# Albemarle County

# Combined Local TMDL Action Plan:

## Benthic TMDL for the Rivanna River
## and
## Bacteria TMDL for the Rivanna River Mainstem, North Fork Rivanna River, Preddy Creek and Tributaries, Meadow Creek, Mechums River, and Beaver Creek Watersheds

**submitted as partial fulfillment**
**in meeting**
**Special Condition (Section 1B) of the**
**2013-2018**
**VPDES General Permit for**
**Small Municipal Separate Storm Sewer Systems**
**VAR040074**


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## List of Acronyms

**BMP** – Best Management Practice

**DEQ** – Virginia Department of Environmental Quality

**GIS** – Geographic Information Systems

**MS4** – Municipal Separate Storm Sewer System

**POC** – Pollutant of Concern

**RCA** – Rivanna Conservation Alliance

**RSEP** – Rivanna Stormwater Education Partnership

**TMDL** – Total Maximum Daily Load

**WLA** – Waste load Allocation

## Introduction

Albemarle County has prepared this local TMDL action plan to address the Special Conditions for Approved Total Maximum Daily Loads (TMDL) other than the Chesapeake Bay in the County's MS4 Permit (Section 1.B.). This report was prepared pursuant to the requirements presented in the MS4 General Permit and the Virginia Department of Environmental Quality (DEQ) Local TMDL MS4 Guidance, dated April of 2015 (henceforth referred to as "Guidance Document"). The content of this Action Plan, as prescribed in the Guidance Document, is summarized below:

1. The name(s) of the Final TMDL report(s);
2. The pollutant(s) causing the impairment(s);
3. The Waste Load Allocations (WLAs) assigned to the MS4 as aggregate or individual WLAs;
4. Significant sources of POC(s) from facilities of concern owned or operated by the MS4 operator that are not covered under a separate VPDES permit. A significant source of pollutant(s) from a facility of concern means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL;
5. Existing or new management practices, control techniques, and system design and engineering methods that have been or will be implemented as part of the MS4 Program Plan that are applicable to reducing the pollutant identified in the WLA;
6. Legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements applicable to reducing the POCs identified in each respective TMDL;
7. Enhancements to public education, outreach, and employee training programs to also promote methods to eliminate and reduce discharges of the POC(s) for which a WLA has been assigned;
8. A schedule of interim milestones and implementation of the items in 5, 6, and 7;
9. Methods to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs; and
10. Measurable goals and the metrics that the permittee and Department will use to track those goals (and the milestones required by the permit). Evaluation metrics other than monitoring may be used to determine compliance with the TMDL(s).

Albemarle County collaborated with the University of Virginia and the City of Charlottesville in preparation of this Action Plan. However, each entity has produced its own Action Plan.

The County intends to implement this Action Plan through multiple permit cycles using an adaptive, iterative approach as progress is demonstrated toward achieving reductions necessary to meet the WLAs. While this Action Plan presents current and future practices intended to mitigate sediment and bacteria impairments described in this report, the County reserves the right to substitute/modify projects and practices for the ones described in this report.

# 1. The Name of the Final TMDL Reports

The report titled *Benthic TMDL Development for the Rivanna River Watershed* (published March 2008) establishes the sediment TMDL for Albemarle County. This report is henceforth referred to as "Benthic TMDL Report." The report titled *Bacteria TMDL Development for the Rivanna River Mainstem, North Fork Rivanna River, Preddy Creek and Tributaries, Meadow Creek, Mechums River, and Beaver Creek Watersheds* (published March, 2008) establishes an aggregate bacteria TMDL for E. coli. This report is henceforth referred to as "Bacteria TMDL Report."

# 2. Pollutant(s) causing the impairment(s)

### 2.1 Benthic TMDL Pollutant

In 1996 and subsequently 2006, two adjacent segments of the Rivanna River were added to Virginia's 303(d) List of Impaired waters for exceedance of water quality standards necessary to support aquatic life. The Rivanna River Benthic TMDL Report identified sedimentation caused by urban runoff as the most probable stressor in the Rivanna River benthic impaired segments. Embeddedness, or the degree to which sediment occupies spaces between cobbles and rocks in the streambed, and sediment deposition observed at monitoring stations were found to be in the suboptimal range for the support of aquatic life, as "buildup of sediment in the stream bed can drastically change the composition and availability of macroinvertebrate habitats and therefore can be a stressor for the benthic community." To address these impairments, a sediment TMDL is presented in the Benthic TMDL Report.

The impaired reaches included on Virginia's 303(d) list and applicable to this TMDL report are VAV-H28R-01 and VAV-H29R-01. These reaches and the corresponding watershed are shown in Figure 2.1.1.

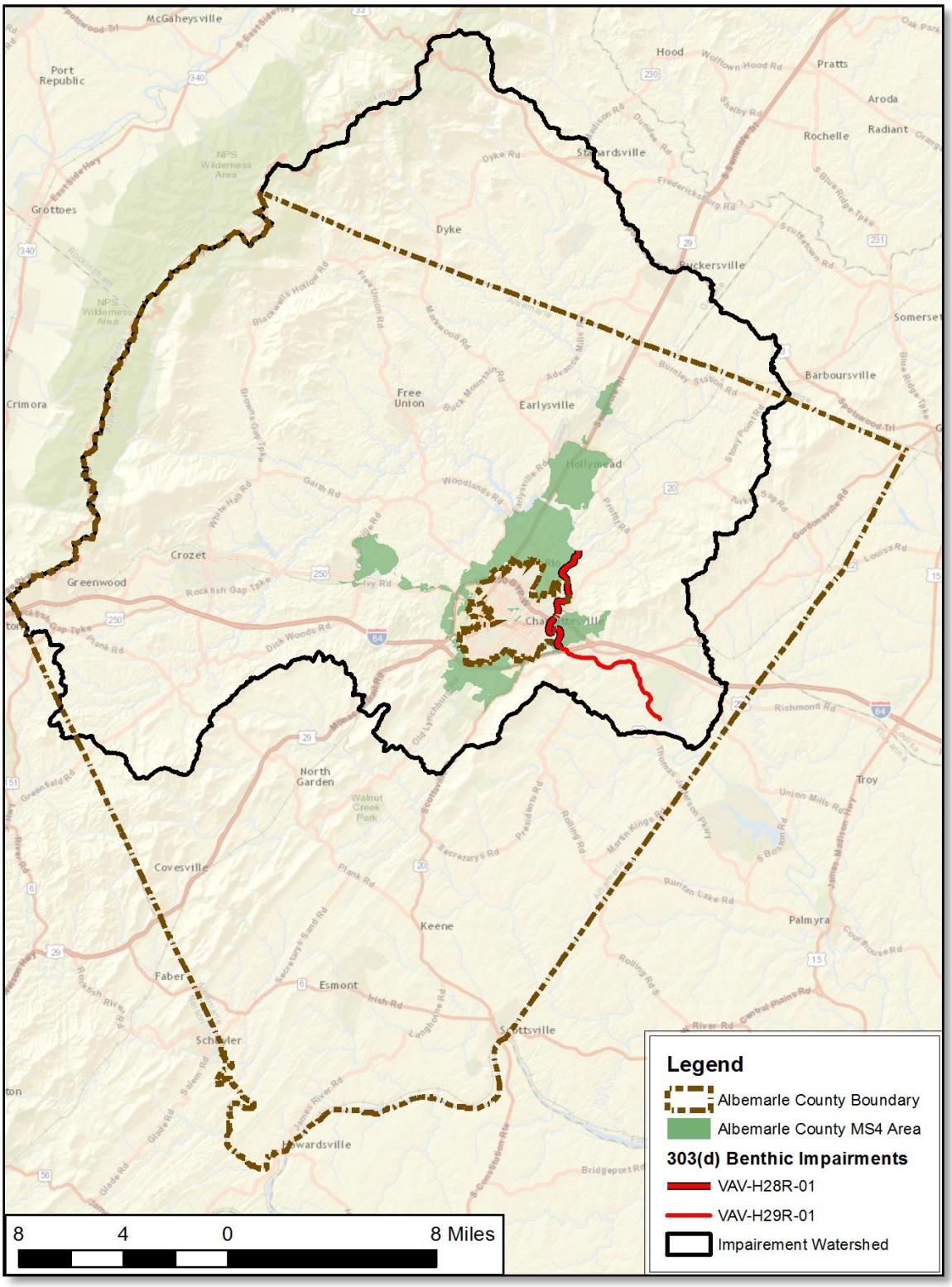


Figure 2.1.1. Benthic Impairment Reaches and Watershed

## 2.2 Bacteria TMDL Pollutant

As stated in the Bacteria TMDL Report, bacteria TMDLs are established for the Rivanna River mainstem (VAV-H28R-RVN01A00), the Northfork Rivanna River (VAV-H27R-RRN01A00), Preddy Creek and tributaries (VAV-H27R-PRD01A00), Meadow Creek (VAV-H28R-MWC01A00), Mechums River (VAV-H23R-MCM01A00), and Beaver Creek (VAV-H23R-BVR02A04). These waterbodies were added to Virginia's 303(d) List of Impaired waters between 1998 and 2006 for exceedance of the state's water quality standards for E. coli and for fecal coliform bacteria. When these waterbodies were first listed as impaired, the water quality standard was expressed in units of fecal coliform bacteria. The bacteria water quality standard is now expressed in units of E. coli because "there is a stronger correlation between the concentration of E. coli and the incidence of gastrointestinal illness than with fecal coliform" (Bacteria TMDL Report, page 1-7). The bacteria impaired reaches included on Virginia's 303(d) list and their corresponding watersheds are shown on Figure 2.2.1.

