BMP.

BMP 5-1: Stormwater Management Ordinance and Manual

The goal of this BMP is to adopt and maintain an Ordinance and Design Manual that complies with the July 1, 2014 Virginia stormwater management requirements for new development and development on prior developed lands.

Responsible Party:

Community Development.

Schedule and Evaluation:

Roanoke County revised its Stormwater Management Ordinance and Stormwater Design Manual to reflect the changes in the state stormwater regulations, which became effective on July 1, 2014. These documents will be evaluated annually to ensure continual compliance with federal and state regulations.

Supporting Documents:

See copy of the Roanoke County Stormwater Management Ordinance and Stormwater Management Design Manual in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by an annual evaluation of the Stormwater Management Ordinance and Manual and their continued compliance with federal and state regulations.

Items to be reported in the Annual Report:

- Analysis of compliance of the Roanoke County Stormwater Management Ordinance and Design Manual.
- Any changes that are planned to the Stormwater Management Ordinance and Design Manual to assure compliance with federal and state regulations.

BMP 5-2: Stormwater Management Plan Review

The goal of this BMP is to develop and maintain written procedures for site plan review which addresses post construction stormwater runoff to ensure consistency of reviews.

Responsible Party:

Community Development.

Schedule and Evaluation:

Written procedures have been developed for site plan review.

Supporting Documents:

See copy of the Stormwater Management Plan review written procedures in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written plan review procedures.

Items to be reported in the Annual Report:

- Analysis of the site plan review procedures and any proposed changes.

BMP 5-3: Stormwater Management Facility Construction Inspection

The goal of this BMP is to develop and maintain written procedures for construction inspections to confirm that construction complies with approved plans.

Responsible Party:

Community Development.

Schedule and Evaluation:

Written procedures have been developed for site construction inspections.

Supporting Documents:

See copy of the Stormwater Management construction inspections written procedures, in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written site construction inspection procedures.

Items to be reported in the Annual Report:

- Analysis of the site construction inspection procedures and any proposed changes.

BMP 5-4: Stormwater Management Facility Post-Construction Inspection

The goal of this BMP is to develop and maintain written procedures for post-construction inspections to confirm that adequate maintenance is occurring.

Responsible Party:

Community Development.

Schedule and Evaluation:

At a minimum all County-owned Stormwater Management Facilities shall be inspected annually, and all privately-owned Stormwater Management Facilities shall be inspected once every 5 years.

Supporting Documents:

See copy of the Stormwater Management post-construction inspections written procedures, in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written post-construction inspection procedures; and completion of the required post-construction inspections.

Items to be reported in the Annual Report:

- Number of known stormwater management facilities in the inventory.
- Number of inspections performed, both private and public.
- Number and type of enforcement actions
- Evaluation of the program and any modifications to the program to improve effectiveness.

BMP 5-5: Stormwater Management Facility Tracking

The goal of this BMP is to develop and maintain a GIS based system to track Stormwater Management Facilities to ensure that proper inspection and maintenance is occurring.

The GIS information shall include the, unique identifier, facility type, address or latitude and longitude, acres treated including total acres as well as the breakdown of pervious and impervious acres, the date the facility was brought online (MM/YYYY) (if the date is not known use June 30, 20005), 6th order HUC, name of any impaired stream sections within the HUC, whether the facility is County or privately owned, whether or not a maintenance agreement exists if the facility is private, date of the most recent post-construction inspection.

Responsible Party:

Community Development, with the assistance of the Department of Communications/Information Technology.

Schedule and Evaluation:

Roanoke County will continue to expand and update the GIS system as needed.

Supporting Documents:

GIS Database

Measurable Goals:

Success for this BMP will be measured by the annual evaluation of the written post-construction inspection procedures; and completion of the required post-construction inspections.

Items to be reported in the Annual Report:

- Information on Stormwater Management Facilities that have been brought online during the current reporting year.

BMP 5-6: Strategies to Encourage Long-Term Maintenance of Single Family Residential Structure Stormwater Control Measures

The goal of this BMP is to develop and implement strategies to promote the long-term maintenance of stormwater control measures that are designed to treat stormwater runoff solely from the individual residential lot. These strategies would be used to replace recorded maintenance agreements and required County post-construction inspections.

