

Total Maximum Daily Load (TMDL) Action Plan
For
Polychlorinated Biphenyls (PCBs) Reduction in the Roanoke River,
Mason Creek, Tinker Creek, Peters Creek, Wolf Creek, and an
Unnamed Tributary to the Roanoke River

MS4 General Permit No. VAR040022



Prepared by
Department of Development Services
Stormwater Management
5204 Bernard Drive
Roanoke, VA 24018

March 2025
(Updated October 2025)

TABLE OF CONTENTS

I.	EXECUTIVE SUMMARY	4
II.	GENERAL	5
III.	WATERSHED DESCRIPTIONS.....	7
	A. Mason Creek	8
	B. Peters Creek	9
	C. Tinker Creek	10
	D. Wolf Creek	11
	E. Unnamed Tributary to the Roanoke River.....	12
	F. Roanoke River.....	13
IV.	IMPAIRMENTS AND TMDL WASTE LOAD ALLOCATIONS.....	14
V.	EVALUATION OF SIGNIFICANT SOURCES OF PCBs DISCHARGING INTO THE MS4.....	16
VI.	BMPs to REDUCE PCBs.....	18
	BMP P-1: Enhanced Public Education and Outreach for PCBs.....	18
	BMP P-2: Enhanced Employee Training for PCBs.....	20
	BMP P-3: Use of Existing Ordinances and Programs.....	22
VII.	ANNUAL REPORTING REQUIREMENTS.....	24
VIII.	EVALUATION OF THE TMDL ACTION PLAN	25
FIGURES		
1	Roanoke County Waterbodies with PCBs TMDL Waste Load Allocations (Based on the 2000 U.S. Census Bureau's Roanoke Urbanized Area)	7
2	Mason Creek Watershed (Denoting the 2000 MS4 Service (Urbanized) Area)	8
3	Peters Creek Watershed (Denoting the 2000 MS4 Service (Urbanized) Area)	9
4	Tinker Creek Watershed (Denoting the 2000 MS4 Service (Urbanized) Area)	10
5	Wolf Creek Watershed (Denoting the 2000 MS4 Service (Urbanized) Area)	11
6	Unnamed Tributary Watershed (Denoting the 2000 MS4 Service (Urbanized) Area)	12
7	Remaining Roanoke River Watershed (Denoting the 2000 MS4 Service (Urbanized) Area).....	13

TABLES

1	Virginia Waterbodies with PCBs TMDLs Located within the Roanoke County Jurisdictional Boundaries.....	15
2	PCBs TMDL Waste Loads Allocated to the Roanoke County MS4	15

ACRONYMS

ABBREVIATION	DESCRIPTION
BOS	Roanoke County Board of Supervisors
BMP	Best Management Practice(s)
CIP	Capital Improvement Plan
DEQ	Virginia Department of Environmental Quality
EPA	U. S. Environmental Protection Agency
LA	Load Allocation
MCM	Minimum Control Measure
MG	Milligram
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
MS4 General Permit	Virginia General Permit for Stormwater Discharges from Small MS4s
PCBs	Polychlorinated Biphenyls
PCBs TMDL	Final Roanoke River PCBs TMDL Development (Virginia)
POC	Pollutant(s) of Concern
PPM	Parts per Million
Special Condition	Special Conditions for Approved TMDLs other than the Chesapeake Bay TMDL
SOPs	Roanoke County Standard Operating Procedures
TMDL	Total Maximum Daily Load
VPDES	Virginia Pollutant Discharge Elimination System
WLA	Waste Load Allocation
WQBELs	Water Quality-Based Effluent Limits
YR	Year

DEFINITIONS

Current Sources of PCBs - generate PCBs loads that have a defined, “disruptable pathway” to a waterbody. Such sources, in theory, can be controlled without eliminating the source of PCBs by blocking the pathway. Examples of current sources include PCBs-contaminated soils that wash from upland areas, leachate from landfills and industrial disposal areas, leaking transformers and storage containers, discharges of PCBs-contaminated effluent, local deposition of atmospheric PCBs accumulated from off-gassing contaminated sites, and a variety of other sources.

Legacy Sources of PCBs - generate PCBs loads to a waterbody that cannot be easily controlled because there is no “disruptable pathway” from the source to the affected waterbody. Control of the source requires direct removal. In all cases, the source exists at an interface with the waterbody where there is a continuous exchange of material. Examples of legacy sources include in-stream contaminated sediments, stream bank soils that are not part of a contaminated site, biota, and atmospheric deposition to surface waters.

I. EXECUTIVE SUMMARY

Polychlorinated Biphenyls (PCBs) are a family of 209 manmade chemicals that were widely used in electrical and heat transfer equipment from 1929 and 1979. A 1970 study found that PCBs were carcinogens (cancer-causing agents), which ultimately led to their manufacturing ban. Over a number of years, the Virginia Department of Environmental Quality (DEQ) conducted various types of monitoring to assess the PCBs pollution in the Roanoke River and its tributaries. Based on the monitoring results, a PCBs Total Maximum Daily Load (TMDL) for waterbodies in the Roanoke River watershed was approved on December 9, 2010 by the Virginia State Water Control Board. The TMDL established PCBs waste load allocations (WLA) for stormwater discharges from the County's Municipal Separate Storm Sewer System (MS4) into Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, an unnamed tributary to the Roanoke River, and the Roanoke River.

Roanoke County's "Total Maximum Daily Load (TMDL) Action Plan For Polychlorinated Biphenyls (PCBs) Reduction in the Roanoke River, Mason Creek, Tinker Creek, Peters Creek, Wolf Creek, and an Unnamed Tributary to the Roanoke River" (PCBs TMDL Action Plan) has been prepared and revised, as required by DEQ's "General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems" (Permit # VAR040022). Roanoke County is subject to the requirements of this permit, effective November 1, 2023 through October 31, 2028.

Roanoke County's strategy to address the permit requirements is to progressively implement Best Management Practices (BMPs) to decrease the discharge of PCBs from the County's Municipal Separate Storm Sewer System (MS4) towards meeting the DEQ-assigned waste load allocation. Roanoke County will implement BMPs over multiple state permit cycles, using an adaptive iterative approach, to reduce PCBs discharges.

Roanoke County plans to implement targeted education and outreach in this permit cycle to decrease discharges of PCBs.

This PCBs TMDL Action Plan was prepared by Roanoke County staff. Note that public input was sought through public advertisement and a comment period. The completed Plan was approved by the County Administrator. 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 necessary funding for implementation.

It is expected that this PCBs TMDL Action Plan will be periodically revised to add, modify, or delete BMPs, to adjust estimated implementation dates, and to reflect new information as it becomes available. Progress regarding implementation of this plan will be included in the MS4 Annual Report that is submitted to DEQ by October 1st of each year in the permit term.

II. GENERAL

The Virginia Department of Environmental Quality (DEQ) routinely monitors and tests the Commonwealth's waters (i.e., streams, rivers, lakes, and estuaries) to confirm that they meet Virginia's water quality standards (9 VAC 25-260-10). According to the 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)."

