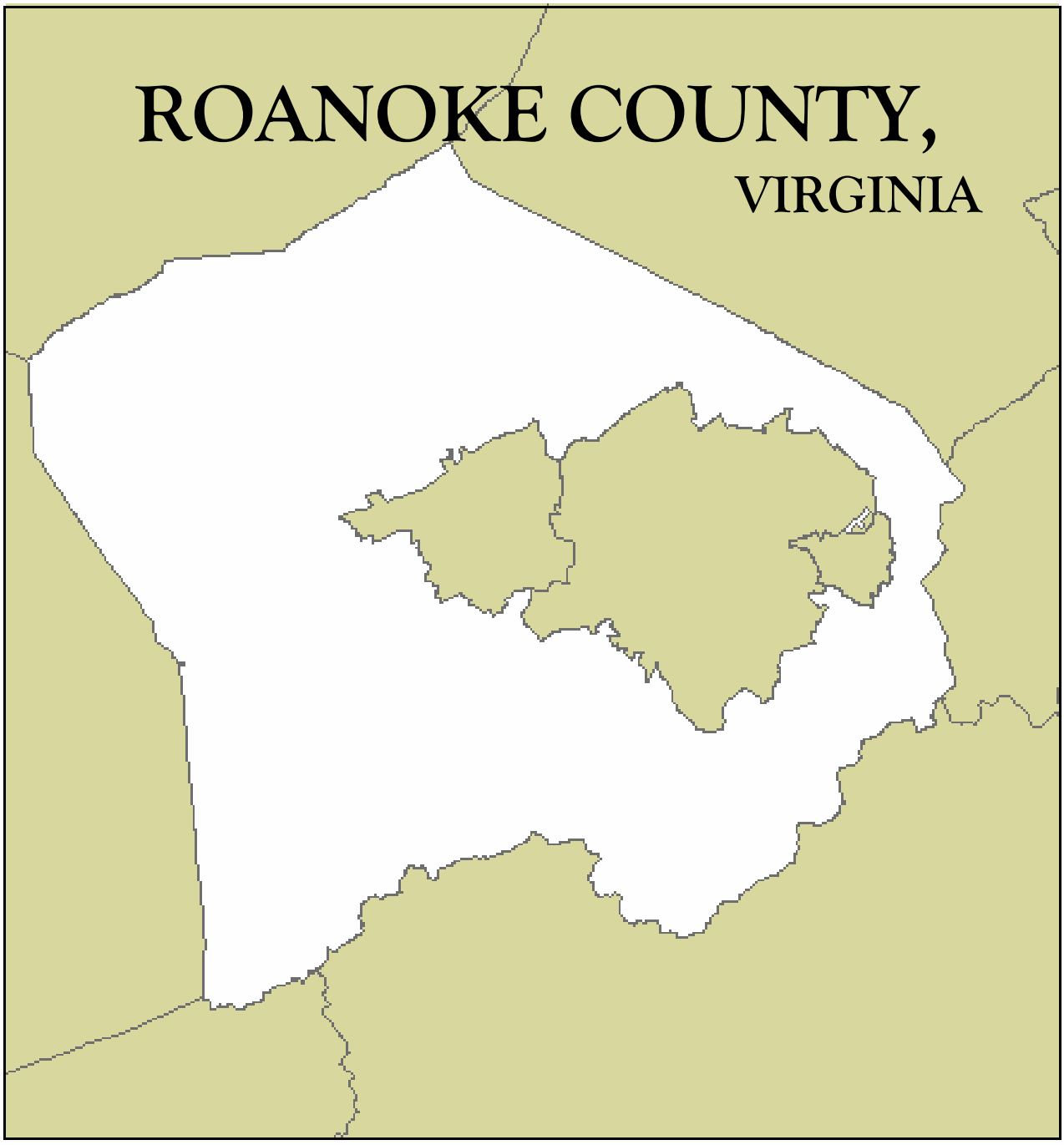
ROANOKE COUNTY,
VIRGINIA



MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4)
GENERAL PERMIT REGISTRATION STATEMENET FOR
STORMWATER DISHCARGES FROM SMALL MUNICIPAL
SEPARATE STORM SEWER SYSTEMS
[VAR040]

DCR
Virginia Department of Conservation & Recreation
State Parks • Soil & Water Conservation • Natural Heritage
Chesapeake Bay Local Assistance • Land Conservation
Outdoor Recreation Planning • Dam Safety & Floodplains

waterwise
ROANOKE COUNTY STORMWATER

COUNTY OF ROANOKE VIRGINIA
1838

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Executive Summary

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

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

The County's stormwater management program includes elements that address six major technical areas:

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 Runoff Control Management
6. Pollution Prevention and Good Housekeeping for Municipal Operations

Roanoke County's commitment to establishing and sustaining a comprehensive program that protects the County's stormwater quality has been made and will continue over the permit term to provide the Roanoke Valley citizens with clean water now and into the future.