Responsible Party:

Community Development

Schedule and Evaluation:

Roanoke County proposes to consider various strategies to promote the long-term maintenance of stormwater control measures for single family residential structures and to implement them by the end of permit year two (July 1, 2015).

Supporting Documents:

None at this time.

Measurable Goals:

Success for this BMP will be measured by tracking the number of new residential lots covered by the strategies, proper implementation of the strategies, and evaluating the effectiveness of the strategies in promoting the long-term maintenance of stormwater control measures.

Items to be reported in the Annual Report:

- Number of new residential lots using the strategies each year.
- Implementation of the strategies.
- Evaluation of the effectiveness of the strategies in promoting long-term maintenance.



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 stormwater runoff pollution from Roanoke County's day-to-day operations. To perform this measure, the County will continue to evaluate its facilities and also provide education and programs that will educate its employees about pollution prevention and hazardous waste. The BMPs that have been established to complete this measure are listed below:

BMP 6-1: Spill Prevention Control and Countermeasures Plans

Roanoke County has developed Spill Prevention Control and Countermeasure Plans (SPCCs) for some of its municipal facilities. These plans will be updated and new plans will be prepared as needed.

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 storm sewer system maintenance.

BMP 6-4*: Employee Training

Roanoke County will develop and implement biennial training for applicable employees in (1) recognition and reporting of illicit discharges; (2) good housekeeping and pollution prevention practices for, (a) road, street, and parking lot maintenance, (b) maintenance and public works facilities, and (c) recreational facilities; (3) spill response by emergency response employees; (4) herbicide application training; and (5) contractor oversight for environmental compliance.

BMP 6-5*: Standard Operating Procedures

Roanoke County will develop and implement standard operating procedures (SOPs) for daily operations and maintenance activities that have a potential of discharging pollutants directly or with stormwater runoff into the MS4. SOPs will be used in training activities.

BMP 6-6* Stormwater Pollution Prevention Plans (SWPPPs) for Municipal Facilities

Roanoke County will identify all high-priority facilities that have a high potential to discharge pollutants in stormwater. Stormwater Pollution Prevention Plans (SWPPPs) will be prepared, implemented, and maintained. SWPPPs will be used in training activities.

BMP 6-7* Nutrient Management Plans

Roanoke County will identify all County owned lands where nutrients are applied to a contiguous area of 1 acre or more. Nutrient Management Plans will be prepared by a certified nutrient management planner. Nutrient Management Plans will be implemented and maintained.

BMP 6-8* Pesticide Applicator Certification

All employees that apply pesticides shall have the proper Virginia Pesticide Applicator Certificate.

BMP 6-9* Responsible Land Disturber

Employees that oversee the performance of regulated land disturbance activities by County employees shall be recognized as a Responsible Land Disturber by DEQ.

***Note – BMPs noted with * are new BMPs effective July 1, 2014. Previous BMP 6-4 Pollution Prevention and Hazardous Waste Training has been discontinued and replaced by the new BMP 6-4.**

Included in this report is a detailed description of each BMP, the objective, the measurable goals, implementation schedules, the responsible parties, and all County support documents that include: policies, ordinances, schedules, inspection forms, written procedures, or other documents necessary for the implementation of the BMP.

BMP 6-1: Spill Prevention, Control, and Countermeasure Plans

The goal of this BMP is to develop and update Spill Prevention, Control, and Countermeasure (SPCC) Plans for appropriate municipal facilities, as required by Federal Oil Pollution Prevention Regulations.

Responsible Party:

Community Development is responsible to develop SPCC plans. Applicable departments are responsible for compliance with SPCC plans.

Schedule and Evaluation:

Roanoke County proposes to annually update its SPCC plans and create new plans for County facilities, as needed. Training will be provided for those employees who are involved with any County SPCC plan.

Supporting Documents:

SPCC Plans for Existing County Facilities.

Measurable Goals:

Success for this BMP will be measured by the updating of or creation of SPCC plans for applicable County facilities.

