ROANOKE COUNTY
Total Maximum Daily Load (TMDL) Action Plan

For Benthic (Sediment) Reduction in the Roanoke River

MS4 General Permit No. VAR040022

JULY 1, 2015

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I. EXECUTIVE SUMMARY

This Roanoke County Total Maximum Daily Load (TMDL) Action Plan for Sediment Reduction in the Roanoke River (Sediment Action Plan) has been prepared as required by Roanoke County's General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (General Permit No. VAR040022).

Roanoke County's strategy is to progressively implement Best Management Practices (BMPs) to decrease the amount of sediment that enters County waters in order to meet Virginia state water quality standards for aquatic life. Roanoke County will implement BMPs over multiple state permit cycles and demonstrate that adequate progress is being made to reduce sediment discharges. As additional information is obtained from DEQ monitoring or other sources, an adaptive iterative approach will be used to modify BMPs implementation as appropriate.

Following is a tabulation of the BMPs that Roanoke County currently plansto implement to decrease discharges of sediment along with their anticipated estimated implementation schedule. Note that all of the BMPs used to address sediment are also effective in addressing the County's E.coli wasteload allocations and are also included in the Roanoke County TMDL Action Plan for E.coli Reduction in the Roanoke River, Ore Branch, Tinker Creek, Glade Creek, Carvin Creek, and Lick Run (Bacteria Action Plan).

BMP Designation	BMP Name/Task	Estimated Implementation Dates
T-1	Initial Streams Assessment and BMP Planning	Underway – Anticipated completion Aug 2018
T-2	Enhanced Public Education and Outreach (Sediment)	Underway
T-3	Enhanced Employee Training (Sediment)	Underway
T-4	County Facilities Assessments and Corrections Screen Facilities/Schedule Assessments Perform 1/3 Assessments Perform 2/3 Assessments Perform all Assessments	 Completed By June 2015 By June 2016 By June 2017
T-5	Not Applicable	
T-6	Erosion and Sediment Control Enhanced Enforcement Evaluate Policies Implement Changes (If Needed)	 By June 2017 To be Determined
T-7	Not Applicable	
T-8	Not Applicable	

BMP Designation	BMP Name/Task	Implementation Dates (Start – Finish)
T-9	Not Applicable	
T-10	Stream Buffers Research Ordinances Identify possible Impacted Properties Obtain Public Input Discuss with Board of Supervisors Prepare Ordinance for Board Consideration	 By June 2017 By June 2017 By Dec 2017 By December 2017 By June 2018
	Capital Improvements Identify Feasible Capital Projects Construction	This will be an ongoing activity. Identify initial capital projects anticipated by July 2017. To Be Determined

This Sediment Action Plan has been prepared by Roanoke County staff and approved by the County Administrator. However, nothing in this Action Plan shall be construed as binding Roanoke County to any action until such time that the Roanoke County Board of Supervisors provides final approvals and/or appropriates funding for implementation.

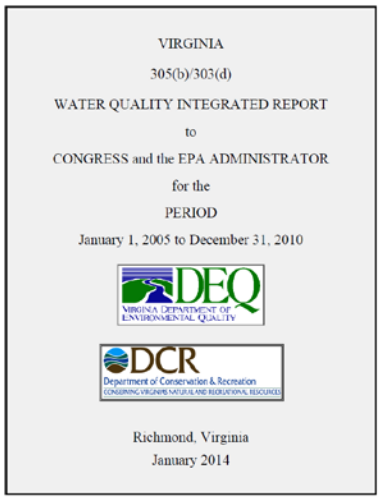
This Plan commits to study, and consideration of new ordinances, but it does not commit the Board of Supervisors to adoption of any specific ordinance or requirement.

It is expected that this Sediment Action Plan will be revised from time-to-time to add and/or delete proposed BMPs, revise estimated implementation dates, and to reflect new information. Revised Sediment Action Plans will be submitted to DEQ with the MS4 Permit Program Annual Report that is due to DEQ by October 1 of each year.

II. BACKGROUND

A. General

The Virginia Department of Environmental Quality (DEQ) routinely monitors and tests the Commonwealth's waters (streams, rivers, lakes, and estuaries) to confirm that they meet Virginia's water quality standards (9 VAC 25-260-10). According to Virginia Water Quality Standards *"all state waters are designated for the following uses: recreational uses (e.g., swimming and boating); the propagation and growth of a balanced indigenous population of aquatic life, including game fish, which might be reasonably expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish)."*


VIRGINIA
305(b)/303(d)
WATER QUALITY INTEGRATED REPORT
to
CONGRESS and the EPA ADMINISTRATOR
for the
PERIOD
January 1, 2005 to December 31, 2010
DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
DCR
Department of Conservation & Recreation
Richmond, Virginia
January 2014

Where DEQ determines that a water does not meet Virginia's water quality standards, the water is termed "impaired". Impaired waters are listed on the Virginia Water Quality Assessment 305(b)/303(d) Integrated Report that is issued on even-number years to meet the requirements of the U.S. Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information and Restoration Act. *Roanoke County has 16 different streams, including the Roanoke River that have 28 identified impairments.*

DEQ performs studies on impaired waters to determine the "total maximum daily load" that the water can assimilate and still meet water quality standards. These studies are called TMDL studies. TMDL studies assign "waste load allocations" (WLAs) to permitted point sources of pollution. WLAs are numerical limits of a pollutant of concern that a permitted point source must meet by implementing appropriate strategies, or Best Management Practices (BMPs) using the adaptive iterative approach. BMPs may be implemented over multiple state permit cycles as long as adequate progress to reduce the pollutant of concern is documented.

Roanoke County has coverage under the Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit); General Permit No. VAR040022. Through this permit, all stormwater that passes through a County owned or operated storm drain or improved channel; and that are located within the urban parts of the County as designated in the 2010 U.S. Census are considered to be a point source discharge and are subject to WLAs, where appropriate.