Where DEQ determines that a waterbody does not meet Virginia's water quality standards, the waterbody is termed "impaired." Impaired waters are listed on the "Virginia Water Quality Assessment 305(b)/303(d) Integrated Report" that is issued on even-numbered 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, with 28 identified impairments.

DEQ performs studies on impaired waters to determine the "Total Maximum Daily Load" that the waterbody 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 an 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.

As previously noted, Roanoke County has coverage under the "Virginia General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems" (MS4 Permit); This MS4 Permit (General Permit No. VAR040022) is effective November 1, 2023 through October 31, 2028. Pursuant to this permit, all stormwater that passes through a County-owned or County-operated storm drain or improved channel that is located within the urban parts of the County, as designated in the latest decennial U.S. Census, is considered to be a point source discharge and, therefore, subject to WLAs, where appropriate.

Roanoke County has 10 streams, including the Roanoke River, located in its MS4 regulated area, and these have 13 TMDL WLAs. Of these WLAs, six are for PCBs. The six streams with PCBs WLAs are Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, an unnamed tributary to the Roanoke River, and the Roanoke River.

Polychlorinated Biphenyls (PCBs) are a family of 209 man-made chemicals that were manufactured between 1929 and 1979. Certain properties held by PCBs made them very attractive for use in electrical or heat transfer equipment and machinery; paints, plastics, and rubber materials, as well as pigments, dyes, carbonless copy paper, and numerous other materials. These desirable properties include chemical stability, high-boiling points, and non-flammability. In the 1970s, studies found that PCBs were carcinogens (cancer-causing agents), which caused their manufacturing to be banned in the United States in 1979.

As a result of their past prolific use and their chemical stability, PCBs are still found in the environment today. Historic releases and spills of these slowly-decomposing organic compounds have contributed to their accumulation in the sediments and stream bottoms of many streams and rivers, including the Roanoke River and some of its tributaries. PCBs-containing equipment and materials manufactured before 1979 that remain in use today likely still contain PCBs; such products may serve as current sources of PCBs, if they are not maintained and disposed of in proper fashion. Deposition of minute concentrations of PCBs found in the atmosphere and the release of soils contaminated with PCBs, which are picked up and carried into downstream waterbodies, represent other current sources of PCBs pollution. The releases of PCBs from legacy and current sources have led to present-day water pollution concerns, since impacted waterbodies cannot meet federal and state water quality standards.

The physical properties of PCBs vary based on their exact molecular composition but, in general, they have no taste or smell and range in consistency from light-colored oily liquids to colorless or yellowish waxy solids. They are generally hydrophobic and readily attach to sediment particles. Once PCBs have been discharged into waterbodies and deposited in sediments, they break down slowly and are released back into the water column. As bottom-feeding organisms filter the contaminated sediments, PCBs accumulate in their bodies. When other animals, such as fish and birds, eat organisms lower in the food chain, the PCBs concentrations accumulate in their bodies at a higher concentration. This biological magnification of PCBs levels in the food chain causes threats to animals and humans. In fact, the Virginia Department of Health has placed health advisories on the Roanoke River due to PCBs. Within the Roanoke Valley, upstream from the Niagara Dam, the Virginia Department of Health recommends avoiding or limiting consumption of carp, redbreast sunfish, redhorse sucker, smallmouth bass, largemouth bass, rock bass, and bluehead chub.

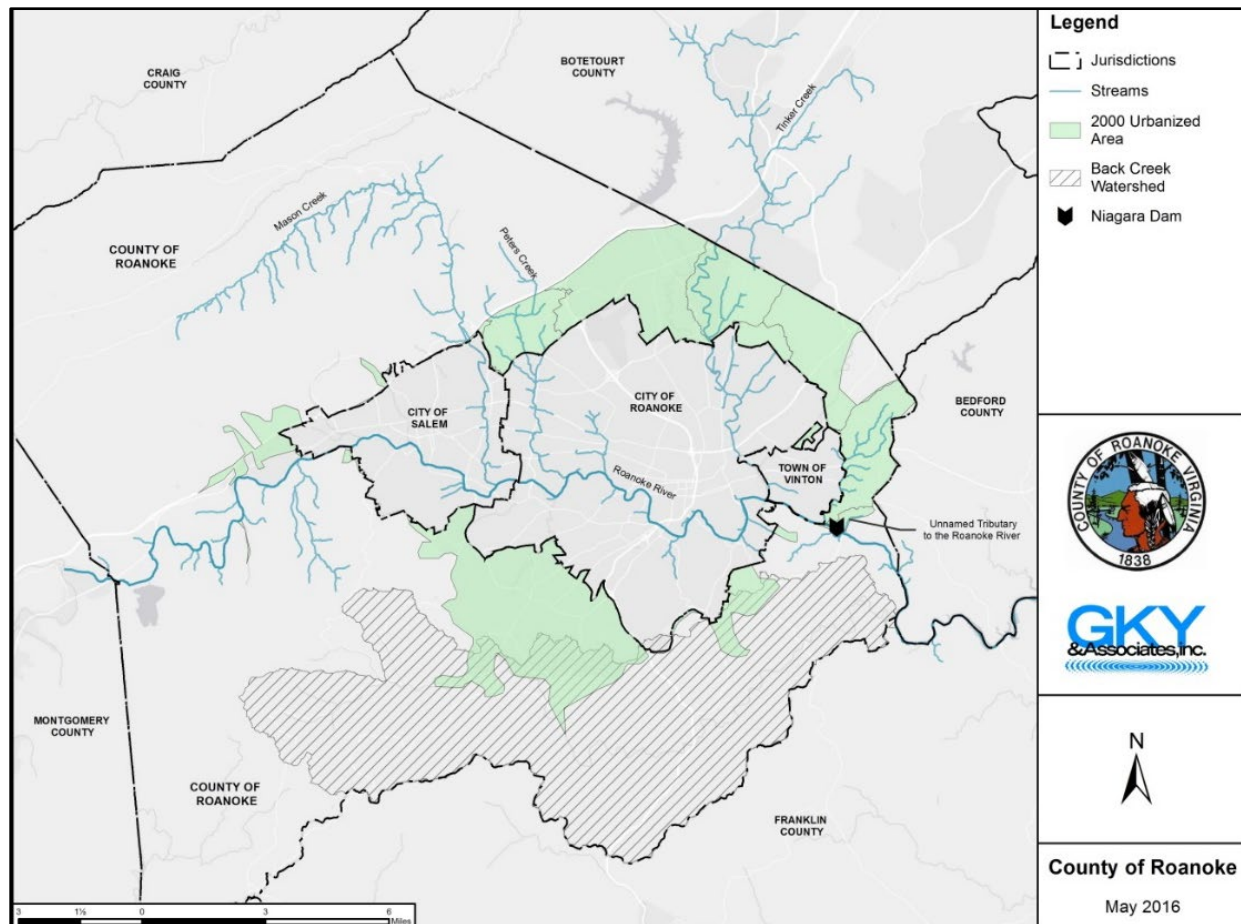
Section II.B. of the MS4 Permit requires Roanoke County to have an updated MS4 Program Plan that includes a specific TMDL Action Plan for pollutants allocated to the MS4 in approved TMDLs.