Items to be reported in the Annual Report:

- Summary of evaluation of SPCC Plans.
- List of new facilities in need of SPCC Plans.
- List of completed SPCC Plans.
- Evaluation of SPCC Plans.

BMP 6-2: Household Hazardous Waste Event

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.

Responsible Party:

Community Development.

Schedule and Evaluation:

Roanoke County considers this BMP to be successful and proposes to continue this program. The County intends on continuing to participate in at least one Household Hazardous Waste Collection Event each year. For each event, the number of attendees will be documented in addition to the total weight of waste collected for the event.

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured by the continued participation in Household Hazardous Waste Collection Events.

Items to be reported in the Annual Report:

- Number of participants in the Household Hazardous Waste Collection Event.
- Weight of waste collected at the event.

BMP 6-3: Storm Sewer Maintenance Program

The goal of this BMP is to actively maintain the County's storm sewer system. Keeping the storm sewer system properly maintained keeps the regulated storm sewer working as designed, minimizing the potential for flows to surcharge or surpass the capacity of the regulated MS4. The County's maintenance crews also have the potential to discover illicit connections and cite additional areas where pollutants may be entering the regulated storm sewer system.

Responsible Party:

Community Development Stormwater Operations and Maintenance.

Schedule and Evaluation:

Roanoke County is committed to continuing this program. The number of large stormwater projects will be documented. In addition, the number of emergency projects and small-scale maintenance projects that the stormwater maintenance crews complete each year will be tracked.

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured by the continuation of this program, and the increase in total value of improvement that has been completed to maintain the storm sewer system.

Items to be reported in the Annual Report:

- Number of large projects completed.
- Number of small projects or emergency projects completed.
- Total value of improvements completed.

BMP 6-4: Employee Training

The goal of this BMP is to provide County employees with adequate training to support the requirements of the General Permit and to perform their duties in a manner that protects water quality. Roanoke County will develop and implement biennial training for applicable employees in (1) recognition and reporting of illicit discharges; (2) good housekeeping and pollution prevention practices for, (a) road, street, and parking lot maintenance, (b) maintenance and public works facilities, and (c) recreational facilities; (3) spill response by emergency response employees; (4) herbicide application training; and (5) contractor oversight for environmental compliance.

Responsible Party:

Community Development to provide training to applicable departments. Applicable departments are responsible to provide employees for training and to comply with training.

Schedule and Evaluation:

In permit year one a training program has been established. Beginning in permit year two, and thereafter, approximately 50% of the required training will be performed (biennial).

Supporting Documents:

See copy of the Training Program in Supporting Documents (CD attached to this plan)

Measurable Goals:

This BMP will be measured by the number of County employees that receive this training.

Items to be reported in the Annual Report:

- Summary Report of Training Activities, including:
 - List of training events
 - Training dates
 - Number of employees attending
 - Objective of the training

BMP 6-5: Standard Operating Procedures

The goal of this BMP is to develop and implement standard operating procedures (SOPs) for daily operations and maintenance activities that have a potential of discharging pollutants directly or with stormwater runoff into the MS4. SOPs will be used in training activities.

SOPs are designed to prevent pollutant discharge from (1) daily operations such as road, street, and parking lot maintenance, (2) equipment maintenance, and (3) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers.

The SOPs shall be designed to (1) prevent illicit discharges, (2) ensure the proper disposal of waste materials, including landscape wastes, (3) prevent discharge of municipal vehicle wash water into the MS4, (4) prevent discharge of wastewater into the MS4, (5) require use of BMPs when discharging water pumped from utility construction and maintenance activities, (6) minimize pollutants in stormwater runoff from bulk storage areas; (7) prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and (8) ensure that the application of materials, including fertilizers and pesticides is conducted in accordance with the manufacturer's recommendations.

Responsible Party:

Community Development to provide support to applicable departments. Applicable departments are responsible to comply with SOPs.

Schedule and Evaluation:

By the end of permit year one, draft SOPs have been completed. The SOPs will be completed by the end of permit year two. Thereafter they will be annually evaluated and revised as needed.

Supporting Documents:

See copy of the Standard Operating Procedures in Supporting Documents (CD attached to this plan)

Measurable Goals:

Measurable goal is the development and training on appropriate SOPs.