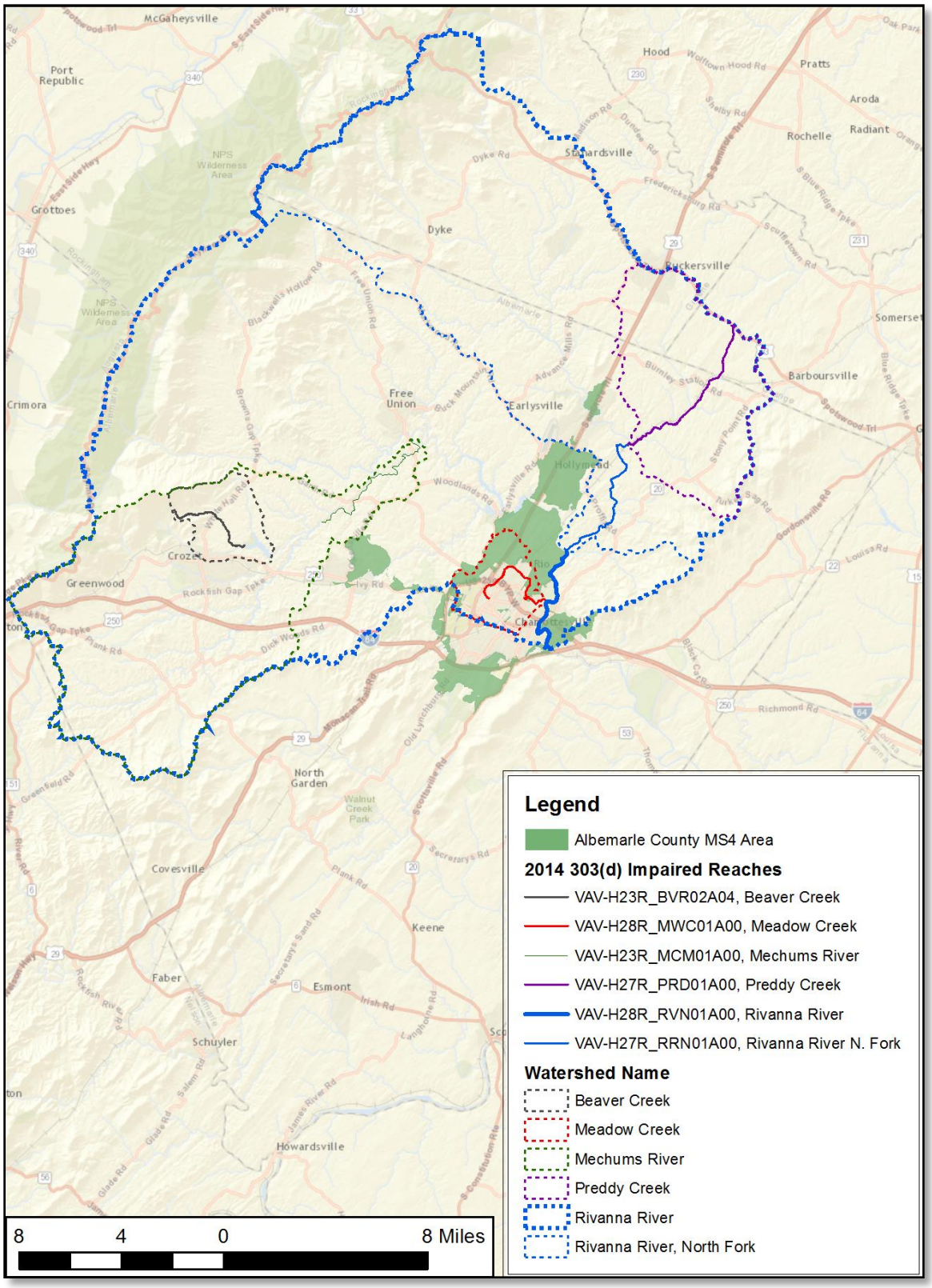


Figure 2.2.1. Bacteria Impairment Reaches and Watershed

## 3. The WLA(s) assigned to the MS4 as aggregate or individual WLAs

As stated in the Guidance Document, Section 303(d) of the Clean Water Act requires that wasteload allocations (WLAs) be implemented through the National Pollutant Discharge Elimination System (NPDES) permit program. The Guidance Document states "as point sources, MS4s are assigned individual or aggregate WLAs in TMDLs for receiving streams or watersheds to which the MS4 discharges." Albemarle County has been assigned an individual WLA for sediment and an aggregate WLA for bacteria.

### 3.1 Sediment WLA

The Benthic TMDL Report estimates existing sediment loads and provides a WLA for the Albemarle County MS4 (Benthic TMDL Report, Table 7-2). These allocations also include "loads from general stormwater permits issued to industrial facilities, domestic sewage facilities, mines/quarries, concrete facilities, car wash facilities, and construction sites within the MS4 area" (Benthic TMDL Report, page 7-3). The existing and allocated loads for the Albemarle County MS4 are summarized below in Table 3.1.1.

**Table 3.1.1. Sediment WLA for Albemarle County MS4**

| Permit Number | MS4 Permit Holder | Land-based loads (lbs/day) | Instream Erosion (lbs/day) | Existing Total Load (lbs/day) | Allocated Load (lbs/day) | Percent Reduction* |
|---|---|---|---|---|---|---|
| VAR040074 | Albemarle County | 1,606 | 4,729 | 6,335 | 2,576 | 59.3 |

(*) The percent load reduction for the MS4s accounts for loads from all land sources including forested areas.

### 3.2 Bacteria WLA

The Bacteria TMDL report includes an aggregate WLA which address point sources in the City of Charlottesville, VDOT, the University of Virginia, Piedmont Virginia Community College, and the Albemarle County MS4 Area. The WLAs provided in the Bacteria TMDL Report do not distinguish between loads aggregated to MS4s and VPDES permitted facilities. These WLAs are summarized in Table 3.2.1. Please note that the report indicates that MS4 areas contribute zero load to Preddy Creek and Mechums River. In addition, Beaver Creek does not intersect Albemarle County's MS4 area (as shown in Figure 2.2.1). As a result, the bacteria components of this Action Plan are applicable to addressing WLAs for the Rivanna River, North Fork Rivanna River, and Meadow Creek.

| Table 3.2.1. Aggregate E. coli WLAs for MS4s and Permitted Point Sources | | |
|---|---|---|
| **Impaired Waterbody** | **WLA (all point sources, colony forming units [cfu]/day)** | WLA Reference Table (Bacteria TMDL Report) |
| **Rivanna River** | **4.93E+12** | **Table 5-5** |
| **North Fork Rivanna River** | **9.88 E+09** | **Table 5-10** |
| Preddy Creek | 6.67E+11 | Table 5-15 |
| **Meadow Creek** | **4.08E+10** | **Table 5-19** |
| Mechums River | 9.06E+07 | Table 5-23 |
| Beaver Creek | 2.60E+08 | Table 5-27 |

# 4. Significant sources of POC(s) from facilities of concern owned or operated by the MS4 operator

The general MS4 permit (Section 1.B.2.d) provides guidance on determining the presence of significant sources of POC(s) from facilities of concern:

> *Assess all significant sources of pollutant(s) from facilities of concern owned or operated by the MS4 operator that are not covered under a separate VPDES permit and identify all municipal facilities that may be a significant source of the identified pollutant. For the purposes of this assessment, a significant source of pollutant(s) from a facility of concern means a discharge where the expected pollutant loading is greater than the average pollutant loading for the land use identified in the TMDL. (For example, a significant source of pollutant from a facility of concern for a bacteria TMDL would be expected to be greater at a dog park than at other recreational facilities where dogs are prohibited.)*

In accordance with Section 4 from the Guidance Document and Section 1.B.2.d from the MS4 General Permit, this section of the Action Plan identifies and assesses municipal facilities which may be significant sources of sediment and bacteria.

## 4.1 Significant sources of sediment

County staff do not currently have evidence indicating any County-owned or operated facilities are expected to generate significant sources of sediment, where a significant source is defined as a sediment loading greater than the average loading for the land use identified in the TMDL. To the best of County staff's knowledge, all County-owned or operated facilities are currently compliant with applicable stormwater regulations and permits.

It should be noted, however, that average loading rates as a function of land use cannot be directly inferred from the Benthic TMDL Report; the Benthic TMDL Report was developed utilizing the Universal

Soil Loss Equation to estimate land-based sediment loads into the impaired reaches of the Rivanna (Benthic TMDL Report, page 6-4). Noting that streambank erosion was also a significant source of erosion, the Benthic TMDL Report estimated instream erosion using a spatial model developed by Evans et al. (2003). This model estimates streambank erosion as a function of estimated monthly stream flow, fraction of developed land, animal density, curve numbers, K factors, and mean field slope (Benthic TMDL Report Page 6-7 to 6-8).

In order to identify which County owned/operated facilities *may* be significant sources of sediment, Albemarle County staff have conducted a GIS analysis to identify County-owned properties in the MS4 area that have significant areas of impervious surface which *are not* served by stormwater management facilities. Stormwater facilities serve a well-documented function of both capturing land-based sediment loads and reducing the peak and/or volume of stormwater discharges. The reduction of stormwater peaks and volumes is known to reduce downstream erosion. Thus, County staff expect that impervious areas which *do not* receive downstream stormwater management are likely to contribute to a greater rate of instream erosion than unmanaged impervious areas and therefore may be significant drivers of downstream sediment pollution.