The Roanoke River from the confluence with Mason Creek to the backwater from Niagara Dam has WLAs for sediment. Within Roanoke County; Tinker Creek, Murray Run, Mudlick Creek, and Mason Creek are identified as impaired by excessive sediment. These tributary streams do not have separate WLAs, but they are considered to be "nested" within the Roanoke River WLAs. The Roanoke River does not properly support aquatic life due to the excessive sediment. Excessive sediment settles over stream bottoms, removing habitat and smothering macroinvertebrates that form the foundation of the aquatic food chain for fish.

Examples of Intolerant Benthic Macroinvertebrates

Section I.B. of the MS4 Permit requires Roanoke County to have an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in approved TMDLs.

This specific TMDL Action Plan addresses reduction of sediment discharged into the Roanoke River. Although only the Roanoke River has a WLA for sediment, sediment discharges into all streams that are tributary to the Roanoke River must be decreased.

This TMDL Action Plan becomes effective and enforceable under Roanoke County's MS4 Permit 90-days after it is received by DEQ, unless DEQ specifically denies it in writing.

This Sediment Action Plan has been prepared by Roanoke County staff and approved by the County Administrator. However, nothing in this Action Plan shall be construed as binding Roanoke County to any action until such time that the Roanoke County Board of Supervisors provides final approvals and/or appropriates funding for implementation.

Many of the proposed BMPs include new ordinances that require Board of Supervisors actions for adoption. This Plan commits to study and consideration of new ordinances, but does not commit the Board of Supervisors to adoption of any specific ordinance or requirement.

It is expected that this Sediment Action Plan will be revised from time-to-time to add and/or delete proposed BMPs, revise estimated implementation dates, and to reflect new information. Revised Action Plans will be submitted to DEQ with the MS4 Permit Program Annual Report that is due to DEQ by October 1 of each year.

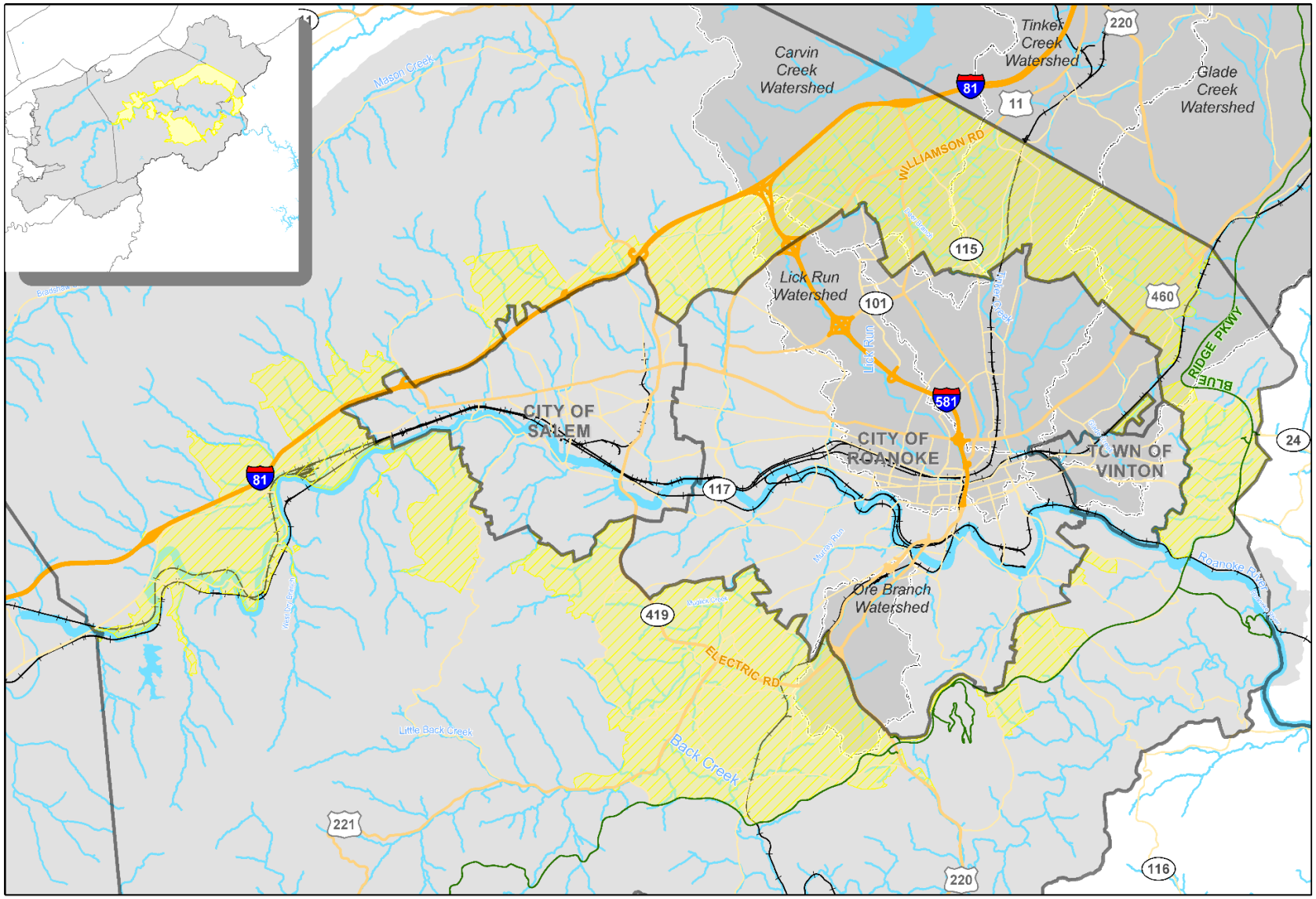
B. Roanoke River Watershed Description

The Roanoke River originates in Montgomery County; flows through Roanoke County, Salem City, Roanoke City, and Town of Vinton; then flows through Roanoke County again; and continues into Bedford and Franklin Counties and Smith Mountain Lake.