Items to be reported in the Annual Report:

- Summary Report on the development and implementation of the daily operational procedures.

BMP 6-6: Stormwater Pollution Prevention Plans (SWPPPs) for Municipal Facilities

The goal of this BMP is to identify municipal facilities that have a high potential to discharge pollutants and provide SWPPPs for them. Roanoke County will identify all high-priority facilities that have a high potential to discharge pollutants in stormwater. Stormwater Pollution Prevention Plans (SWPPPs) will be prepared, implemented, and maintained. SWPPPs will be used in training activities as a part of the SOP training, where appropriate.

High-priority facilities include composting facilities, equipment storage and maintenance facilities, materials storage yards, pesticide storage facilities, public works yards, recycling facilities, salt storage facilities, solid waste handling and transfer facilities, and vehicle storage and maintenance yards.

High-priority facilities that have a high potential to discharge pollutants in stormwater include the following – (1) areas where residuals from using, storing or cleaning machinery or equipment remain exposed to stormwater; (2) materials or residuals on the ground from spills or leaks; (3) material handling equipment; (4) materials or products that would be expected to be mobilized by stormwater during loading/unloading or transporting activities; (5) materials or products stored outdoors; (6) materials or products that would be expected to be mobilized by stormwater contained in open, deteriorated or leaking storage containers; (7) waste materials, except waste kept in covered non-leaking containers; (8) disposal of process wastewater; or (9) particulate matter or visible deposits of residuals from roof stacks or vents.

A SWPPP Program Plan is attached to this plan that identifies all County high-priority facilities that have a high potential to discharge pollutants. The SWPPP Program Plan also contains the schedule by which the individual SWPPPs will be prepared, and the individual SWPPPs locations

Responsible Party:

Community Development will evaluate facilities and prepare SWPPPs. Appropriate departments are responsible to comply with SWPPPs.

Schedule and Evaluation:

By the end of permit year one, Roanoke County has identified all municipal high-priority facilities, and has determined which of these high-priority facilities has a high potential to discharge pollutants in stormwater. All necessary SWPPPs shall be completed by the end of permit year 4. The SWPPPs shall be maintained thereafter.

Supporting Documents:

The County's SWPPP Program Plan is included in the Supporting Documents section of this document, along with the completed SWPPPs. See BMP 6-6 on the attached CD.

Measurable Goals:

Success for this BMP will be measured by the development, implementation, and maintenance of the required SWPPPs.

Items to be reported in the Annual Report:

- Summary Report on the development and implementation of the SWPPPs.

BMP 6-7: Nutrient Management Plans

The goal of this BMP is to ensure that excessive nutrients are not being applied to County owned lands. Roanoke County will identify all County owned lands where nutrients are applied to a contiguous area of 1 acre or more. Nutrient Management Plans will be prepared by a certified nutrient management planner for these lands. Nutrient Management Plans will be implemented and maintained.

Responsible Party:

Community Development will track progress. Parks, Recreation, and Tourism is responsible for the preparation, implementation, and maintenance of Nutrient Management Plans.

Schedule and Evaluation:

By the end of permit year one, all County owned lands, where nutrients are applied to a contiguous area of 1 acre or more, have been identified. Nutrient Management Plans will be provided as follows:

By the end of permit year two	Not less than 15% of the acreage
By the end of permit year three	Not less than 40% of the acreage
By the end of permit year four	Not less than 75% of the acreage
By the end of permit year five	100% of the acreage

Supporting Documents:

See copy of the Nutrient Management Plan in Supporting Documents (CD attached to this plan).

Measurable Goals:

Success for this BMP will be measured by the development and implementation of the Nutrient Management Plans on the necessary lands.

Items to be reported in the Annual Report:

The total acreage where nutrient management plans are required and the acreage of lands upon which nutrient management plans have been implemented.

BMP 6-8: Pesticide Applicator Certification

The goal of this BMP is to ensure that all employees that apply pesticides have the proper Virginia Pesticide Applicator Certificate.

Responsible Party:

Community Development shall track compliance. Park, Recreation and Tourism; and General Services are responsible to ensure that employees that apply pesticides have current pesticide applicator certifications.