A list of County-owned properties in the MS4 area having greater than 10,000 square feet of unmanaged impervious area discharging to impaired waters is provided below in Table 4.1.1. These facilities may be significant sources of excess stormwater flow and therefore may drive downstream sediment pollution through instream erosion. These facilities are also shown on Figure 4.1.1. Facilities are color coded to reflect total untreated impervious area, with blue properties having the most impervious area and yellow properties having the least. Untreated impervious area is also labeled on the figure for each property.

| Table 4.1.1. County-owned/operated facilities identified as potential significant sources of sediment | | | | | |
|---|---|---|---|---|---|
| **Property Pin** | **Description** | **Total Acres in MS4** | **Managed Imperv. Acres** | **Unmanaged Imperv. Acres** | **Percent Unmanaged Imperv.** |
| 350134000* | County Office Building | 14.5 | 1.28 | 4.19 | 76.6% |
| 077000000011A0 | Albemarle Regional Jail | 8.9 | 0.42 | 3.74 | 89.9% |
| 360001000* | Burley Middle School | 17.7 | 0.00 | 3.52 | 100.0% |
| 6100000015300 | Charlottesville Technical Center (southern property) | 5.3 | 0.00 | 2.14 | 100.0% |
| 046B1010000100 | Hollymead Elementary School | 36.9 | 5.96 | 1.83 | 23.5% |
| 350001000* | Murray High School | 6.5 | 0.00 | 1.47 | 100.0% |
| 061000000167B0 | Charlottesville Technical Center (northern property) | 8.1 | 0.00 | 1.40 | 100.0% |
| 6200000002300 | Darden Towe Park (southern portion; remainder not in MS4) | 7.3 | 0.00 | 0.64 | 100.0% |
| 4600000002600 | Polo Grounds Rd | 26.1 | 0.00 | 0.58 | 100.0% |

*Property included in County MS4 but within City of Charlottesville boundaries.

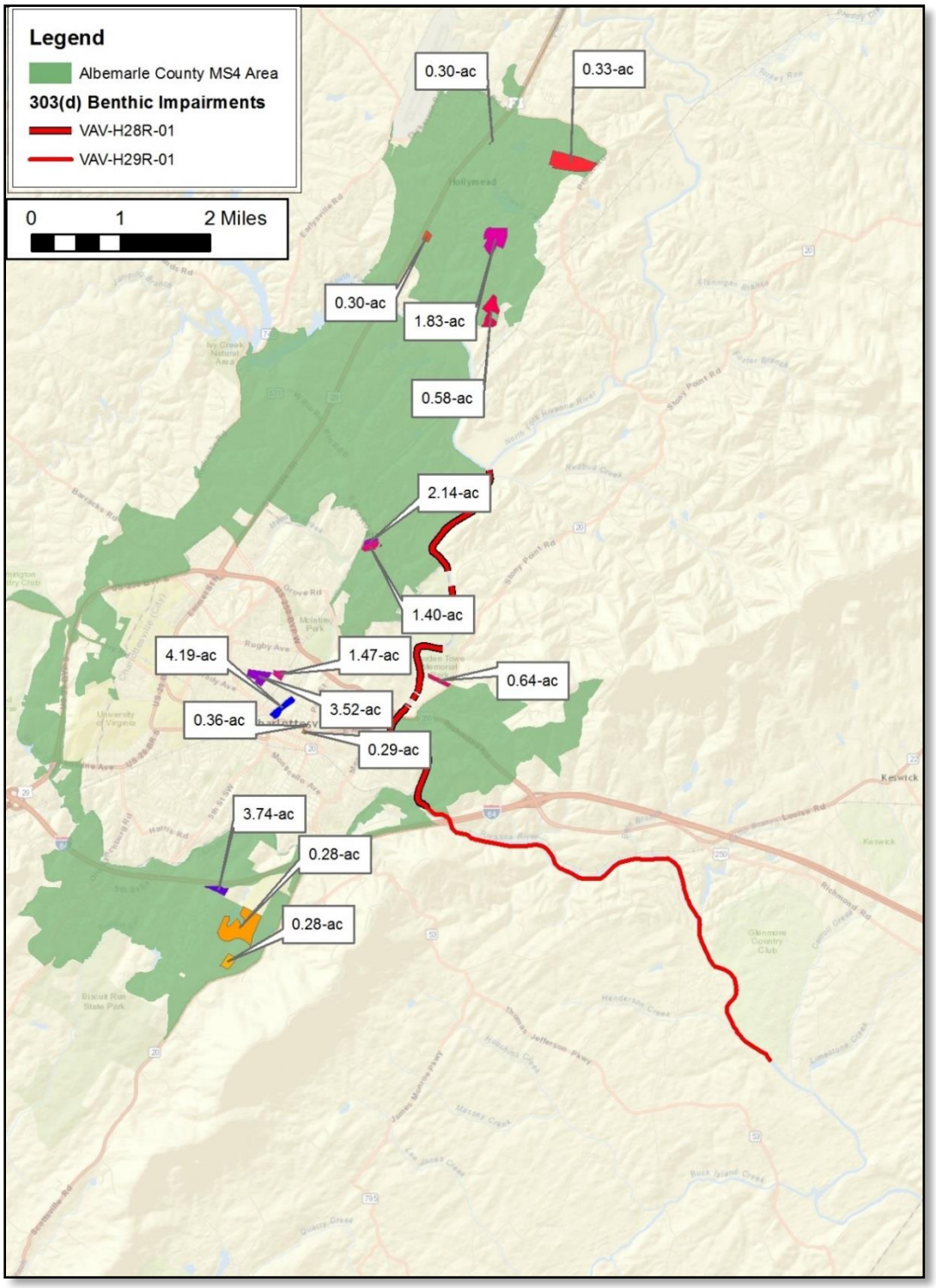


Figure 4.1.1. Potentially significant sources of sediment

### 4.2 Significant sources of bacteria

Because both wildlife and pets are recognized as sources of bacteria into bacterially impaired waters (Bacteria TMDL Report Pages 3-28 and 3-30), County staff anticipate that the rate of bacteria loading from County parks may be greater than the average bacteria loading for similar land uses identified in the TMDL. There are two County parks within the MS4 area and both allow pets, provide wildlife habitat, and contain MS4 outfalls. However, it is currently unknown which, if any, of these properties have a pollutant loading greater than the average pollutant loading for the land use identified in the TMDL.

County parks located wholly or in part within the MS4 area are indicated below in Table 4.2.1 and Figure 4.2.1.

**Table 4.2.1. Potentially significant sources of bacteria from facilities of concern**

| Property Pin | Property Description | Area (Ac) | % Inside MS4 |
|---|---|---|---|
| 485084915421 & 485009914885 | Charlotte Y. Humphris Park | 28.1 | 100% |
| 497793903017 & 496465902511 | Darden Towe Park | 114.9 | 6.3% |