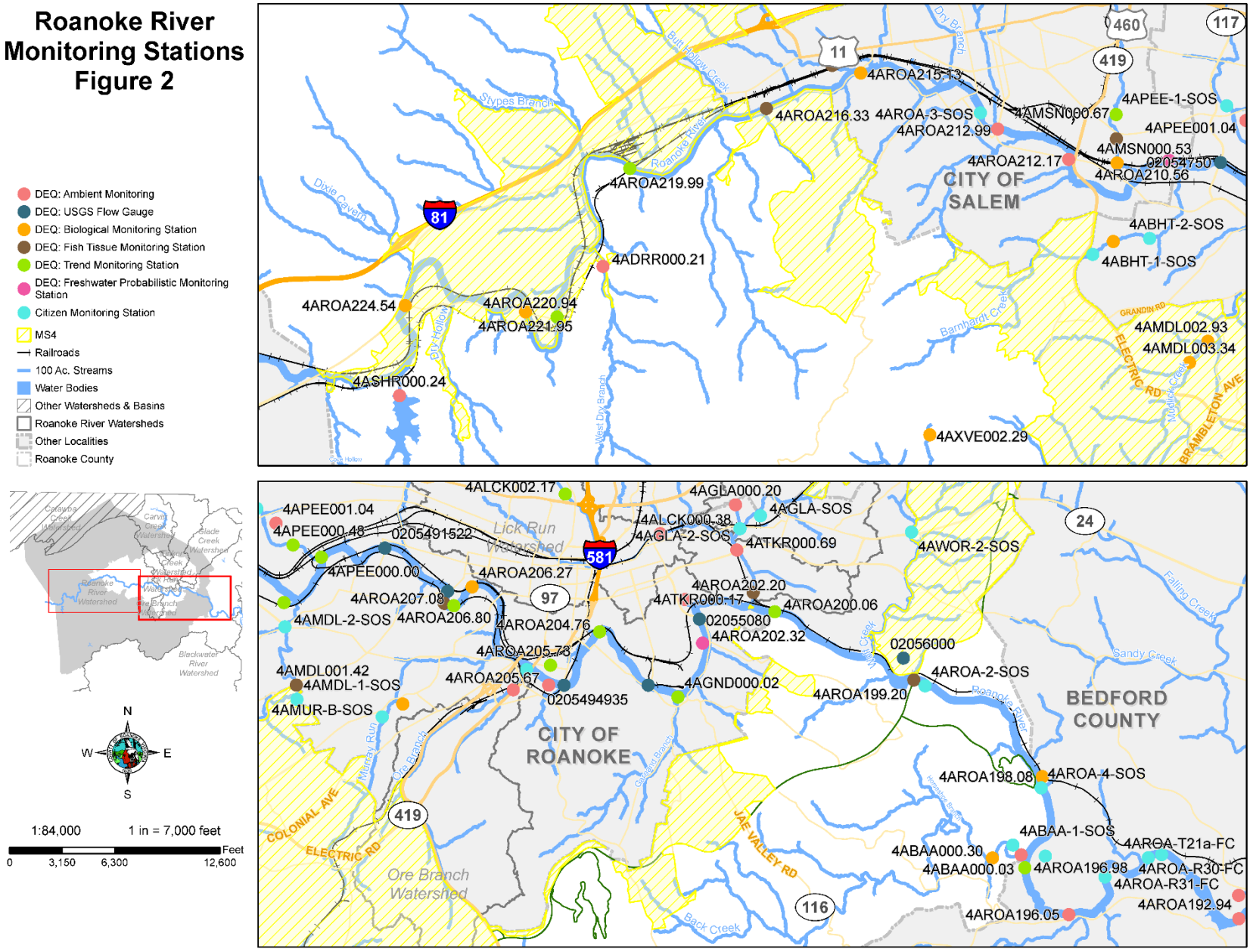
All of Roanoke County, except for the northern part of the Catawba Valley, flows into the Roanoke River.

Within Roanoke County, the watershed contains 50.5 square miles within the MS4 regulated area, and 174.4 square miles outside of the MS4 regulated area. There are approximately 13.2 miles of river, within the regulated MS4 area; and approximately 2.7 miles of river, outside of the regulated MS4 area. Within Roanoke County, the river is fed by approximately 122.2 miles of streams, with drainage areas of 100 acres or greater, within the regulated MS4 area; and approximately 315.5 miles of streams, with drainage areas of 100 acres or greater, outside of the regulated MS4 area. See Figure 1, Roanoke River Watershed Map.

See Figure 2, Roanoke River Monitoring Stations for locations of DEQ monitoring stations on the Roanoke River.


Carvin Creek Watershed
Tinkel Creek Watershed
Glade Creek Watershed
Lick Run Watershed
Ore Branch Watershed
CITY OF SALEM
CITY OF ROANOKE
TOWN OF VINTON
WILLIAMSON RD
ELECTRIC RD
BLUE RIDGE PKWY
Mason Creek
Lick Run
Back Creek
Little Back Creek
81
220
11
115
101
460
581
24
117
419
221
116
MS4 Area
Supplemental Watersheds
Roanoke River Watershed
Roanoke River Watershed
Figure 1
1:126,720 1 in = 2 miles
Miles
0 1 2 4
N
W E
S

Roanoke River Monitoring Stations Figure 2



C. Impairment and TMDL Wasteload Allocation

The Roanoke River, Tinker Creek, Murray Run, Mudlick Creek, and Mason Creek were listed as "impaired" because they did not meet the Virginia water quality standard for wildlife habitat as measured using the modified Rapid Bioassessment Protocols (EPA, 1999). Streams are required to support the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them. Sediment was identified as the probable stressor pollutant that is adversely impacting macroinvertebrates (benthic organisms).