This specific TMDL Action Plan addresses reduction of PCBs discharged into the six streams with PCBs WLAs, and it has been prepared by Roanoke County staff. Public input was sought through public advertisement and a public comment period. The completed Plan was approved by the County Administrator. 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 necessary funding for implementation.

It is expected that this PCBs TMDL Action Plan will be periodically revised to add, modify, or delete BMPs, to adjust estimated implementation dates, and to reflect new information as it becomes available. Progress regarding implementation of this plan will be included in the MS4 Annual Report that is submitted to DEQ by October 1st of each year in the permit term.

III. WATERSHED DESCRIPTIONS

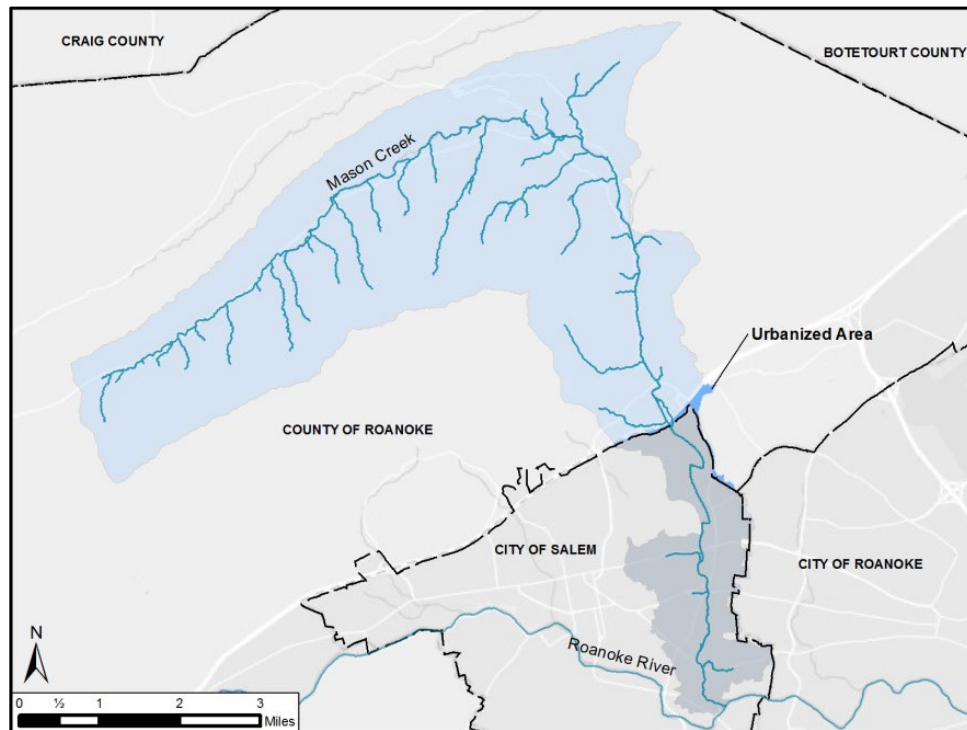
Individual general watershed descriptions are provided below for those watersheds in the County's MS4 that were allocated a waste load in the PCBs TMDL. Maps associated with these watersheds were drawn using the U.S. Census Bureau's 2000 Roanoke Urbanized Area boundaries rather than 2010 Urbanized Area boundaries (**Figure 1**). Waste loads were calculated in the TMDL using the 2000 Urbanized Area. PCBs loads from those areas of the County which were added in the 2010 Urbanized Area were not addressed as part of the TMDL load allocation. The Virginia Department of Environmental Quality (DEQ) must modify the PCBs TMDL before these loads become part of the County's waste loads.



**Figure 1. Roanoke County Waterbodies with PCBs TMDL Waste Load Allocations
(Based on the 2000 U.S. Census Bureau's Roanoke Urbanized Area)**

A. Mason Creek

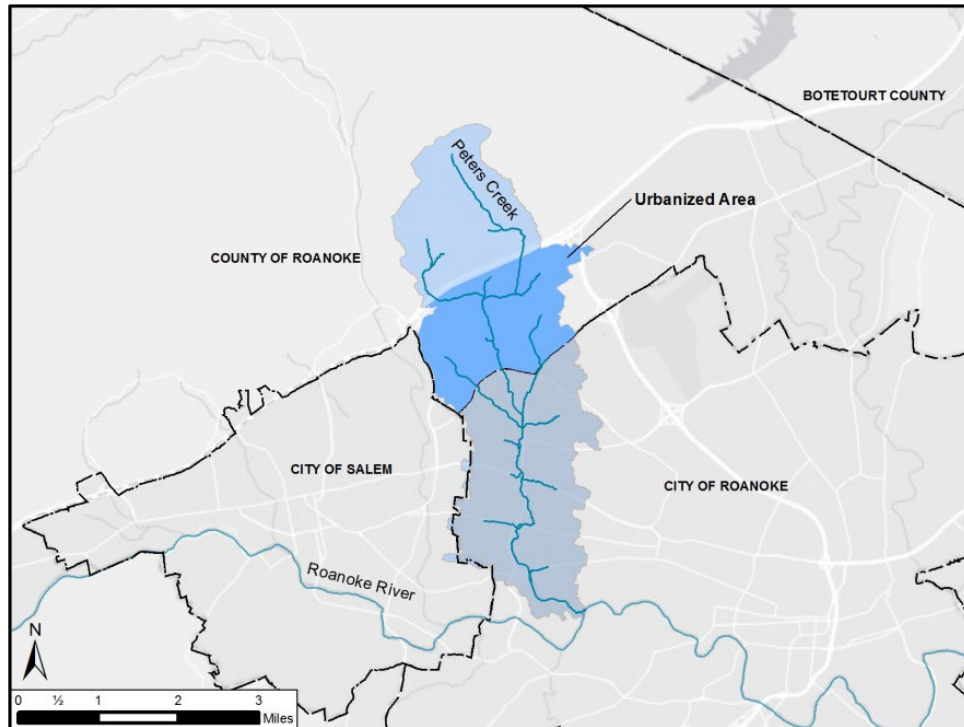
The Mason Creek watershed is located in the north central portion of the County. It receives runoff from the County and the cities of Roanoke and Salem, and it enters the Roanoke River upstream of the Niagara Dam (**Figure 2**). The primary land uses in the Mason Creek watershed are forest / open space (80%) and residential (10%). The County's 2000 MS4 urbanized drainage area for Mason Creek is 71 acres.