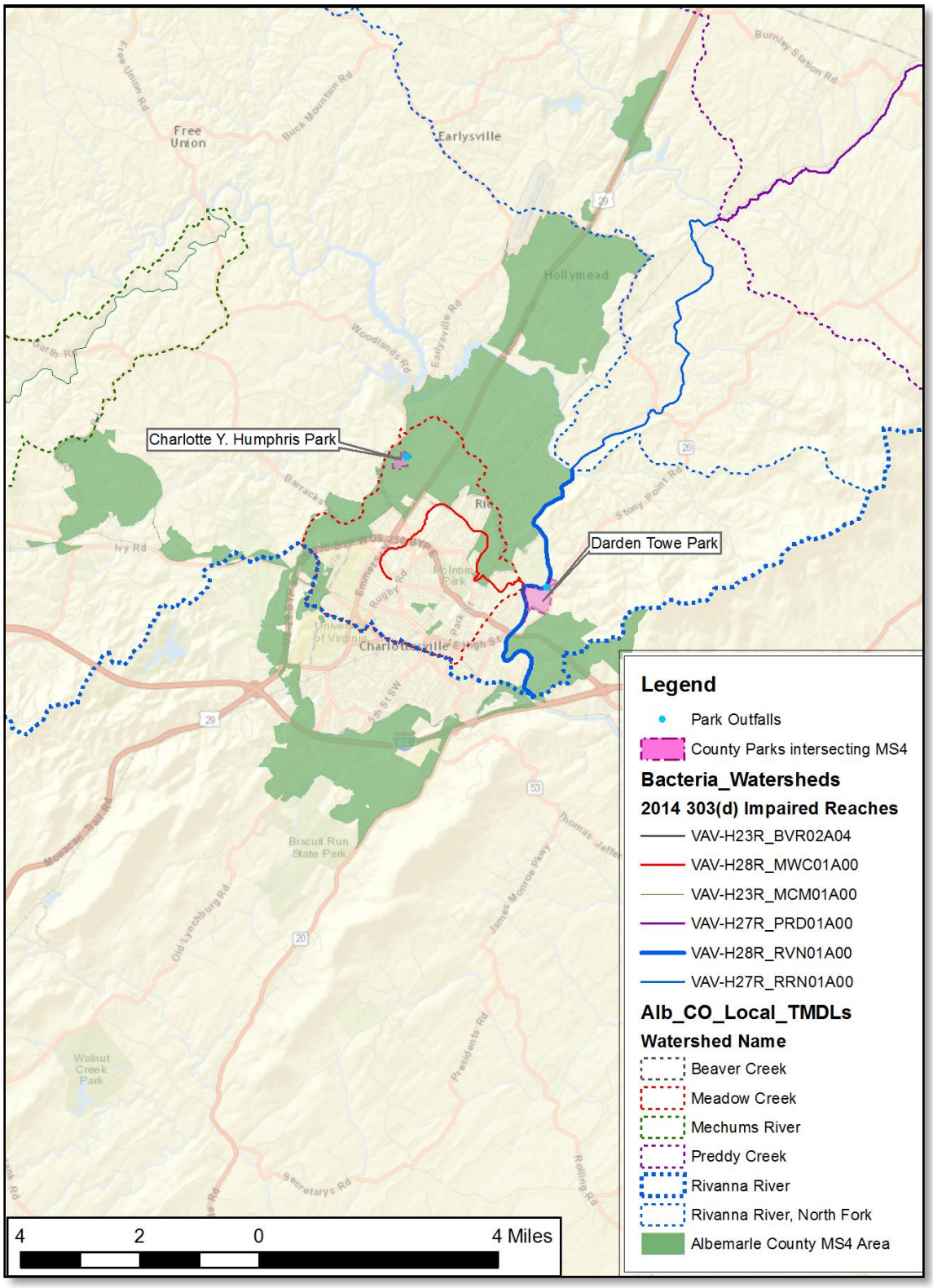


Figure 4.2.1. Potentially significant sources of bacteria

## 5. Operator efforts at reducing POCs and interim milestones

This section of the Action Plan describes efforts being conducted by Albemarle County in order to reduce sediment and bacteria loads in locally impaired waters with WLAs. Specifically, this section of the Action Plan addresses MS4 general permit sections 1.B.2.a (legal authorities), 1.B.2.b (management practices, control techniques, and system design and engineering methods), and 1.B.2.c (enhancements in public education and outreach). Interim milestones for the activities to be implemented during the remaining terms of this permit cycle are also provided, addressing MS4 general permit section 1.B.1 and Action Plan Content item number 8 from the Guidance Document.

### 5.1 Legal Authorities applicable to reducing the POCs identified in each TMDL

The general MS4 permit Section 1.B.2.a requires that the MS4 operator "develop and maintain a list of its legal authorities such as ordinances, state and other permits, orders, specific contract language, and interjurisdictional agreements applicable to reducing the pollutant identified in each applicable WLA."

Legal authority applicable to reducing sediment and bacteria is implemented under the following:

- Virginia Stormwater Management Act
- Virginia Erosion and Sediment Control Law
- Chesapeake Bay Preservation Act (CBPA)
- Albemarle County Code, including:
    - Subdivision Ordinance (Chapter 14)
    - Water Protection Ordinance (Chapter 17)
    - Zoning Ordinance (Chapter 18)
- Albemarle County Design Standards Manual (outlines administrative policies and procedures related to land development regulations)

Chapter 17 of the Albemarle County Code – known as the Water Protection Ordinance (WPO) – is the primary legal mechanism through which the County regulates land disturbing activities, land development, illicit discharges, and impacts to riparian areas and other natural resources. The WPO was revised in 2014 to incorporate the new Virginia Stormwater Management Program (VSMP) requirements pertaining to erosion and sediment control and stormwater management and in recognition of the impacts of sediment and bacteria pollution on local waterways. The WPO continues certain preexisting programs of the County that exceed the minimum State standards in several respects:

- The land disturbance threshold for small construction activities is 10,000 square feet, as opposed to 1 acre
- Denuded areas must be stabilized with permanent vegetation within nine months after commencing land disturbing activity (with caveats and opportunities for extensions)
- The use of fill or waste areas is limited to one year
- A 100-foot vegetated stream buffer must be established and maintained in perpetuity

Below is a brief summary of the key elements in the WPO:

- Article V, Technical Criteria (Sections 17-500 to 17-502): Establishes the technical criteria for controlling erosion and sediment, managing stormwater quantity, and managing stormwater quality to satisfy State standards.

- Article VI, Stream Buffers (Sections 17-600 to 17-604): Continues the County's stream buffer protection regulations and amends some of the regulations to simplify their administration.

- Article VII, Illicit Discharges, Illicit Connections, and Prohibited Dumping (Sections 17-700 to 17-703): Continues the County's regulations prohibiting illicit discharges and connections, and prohibiting dumping, as part of the County's MS4 program.

- Article VIII, Compliance (Sections 17-800 to 17-814): Establishes a wide range of duties on owners holding approved permits to engage in land disturbing activity, including the duty to comply with all applicable requirements, to maintain all structures, systems and facilities, to maintain certain required permits and plans onsite, to provide information pertaining to certain discharges, to report certain discharges, and to provide records; also establishes the authority of the administrator to obtain information from owners, to conduct inspections of sites, and to conduct monitoring and sampling; the new State regulations impose an obligation on the County for ensuring compliance.

- Article IX, Enforcement (Sections 17-900 to 17-905): Continues, clarifies and enhances the County's enforcement authority under its VESCP, VSMP and MS4 programs, ranging from issuing notices to comply and stop work orders to seeking civil penalties and other judicial remedies.

In addition, Albemarle County is exploring formalizing an understanding with the City of Charlottesville and the University of Virginia through an MOU regarding joint responsibility for cleanup of TMDL-impaired waterbodies (both Chesapeake Bay TMDL and Local TMDLs). The County, City, and UVA have agreed to take responsibility for the POC loads within their regulated area boundary regardless of sheetflow draining to or from another jurisdiction. Furthermore, POC reduction credit for installed BMPs draining lands from multiple jurisdictions will be received by the permittee that installs the BMP. However, each entity reserves the right to enter into agreements in which TMDL credit is shared with adjacent permittees for any projects which treat drainage from multiple permittees' lands [milestone: submission during the current permit cycle]. A draft MOU is presented as an appendix in Section 8.3 in this report.

### 5.2 Management practices, control techniques, and system design and engineering methods

This section of the report address general MS4 permit Section 1.B.2.a and Action Plan Content item 6. This section also addresses Action Plan Content item 8 (milestones). These sections require that the MS4 operator identify and maintain an updated list of all additional management practices, control techniques, system design and engineering methods, and associated milestones, that have been implemented as part of the MS4 Program Plan that are applicable to reducing the pollutants identified in the WLA.

**Structural BMPs and Stream Restorations**

Since 2011 Albemarle County has voluntarily constructed three structural BMPs and one stream restoration within the regulated area. These system engineering methods are beyond those identified in Section II B of the general permit (minimum control measures). The location of these facilities relative to

impaired watersheds and the regulated area is shown on Figure 5.2.1 and summarized below in Table 5.2.1. The purpose of these best management practices is to provide water quality benefits for the Chesapeake Bay and local watersheds, including removal of sediment and bacteria.

Constructed wetlands and biofilters have been found to remove greater than 50% of E. coli.[1] Modeling for sediment reductions provided by these facilities are presented in Section 6.1, pursuant to guidance received from DEQ staff and DEQ Guidance Memo 15-2005, Chesapeake Bay TMDL Action Plan Guidance Document.

**Table 5.2.1. Structural BMPs and Stream Restorations Relevant to the Removal of POCs**

| Project Name | Year Installed | Milestones | Acres Treated | Relevant POCs Removed | Lat | Long |
|---|---|---|---|---|---|---|
| Four Seasons Stream Restoration | 2015 | Minimum inspection frequency: annual | 12.6 | Sediment | 38.082 | -78.487 |
| Church Road Constructed Wetlands | 2015 | Minimum inspection frequency: annual | 68.4 | Sediment, Bacteria | 38.073 | -78.477 |
| Woodbrook Lagoon Constructed Wetlands | 2013 | Minimum inspection frequency: annual | 254 | Sediment, Bacteria | 38.036 | -78.482 |
| County Office Building (COB) Biofilter* | 2011 | Minimum inspection frequency: annual | 2.11 | Sediment, Bacteria | 38.083 | -78.465 |

*Uncertain if significant bacteria load is generated within parking lot that drains to biofilter. Facility may or may not contribute to reduction of bacteria loads.

[1] Hathaway et al., 2009. Indicator Bacteria Removal in Storm-Water Best Management Practices in Charlotte, North Carolina. Journal of Environmental Engineering Vol. 135, Issue 12.