VSMP GENERAL PERMIT REGISTRATION FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS [DCR02]

(Please Type or Print All Information)

1. Regulated Small MS4

Name: The County of Roanoke, Virginia
Location (County or City): Roanoke County, Virginia

2. Regulated Small MS4 Owner

Name: The County of Roanoke, Virginia
Address: Attn: County Administrator
5204 Bernard Drive,
PO BOX 29800
Roanoke, VA 24018-0798
Phone: (540) 772-2204 (ph) (540) 772-2108 (fax)

3. Name(s) of the receiving water(s) into which the small MS4 currently discharges or has the potential to discharge to:

Back Creek
Barnhardt Creek
Big Bear Rock Branch
Bowman Hollow
Bradshaw Creek
Butt Hollow Creek
Callahan Branch
Camp Creek
Catawba Creek
Carvin Creek
Cook Creek
Cole Hollow Branch
Deer Branch
Dry Branch
Gish Branch
Glade Creek
Gum Spring Branch
High School Branch
Jumping Run
Lick Run
Little Back Creek
Martins Creek
Mason Creek
McAfee Run
Mill Creek
Mudlick Creek
Murdock Creek
Murray Run
North Fork Roanoke River
Riverside
Roanoke River
Ore Branch
Paint Bank Branch
Peters Creek
South Fork Roanoke River
Tinker Creek
Trout Creek
West Fork Carvin Creek
Wolf Creek

4. **Attach a description of the Best Management Practices (BMPs) that the owner or another entity proposes to implement for each of the following stormwater minimum control measures:**
SEE ATTACHED

5. For each of the BMPs described in (4), list the measurable goals for each BMP including, as appropriate, the years in which the required actions will be undertaken, including interim milestones and the frequency of the action.
SEE ATTACHED

6. Attach a list of the person or persons responsible for implementing or coordinating the small MS4 stormwater management program.

Stormwater Management Program Administrator:

George W. Simpson, III, P.E.
County Engineer, Department of Community Development
5204 Bernard Drive
P.O. BOX 29800
Roanoke, VA 24018-0798
(540) 772-2080

Certification: "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

Print Name:_____ Title:_____
Signature: _____ Date:_____

For Department of Conservation and Recreation Use Only
Accepted/Not Accepted by:_____ Date:_____
Basin_____ Stream Class_____ Section_____ Special Standards_____
(DCR 199-148) (09/04)

Roanoke County's Physically Interconnected MS4's to which it Discharges

Roanoke County is located outside the limits of the City of Salem, the City of Roanoke, and the Town of Vinton. All three localities are regulated small MS4's. The majority of Roanoke County's watersheds drain to the Roanoke River which flows west to east through all four regulated MS4's, as shown in the map to the right.

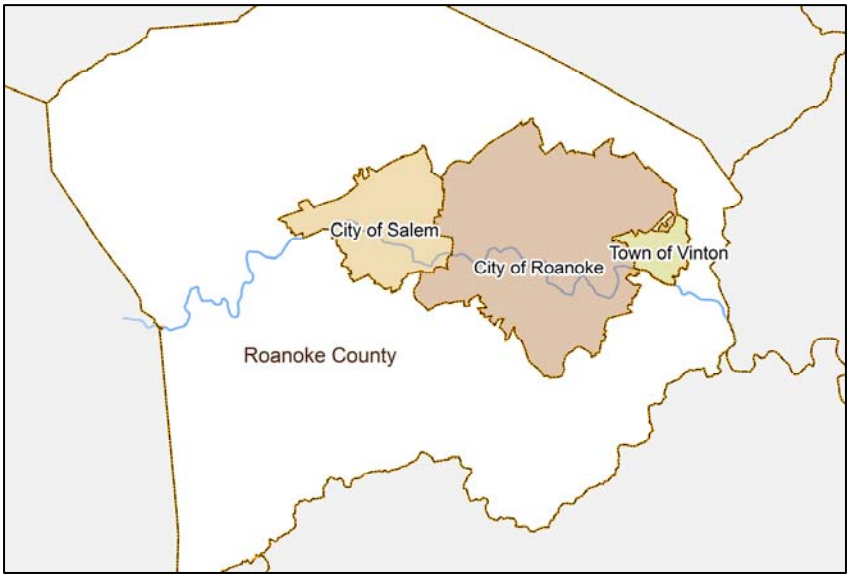

Figure 1: Map of Interconnected MS4's

Watershed Summary

This section details a list of all known waters currently receiving discharges or that have potential to receive discharges from the regulated small MS4. Table 1 lists the waterways and the Hydrologic Unit Codes as identified in the most recent version of the Virginia's 6th Order National Watershed Boundary Dataset and the estimated drainage area, in acres, served by the regulated small MS4 discharging to these surface waters. Following the table is a description of the approximate land use for each drainage area and a summary of all TMDL's completed and the appropriate wasteload allocation for Roanoke County as the regulated MS4.