**Figure 2. Mason Creek Watershed
(Denoting the 2000 MS4 Service (Urbanized) Area)**

B. Peters Creek

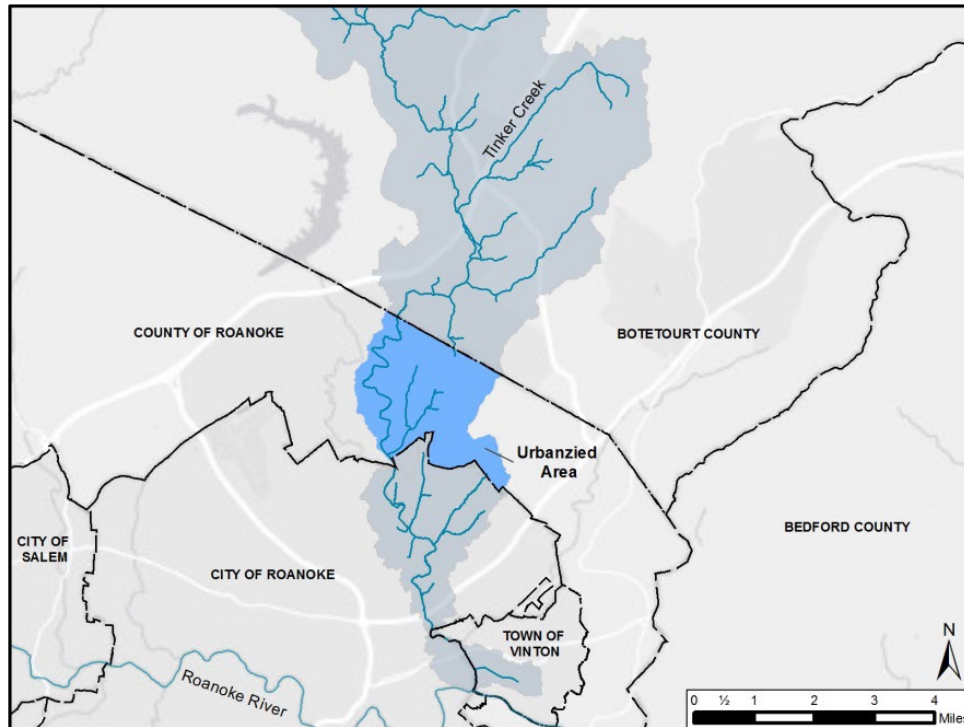
The Peters Creek watershed is located in the central portion of the County. It receives runoff from Roanoke County and the cities of Roanoke and Salem, and it enters the Roanoke River upstream of the Niagara Dam (**Figure 3**). The primary land uses in the Peters Creek watershed are residential (40%) and forest / open space (35%). The County's MS4 urbanized drainage area for Peters Creek totals 1,551 acres.



**Figure 3. Peters Creek Watershed
(Denoting the 2000 MS4 Service (Urbanized) Area)**

C. Tinker Creek

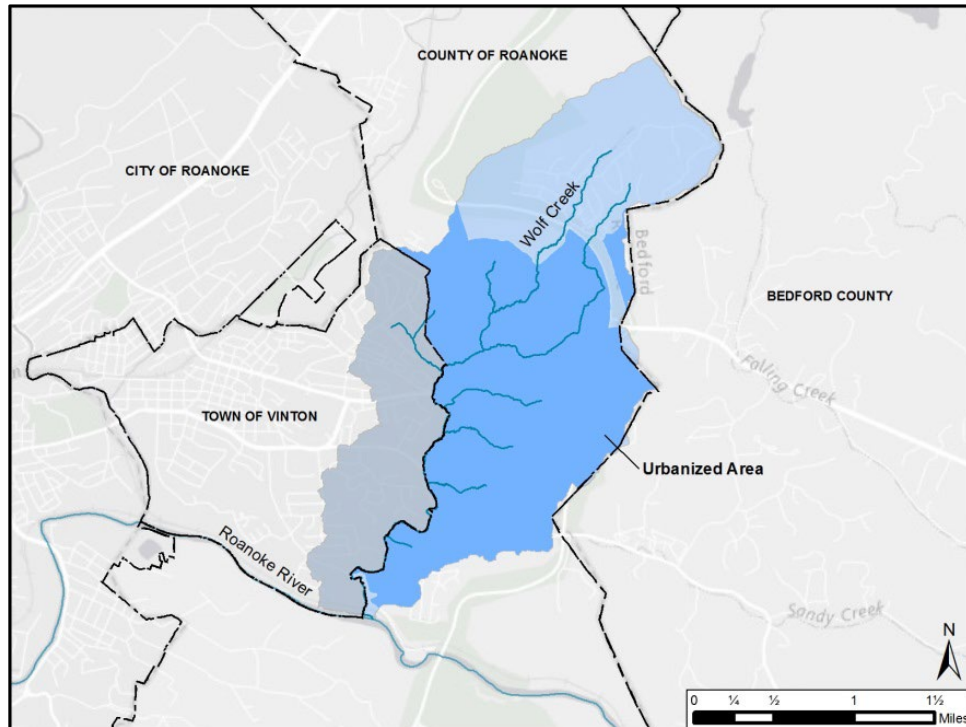
The Tinker Creek watershed is located in the northeast portion of the County. It receives runoff from the counties of Roanoke and Botetourt, the cities of Roanoke and Salem, and the Town of Vinton. It enters the Roanoke River upstream of the Niagara Dam (**Figure 4**). The primary land uses in the Tinker Creek watershed are forest / open space (50%) and agricultural (25%). The County's MS4 urbanized drainage area for Tinker Creek totals 2,678 acres.



**Figure 4. Tinker Creek Watershed
(Denoting the 2000 MS4 Service (Urbanized) Area)**

D. Wolf Creek

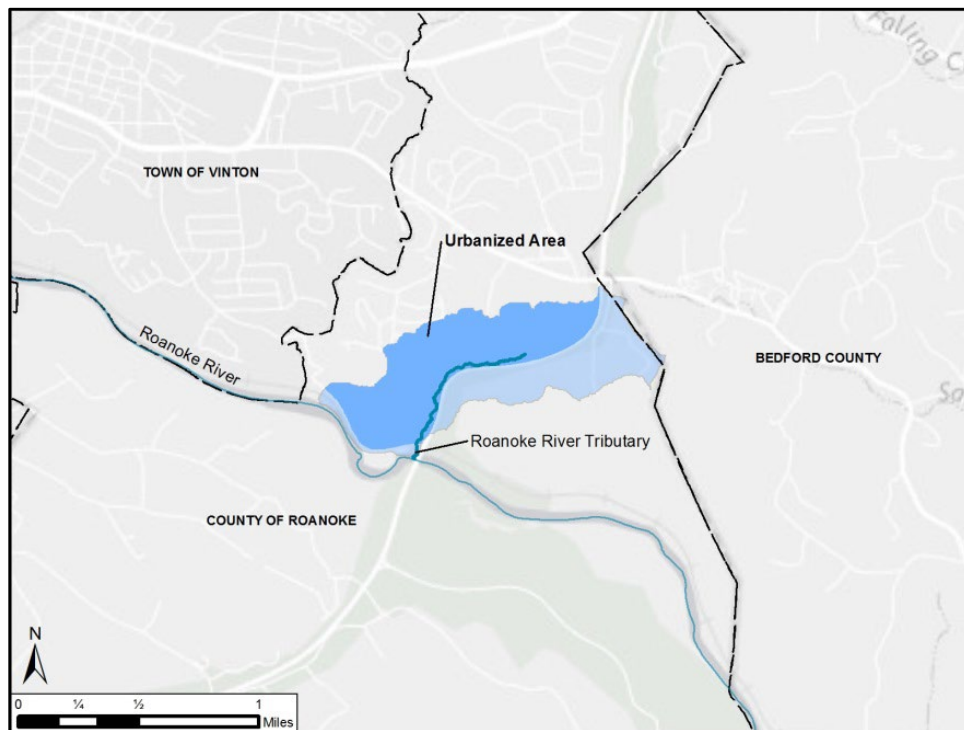
The Wolf Creek watershed is located in the eastern portion of the County. It receives runoff from the County and the Town of Vinton, and it enters the Roanoke River upstream of the Niagara Dam (**Figure 5**). The primary land uses in the Wolf Creek watershed are forest / open space (40%) and residential (35%). The County's MS4 urbanized drainage area for Wolf Creek totals 1,472 acres.