Schedule and Evaluation:

This BMP will be implemented beginning on July 1, 2014

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured by maintenance of current certification by the applicable employees.

Items to be reported in the Annual Report:

- Summary report of the names of applicable employees and the expiration dates of their certification.

BMP 6-9: Responsible Land Disturber

The goal of this BMP is to ensure that employees that have responsibility to oversee the performance of regulated land disturbance activities by County employees shall have the qualifications to properly implement erosion and sediment control measures. Responsible employees shall be certified as a Responsible Land Disturber by DEQ.

Responsible Party:

Community Development.

Schedule and Evaluation:

This BMP will be implemented effective July 1, 2014.

Supporting Documents:

None.

Measurable Goals:

Success for this BMP will be measured by maintenance of current certification by the applicable employees.

Items to be reported in the Annual Report:

- Summary report of the names of applicable employees and the expiration dates of their certification.

Part III. Total Maximum Daily Load (TMDL) Action Plans

Roanoke County has 13 TMDL wasteload allocations as described in Part I of this Plan. The MS4 General Permit requires that, each permit cycle, the County show sufficient progress toward lowering pollutants discharged through the MS4 to meet the wasteload allocations.

The 6 Minimum Control Measures, described in Part II of this Plan, address some of the pollutants of concern; however, they are basic requirements required by all Phase 2 MS4 permittees.

Additional control measures are required where DEQ has performed TMDL studies and assigned wasteload allocations to permittees. These additional control measures are documented in TMDL Action Plans that are prepared and adopted by the permittee.

The current MS4 General Permit requires that localities that have TMDLs that were approved before July 2008 have updated TMDL Action Plans completed by July 1, 2015; and that localities that have TMDLs that were approved after July 2008 have updated TMDL Action Plans completed by July 1, 2016.

Currently, Roanoke County has relied on the 6 Minimum Control Measures to address TMDL requirements. Formal TMDL Action Plans will be prepared, and submitted to DEQ as follows:

TMDL Action Plan for E. Coli

The Total Maximum Daily Load Action Plan for E. Coli Reduction in the Roanoke River, Ore Branch, Tinker Creek, Glade Creek, Carvin Creek, and Lick Run will be prepared and submitted to DEQ with the permit year two MS4 annual report.

TMDL Action Plan for Sediment

The Total Maximum Daily Load Action Plan for Sediment Reduction in the Roanoke River will be prepared and submitted to DEQ with the permit year two MS4 annual report.

TMDL Action Plan for PCBs

The Total Maximum Daily Load Action Plan for PCBs in the Roanoke River, Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, and an Unnamed Tributary to the Roanoke River will be prepared and submitted to DEQ with the permit year three MS4 annual report.

The completed TMDL Action Plans are included in the Supporting Documents section of this document. See TMDLs on the attached CD.

Part IV. Supporting Documents List (*See Attached CD*)

General:	Letters to Physically Interconnected Downstream Regulated MS4's Clean Valley Council Cooperative Agreement
BMP 1-5	Stormwater Public Awareness Program (High-Priority Water Quality Issues, Target Audiences, Communications Modes, Messages)
BMP 3-2	Illicit Discharge Ordinance
BMP 3-4	Illicit Discharge Detection and Elimination Written Procedures
BMP 4-1	Erosion and Sediment Control Ordinance
BMP 4-3	Erosion and Sediment Control Plan Review Written Procedures
BMP 4-4	Erosion and Sediment Control Inspections Written Procedures, including the State Approved Alternative Inspection Program
BMP 4-5	Erosion and Sediment Control Compliance and Enforcement Written Procedures
BMP 5-1	Stormwater Management Ordinance and Stormwater Management Design Manual
BMP 5-2	Stormwater Management Plan Review Written Procedures
BMP 5-3	Stormwater Management Construction Inspections Written Procedures
BMP 5-4	Stormwater Management Post-Construction Inspections Written Procedures
BMP 6 -4	Training Program
BMP-6-5	Standard Operating Procedures
BMP 6-6	SWPPP Program Plan and Completed SWPPPs
BMP 6-7	Nutrient Management Program Plan
TMDLs	Completed TMDL Action Plans