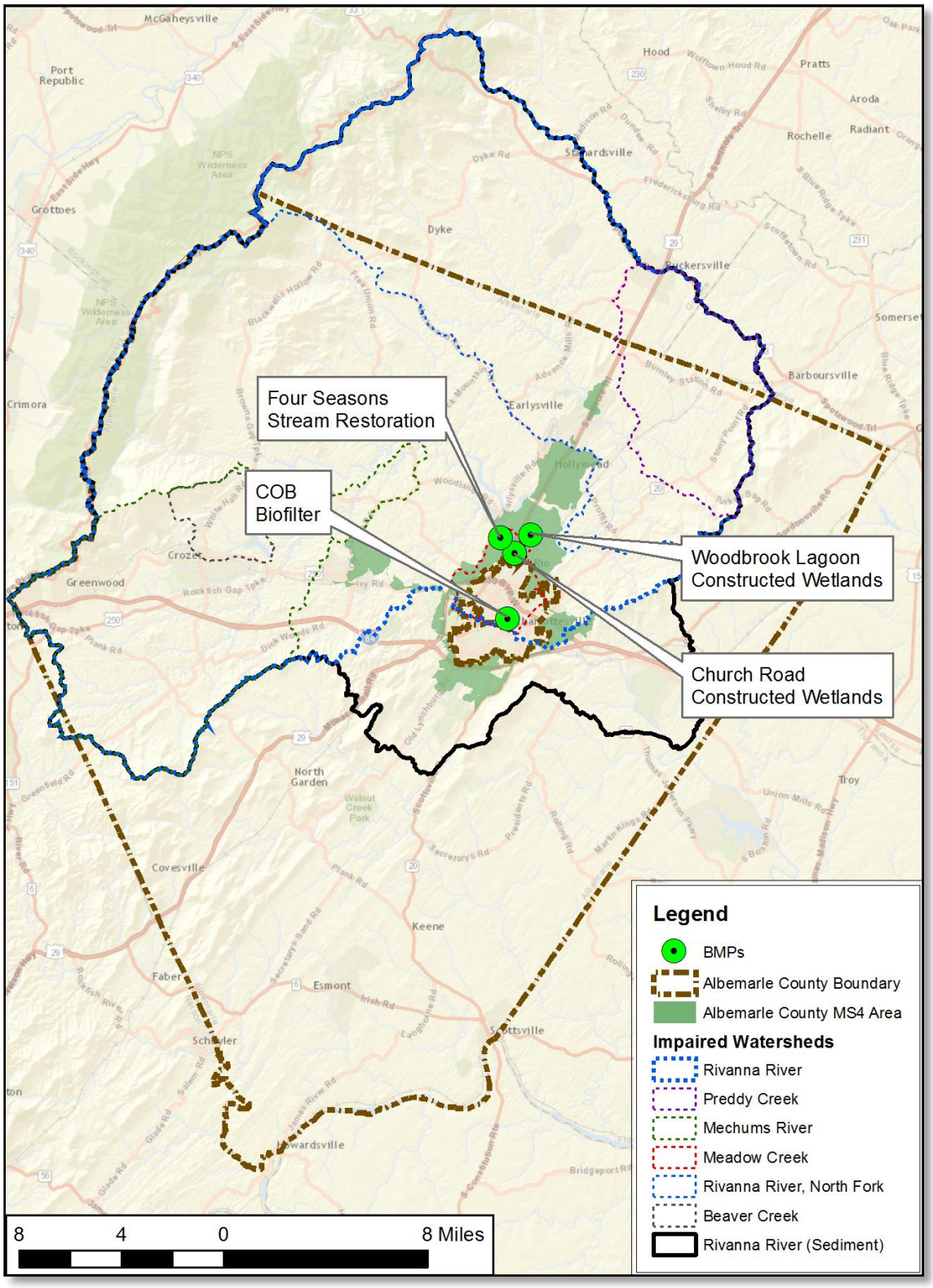


Figure 5.2.1. Structural BMPs and Stream Restorations Relevant to the Removal of POCs

**Proposed Structural BMPs**

In addition to the BMPs listed above, Albemarle County has been pursuing and awarded grant funding for the construction of additional structural water quality projects, which are anticipated to be completed over the next several years (milestones provided in Table 5.2.2 below). A DEQ Stormwater Local Assistance Grant was awarded for the construction of the Chapel Hills Stream Restoration, an approximately 1,140 LF project, which will result in significant reductions of sediment into the Rivanna River and contribute toward achieving the WLA. In addition, the National Fish and Wildlife Foundation (NFWF) has awarded the County a grant to retrofit up to three privately-owned detention basins for water quality benefits. These retrofits are expected to result in significant reductions of both sediment and bacteria into locally impaired waterbodies. Table 5.2.2 presents these BMPs which are currently in the planning stages, preliminary milestones, and additional information relevant to each planned BMP.

**Table 5.2.2. Proposed Structural BMPs and Stream Restorations Relevant to the Removal of POCs**

| Project Name | Anticipated Milestones | Acres Treated | Relevant POCs Removed | Lat | Long |
|---|---|---|---|---|---|
| Chapel Hills Stream Restoration | Construction complete: 2018 | 72 | Sediment | 38.072 | -78.475 |
| RiverRun dam decommissioning and stream restoration | Construction Complete: 2018 | 31 | Sediment | 38.056 | -78.454 |
| Minor Hill Bioretention retrofit from dry detention basin | Construction Complete: 2018 | 4 | Sediment | 38.077 | -78.502 |

**Additional Management Practices, Control Techniques, and System Design and Engineering Methods**

In addition to the existing and proposed and structural BMPs listed above in this section, the County is dedicated to additional management practices, control techniques, and system design and engineering methods that are applicable to reducing the pollutants identified in the WLAs. These are listed in Table 5.2.3.

| Table 5.2.3. Management practices, control techniques, and system design and engineering methods that have been implemented as part of the MS4 program plan | | | |
|---|---|---|---|
| **BMP Name** | **BMP Description** | **Milestone** | **Relevant POC(s)** |
| Charlottesville Area Transit Bus Add | Ad directing viewers to pick up after pets | Annual | Bacteria |
| Cville Weekly print ad | Ad directing viewers to pick up after pets | Annual | Bacteria |
| Utility Bill Mailing Insert | Flyer encouraging recipients to pick up after pets | Completed April 2015 | Bacteria |
| Regal Cinemas Movie Ad | Add directing viewers to pick up after pet, minimize lawn fertilization, and use rain barrels and rain gardens | Annual | Bacteria, Sediment |
| Annual Charlottesville EcoFair | Table informing attendees about negative impacts of urban stormwater and resources available to reduce impact | Annual | Bacteria, Sediment |
| Stormwater Utility Funding Advisory Committee | Receive stakeholder input on the desired level of stormwater services and equitable funding mechanisms | 2014-current | Bacteria, Sediment |
| Illicit Discharge Detection | Dry-weather outfall inspections, response to reported discharge, investigation of discharges | Ongoing | Bacteria, Sediment |
| Illicit Discharge Reporting Website | A web-based reporting form at www.rivanna-stormwater.org is used to receive reports of illicit discharges | Ongoing | Bacteria, Sediment |
| Illicit Discharge Reporting Hotline | The Thomas Jefferson Soil and Water Conservation District receives reports of illicit discharges and forwards to the appropriate MS4 operator | Ongoing | Bacteria, Sediment |
| Storm sewer mapping | The County is in the process of completing MS4 storm sewer system map to assist illicit discharge investigation | Completion goal: July 2017 | Bacteria, Sediment |
| BMP Maintenance Workshop | Workshop for BMP owners / maintainers about County Requirements for BMP maintenance | Completed June 2016 | Bacteria, Sediment |
| Construction site runoff control | Albemarle County Department of Community Development regularly issues land disturbance permits, reviews erosion and sediment control plans, and inspects construction sites for erosion and sediment control | Ongoing | Sediment |
| Post-construction stormwater management | County staff regularly inspect all privately-owned stormwater BMPs to ensure continued operation and maintenance following completion of construction | Minimum frequency: one inspection every five years | Bacteria, sediment |
| Pollution prevention and good housekeeping at County-owned facilities | County Environmental Compliance Managers develop and maintain pollution prevention programs, stormwater pollution prevention plans, and nutrient management plans for County-owned facilities. | Updates as needed | Bacteria, sediment |
| Good housekeeping training | County Staff training for good housekeeping and pollution prevention at County-owned facilities. | Biennial / as needed to | Bacteria, sediment |

| | | | |
|---|---|---|---|
| | | maintain certification | |
| Bacteria Sampling and Tracking Program – Coordination with Rivanna Conservation Alliance and adjacent permittees | Initiate and sustain bacteria sampling and tracking program to enable assessment of action plan effectiveness (Section 5.2 of this report) | To be initiated during this permit cycle | Bacteria |
| Rivanna Conservation Alliance Science Advisory Collaboration | Albemarle County's MS4 Manager serves as the science advisor to Rivanna Conservation Alliance. This advisory position will help the County to make informed decisions regarding targeting of monitoring efforts and additional BMPs. | Ongoing | Bacteria, sediment |
| County funding for Rivanna Conservation Alliance | Albemarle County funds benthic and bacteria monitoring activities of the Rivanna Conservation Alliance, which will be used to assess the effectiveness of this Action Plan and target BMPs. | Ongoing | Bacteria, sediment |
| Feasibility assessment – additional stormwater management for County owned facilities | Albemarle County will assess the feasibility of incorporating new stormwater BMPs in the County-owned facilities identified in Sections 4.1 and 4.2. | Assessment to be completed during this permit cycle | Sediment, Bacteria |

### 5.3 Enhancements in Public Education, Outreach, and Employee Training Programs

Albemarle County' MS4 permit requires that the County "enhance its public education and outreach and employee training programs to also promote methods to eliminate and reduce discharges of the pollutants identified in the WLA" (Section II.B.2.c).

Albemarle County is a sponsor and active participant of the Rivanna Stormwater Education Partnership (www.rivanna-stormwater.org, RSEP), which is a collaboration between local MS4 permittees to promote education and outreach regarding local stormwater issues, including sediment and bacteria impaired waterbodies. Educational resources (and associated pollutants addressed) through RSEP include:

- Pet Waste Education Initiative (bacteria)
- Middle School Science Lesson Plans (sediment and bacteria)
- Public Service Announcements (sediment and bacteria)
- Rain garden construction information (sediment and bacteria)
- Stormwater tips for homeowners (sediment)
- Septic system maintenance tips (bacteria)

In addition to the educational resources listed above, County staff have worked through RSEP to enhance outreach by leading a stormwater facility maintenance workshop, which educated property owners and private BMP maintenance staffs on their responsibilities for maintenance and how best to fulfil them. The workshop was conducted on June 22, 2016 and it addresses both sediment and bacteria. A workshop flyer is included in Appendix 7.2.