**Figure 5. Wolf Creek Watershed
(Denoting the 2000 MS4 Service (Urbanized) Area)**

E. Unnamed Tributary to the Roanoke River

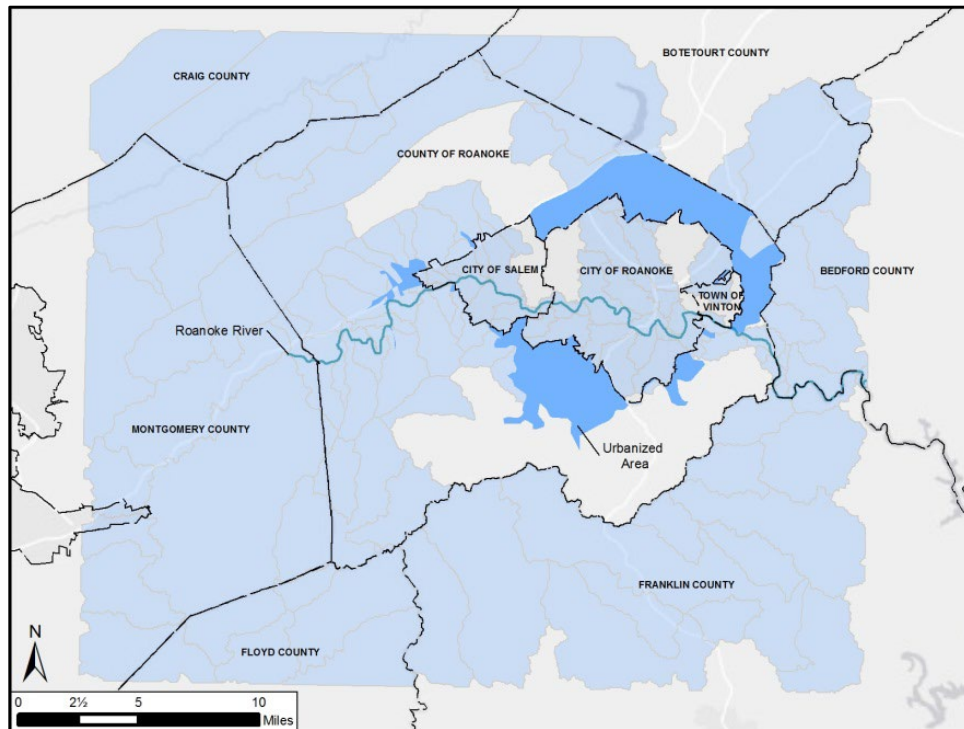
The unnamed tributary to the Roanoke River associated with the Upper Roanoke River TMDL is identified as Watershed Segment 3032, which is located in the eastern portion of the County. The unnamed tributary runs parallel to the Blue Ridge Parkway on National Park Land (**Figure 6**). The primary land use in the unnamed tributary watershed is forest / open space. The County's urbanized area in this watershed comprises 191 acres, and it is primarily residential. County GIS data indicates limited stormwater infrastructure in the watershed, which primarily drains a limited residential area west of the tributary. The tributary discharges downstream of the Niagara Dam; however, it was still allocated a waste load for PCBs.



**Figure 6. Watershed of Unnamed Tributary to Roanoke River
(Denoting the 2000 MS4 Service (Urbanized) Area)**

F. Roanoke River

The Roanoke River bisects Roanoke County running from west to east. The upper Roanoke River, which is the applicable portion of this Action Plan, begins from its headwaters downstream to the Niagara Dam (**Figure 7**). MS4 permit holders physically interconnected with the County include the cities of Salem and Roanoke, the Town of Vinton, and the Virginia Department of Transportation. The primary land uses for areas outside of the specific tributaries mentioned above and for Back Creek, which discharges into the Roanoke River below the Niagara Dam, include forest / open space and residential. Limited commercial land use is spread throughout the watershed, and pockets of industrial land use are found in the northwest and west central portions of the County. The County's MS4 urbanized drainage area for the Roanoke River is approximately 17,894 acres.



**Figure 7. Remaining Roanoke River Watershed
(Denoting the 2000 MS4 Service (Urbanized) Area)**

IV. IMPAIRMENTS AND TMDL WASTE LOAD ALLOCATIONS

Over a number of years, the Virginia Department of Environmental Quality (DEQ) has conducted various types of monitoring (i.e., in fish tissue, sediment, and water) in order to assess the PCBs pollution in the Roanoke River and its tributaries. Based on this monitoring, the United States Environmental Protection Agency (EPA) published a Total Maximum Daily Load (TMDL) study in December 2009 entitled: *Final Roanoke River PCB TMDL Development (Virginia)*. A TMDL is the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. For Roanoke County water bodies, those standards are established by Virginia Code §62.1-44.15.3a.

A TMDL contains three separate components:

- The portion of the maximum pollutant load assigned to unregulated non-point pollutant sources is known as a load allocation (LA)
- The portion of the maximum pollutant load assigned to regulated point sources is known as the waste load allocation (WLA)
- The final portion of the maximum pollutant load not assigned to either the LA or the WLA, but kept in reserve as a margin of safety (MOS)

Each component is contained in the following equation: $TMDL = WLA + LA + MOS$

While a TMDL incorporates the required reductions for both non-point sources and point sources, TMDL Implementation Plans are developed for reducing LA from only non-point sources through voluntary implementation.

Point sources are required to implement pollutant reduction actions sufficient to meet WLAs to comply with Virginia Pollutant Discharge Elimination System (VPDES) permits. Roanoke County's MS4 is considered a point source under the federal Clean Water Act and the Virginia State Water Control Law, and it is regulated under the Virginia General Permit for Stormwater Discharges from Small MS4s (MS4 General Permit). The MS4 General Permit contains a Special Condition that requires Roanoke County to develop and implement a TMDL Action Plan for any TMDL that includes a specific waste load for pollutant(s) allocated to the MS4 for each of the approved TMDLs.

The PCBs TMDL, approved by EPA on April 9, 2010 and subsequently by the Virginia State Water Control Board on December 9, 2010, established numeric TMDLs for waterbodies in the Roanoke River watershed (**Table 1**). The TMDLs WLAs are for all regulated discharges (VPDES individual permits and MS4s).