Benthic TMDL Development
for the Roanoke River, Virginia

Submitted to
Virginia Department of Environmental Quality

Prepared by

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Washington, DC 20037

March 2006

A TMDL study was performed and approved by U.S. EPA on 5/10/06 and the Virginia State Water Control Board on 9/7/06. This study determined that the Roanoke River has a "moderately impaired benthic community from the confluence with Mason Creek to the backwater from Niagara Dam."

Roanoke County was assigned a WLA of 1,680 tons of sediment/year.

D. Roanoke River Bacteria and Sediment TMDL Implementation Plan, Part 1

DEQ released the draft Roanoke River Bacteria and Sediment TMDL Implementation Plan, Part 1 on May 1, 2015 for public comment. Roanoke County attended meetings and provided comment during the development of this Implementation Plan. While Roanoke County supports the goals of the Implementation Plan, it has expressed concerns about the technical feasibility of the Implementation Plan's proposed BMPs and their related costs.

III. IMPLEMENTATION STRATEGY

For this permit cycle (July 1, 2013 – June 30, 2018), implementation largely consists of the development of this TMDL Action Plan, study of the County's streams, consideration of changes to ordinances, preparation and adoption of ordinances, and enhancements to existing MS4 Program BMPs required by the minimum control measures.

Detailed estimated implementation schedule for this permit cycle is provided in Section VI of this TMDL Action Plan. Further implementation this permit cycle, is constrained by our lack of information, which will be addressed through our proposed stream assessments; and staff and budget constraints. Roanoke County is also still coping with the impacts from implementing the new stormwater management regulations and serving as the Virginia Stormwater Management Program local authority, effective July 1, 2014; and the impacts from implementing additional MS4 Permit requirements that became effective with the current permit.

The overarching strategy is to progressively implement BMPs to decrease the amount of sediment that enters County waters. Roanoke County will implement BMPs over multiple state permit cycles, using the adaptive iterative approach, and demonstrate that adequate progress is being made to reduce sediment discharges.

As additional information is obtained from DEQ monitoring or other sources, an adaptive iterative approach will be used to modify BMPs implementation as appropriate.

IV. ONGOING AND PLANNED STUDIES AND MONITORING

The goal of this Sediment Action Plan is to reduce sediment discharged into the Roanoke River to meet the Virginia water quality standards. The TMDL WLAs are a numeric tool used to gauge progress toward reaching this goal; however, the goal is to meet the Virginia water quality standards. Therefore, ongoing DEQ monitoring is important to assess actual long-term progress in improving aquatic habitat.

A. Roanoke County Outfall Inspections

Roanoke County as a part of its illicit discharge program, minimum control measure 3, inspects and field screens a minimum of 50 outfalls a year. These outfalls are dispersed throughout the MS4 regulated portion of the County. Where illicit discharges are detected, appropriate follow-up investigations will take place to locate and eliminate them. While this program will continue, it is unlikely that it will locate significant sediment sources. To this date, all of our outfalls have been dry when inspected, and no illicit discharges have been detected.

B. DEQ Monitoring

DEQ has a number of monitoring stations set up in the Roanoke Valley that are periodically sampled and tested under various programs. These monitoring stations are indicated on the individual watershed maps. Many monitoring station locations are used by multiple sampling and testing programs.

The analytical information from these programs are assessed every 2-years (i.e. even numbered years) to identify and list "impaired and threatened waters" as required by Section 303(d) of the federal Clean Water Act. Each bi-annual assessment uses analytical information gathered over a 6-year sampling and testing cycle, with a 2-year lag (i.e. the 2014 assessment is based on data from 2012 – 2007). Long-term progress toward meeting state water quality standards will be based on the ongoing results of DEQ's monitoring programs.

Following is a brief discussion of DEQ's various monitoring programs.

1. Ambient Watershed Network

The ambient watershed network was originally established to monitor point source problems (primarily municipal wastewater treatment plants and industries). It has evolved into a watershed monitoring network. Monitoring stations are typically at bridges, or other locations, where convenient access is present for sampling. There is typically one station for each 6 digit Hydrologic Unit Code (HUC). These stations are used for screening level information. Only limited testing is performed including: E.coli, temperature, pH, conductivity, nitrogen, and phosphorus. Ideally, each station is sampled bimonthly over a two-year period (12 data points)

within a 6-year assessment window. If sampling and testing are performed at a location under another program (e.g. biological or probabilistic), then sampling and testing under the Ambient Watershed Network may be skipped. This program is not very applicable to sediment.

2. Trend Monitoring Stations

The trend monitoring stations have the longest continuous data records. Some of the monitoring stations were originally established in the 1940's. These stations are useful for looking for long-term trends. Testing includes: pH, temperature, dissolved oxygen, conductivity, fecal and E.coli bacteria, nitrogen, phosphorus, total suspended solids, total solids, and turbidity. They are sampled bimonthly every year. While these stations do test for total suspended solids and total solids, it is very difficult to detect any trends for sediment from these short term grab samples.

3. Biological Monitoring

Biological monitoring consists of sampling and characterizing benthic macroinvertebrates. Benthic macroinvertebrates are organisms without backbones that are visible to the eye without the aid of a microscope, that live on, under, and around rocks and sediment on the bottoms of lakes, rivers, and streams. Many of the benthic macroinvertebrates have complex life cycles of one-year or more and they are extremely sensitive to pollutants. In essence, benthic macroinvertebrates are virtual "living recorders" of water quality conditions over time. By analyzing the presence, or absence, of various organisms, the overall ecological health of a stream can be assessed.

The Roanoke River, in the Roanoke Valley has 5 biological stations that are usually monitored each year, once in the spring and once in the fall. Other biological stations in the Roanoke Valley are monitored very infrequently.

This monitoring program is valuable to detect long-term trends in stream bio-diversity that may result from decreased sediment discharges.