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

Watershed	Hydrologic Unit Code	Impaired Receiving Waters	Drainage Area (Ac)
Back Creek	RU15	Back Creek	33,870
Barnhardt Creek	RU14	Roanoke River	2,669
Big Bear Rock Branch	RU09	Roanoke River	1,375
Bowman Hollow	RU09	Roanoke River	1,486
Bradshaw Creek	RU08	-	6,359
Butt Hollow Creek	RU09	Roanoke River	1,982
Callahan Branch	RU09	Roanoke River	2,157
Cook Creek	RU13	Glade Creek	704
Catawba Creek	JU52	-	11,424
Carvin Creek	RU12	Carvin Creek	4,404
Cole Hollow Branch	RU09	Roanoke River	2,150
Deer Branch	RU12	Carvin Creek	1,166
Dry Branch	RU09	Roanoke River	3,389
Gish Branch	RU10	Mason Creek	699
Glade Creek	RU13	Glade Creek	2,753
Gum Spring Branch	RU14	Roanoke River	796
High School Branch	RU09	Roanoke River	416
Jumping Run	RU10	Mason Creek	2,545
Lick Run	RU13	Lick Run	402
Little Back Creek	RU15	-	2,555
Martins Creek	RU15	-	1,148
Mason Creek	RU10	Mason Creek	13,004
McAfee Run	JU43	-	1,352
Mill Creek	RU09	Roanoke River	464
Mudlick Creek	RU14	Mudlick Creek	4,571
Murdock Creek	RU14	Mudlick Creek	93
Murray Run	RU14	Roanoke River	903
North Fork	RU06	North Fork	4564
Roanoke River	RU05,09,14&16	Roanoke River	14,2197
Riverside	RU09	Roanoke River	362
Ore Branch	RU14	Ore Branch	907
Paint Bank Branch	RU09	Roanoke River	840
Peters Creek	RU14	Peters Creek	3096
South Fork	RU02	South Fork	11,298
Stypes Branch	RU09	Roanoke River	2,448
Tinker Creek	RU11	Tinker Creek	2,661
Trout Creek	JU41	-	3,529
West Fork Carvin Creek	RU12	Carvin Creek	2,406
Wolf Creek	RU14	Roanoke River	2,606

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 much more prevalent than most: woods, agricultural areas and residential areas. Approximately 75% of the watershed is wooded and the agricultural and residential areas comprise about 10% of the watershed. The remaining 5% of the watershed consists of pasture, brush, and open space land uses.

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.

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 ft 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.

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 ft 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.

Bradshaw Creek:

The Bradshaw Creek watershed is a drainage basin located in northwestern Roanoke County and northeastern Montgomery County. The Bradshaw Creek drainage basin originates between Ft. Lewis Mountain and Catawba Mountain. The watershed flows easterly towards Montgomery County and turns south to its confluence with the North Fork Roanoke River.

The Bradshaw Creek watershed is predominantly agricultural preserve. This land use consists of farmland, woodland, and widely scattered residential development located within the rural service area.

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 above sea level and flows southeasterly to its confluence with the Roanoke River.

The Butt Hollow Creek watershed contains ten existing land uses. With approximately 80% of the watershed area, woods is the predominant land use in this watershed. 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.

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 above sea level and flows southeasterly to its confluence with the Roanoke River.

The Callahan Branch watershed contains six predominating land uses. With approximately 33% of the watershed area comprised of mixed residential, 25% commercial, 25% wooded, 10% industrial, the remaining 10% of the watershed area contains impervious area, and open space.

Catawba Creek

The Catawba Creek watershed has an 18.9 square mile drainage basin just inside the boundaries of Roanoke County. This drain shed is located on the northern edge of Roanoke County. The Catawba Creek watershed originates in the Jefferson National Forest at an elevation of 3080 above sea level and flows northeasterly to its confluence with the Upper James River watershed.

The Catawba Creek watershed contains two major land uses. With approximately 90% of the watershed area heavily agriculture, the remaining 10% is primarily agricultural village large residential lots.

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 ft 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** is primarily undeveloped but has some development consisting of residential 1/4 acre lots and commercial uses. **Deer Branch** is partly developed with residential development (mostly 1/4 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, 1/4 acre residential lots and commercial. Approximately 75% of the watershed is wooded, 10% is residential and 5% of the watershed is pasture, 5% is open water, and 5% is commercial land uses.

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 ft. 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 is primarily undeveloped.

The Cole Hollow Branch watershed contains several specific land uses, but the five major land uses are: 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.

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 ft. 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.

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 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.

Glade Creek:

The Glade Creek watershed is a 33 square mile drainage basin located in northeast Roanoke County, northeast Roanoke City, and northwest Vinton which 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 land uses are: woods, agriculture, 1/2- acre and 1/4- acre residential lots and commercial development. Approximately 50% of the watershed consists of wooded areas, 20% of the watershed is agriculture, 15% of the watershed is residential, and 5% is commercial. The remaining 10% of the watershed consists of pasture, brush, industrial development and open space.