**Table 1. Virginia Waterbodies with PCBs TMDLs
Located within Roanoke County's Jurisdictional Boundaries**

Upper Roanoke River PCBs TMDL Individual Waterbody TMDL	Overall TMDL		
	WLA (mg/yr)*	LA (mg/yr)	MOS (mg/yr)
Mason Creek	9.1	193.2	10.6
Peters Creek	65.4	31.2	5.1
Tinker Creek	103.9	3,414.2	185.2
Wolf Creek	10.0	20.3	1.6
Unnamed Tributary to the Roanoke River	0.5	1.3	0.1
Roanoke River	28,157.7	3,455.7	1,663.9

**Includes allocations to VPDES individual permits and MS4s (Cities of Roanoke and Salem, and Roanoke County).*

The PCBs TMDLs WLAs are further broken down to provide a WLA for Roanoke County's MS4 area including allocated waste loads for the Roanoke County MS4 for stormwater discharges into Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, an unnamed tributary to the Roanoke River, and the Roanoke River (**Table 2**).

Table 2. PCBs TMDL Waste Loads Allocated to the Roanoke County MS4*

TMDL	Roanoke County		
	Existing Baseline (mg/yr.)	WLA (mg/yr.)	Percent Reduction
Mason Creek	12.4	0.1	99.050%
Peters Creek	490.0	4.7	99.050%
Tinker Creek	4,045.4	38.4	99.050%
Wolf Creek	1,053.2	10.0	99.050%
Unnamed Tributary to the Roanoke River	52.8	0.5	99.050%
Roanoke River	5,038.7	47.9	99.050%

**Although the Town of Vinton has a MS4 permit, the TMDL inadvertently did not issue any WLAs to the Town of Vinton's MS4 area. The WLAs that should have been allocated to the Town were, instead, included in Roanoke County's WLAs.*

V. EVALUATION OF SIGNIFICANT SOURCES OF PCBs DISCHARGING TO THE MS4

As part of the MS4 Permit's Local TMDLs Special Conditions, Roanoke County is required to:

1. Identify the significant sources of the pollutant(s) of concern discharging to the permittee's MS4 and that are not covered under a separate VPDES permit. For the purposes of this requirement, a significant source of pollutants means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL.
2. Include an inventory of potentially significant sources of PCBs owned or operated by the County that drains to the MS4.

A. Significant Sources of PCBs Discharging to MS4 that are not covered under a Separate VPDES Permit

Roanoke County conducted a desktop review to identify potential current sources of PCBs and their relationship to the County's MS4. A summary of each of the aspects reviewed is included below:

- ***PCBs Commercial Storage and Disposal Facilities*** - EPA permits facilities to store and dispose of PCBs waste according to federal regulations. In reviewing the EPA Region 3 list of permitted facilities, none of the permitted facilities were found to be owned or operated by Roanoke County nor located within the County's jurisdictional boundaries. (<https://www.epa.gov/pcbs/list-approved-polychlorinated-biphenyl-pcb-commercial-storage-and-disposal-facilities>)
- ***Registered Transformers Containing PCBs*** - EPA requires registration of known PCBs transformers. PCBs transformers are those that contain 500 ppm or greater of PCBs dielectric. In reviewing EPA's 76-page "Most Recent" EPA Regulated Transformer Data, no registered PCBs transformers were found to be owned by the County or located within the County's jurisdictional boundaries. (www.epa.gov/pcbs/registering-transformers-containing-polychlorinated-biphenyls-pcbs)
- ***Proximity of County MS4 Infrastructure to Point Sources Allocated a Waste Load in the PCBs TMDL*** - The PCBs TMDL allocated 45 individual waste loads to 44 industrial point sources in the Upper Roanoke River and its tributaries located below the confluence of the South and North Roanoke Rivers. GIS analysis of these industrial facilities identified that three of the 44 were located within the MS4 Service Area (2000 Urbanized Area). The other industrial facilities were located in the cities of Roanoke and Salem, and the Town of Vinton or outside the County's MS4 Service Area. Of the three located within the County's MS4 Service Area, the properties of two facilities have been sold since the TMDL approval. One property no longer maintains an active permit under the VPDES General Permit for Industrial Activity Stormwater Discharges (Industrial

General Permit). The second property is now owned by an industrial facility for which the Standard Industrial Classification ("SIC") code is not related to PCBs concerns, but the facility is regulated under the Industrial General Permit (VAR051803).

The third industrial facility, which drains through off-site stormwater infrastructure before discharging into Big Bear Rock Branch, is regulated by DEQ under the VPDES General Permit for Industrial Activity Stormwater Discharges (VAR050741).

- ***Proximity of County MS4 infrastructure to industrial facilities with SIC codes subject to PCBs monitoring Guidance*** - DEQ Guidance Memo No. 09-2001¹ (Monitoring Guidance) identified specific industrial operations that were more likely to discharge PCBs than others. The Monitoring Guidance identified the types of facilities by their SIC codes. Facilities whose SIC codes matched those identified in the Monitoring Guidance are subject to PCBs monitoring. The County compared the list of 18 industrial facilities in Roanoke County that are covered under the Industrial General Permit against the SIC codes found in Table 1 of the Monitoring Guidance. Aside from facilities previously identified as being allocated a waste load, seven VPDES-permitted facilities were identified as having an applicable SIC code. Of these seven facilities, six of the facilities were outside of the MS4 Service Area identified in the TMDL. The remaining industrial facility is regulated under the industrial permit (VAR052297) and discharges into the Upper Tinker Creek watershed. Based on state regulatory activity regarding this facility, the County does not believe that downstream drainage infrastructure could be considered a significant source of PCBs. The County will reconsider this, if so directed by DEQ.

Based on this desktop review, no significant sources of PCBs discharging to the MS4 that are not covered under a separate VPDES permit were identified.

B. Inventory of Potentially Significant Sources of PCBs Owned or Operated by the County that Drains to the MS4

Between 2009 and 2012, Roanoke County collected and evaluated available site data on all 152 County properties that were located within the MS4 Service Area. Through this evaluation, the County found no evidence that any County-owned or County-operated property within its MS4 area was a potentially significant source of PCBs.

C. Subsequent Discovery of Significant Sources of PCBs that Drains to the MS4

If at any time during the term of this permit, Roanoke County discovers a previously unidentified significant source of PCBs within its MS4 regulated service area, the County will notify DEQ in writing within 30 days of such discovery.

¹ TMDL Guidance Memo No. 09-2001. Guidance for monitoring of point sources for TMDL development using low-level PCBs method 1668. March 2009.

VI. BMPs TO REDUCE PCBs

As previously stated, the County will concentrate on interrupting the PCBs pathway from current sources to its receiving waters. Given the widespread distribution of potential current sources, the County will direct its efforts on increasing the general awareness of the public and county employees regarding current sources of PCBs. Increased awareness will lead to better implementation of pollution prevention strategies, which will help to minimize the discharges from current sources of PCBs.

The County's selected Best Management Practices (BMPs) to reduce PCBs are described below.