4. Freshwater Probabilistic Monitoring

The other monitoring programs are biased to finding and defining problems (i.e. monitoring stations are set up near industries or wastewater treatment plants). In order to obtain unbiased statewide water quality statistics, the freshwater probabilistic monitoring program was established. Fifty to sixty locations are randomly selected across the state for sampling in the spring and fall. This program performs the most comprehensive testing, including: pH, temperature, dissolved oxygen, conductivity, fecal and E.coli bacteria, nitrogen, phosphorus, dissolved metals, total suspended solids, total solids, turbidity, ions, cations, fish community, algae community, biological assessment, and quantitative physical habitat. This program is not very applicable to sediment.

5. Citizen Monitoring

Various citizen groups volunteer to perform stream monitoring in various streams across the state. In most cases, the monitoring is biological and the results do not meet DEQ's rigorous quality control requirements. Therefore, these results are not used by DEQ in listing or

delisting streams for impairments; but they might be useful to identify a potential problem that warrants further DEQ investigation.

This program may provide some valuable information in detecting trends in improving or declining stream bio-diversity that may be related to sediment.

6. Fish Tissue Monitoring

Fish tissue monitoring is performed for special studies to determine if fish are accumulating any toxics, such as mercury or PCBs, which would warrant consumption advisories.

This program is not applicable to this TMDL Action Plan.

7. TMDL Monitoring

TMDL monitoring stations are established when special studies are performed to set a Total Maximum Daily Load (TMDL). Once a TMDL is established, this program becomes inactive.

8. Implementation Monitoring

A TMLD Implementation Plan is performed by DEQ after a TMDL has been established. Once a TMDL Implementation Plan is completed, DEQ performs implementation monitoring to assess progress towards meeting the TMDL. Usually the same stations that were used in the TMDL study are used for implementation monitoring.

Currently, DEQ is completing an Implementation Plan for the Upper Roanoke River Basin for sediment and E.coli. It is anticipated that implementation monitoring will occur after the Implementation Plan is completed.

This program will be the most important is assessing the progress toward improving aquatic bio-diversity by decreasing sediment discharges.

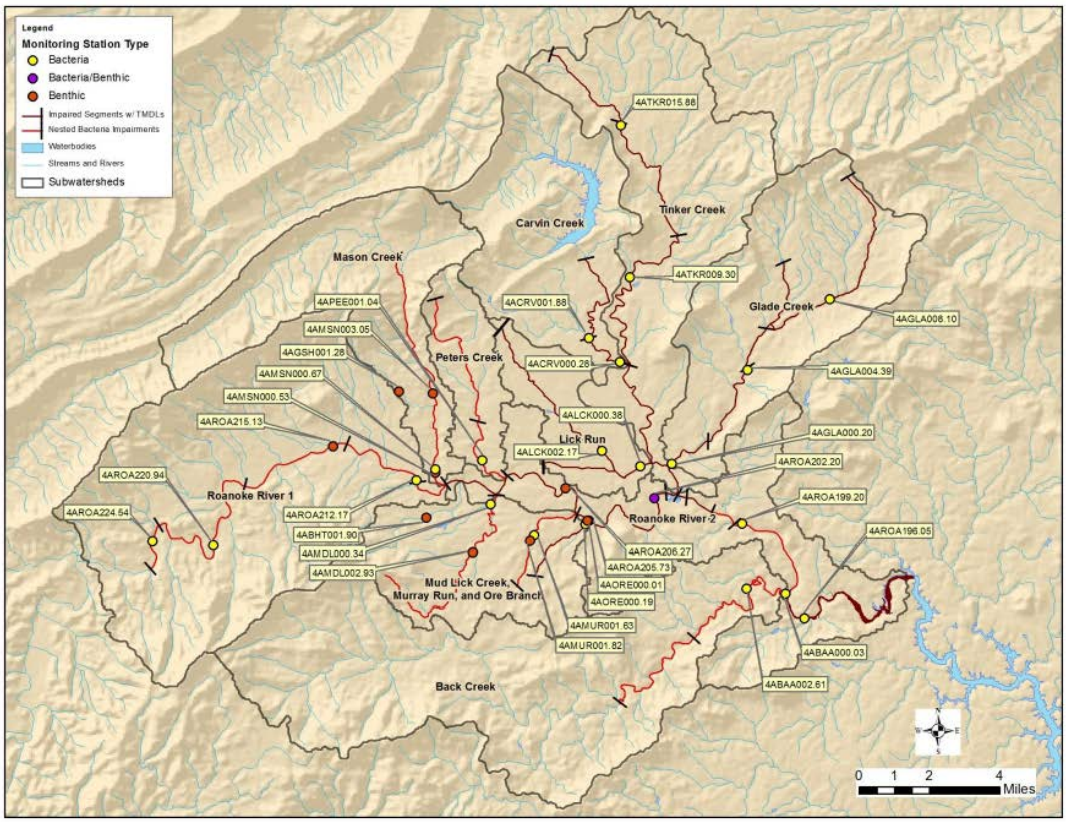


Figure 6-5: Monitoring Station Map for the Roanoke River Implementation Plan Part I

DEQ Proposed Monitoring Stations taken from the April 2015 draft of the Roanoke River Implementation Plan, Part 1

9. United States Geologic Survey (USGS) Monitoring

The USGS has several monitoring stations that record stream flow.

C. Stream Assessments

Lowering pollutant loadings to meet the waste load allocations will require significant public investment. In order to properly prioritize spending, Roanoke County proposes performing field and office investigations to document existing physical conditions and to identify opportunities for BMPs.

The entire length of the Roanoke River, in the Roanoke Valley, has TMDL WLAs of one type or another. All of the streams in Roanoke County, except for the northern Catawba Valley area drains into the Roanoke River. Therefore, it is important to understand the conditions of all of these streams in order to properly address all of the County's TMDL WLAs.

Stream Assessment is discussed further in Section VI.