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 US 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 land uses include residential areas of various densities, railroad yards and wooded areas.

Little Back Creek:

Little Back Creek is located in the western part of the Back Creek watershed and is located northeast of Martins Creek. It converges with Back Creek approximately 22.5 miles upstream of the confluence of Back Creek with the Roanoke River. The Little Back Creek Watershed originates on Poor Mountain and flows southeasterly for approximately 3.5 miles to its confluence with Back Creek. The watershed land us is mostly wooded with some agricultural and scattered residential development.

Martins Creek:

Martins Creek is located in the western part of the Back Creek watershed. It originates on Poor Mountain and flows southeasterly to its confluence with Back Creek which is approximately 24 miles upstream of the confluence of Back Creek with the Roanoke River. The watershed land use is predominately wooded with some agricultural and scattered residential development. Developed land use is primarily rural village with some low density residential and village center development.

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 land use 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% of the land use is open space, commercial or agriculture areas.

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 ft 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. 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.

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 ft 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 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 land use. The remaining 10% of the watershed consists of industrial development, paved areas, 1/2- acre residential lots and brush.

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 Ridge at an elevation of 1700 ft 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%, one third- 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.

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 Mountain at an elevation of approximately 2380 ft 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 Tributary 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.

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 ft and flows in a southerly direction until its confluence with the Roanoke River. There are three significant streams that drain the Tinker Creek watershed: **Carvin Creek**, **Glade 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.

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 ft 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.

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

TMDL Waterways and Impaired Tributaries*	Year Completed	Parameter	WLA
Tinker Creek Watershed	2004	E-Coli	4.68E+12 (colony forming units/yr)
Carvin Creek			
Glade Creek			
Lick Run			
Tinker Creek			
Roanoke River Watershed	2006	E-Coli	2.84E+11 (colony forming units/yr)
Ore Branch			
Roanoke River			
Roanoke River Watershed	2006	Sediment	1,823 (tons/yr)
Roanoke River			

***This information is based upon DEQ list of approved and draft TMDL's at http://www.deq.state.va.us/tmdl/develop.html.**

Municipal Separate Storm Sewer System (MS4) Program

Minimum Control Measures for the Roanoke County MS4 Program:

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 Redevelopment
MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations

MCM 1: Public Education and Outreach on Stormwater Impacts

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

- Update and distribute a comprehensive review of existing stormwater educational programs available to Roanoke County and the Roanoke Valley area.
- Develop and distribute a Roanoke County Stormwater Informational Mailer to Roanoke County Residents.
- In cooperation with Virginia Save Our Streams, Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County residents.
- Develop a stormwater educational program for Roanoke County school age children. Different programs will target appropriate grade levels.
- Develop a Stormwater Public Awareness Program that includes the distribution of stormwater merchandise, public service announcements, and other high visibility educational media.
- Maintain and expand a Roanoke County Stormwater webpage that informs the public about water quality, community-based outreach and local projects.
- Develop and maintain a stormwater quality education program for specific commercial businesses within the County.

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

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, flood-plain management, pollution prevention, conservation practices and riparian habitat protection.

Responsible Party: Department of Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County successfully implemented a review of publications and educational programs that address stormwater issues such as stormwater management, stormwater quality, floodplain management, watershed development, pollution prevention, and other conservation practices. This database was updated each year and posted to the Roanoke County Stormwater website.

Roanoke County proposes to 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 website 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 form target groups based on website usage to distribute theme specific program lists 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 stormwater programs database can be found.

Supporting Documents: None

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:
Evaluation and modifications to this are BMP based on results of analysis of 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 about local stormwater issues. The mailer will be designed as a regional document and will touch on the County's Stormwater Program, general stormwater quality education, updates on local impaired water bodies, and TMDL's. The mailer will be designed as a regional document based on the unique issues and concerns for the Roanoke River Watershed.

Responsible Party: Department of Community Development and Department of Parks, Recreation and Tourism

Schedule and Evaluation:
During the first permit cycle, Roanoke County created a stormwater informational mailer which educated residents on the County's Stormwater Program, general stormwater quality education, updates on local impaired water bodies and TMDL's. This mailer was included in the County's Parks and Recreation catalog for distribution to the entire County population.

For this permit cycle, Roanoke County proposes to continue to educate residents on the County's Stormwater Program through an informational mailer. The County will post a version of the mailer on the website for additional outreach.

At the end of each annual period, the County will document annual distribution totals and number of hits on the website and report numbers in annual report.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured the documentation of the numbers of mailers and tracking the rate of website usage.

Items to be reported in the Annual Report:
Evaluation and modifications to this BMP based on the results of analysis of measurable goals.