Albemarle County's MS4 staff training program, including enhancements and milestones, are presented below in table 5.3.1.

**Table 5.3.1. Staff Training Program, Enhancements, and Milestones**

| **Department Receiving Training** | **Targeted Staff** | **Good Housekeeping / Pollution Prevention** | **Enhanced Training (for applicable staff)** | |
|---|---|---|---|---|
| | | | **Spill Response** | **VA ESC Law** |
| (milestones) | biennial | To maintain certification | To maintain certification | To maintain certification |
| Public Schools Building Services | • building maintenance<br>• grounds management<br>• custodians<br>• mechanics<br>• bus drivers<br>• other field staff | x | x | |
| Community Development | • E&S control inspectors<br>• building inspectors<br>• zoning inspectors | x | | x |
| Community Emergency Response Team | • all staff | x | x | |
| Emergency Communications Center | • all staff | x | | |
| Fire & Rescue | • all staff | x | x | |
| Facilities and Environmental Services | • building maintenance<br>• grounds management<br>• custodians<br>• project managers | x | x | |
| Parks and Recreation | • all staff | x | x | |
| Police | • all staff | x | | |
| Purchasing | • all staff | x | | |
| Social Services | • field staff | x | | |

# 6. Methods to assess Action Plan effectiveness

This section of the Action Plan addresses MS4 general permit sections 1.B.2.e, which requires that permittees:

> *Develop and implement a method to assess TMDL Action Plans for their effectiveness in reducing the pollutants identified in the WLAs. The evaluation shall use any newly available information, representative and adequate water quality monitoring results, or modeling tools to estimate pollutant reductions for the pollutant or pollutants of concern from implementation of the MS4 Program Plan. Monitoring may include BMP, outfall, or in-stream monitoring, as appropriate, to estimate pollutant reductions. The operator may conduct monitoring, utilize existing data, establish partnerships, or collaborate with other MS4 operators or other third parties, as appropriate. This evaluation shall include assessment of the facilities identified in subdivision 2 d of this subsection [significant sources of POCs from facilities owned or operated by the MS4 operator]. The methodology used for assessment shall be described in the Action Plan.*

The County is committed to an adaptive, iterative approach over multiple permit cycles to ensure that progress continues to be made toward reducing the discharge of sediment and bacteria into locally impaired waterbodies. In order to assess Action Plan effectiveness, the County will model the effectiveness of sediment load reduction and institute a sampling and tracking program to assess the effectiveness of bacteria load reduction. As new modeling and bacteria sampling information becomes available, the County intends to adapt its monitoring and sampling and tracking programs in order to target BMPs most appropriately to tangible reduction of sediment and bacteria loads into impaired waters.

### 6.1 Methods to assess sediment reductions

The County will model sediment load reductions achieved during the current permit cycle pursuant to the Chesapeake Bay TMDL Action Plan Guidance Document published by DEQ (Guidance Memo No. 15-2005) and any additional guidance issued by DEQ. The Guidance Document dictates that "permittees may refer to the Chesapeake Bay TMDL Action Plan Guidance… for strategies and information on how to calculate reductions from BMPs in watersheds with local nutrient and sediment TMDLs." This sediment reduction modeling program will be tailored to include any reductions of sediment loads from the facilities identified in section 4 of this report (significant sources of POCs). DEQ staff have indicated that it is not appropriate to use the edge of stream sediment loading rates provided in The Chesapeake Bay TMDL Action Plan Guidance Document Table 2a, as these loading rates reflect average sediment delivery into the Chesapeake Bay (not the Rivanna River) as a function of land use type.

As a result, DEQ staff instructed Albemarle County staff that they may use a generalized loading rate of 0.3lbs/day/acre to model land-based sediment loads and subsequently load reductions toward achieving the WLA[2]. The loading rate of 0.3 lbs/day/acre is the average loading rate per acre for Albemarle County, the City of Charlottesville, and UVA MS4 areas presented in the Benthic TMDL Report. Modeling results for sediment load reductions from the structural BMPs and the stream restoration projects described in section 5.2 are presented below in Tables 6.1.1 and 6.1.2.

[2] Email from Tara Seiber, DEQ Valley Region TMDL Coordinator, December 9, 2015

| Table 6.1.1. Sediment load reduction modeling results for implemented Stream Restorations | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Year Installed** | **Acres Treated** | **Sediment removed (lb/yr)** | **Lat** | **Long** |
| Four Seasons Stream Restoration | 2015 | 12.6 | 92,000[1] | 38.082 | -78.487 |

[1]Stream restoration sediment removal modeling supported in Appendix Section 8.1.

Modeling results for the removal of sediment from structural BMPs are presented below in Table 6.1.2. Sediment load reduction was modeled pursuant to the Chesapeake Bay TMDL Action Plan Guidance Document, with the exception that a uniform loading rate of 0.3 lb/acre/day was used to calculate sediment loads entering these facilities. Removal rates for Woodbrook Lagoon and the County Office Building Biofilter were calculated using the stormwater treatment / runoff reduction curves presented in the Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects[3]. Removal rates for the Church Road Constructed Wetlands were calculated using Chesapeake Bay Program Established Efficiencies[4]. Additional details regarding the sediment removal efficiencies of these BMPs are provided in Albemarle County's Chesapeake Bay TMDL Action Plan, which was submitted on October 1, 2015.

| Table 6.1.2. Sediment load reduction modeling results for implemented Structural BMPs | | | | | |
|---|---|---|---|---|---|
| **Project Name** | **Acres Treated** | Total Sediment Load (lb/day) | Sediment Removal Rate (%) | Sediment Removal (lbs/day) | Sediment Removal (lbs/yr) |
| Church Road Constructed Wetlands | 68.4 | 20.52 | 51.0% | 10.46 | 3,821.86 |
| Woodbrook Lagoon Constructed Wetlands | 254 | 73.71 | 14.8% | 10.94 | 3,996.62 |
| County Office Building (COB) Biofilter | 2.11 | 0.63 | 73.0% | 0.46 | 168.75 |

In addition to modeling sediment reductions, Albemarle County will track the impaired condition of the impaired reaches and the condition of major tributaries flowing into the reaches through ongoing support of the StreamWatch monitoring program, now a program of the Rivanna Conservation Alliance (RCA). With financial support from Albemarle County, StreamWatch has collected Level III benthic data at sites in and near the impaired reaches for over a decade. The quality of Level III data is on par with

[3] Bahr et al., 2012. Recommendations of the Expert Panel to Define Removal Rates for Urban Stormwater Retrofit Projects. Prepared by Tom Schueler and Cecilia Lane, Chesapeake Stormwater Network.

[4] Chesapeake Bay TMDL Action Plan Guidance Document published by DEQ (Guidance Memo No. 15-2005), Appendix V.C.

DEQ's own data and is accepted by DEQ for listing and de-listing purposes. The StreamWatch dataset helped prompt the listing of VAV-H29R-01.

StreamWatch data collected in the impaired reaches over an eleven-year period demonstrate persistent benthic impairment (see Figure 6.1.1). In the figure, multimetric benthic index scores from samples collected in spring and fall of each year are shown. Scores lower than 60 (red line in figures) indicate impairment. To be de-listed, scores need exceed 60 for five years with minimal exceptions. As shown, benthic scores from individual samples sometime meet the standard, but the overall pattern does not.

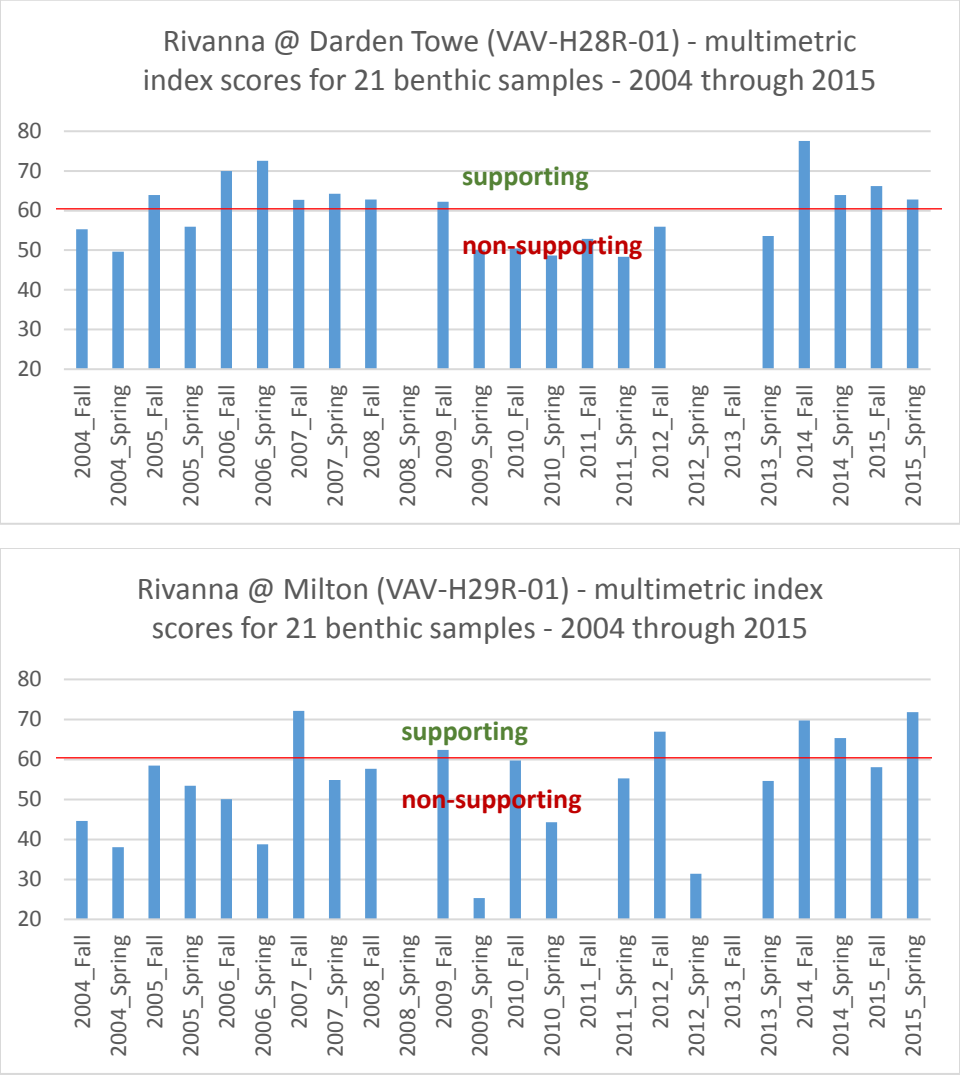


Figure 6.1.1. Multimetric benthic index scores at impaired reaches

It is also worth noting the condition of waters flowing into the impaired reaches. VAV-H28R-01 is formed at the confluence of the North and South Forks of the Rivanna River. As shown in Table 6.1.3, average