V. COUNTY LEGAL AUTHORITIES

Section I.B. of the MS4 Permit requires Roanoke County to maintain a list of its legal authorities, such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements applicable to reducing pollutants contained in a WLA. Following is the listing for Roanoke County:

- Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit); General Permit No. VAR040022
- Roanoke County Code of Ordinances
    - Chapter 5, Animals and Fowl Ordinance
    - Chapter 8.1, Erosion and Sediment Control Ordinance
    - Chapter 23, Stormwater Management Ordinance
    - Chapter 24, Illicit Discharge Ordinance
    - Appendix A, Zoning Ordinance
- Contract Agreement with Clean Valley Council to provide certain Stormwater Education and Public Participation services to facilitate compliance with Minimum Control Measures 1 and 2 of the MS4 permit
- Contract with Pauley's Excavating & Demolition, Inc. to provide BMP Maintenance and Repair
- Contract with GKY & Associates, Inc.to provide Stream Assessments and Evaluation for Retrofits
- Stormwater Facility (BMP) Maintenance Agreements
- Contract with Wright Contracting, Inc. to design and construct the stream restoration of Glade Creek at Vinyard Park
- PPEA Final Agreement with HHHunt, Inc. to design and construct stream restoration of Murray Run at Ogden Road.

VI. TMDL SPECIFIC BEST MANAGEMENT PRACTICES WITH IMPLEMENTATION SCHEDULE

The following BMPs have been specifically identified to reduce discharges of sediment into County waterways. The BMPs listed below are also effective in reducing E.coli discharges. BMPs that specifically address TMDLs are designated with a "T" prefix.

A. Stream Assessment

BMP T1 – Initial Streams Assessment and BMP Planning
Roanoke County has approximately 135.4 miles of streams draining 100 acres or more, within its MS4 regulated area.

We propose to assess these streams to better understand their condition and to assist in determining the most cost-effective means of lowering pollutant loads.

In permit year 2014 – 2015, a consultant was hired to begin this task. This work includes office assessment using existing information, field assessment where appropriate, and prioritized recommendations for BMP implementation.

The initial stream assessments are in progress. At this time, Roanoke County anticipates that an initial assessment of the majority of streams within the MS4 area may be completed by August 2018.

Once the initial stream assessments are completed, Roanoke County will be better able to plan BMP capital improvements.

B. Enhanced Public Education and Outreach

BMP T2 - Enhanced Public Education and Outreach (Sediment)
This BMP will be implemented County-wide as an enhancement to the BMPs performed to satisfy Minimum Control Measure 1, Public Education and Outreach on Stormwater Impacts.

Roanoke County's Public Education and Outreach efforts have been enhancedby reshaping the programs and materials to focus on the County's three high-priority water quality issues: excess bacteria, sediments, and nutrients. BMP 1-7, entitled Targeted Education Program, describes the planned strategies that will be used to reach the various target audiences. The following table identifies the target audiences for sediment reduction, the messages to be delivered, the planned delivery means, and the rationale for selecting the identified audiences.

This BMP was implemented beginning with the 2014 - 2015 permit year.

Table 1. Targeted Education Program for Sediment Reduction

High-Priority Water Quality Issue	Target Audiences	Means to Determine Audience Size	Estimated Audience Size	Overall Messages	Means to Deliver Messages	Rationale
#1 SEDIMENT	Car Washing/Detail Facilities	Business Licenses/Yellow Pages	16	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	Commercial car wash facilities can contribute significant sediment if wash water is discharged into the County's MS4.
	Car Dealers	Business Licenses/Yellow Pages	20	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	Vehicle washing/detailing can contribute significant sediment if wash water is discharged into the County's MS4, which drains, untreated, to local streams. Residential car washing is specifically allowed; but, it still may contribute significant sediment if wash water is not properly handled.
	Auto Body Shops	Business Licenses/Yellow Pages	51	• All wash water to sanitary sewer. • Potential damage caused to streams by wash water.	• Mailer, annually • PSAs on local cable station	
	Homeowners	Tax Records	36,000	• Potential damage caused to streams by wash water. • Direct wash water to grass area for filtration and infiltration. • Never allow wash water to flow into street or storm drains.	• County Publication sent annually to homeowners • PSAs on local cable station • Handouts at local environmental events, 4 per year minimum	
	Contractors Involved in Land-Disturbing Activities	Community Development Permit Records	51	• Damage caused to streams by sediments. • Healthy fish populations require clear stream bottoms. • Silt fence is not enough. • Limit disturbed areas. • Stabilize as quickly as possible.	• Brochure given to land-disturbance permittee when permit is issued. • Brochure given with enforcement actions	Erosion and sediment control is required by regulations; however, more effective implementation may occur with additional education.

C. Enhanced Employee Training

BMP T3 – Enhanced Employee Training (Sediment)
This BMP will be implemented County-wide as an enhancement to the County employee training performed to satisfy Minimum Control Measure 6, Pollution Prevention and Good Housekeeping for Municipal Operations.

Roanoke County's employee training has been enhanced to recognize sediment as a "high-priority water quality issue." Training courses included the following, as discussed in the Annual Report in BMP 6-4:

- **Recognition and Reporting Illicit Discharges** - all applicable field personnel will receive training on a biennial basis in the recognition and reporting of illicit discharges. Among many potential illicit discharges, sediment and bacteria are identified as potential pollutants in this training.

- **Good Housekeeping and Pollution Prevention Practices** - all employees that perform road, street, and parking lot maintenance, or are employed in and around maintenance and public works facilities and at recreational facilities will receive biennial training in good housekeeping and pollution prevention practices. Sediment and bacteria are identified as potential pollutants in this training.