BMP 1-3: Stream Monitoring and Education

In cooperation with the local Virginia Save Our Streams chapter, Roanoke County will provide stream monitoring and informational stream seminars for Roanoke County residents. The goal of this BMP is to educate citizens on the field procedures that have been established to determine water quality, in addition to motivating citizens to monitor waterways in their neighborhood and enhance grass roots cooperation to promote the importance of a 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: Community Development in cooperation with VASOS.

Schedule and Evaluation:

During the first permit cycle, Roanoke County provided stream school seminars and coordinated a monitoring program with Virginia Save Our Streams in different BMPs. After evaluation of these BMPs, the County determined that these two BMP's fulfilled similar goals and should be combined into one BMP for stream monitoring and education.

Roanoke County proposes to cooperate with the local Virginia Save Our Streams chapter 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 Save Our Streams Program will create a database that will track the number of streams monitored, monitoring locations, the number and type of groups participating, and monitoring results. The database will be submitted to DCR in the annual report.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by tracking the number of streams that are monitored and their Benthic Macroinvertebrate monitoring score and the number of attendees present at the stream schools.

Items to be reported in the Annual Report:

- Number of streams monitored in Roanoke County using the Benthic Macroinvertebrate method.
- Reported score.
- 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 storm water and related water quality issues. Different programs will target appropriate grade levels and will be SOL correlated.

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:
During the first permit cycle, Roanoke County developed and provided a Storm Water Education Program for school children which met certain SOL's for the Roanoke County School System. Programs targeted appropriate grade levels. The County believes that this program was successful in teaching school age children about storm water issues and the benefits of storm water quality.

Roanoke County proposes to continue this program for the new permit cycle. The Storm Water Education Program for school children will be submitted in the Annual Report. The County will document how many children within Roanoke County 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 where reached to determine the most effective method.

Supporting Documents: Clean Valley Council Education Program List

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

Responsible Party: Department of Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County distributed posters, bumper stickers, flyers, fact sheets, and other items promoting the importance of stormwater quality to the citizens of Roanoke County. The County also proposed billboard utilization, and a public service announcement program to bring stormwater issues into every home in the County. The County did not have success with the billboards due to changes in the County zoning regulations. This BMP was discontinued.

The County proposes to combine the promotional merchandise BMP with the public service announcement BMP to create a Public Awareness Program that will incorporate the distribution of stormwater merchandise, the creation of public service announcements, work with local TV news networks to cover stormwater in the news media and other high visibility educational media to bring storm water quality issues to the attention of citizens of Roanoke County.

Supporting Documents: None

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:

- Audience statistics.
- Impact Indicators.
- Changes over the permit year.
- Conclusion of effectiveness of BMP and any modifications to this BMP based on the analysis of effectiveness.

BMP 1-6: Roanoke County Stormwater Webpage

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

Responsible Party: Department of Community Development

Schedule and Evaluation:

During the first permit cycle, Roanoke County developed a stormwater webpage where citizens could specifically get information concerning Roanoke County's Stormwater Management Program. The creation of the site was successful and it was expanded to encompass the stormwater program, watershed information, floodplain management, and other water quality issues.

Roanoke County proposes to continue to expand and update the website, and document the webpage usage, including the annual number of visits to each page. 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 DCR with 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:

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

BMP 1-7: Business Education Program

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

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:
During the first permit cycle, Roanoke County developed a stormwater quality education program for specific commercial businesses within the County and provided information to these businesses in an effort to increase business owner awareness of the impacts of illicit discharges into the County's storm sewer system.

Roanoke County proposes to continue this program by developing a list of target businesses and distributing information to business owners and personnel. The County will document the target businesses and the amount of information distributed. A review of the target audience and indicators of the effectiveness of the objectives will be completed. The County will submit the list of businesses and indicators to DCR in the annual report.

Supporting Documents: None

Measurable Goals:
Review the target audience and indicators of the effectiveness of the objectives.

Items to be reported in the Annual Report:
Submit the list of businesses and indicators to DCR in the annual report.

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 to the success of the storm water management plan. To garner this support, the County will be coordinating several programs to engage the citizen's interest in storm water quality. The programs are listed below:

- Coordinate a storm drain stenciling program designed to engage group involvement and educate people about the consequences of dumping waste into the storm drain system.
- Conduct a public event to bring attention to current stormwater issues and allow feedback from citizens on the condition of the County's stormwater program, from a citizen's point of view.
- Conduct a stormwater management program citizen's advisory committee to provide an approachable environment where ideas and concerns regarding the County's stormwater program may be shared and discussed. A member of the County's stormwater management team must be present.
- Continue to post Roanoke County's Stormwater Discharge permit and annual report on the County's website for citizens to download and read.

Included with this document is a detailed description of 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 2-1: Storm Drain Stenciling Program

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

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:
During the first permit cycle, Roanoke County worked with Explore Park and Clean Valley Council to coordinate a Storm Drain Stenciling Program with local organizations including schools and businesses.