BMP P-1: Enhanced Public Education and Outreach

The County believes that increased public and employee awareness may be the best opportunity to minimize the discharge of PCBs from current sources. Therefore, the County will enhance several of its existing BMPs (as fully outlined in the MS4 Program Plan) to include messages about PCBs and ways to reduce them from entering the MS4. The following existing BMPs will be enhanced, as described:

BMP 1-2: Roanoke County Stormwater Newsletter

Roanoke County will promote general public awareness of PCBs and their potential sources by publishing an article or messages regarding PCBs in its annual Stormwater Newsletter.

Rationale: The Stormwater Newsletter is mailed to more than 34,800 addresses located across the County. Because of this wide distribution, the County believes this will be a good venue to share information with the public about PCBs, their sources, and how to minimize their introduction into the environment.

BMP 1-7: Targeted Education Program

As part of its targeted education program, Roanoke County will promote public awareness information specifically to the development community regarding PCBs and their potential sources using the following methods:

- Incorporating the PCBs Awareness Fact Sheet into the informational materials provided by the Department of Development Services' permitting office. Specifically, the Fact Sheet will be handed out to developers applying for a demolition permit.
- Including PCBs-related articles and messages in the *It's Just Dirt* newsletter that is mailed to all land-disturbing contractors each year.

Rationale: Given that a potential significant source of current PCBs is from old construction materials, it is important that the development community recognize their role in controlling PCBs. Pollution prevention activities, such as proper disposal of construction waste materials, will interrupt the PCBs' pathway to the receiving waters.

BMP 2-3: MS4 Program and Stormwater Pollution Prevention Website

Roanoke County will post its PCBs Awareness Fact Sheet and PCBs PowerPoint Presentation on the MS4 webpage.

Rationale: Given the widespread distribution of PCBs sources identified in the TMDL, the County believes that increased public awareness provides the best opportunity to minimize the discharge of PCBs from current PCBs sources. By placing these informative documents on the County's MS4 webpage, additional awareness regarding PCBs will be generated.

BMP P-2: Enhanced Employee Training for PCBs

The County believes that raising awareness of applicable County employees involved in certain municipal operations will lead to better implementation of pollution prevention strategies, which will help to minimize the discharges from current sources of PCBs. Therefore, the County will enhance two of its existing BMPs (as fully outlined in the MS4 Program Plan) to include messages about PCBs and ways to reduce them from entering the MS4. The following existing BMPs will be enhanced, as described:

BMP 6-2: Standard Operating Procedures (SOPs) for Pollution Prevention and Good Housekeeping

Roanoke County will incorporate the PCBs Awareness Fact Sheet and its PCBs PowerPoint Presentation into its written Standard Operating Procedures (SOPs) for Pollution Prevention and Good Housekeeping. These procedures address daily operations and maintenance activities that have a potential of discharging pollutants directly or with stormwater runoff into the MS4. The SOPs will be used in employee training activities.

Rationale: The County has developed SOPs for minimizing pollutant discharges. As the County is not actively using, storing, or producing PCBs, the County will concentrate on waste management. Proper disposal of debris collected as a result of stormwater maintenance and wastes from general facility maintenance will interrupt the pathway of PCBs travelling to the receiving waters. By incorporating the PCBs Awareness Fact Sheet and the PCBs PowerPoint Presentation into the SOP manual, County employees will be made aware of PCBs, their sources, and how to minimize their introduction into the environment.

BMP 6-3: Employee Training

Roanoke County implements biennial training for applicable employees regarding the following topics:

- a. Recognition and reporting of illicit discharges
- b. Good housekeeping and pollution prevention practices associated with:
 - Road, street, and parking lot maintenance
 - Maintenance and public works facilities
 - Recreational facilities
- c. Spill response by emergency response employees
- d. Herbicide application training
- e. Contractor oversight for environmental compliance

As stated in **BMP 6-2**, Roanoke County will incorporate the PCBs Awareness Fact Sheet and the PCBs PowerPoint Presentation into its manual of SOPs for Pollution Prevention and Good Housekeeping. Review of this manual is required as part of the County's employee training program, which will raise employee awareness regarding PCBs and their relationship to County facilities.

The Department of Development Services takes the lead in employee training efforts, but individual County departments are responsible for ensuring that their department staff adheres to the contents of the SOP manual.

Rationale: By incorporating the PCBs Awareness documents into the County stormwater training program, County employees will be made aware of PCBs, their sources, and how to minimize their introduction into the environment at County facilities.

BMP P-3: Use of Existing Ordinances and Programs

Given the TMDL assumption that PCBs are widely dispersed across the impaired watersheds in minute quantities, Roanoke County has several related ordinances and programs that will help to interrupt the pathway of PCBs entering the environment from current sources.

Continued implementation of the following ordinances and programs will assist the County in overall long-term reductions of the discharge of PCBs.

Illicit Discharge Ordinance

Roanoke County will continue to identify and eliminate illicit discharges in accordance with Chapter 24 of the County Code.

Rationale: The illicit discharge ordinance provides the County with the legal authority to provide for clean-up of releases to the MS4.

Erosion and Stormwater Management Ordinance

- 1) Roanoke County will continue to implement its Erosion and Stormwater Management ordinance, which requires administrative oversight, plan review, inspections, and enforcement associated with active land-disturbing projects. Through implementation of this ordinance, the discharge of sediments, which may potentially have PCBs adhered to them because of atmospheric deposition, will be minimized.

Rationale: PCBs adhere to sediments. Thus, by interrupting the pathway of loosened sediments from reaching the County's MS4, PCBs attached to such sediments will be minimized from entering local impaired waters.

- 2) The Erosion and Stormwater Management ordinance also requires the inspection of post-construction stormwater management facilities. As required, the County will continue to conduct annual site inspections of County-owned stormwater facilities and will conduct site inspections of privately-owned stormwater facilities once every 5-years. During these inspections, County staff will assure that the stormwater facility is properly functioning, that adequate vegetation exists for facility stability, and that water is not ponding in the facility for periods longer than designed.

Rationale: Stormwater management facilities (SWMFs) may provide both water quality and water quantity controls. As such, pollutants settle out and are retained in the SWMF. By ensuring that these SWMFs are functioning as designed and are being properly maintained, the SWMFs will interrupt the pathway of incoming PCBs and keep them from entering the downstream impaired waters. By properly disposing of the sediments during maintenance, as described in the Standard Operating Procedure (SOP) manual, potential PCBs-laden sediments will be eliminated as a potential source.

Emergency Spill Response and Containment

The Roanoke County Fire and Rescue Department provides emergency response services to County residents. As part of this service, approximately 184 uniformed employees and 136 volunteers are trained in hazardous materials operations. In response to spills and accidental releases, Fire and Rescue staff help the responsible party in mitigating containment of an accidental release.

Regulation of Open Burning

Roanoke County regulates open burning under Chapter 9 of the County Code. This code section places restrictions on the burning of construction and demolition waste and debris, which may contain PCBs. Thus, by implementing Chapter 9, the release of PCBs into the environment from local airborne deposition is minimized.