  NOTE: *All employees who were required to take Good Housekeeping and Pollution Prevention Practices were required to read and follow the County's Standard Operating Procedures (SOPs). These procedures were designed to eliminate or minimize pollutant discharges in stormwater.*

- **Contractor Oversight for Environmental Compliance** – all supervisors who oversee Contractors that perform work for the County or employees involved in developing contracts for Contractors will take this training on a biennial basis. The training explains that all Contractors must have their own written good housekeeping and pollution prevention program, or they must comply with the County's written policies and SOPs. This training discusses the significance of soil erosion from construction sites, the potential harm to receiving waters, and the need to use effective erosion and sediment controls. It also discusses the need to carefully place and maintain portable toilets onsite to ensure bacterial wastes do not enter stormwater runoff. County employees who oversee Contractors working for the County must ensure compliance by Contractors.

- **Hazardous Materials (HAZ-MAT) Training** – although not directly related to sediment reduction, the County of Roanoke currently maintains basic hazardous materials training for its employees, including volunteers, in Fire and Rescue. All career (paid) staff are certified to HAZ-MAT Operations. HAZ-MAT certification does not expire from the Virginia Department of Fire Programs; however all career personnel receive annual, internal training on this topic as part of their career development training.

This BMP was implemented beginning with the 2014/2015 permit year.

D. Assess County Facilities

BMP T4 – County Facilities Assessments and Corrections
All County properties have been screened for conditions that could result in elevated discharges of sediment. Those that have been determined to have a high potential will be inspected in the field and a site-specific Stormwater Pollution Prevention Plan (SWPPP) will be prepared. Any potential sources of elevated sediment discharge will be eliminated and steps taken to assure that they do not reoccur. Possible sources of sediment are improper materials storage and disturbed soils,

The initial screening of properties and estimated inspection schedule has been completed and is included in the MS4 Program Plan and as shown below. One log applies to Roanoke County properties; one applies to Roanoke Public School properties.

The site inspections and SWPPP preparation will be performed over a 3-year period with 1/3 performed in 2014 - 2015, 1/3 in 2015 - 2016, and the final 1/3 performed in 2016 - 2017.

For Permit Year 2 (2014 – 2015), SWPPPs were completed for the following facilities:

- Public Service Center at Kessler Mill
- Fleet Service Center
- Roanoke County Public Schools - Municipal Yards, covering the following sites
    - Small Engine Repair and Welding Shop
    - Transportation Dept. - Bus Maintenance Shop/parking Lot
    - Maintenance Dept. - Maintenance Shop, Warehouse, and Office

As can be seen from the logs below, five SWPPPs will be prepared in permit Year 3 (2015 – 2016) and six will be prepared in Permit Year 4 (2016 – 2017).

Roanoke County Public Schools - SWPPP PROGRAM PLAN AND LOG

Name of High-Priority Facility	Activities that make it High-Priority	High Potential of Discharging Pollutants (Yes or No)	Reasons for High Potential/ Or Not	Scheduled SWPPP Development	SWPPP Completion Date/or last Revision Date
Maintenance Dept. Shop, Office, Warehouse 702 South Market Street, Salem	Vehicle storage	No	Parking lot	7/1/15	June, 2015
Small Engine & Welding Shop 622 South Market Street, Salem	Vehicle storage	No	Parking lot	7/1/15	June, 2015
Transportation Dept. Bus Mintenance, Parking Lot 701 South Market Street, Salem	Vehicle maintenance	Yes	Exterior fueling & washing	7/1/16	June, 2015
Maintenance/Storage Facility Burton Center for Arts and Technology (BCAT)	Vehicle storage	No	Parking lot	7/1/16	
Cave Spring Bus Lot	Vehicle maintenance	Yes	Exterior fueling & washing	7/1/16	
Glenvar Bus Lot	Vehicle maintenance	Yes	Exterior fueling & washing	7/1/17	
Northside Bus Lot	Vehicle maintenance	Yes	Exterior fueling & washing	7/1/17	
Vinton Bus Lot	Vehicle maintenance	Yes	Exterior fueling & washing	7/1/17	

Roanoke County - SWPPP PROGRAM PLAN AND LOG

Name of High-Priority Facility	Activities that make it High-Priority	High Potential of Discharging Pollutants (Yes or No)	Reasons for High Potential/ Or Not	Department(s)	Scheduled SWPPP Development	SWPPP Completion Date/or last Revision Date
Kessler Mill Service Center	Store Equip/Fert; Public Works Yard	Yes	Exterior material and equipment storage	P,R,and T; GS, CD	By July 1, 2015	June, 2015
Starkey Park - Satellite Shop - Temporary storage	Store Fertilizers	No	No exterior storage, only ~3 pieces of equipment stored	P,R,and T		
Gearhart Maintenance Shop - Temporary Storage	Store fertilizers	No	No exterior storage, only ~3 pieces of equipment stored	P,R,and T		
Fleet Service Center	Vehicle maintenance	Yes	Heavy vehicle maintenance	GS	By July 1, 2015	June, 2015
#1 North County Fire and Rescue	Equipment washing, fueling activities	Yes	Exterior fueling and washing	F&R	By July 1, 2016	
#3 Cave Spring Fire	Equipment washing, fueling activities	Yes	Exterior fueling and washing	F&R	By July 1, 2016	
#5 Hollins Fire and Rescue	Equipment washing, fueling activities	Yes	Exterior fueling and washing	F&R	By July 1, 2016	
#6 Mount Pleasant Fire and Rescue	Equipment washing, fueling activities	Yes	Exterior fueling and washing	F&R	By July 1, 2017	
#9 Fort Lewis Fire and Rescue	Equipment washing, fueling activities	Yes	Exterior fueling and washing	F&R	By July 1, 2017	
EMS Training Facility	Chemicals used in training	Yes	Exterior training exercises with chemicals	F&R	By July 1 2017	

P,R, and T - Parks, Recreation, and Tourism
CD - Community Development
GS - General Services
F&R - Fire and Rescue

E. Erosion and Sediment Control Enhanced Enforcement

BMP T6 – Erosion and Sediment Control Enhanced Enforcement
Roanoke County currently operates a state-compliant erosion and sediment control program. When violations are observed, the County's priority is to work with the site operators to get the site back into compliance. Most of the time deficiencies are corrected within a mutually agreed upon time-schedule without any formal compliance activities or fines. The County has proposed for permit year 2016 – 2017 to evaluate the current enforcement policies to determine if they should be stiffened to be stricter with shorter allowable correction periods and more frequent civil penalties. The annual report submitted by October 1, 2017 will report on the results of this evaluation and provide the implementation schedule, if appropriate.