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 more than 50 storm drains within the County of Roanoke.

Supporting Documents: None

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.

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

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:
During the first permit cycle, Roanoke County coordinated with Explore Park and Clean Valley Council to conduct a public forum meeting describing what the County is doing concerning stormwater management issues. The meetings allowed time for the County to receive input from the public on their concerns about storm water issues. After evaluating the success of the first permit cycle, the County believes that combining the forum with a storm water public event would improve effectiveness of the BMP by increasing the public attendance.

The County proposes to hold at least one public event to address stormwater issues and the County's progress towards storm water quality improvements. The event will allow time for the County to receive input from the public on their concerns about storm water issues and the County's Stormwater Management Program. The County will document the event, the participants and attendance. Using the attendance as an indicator, we will evaluate the effectiveness of the public event and how it supports the achievement of the goals of the event.

Supporting Documents: None

Measurable Goals:
The County will document the details of the event, the participants, and attendance. Success for this BMP will be measured by an increase in public attendance.

Items to be reported in the Annual Report:

- Participants and program itinerary.
- Attendance of citizens.
- Adjustments that are proposed to be made for the next annual period.

BMP 2-3: Stormwater Management Citizens Advisory Committee

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

Responsible Party: Community Development in conjunction with Clean Valley Council

Schedule and Evaluation:
During the first permit cycle, Roanoke County established a citizen advisory committee that met four times a year to be updated on the Stormwater Management Program, and to review educational materials and components of the stormwater program. This program was successful during the first permit cycle.

Roanoke County proposes to continue this citizen's advisory committee. This committee will continue to meet four times year to be updated on the Stormwater Management Program and to review educational materials and components of the stormwater program. After selected Citizens Advisory meetings, a short survey will be distributed to each member of the team to provide feedback on the impact that each meeting has on the individual.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by the attendance of the meetings and the feedback received on the post-meeting surveys.

Items to be reported in the Annual Report:

- Attendance of each meeting.
- Minutes of the meetings.
- A summary of the surveys will be submitted to DCR in the annual report in conjunction with any modifications that will be made to the program.

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

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

Responsible Party: Community Development

Schedule and Evaluation:
Roanoke County proposes to post the MS4 permit application on the stormwater website and also post each subsequent annual report submitted to DCR. The permit application will be posted no more than 30 days after the County receives permit approval and coverage from DCR. Each annual report will be posted to the website no more than 30 days after annual renewal date. Any appropriate correspondence between Roanoke County and DCR will also be posted to the website for the public to view.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by the successful posting of the MS4 permit and annual reports within the 30 day period.

Items to be reported in the Annual Report:

- Date of posting of Permit.
- Date of posting of Annual Reports.
- Comments received by citizens regarding MS4 permit on website.

MCM 3: Illicit Discharge Detection and Elimination

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 programs that have been established to complete this measure are listed below:

- A County-wide Storm Sewer Map in the GIS database has been completed for all known locations of municipal storm sewer systems. The Roanoke County Storm Sewer Database will be maintained so that a map of all the public storm sewers in the County will be available to the public.
- A Roanoke County Illicit Discharge Program will be established which will include policy, procedures, reporting, and enforcement measures for illicit discharges.
- The Stormwater Management Ordinance includes language prohibiting non-stormwater discharges into the storm drain system.

Included with this document 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

To establish a program to continue to develop a storm drain map which identifies all of the municipal separate storm sewers within the County of Roanoke which discharge to natural drainage-ways.

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County completed a storm drain map that showed the location of all known storm drain structures and outfalls.

Roanoke County proposes to continue this program by expanding and updating the storm sewer map of Roanoke County. In addition to locating any new storm sewer outfalls, the map will also update the existing map to show the current outfalls and their associated Hydrologic Unit Code (HUC) of the waters that are being discharged to, and the names and locations of all the impaired surface waters that receive discharges from these systems. The County will also estimate the acreage within the regulated storm sewer system discharging to each outfall.

Supporting Documents: None

Measurable Goals:

Success for this BMP will be measured by meeting the goal for each reporting year. At the end of Year 1, 25% of the known storm sewer system will be expanded with the HUC, impaired water, and estimated acreage draining to the storm sewer outfall. At the end of Year 2, 50% will be updated. By Year 3, 75% will be updated and by Year 4 100% of the outfalls will be updated with the HUC, impaired water, and estimated acreage draining to the outfall.

Items to be reported in the Annual Report:

- Number of new structures located.
- Percent of known storm sewer system outfalls updated with HUC, impaired water, and drainage acreage.
- Analysis of progress.
- Adjustments needed to be made to the program, based on analysis of the progress.

BMP 3-2: Illicit Discharge Ordinance

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

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County adopted an ordinance prohibiting illegal discharges into the storm drain system. Roanoke County's Stormwater Ordinance includes language that regulates illicit discharge that has been adopted and will become effective on January 1, 2008.