benthic scores for these two streams suggest marginal and sub-standard conditions. The North Fork Rivanna River might support the aquatic life standard; the larger South Fork definitely does not. Downstream of the confluence, urbanization increases. The effects of urban land use are reflected in average scores indicative of severe impairment in Meadow Creek and Moores Creek. These streams contribute polluted water and flashy flows to the subject reaches of the Rivanna. They also indicate an intensity of urban land use that directly impacts the Rivanna and that cannot easily be mitigated.

Table 6.1.3 - Benthic conditions in major tributaries of impaired reaches of the Rivanna River

| Site / Stream | # of samples | Average benthic score | Condition |
|---|---|---|---|
| North Fork @ Forks of Rivanna | 20 | 61.4 | Good to Fair (Borderline supporting) |
| South Fork @ Forks of Rivanna | 30 | 45.5 | Fair to Poor (Non-supporting) |
| Meadow Creek @ Locust Lane Court | 22 | 27.7 | Poor (Non-supporting) |
| Moores Creek @ Woolen Mills | 17 | 24.8 | Poor (Non-supporting) |

## 6.2 Methods to assess bacteria reductions

Instead of *modeling* the bacteria reductions, Albemarle County plans to track progress of bacteria reductions via a sampling and tracking program which will initiate during this permit cycle. This program will be tailored to enable assessment of the facilities identified in section 4 of this report (significant sources of POCs). Albemarle County, the City of Charlottesville, and the University of Virginia have begun coordination to determine how existing/ongoing bacteria sampling programs may be used and potentially augmented to assess bacteria reductions along impaired reaches.

Figure 6.2.1 shows locations of ongoing bacteria sampling stations relative to impaired reaches and the Albemarle County MS4 Boundary. These stations are operated by RCA. The StreamWatch program began a bacteria sampling program in 2012 through which staff and volunteers monitor E. coli levels once per month (in general) using Coliscan© Easygel. Limited data from each of these stations is currently provided by RCA on their website (http://www.rivannariver.org/bacteria).

Data from the existing water quality sampling locations will be used, and the County/City/University partnership will work with RCA staff and volunteers to add additional sampling locations if necessary to assess the effectiveness of this Action Plan in reducing the discharge of bacteria from the MS4 area. Additionally, RCA and the partnership members will assess strategies through which the RCA mapping website may be improved to make bacteria sampling data more useful to both the public and to MS4 staff in improving local water quality. This sampling and tracking program will be operational by June 30, 2018 and documentation will be submitted to DEQ with the annual report which is due on October 1, 2018.

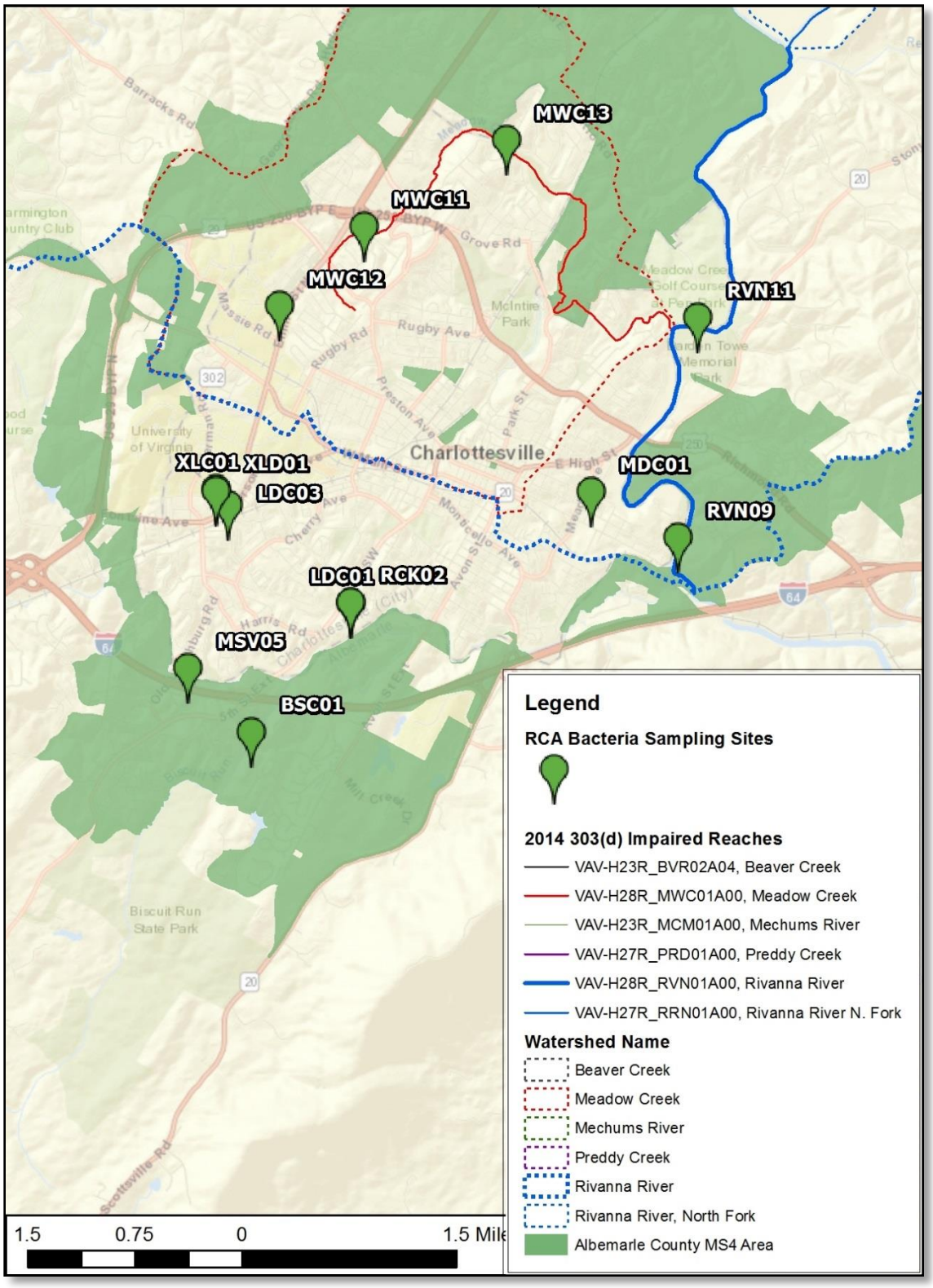


Figure 6.2.1. Rivanna Conservation Alliance (formerly StreamWatch) Bacteria Sampling Locations

An example of existing bacteria sampling data which may be used and augmented to assess action plan effectiveness is provided in Figure 6.2.2 below.