F. Stream Buffers

BMP T10 – Stream Buffers
Stream buffers can be effective in filtering stormwater runoff that sheet flows through the buffer, removing sediments, bacteria, and other pollutants. Unfortunately much of the land along County streams has already been developed, which limits where stream buffers could be provided. Roanoke County currently only has stream buffer requirements for new development along the Roanoke River (Roanoke River Overlay District).

We propose in permit year 2016 – 2017 to research similar ordinances, identify properties that border waterways in the County, and develop possible stream buffer criteria for new development. During permit year 2017 – 2018, public input will be sought and discussions will be held with the Board of Supervisors to obtain their direction. If the Board of Supervisors gives general concurrence, staff will prepare a draft ordinance and hold public meetings to obtain public input. We anticipate that a proposed Stream Buffer ordinance may be presented to the Board of Supervisors for their consideration near the end of permit year 2017 – 2018. In the event, that the Board of Supervisors decides not to enact any stream buffer ordinance, stream buffers/no mow strips will still be encouraged on a voluntary basis.

Additionally, in permit year 2017 – 2018, **BMP T2** will be expanded to include targeted education of the value of stream buffers to all property owners that are located along streams.

G. Capital Improvements

Roanoke County currently has two stream restoration projects under contract that are anticipated to significantly decrease in-stream erosion in the project areas. These two projects are 1) Restoration of Glade Creek in Vinyard Park, Phase 1; and 2) Restoration of Murray Run at Ogden Road. When completed, these two projects will have naturally restored approximately 4,000 linear feet of eroding stream and will serve as a component of the County's compliance with Section I.B.2.b of the MS4 permit. The implementation schedules for these two projects are listed below:

- Restoration of Glade Creek in Vinyard Park, Phase 1:
  - under design and permitting
  - project completion by December 31, 2016

- Restoration of Murray Run at Ogden Road:
  - under design and permitting,
  - project completion by December 31, 2016

At this time, Roanoke County does not have enough information on its streams to develop a valid capital improvement plan to identify future projects. We anticipate that by the end of permit year 2016 – 2017, enough evaluation of County streams may have been done to allow for the identification and prioritization of additional projects.

Stream Conditions Prior to Work
Stream Restoration of Mudlick Creek in Garst Mill Park, performed in 2008

Stream Conditions after Construction
Stream Restoration of Mudlick Creek in Garst Mill Park, performed in 2008

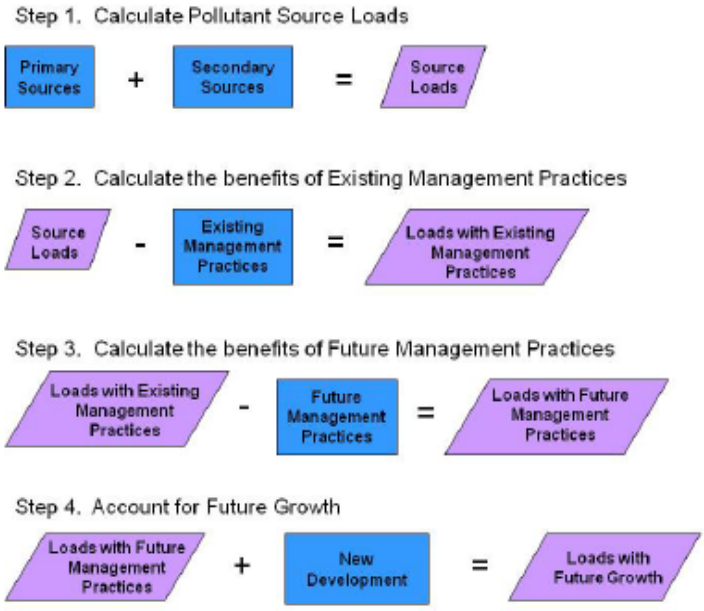
VII. PLAN ASSESSMENT METHODOLOGY

Section I.B. of the MS4 Permit requires Roanoke County to develop and implement a method to assess this Sediment Action Plan for its effectiveness in reducing the pollutant (sediment) identified in the WLA. The evaluation shall use any newly available information, representative and adequate water quality monitoring results, or modeling tools to estimate pollutant reductions of sediment from implementation of the MS4 Program Plan.

Roanoke County has been assessing pollutant loads using the Simple Method and watershed land uses as presented in its MS4 Annual Report.

Roanoke County plans on changing its plan assessment methodology to the Watershed Treatment Model, developed by the Center for Watershed Protection for the submission of the 2016 - 2017 annual report by October 1, 2017.

Roanoke County will also continue to review and evaluate any newly available information; including results of DEQ's ongoing water monitoring program, the County's outfall inspections, and the County's Stream Assessments.



Watershed Treatment Model Structure

VIII. ANNUAL REPORTING REQUIREMENTS

The MS4 Annual Report covers activities that occur from July 1st to June 30th, and it is due to DEQ by October 1st of each year.

The MS4 Annual Report will be updated to include this Sediment Action Plan, a description of implementation activities, and an assessment of the effectiveness in lowering sediment discharges.

IX. PERMIT REAPPLICATION REQUIREMENTS

Reapplication for coverage is due to DEQ at least 90 days before the expiration of the current General Permit on June 30, 2018. As a part of the reapplication submittal, this Sediment Action Plan will be revised to indicate the BMPs that will be implemented in the next permit cycle.

At that time, the Sediment Action Plan will be revised to include an estimated end date for achieving the sediment wasteload allocation. This estimate will be for planning purposes only and will not be binding.