Roanoke County proposes to annually evaluate this ordinance to keep it in compliance with any changes to regulations being made at the State level.

Supporting Documents: County of Roanoke Stormwater Management Ordinance

Measurable Goals:
Success for this BMP will be measured by the continued compliance of the County of Roanoke Stormwater Management Ordinance with the rules and regulations of the Virginia Department of Conservation and Recreation.

Items to be reported in the Annual Report:

- Analysis of compliance of the Roanoke County Stormwater Management Ordinance.
- Any changes that are planned to the Ordinance to continue remain in compliance with Virginia regulations.

BMP 3-3: Illicit Discharge Program

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

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

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County performed a pilot project for the detection of illicit discharge in a highly commercialized area. This was performed by completing dry weather visual inspections of all storm drains 12-in and larger with suspicious dry weather flows. This project was a successful training technique, but no illicit connections were found.

Roanoke County proposes to continue this effort by developing County procedures to detect, address, and report illicit discharges that enter the municipal separate storm sewer system.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by the successful completion of the goals listed below:

Goals:

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

Items to be reported in the Annual Report:
The steps the County has taken in the process of developing, implementing, and enforcing a program to detect illicit discharges will be included in the Annual Report.

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:

- An Erosion and Sediment Control Ordinance to require erosion and sediment controls, as well as sanctions to ensure compliance, under local law for all land disturbances of 2,500 square feet or more.
- E&S Ordinance includes requirements of construction site operators to implement appropriate erosion and sediment control best management practices.
- Procedures for site plan review which incorporate consideration of potential water quality impacts, consideration for information provided by the public, and site inspection and enforcement procedures.

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

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, Roanoke County adopted an Erosion and Sediment Control Ordinance to reduce construction pollutants in its storm water runoff. This ordinance is fully compliant with the State requirement that land disturbances greater than one acre must be regulated. The Roanoke County E&S Ordinance requires erosion and sediment 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.

Roanoke County proposes to annually evaluate this ordinance to keep it in compliance with any changes to regulations being made at the State level. The County will track the total number of regulated land-disturbing activities and the total acreage disturbed will be included in the County's records.

Supporting Documents: Roanoke County Erosion and Sediment Control Ordinance

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 compliance of the Roanoke County Erosion and Sediment Control Ordinance.
- Any changes that are planned to the Ordinance to continue remain in compliance with Virginia State regulations.
- 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 current Erosion and Sediment Control certified employees and develop a program for additional certifications and cross-training.

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, the County of Roanoke allocated staff for plan review and inspection. It has maintained Erosion and Sediment Control Certified employees to be involved in the plan review, inspection, and enforcement processes.

Roanoke County proposed to continue this program to identify the positions needing a certified E&S employee and to identify those employees currently certified in Erosion and Sediment Control practices.

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 needing a certified E&S employee.

Items to be reported in the Annual Report:

- Number and Title of position needing an E&S certified employee.
- List of Employees and Titles that have current E&S certification.
- Total number of positions identified as in need of E&S certification that do not have appropriate certification.

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

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

- Roanoke County has developed a Stormwater Management Ordinance and Design Manual which addresses storm water runoff from new development and redevelopment. This manual includes regulations and design standard for the design, construction, and maintenance of water quality best management practices.
- The County has developed a program to identify, track, and inspect all known permanent stormwater management facilities that discharge to the municipal storm sewer system.
- The County will also encourage and track any developments to be designed utilizing low impact development principles.

Included with this document is a detailed description of 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 enforce an ordinance and design manual that requires stormwater runoff to be addressed. These documents ensure that controls are in place that would prevent or minimize water quality and quantity impacts due to new developments and redevelopments.

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, the County of Roanoke developed the Stormwater Management Ordinance and Manual which were both adopted and will become effective on January 1, 2008. In conjunction, these documents provide the regulations needed to require development projects to address water quality and quantity. Both documents are in compliance with the Virginia Stormwater Management Act and attendant regulations and encourage the use of low impact development.

Roanoke County proposes to enforce this program, beginning on January 1, 2008. The Stormwater Management Ordinance regulates new development and redevelopment projects of 5,000 square feet and larger. The Stormwater Management Design Manual details structural and non-structural best management practices (BMPs) that are appropriate for this region. The Ordinance requires the designation of a responsible party who is legally bound to inspect and maintain the best management practices. These documents will be evaluated annually to ensure continual compliance with Federal and State Regulations.

Supporting Documents: The County of Roanoke Stormwater Management Ordinance & The County of Roanoke Stormwater Management Design Manual

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 Ordinance to continue to remain in compliance with Federal and Virginia State regulations.

BMP 5-2: Stormwater Management Facility Inspection Program

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

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, the County of Roanoke conducted an inventory of structural runoff controls and developed procedures for the Stormwater Management Facility Inspection Program.