Regulation of Illegal Dumping and Littering

Roanoke County regulates illegal dumping and littering under Chapter 13 of the County Code. This chapter provides the County with the necessary legal authority to minimize the amount of debris and wastes that are dumped, which may minimize the discharge of incidental PCBs that may be present in such materials.

Contract Language

Roanoke County uses general contract language in its vendor contracts to ensure that demolition and construction wastes are lawfully disposed of in permitted landfills. The proper disposal of demolition and construction waste minimizes the amount of PCBs that are available for entry into receiving waters by interrupting their travel path.

DEQ Coordination

Roanoke County will continue to coordinate with the DEQ, particularly via the local Blue Ridge Regional Office in Salem, VA. Through combined state and local efforts, it is anticipated that the quantity of PCBs being discharged from current sources into the waters in and around Roanoke County will diminish. In addition, DEQ will continue to strategize on how best to remove the legacy pollutants that currently exist in these impaired waterways.

VII. ANNUAL REPORTING REQUIREMENTS

The MS4 Annual Report will include a summary of actions conducted to implement this PCBs TMDL Action Plan during the reporting period of July 1st - June 30th for each year of the permit term.

In accordance with the MS4 Permit, the report is submitted to DEQ by October 1st of each year.

VIII. EVALUATION OF THE TMDL ACTION PLAN

The Virginia State Water Control Board approved a PCBs Total Maximum Daily Load (TMDL) for waterbodies in the Roanoke River watershed on December 9, 2010. The TMDL established PCBs waste load allocations (WLA) for stormwater discharges from the County's Municipal Separate Storm Sewer System (MS4) into Mason Creek, Peters Creek, Tinker Creek, Wolf Creek, an unnamed tributary to the Roanoke River, and the Roanoke River.

Roanoke County subsequently prepared the required Total Maximum Daily Load (TMDL) Action Plan dated June 30, 2016, which was last revised in April 2020.

To satisfy the requirements of Section II.B.2.a.(1) of the current MS4 Permit, the County hereby provides "an evaluation of the results achieved by the previous action plan" named above.

PCBs continue to enter the Roanoke River and its tributaries, albeit at an ever-reducing rate. Given the long-term stability of PCBs, their existence in soils, air, and water and their prevalence in the impaired water bodies, it is unlikely that the water quality standards for PCBs will be met in the foreseeable future. As a result of being issued a wasteload allocation for the discharge of PCBs into its MS4, Roanoke County is required to reduce the amount of PCBs being discharged to the system in order to meet the allocation. These current sources have a defined, disruptable pathway to a water body, which in theory can be controlled without eliminating the source of the PCBs. The TMDL recognizes this and also states that "non-numeric WQBELs (BMPs) will be used to comply with the provisions of the TMDL."

The goal of Roanoke County's PCBs TMDL Action Plan is to increase the overall awareness of PCBs and their sources in order to further identify and minimize the innumerable potential current sources. The BMPs selected for meeting this goal are non-numeric BMPs for which efficiencies cannot be measured. As such, the County will measure the effectiveness of this plan by documenting implementation of the schedule, as shown below, and whether or not the milestones and BMP metrics have been met. The County will also report to DEQ in the annual report any additional potential PCB sources identified as part of its efforts.

BMP #	BMP Name/Task	Estimated Implementation Dates
P-1	Enhanced Public Education and Outreach for PCBs	Ongoing
P-2	Enhanced Employee Training for PCBs	Ongoing
P-3	Use of Existing Ordinances and Programs	Ongoing

The County has chosen to not evaluate the PCBs Action Plan through monitoring for a variety of reasons, including:

- “Hydrophobic properties of PCBs make them difficult to detect in water quality samples” (PCBs TMDL, page 8).
- “Atmospheric deposition has been shown to be a significant pathway of PCBs cycling in freshwater systems” (PCBs TMDL, page 44).
- “The development of PCBs TMDLs in the Roanoke River watershed is subject to adaptive implementation and ongoing source investigation whereby sources of PCB contamination are continuously being reviewed and updated on the basis of the best available data. The discussion of current sources of PCBs, therefore, should be considered the most up-to-date information at the time of development of the TMDLs, rather than a complete and final characterization” (PCBs TMDL, page 52).
- “Loads calculated for all WLA sources are estimates” (PCBs TMDL, page 69).
- The PCBs TMDL states that MS4 permit holders will be held accountable for meeting the monitoring requirements in DEQ’s Monitoring Guidance. However, the Monitoring Guidance states that the monitoring requirements are not applicable to MS4s. As such, the PCB TMDL is in direct conflict with the Monitoring Guidance. Due to the high cost of implementing a PCBs monitoring program in order to identify previously unknown sources of PCBs, DEQ must provide clear direction and guidance regarding monitoring expectations.
- The County has chosen to use BMPs that do not have numeric efficiencies in order to comply with the WLA. The approach taken by the County is consistent with the directions provided by the PCB TMDL. However, by following the recommended approach, there is not a methodology for accurately determining the pollutant reductions as a result of BMP implementation.

Thus, the County has opted to forego modeling as a means to evaluate the PCBs Action Plan because its selected BMPs for compliance are non-structural in nature, and such activities do not have efficiencies that can be effectively modeled.

Roanoke County uses three strategies to help reduce the discharge of PCBs:

- **P-1 Enhanced Public Education and Outreach for PCBs**

As described in Section VI of this report, the County believes that increased public and employee awareness may be the best opportunity to minimize the discharge of PCBs from current sources. Therefore, the County enhanced several of its existing BMPs (as fully outlined in the MS4 Program Plan) to include messages about PCBs and ways to reduce them from entering the MS4.

Use of tailored messages to address PCBs that are focused on the proper target audiences is an effective means to raise awareness, improve individual's actions, and increase support for water quality programs. Roanoke County believes that its current activities in this area are robust, and no modifications are currently planned for this BMP.

- **P-2 Enhanced Employee Training for PCBs**

The County believes that raising awareness of applicable County employees involved in certain municipal operations will lead to better implementation of pollution prevention strategies, which will help to minimize the discharges from current sources of PCBs. Therefore, the County enhanced two of its existing BMPs (as described in Part VI of this report and in the MS4 Program Plan) to include messages about PCBs and ways to reduce them from entering the MS4.

This training is an effective and important way to give County employees the understanding that PCBs are a high priority water quality issue and that measures shall be implemented, where practical, to reduce their discharge into stormwater.

- **P-3 Use of Existing Ordinances and Programs**

Given the TMDL assumption that PCBs are widely dispersed across the impaired watersheds in minute quantities, Roanoke County has several related ordinances and programs that will help to interrupt the pathway of PCBs entering the environment from current sources. Continued implementation of these ordinances and programs, as described in Section VI of this report, is an effective strategy as it will assist the County in overall long-term reductions of the discharge of PCBs.

Conclusion

Although the County's BMPs do not have numeric efficiencies, the County finds its approach to be consistent with the directions provided by the PCB TMDL, and believes the selected strategies are effective in increasing the overall awareness of PCBs and their sources to further identify and minimize the innumerable potential current sources.