Supporting Documents: Roanoke County Stormwater Ordinance, Roanoke County Stormwater Management Design Manual, Stormwater Facility Maintenance Agreement and Roanoke County Land Development Regulations

Measurable Goals:
Success for this BMP will be the successful inspection of stormwater facilities on schedule with the Inspection Program Procedures.

Items to be reported in the Annual Report:

- Number of known stormwater management facilities in the inventory.
- Number of inspection performed.
- Evaluation of the program and any modifications to the program to improve effectiveness.

BMP 5-3: Low-Impact Development Utilization

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

Responsible Party: Community Development

Schedule and Evaluation:

Roanoke County proposes to document and track the number development projects and total acreage that have been developed using Low Impact Development principles in each HUC.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by the continual increase in development projects that are developed using Low Impact Development principles.

Items to be reported in the Annual Report:

- Number and size of Low Impact Developments.
- The associated HUC for each development.
- Total number of Roanoke County that utilized Low Impact Development.

MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations

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

- Roanoke County has developed Spill Prevention and Control Plans for all of its municipal facilities. These plans will be updated and annual training will be completed.
- 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.
- Roanoke County will continue to provide a program for storm sewer maintenance.
- Roanoke County will continue the pollution prevention and hazardous waste training for County employees, maintenance workers, and landscaping crews, and encourage additional pollution prevention training to be attained by County employees.

Included with this document is a detailed description of 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 6-1: Spill Prevention and Control Plans

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

Responsible Party: Community Development

Schedule and Evaluation:
During the first permit cycle, the County of Roanoke completed spill prevention and pollution control plans for all existing County facilities.

Roanoke County proposes to update these spill prevention plans and create new plans for the new County facilities. Training for associated facilities will be performed for the County employees affected by the spill prevention plan.

> ***Year 1:*** *Evaluate existing Spill Prevention Plans and determine areas that need additional information. Determine what new County facilities are in need of a Spill Prevention plan.*
> ***Year 2:*** *Complete Spill Prevention Plans for all new County facilities.*
> ***Year 3:*** *Update Spill Prevention Plans for all County facilities.*
> ***Year 4:*** *Re-evaluate all Spill Prevention Plans for areas needing additional training or information.*

Supporting Documents: Spill Prevention and Pollution Prevention Plans for Existing County Facilities

Measurable Goals:
Success for this BMP will be measured the completion of the goal allotted for each year and the achievement of Spill Prevention and Pollution Control Plans for all County facilities.

Items to be reported in the Annual Report:

- Summary of evaluation of Spill Prevention and Pollution Control Plans.
- List of new facilities in need of Spill Prevention Plans.
- List of completed Spill Prevention Plans.
- Evaluation of Spill Prevention Plans.

BMP 6-2: Household Hazardous Waste Event

The goal of this BMP is to encourage and identify strategies 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:

During the first permit cycle, the County of Roanoke successfully participated in multiple annual Household Hazardous Waste Collection Events. The County collected large amounts of household hazardous wastes in addition to distributing information regarding the responsible disposal of household wastes, and alternatives to using hazardous materials around the home.

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

Responsible Party: Community Development Stormwater Operations and Maintenance

Schedule and Evaluation:

During the first permit cycle, the County of Roanoke successfully maintained a program for the maintenance of the storm sewer system. Two full time crews were devoted to repairing, maintaining and upgrading the regulated storm sewer system.

Roanoke County is committed to continuing this program. The number of large storm water projects will be documented. In addition, documentation of the number of emergency projects and small scale maintenance projects that the storm water maintenance crews will be completed each year.

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 have been completed to maintain the storm sewer system.

Items to be reported in the Annual Report:

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

BMP 6-4: Pollution Prevention and Hazardous Waste Training

The goal of this BMP is to develop and maintain pollution prevention and Hazardous Waste Training for County employees, grounds maintenance workers, and landscaping crews.

Responsible Party: Community Development and Human Resources

Schedule and Evaluation:

The County of Roanoke currently maintains basic hazardous waste training for employees in Fire and Rescue. The County's Environmental Assessment Team (EAT) is a team responsible for establishing and maintaining the environmental management and ensures its conformance with state laws. The County's EAT is also involved in specifying hazardous waste training for applicable positions within the County. All County employees receive environmental awareness and management training. Human Resources ensure this training is delivered to all County full and part-time employees. The training includes: the County's environmental policy and system to manage environmental resources, identification of potentially significant environmental impacts, environmental objectives and targets, and employee roles and environmental responsibilities.

Roanoke County considers this BMP to be successful and proposes to continue this program. Roanoke County will update the pollution prevention and hazardous waste training for County employees, maintenance workers, and landscaping crews, and encourage additional pollution prevention training to be attained by County employees. The total number of new employees to receive this training will be documented in addition to the total number of employees trained to date.

Supporting Documents: None

Measurable Goals:
Success for this BMP will be measured by the number of County employees that receive this training.

Items to be reported in the Annual Report:

- Number of new County employees that received this training.
- Total number of County employees that have received this training.