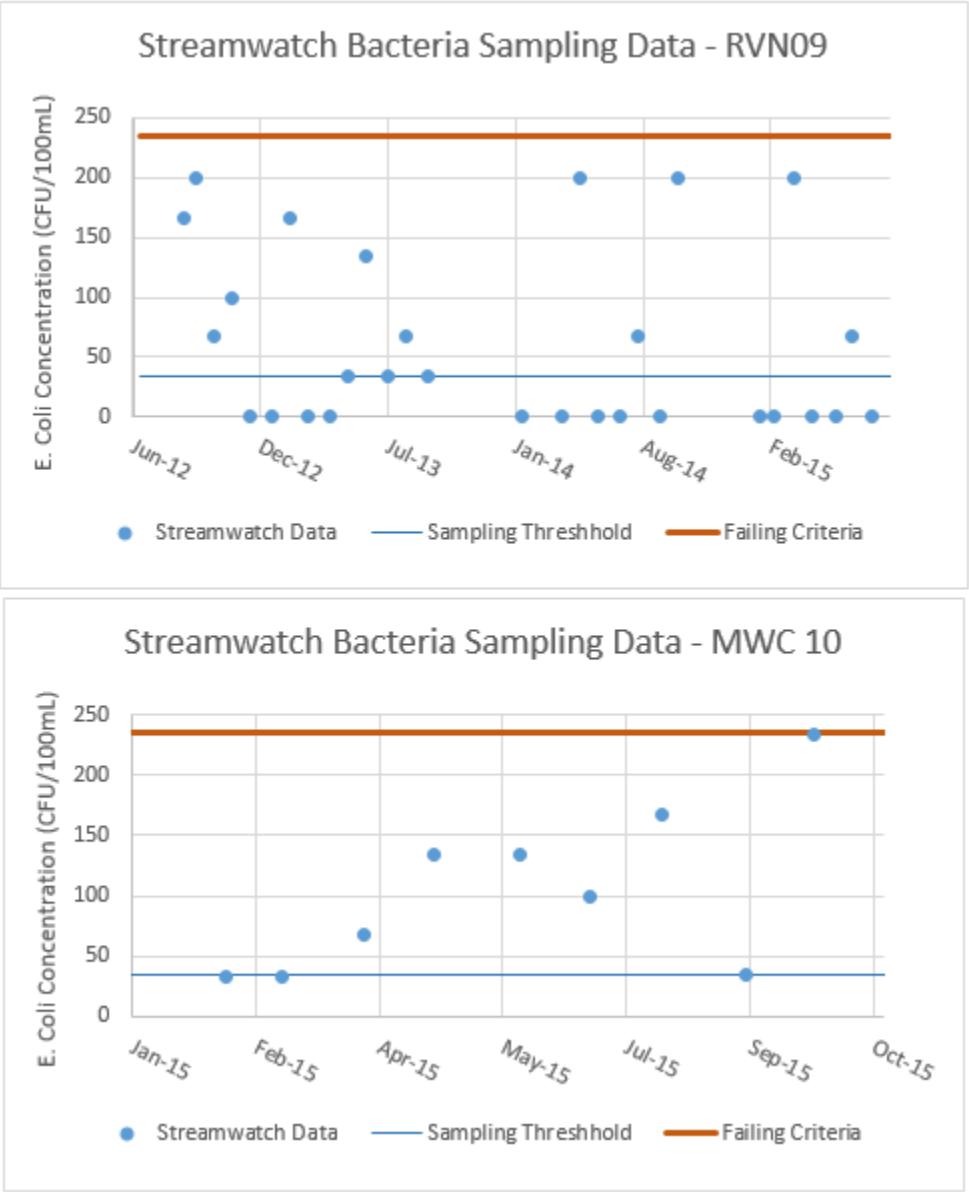


Figure 6.2.2. Existing bacteria sampling data

## 7. Measurable Goals and Metrics to Track Compliance

In addition to providing methods to assess Action Plan effectiveness at achieving WLAs, action Plan Content item 10 in the Guidance Document also requires that the Action Plan contain measurable goals as defined below:

> *Measurable goals and the metrics that the permittee and Department will use to track those goals (and the milestones required by the permit). Evaluation metrics other than monitoring may be used to determine compliance with the TMDL(s).*

The County will track and report on progress toward achieving WLAs in its MS4 annual reports, which are submitted to DEQ annually on October 1. The annual reports will include updates on progress as demonstrated through implementation of BMPs described in Section 5 of this report and respective modeling and sampling/tracking of sediment and bacteria reductions as described in section 6 of this report. In accordance with the adaptive, iterative approach described in Section 1.B.1 of the MS4 general permit, Albemarle County reserves the right to modify the BMPs described in Section 4 of this report.

# 8. Appendices

## 8.1 Four Seasons Stream Restoration Sediment Load Reduction Accounting

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

1001 Boulders Parkway
Suite 300
Richmond, VA 23225

P 804.200.6500
F 804.560.1016
www.timmons.com

April 15, 2014

Greg Harper
County of Albemarle
Water Resources Manager
401 McIntire Road, Room 224
Charlottesville, Virginia 22902-4596

VIA EMAIL: gharper@albemarle.org

**Re: Defining Pollutant Reductions by Four Season Drive Channel Improvements**
**Albemarle County, Virginia**

Dear Mr. Harper:

Timmons Group was contracted to analyze the applicability of three of the four (Protocols 1-3) *Recommended Protocols for Defining Pollutant Reductions Achieved by Individual Stream Restoration Projects*[1]. The following is a summary of our analysis.

**Protocol 1: Credit for Prevented Sediment during Storm Flow**

"This protocol provides an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that would otherwise be delivered downstream from an actively enlarging or incising urban stream," (Schueler and Stack 2013). Timmons Group followed the outlined three step process to compute a mass reduction credit for prevented sediment, as follows:

**Step 1.** The stream sediment erosion rates and annual sediment loadings were estimated utilizing the Bank and Nonpoint Source Consequences of Sediment (BANCS) Method developed by Rosgen (2001). On January 17, 2014, Timmons Group assessed the existing channel by performing a series of field data collection exercises including the Bank Erosion Hazard Index (BEHI) and Near Bank Stress (NBS) assessments for each stream bank within the restoration reach. This assessment summary can be found on the enclosed Worksheet 3-13. Summary form of annual stream bank erosion estimates for various study reaches. Sample reaches were then assigned one of four (4) corresponding erosion rate categories ranging from "Low" to "Extreme," as illustrated on the enclosed BANCS Assessment Map. Based on this analysis, the existing channel can be classified as having an extremely high erosion rate (calculated unit erosion rate = 0.17 tons/yr/ft). Extrapolated along the existing restoration length, the overall sediment load is predicted to be 92 ton/yr.

**Step 2.** The erosion rates calculated using the BANCS method were converted to nitrogen and phosphorus loadings. Based on the published values presented in the guidance document for both phosphorus and nitrogen concentrations in stream bank sediments (1.05 pounds P/ton of sediment and 2.28 pounds N/ton of sediment), the predicted nutrient load resulting from erosion of the stream banks within the project limits is 97 lb/yr of phosphorus and 210 lb/yr of nitrogen.

[1] Provided as Section 5 in *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects* prepared by Tom Schueler, Chesapeake Stormwater Network and Bill Stack, Center for Watershed Protection. The Water Quality Goal Implementation Team issued their final approval of this document on May 13, 2013.

**Step 3.** The protocol calls for a 50% effective reduction in the nutrient loading unless there is a representative "natural" condition from which the low BEHI and NBS scores can be estimated from, however the 50% effective reduction was used in this analysis. The following sediment and nutrient credits were determined for Protocol 1:

Sediment = 46 ton/yr
Total Phosphorus = 49 lb/yr
Total Nitrogen = 105 lb/yr

**Protocol 2: Credit for In-stream and Riparian Nutrient Processing during Base Flow**

"This protocol provides an annual mass nitrogen reduction credit for qualifying projects that include design features to promote denitrification during base flow," (Schueler and Stack 2013). To qualify for credit under Protocol 2, the bank height ratio is required to be 1.0 or less in order to promote hyporheic exchange between the stream channel and the floodplain rooting zone. The hyporheic box is calculated as the width of the channel plus five feet on either side of the stream bank, extending to a maximum depth of five feet, excluding areas of bedrock outcropping or confining clay layers. The box extends the length of the restored channel.

As a result of the project 360 linear feet of stream will be reconnected to the hyporheic zone. The area of the proposed hyporheic box is 98 $ft^2$, resulting in an estimated 2,205 tons of soil nutrient processing.

Protocol 2 limits the amount of reduction based on 40% of the contributing watersheds nitrogen load. The project will provide 64 lb/yr of nitrogen reduction.

**Protocol 3: Credit for Floodplain Reconnection Volume**

"This protocol provides an annual mass sediment and nutrient reduction credit for qualifying projects that reconnect stream channels to their floodplain over a wide range of storm events… A wetland-like treatment is used to compute the load reduction attributable to floodplain deposition, plant uptake, denitrification and other biological and physical processes," (Schueler and Stack 2013).

It appears the intent of Protocol 3 is to provide increased sediment and nutrient credit for restoration projects that include the design of wetlands within the project floodplain that are actively engaged during smaller storm events, specifically those less than the 1.5 year storm event. The result is a reduction in sediment and nutrient concentrations of the stormwater runoff from the contributing watershed by means of hydraulic detention and nutrient processing occurring in the floodplain wetlands. Therefore, the project should result in a minimum watershed to floodplain ratio of one percent to ensure adequate hydraulic detention time for flows in the floodplain. Further, the floodplains should be specifically designed to act as wetlands, and designers are afforded more credit for designs that engage the floodplain during smaller storm events (e.g., 0.25 or 0.5 inches).

The goal of this stream restoration project was to reduce erosion of the existing stream banks utilizing natural stream channel techniques. The proposed design primarily utilizes a Priority 3 restoration approach - widening the floodplain at the existing bankfull elevation. This is accomplished by creating a floodplain bench on one or both sides of the existing stream channel at the elevation of the existing bankfull stage (1- to 2-year storm event). A minimal floodplain bench is proposed, corresponding to 0.2 acres of the 13-acre project watershed, or only 0.83%. As this project does not meet the minimum floodplain to watershed ratio, nor include specifically designed wetland areas to be engaged in small storm events, Protocol 3 is not applicable.

**Summary**

Sediment and nutrient credits were computed for the Hoehns Lake Stream Restoration project, as follows:

| Protocol | Phosphorous Credit (lbs/yr) | Nitrogen Credit (lbs/yr) | Sediment Removal Credit (ton/yr) |
|---|---|---|---|
| **1** | 49 | 105 | 46 |
| **2** | N/A | 64 | N/A |
| **3** | N/A | N/A | N/A |
| **Total** | 49 | 169 | 46 |

Timmons Group thanks you for the opportunity to work on this project and assess the potential sediment and nutrient reduction credits associated with compliance with the Chesapeake Bay TMDL. We would be happy to meet with you to review our findings and to discuss our assumptions, the guidance documents, and the Protocols in-depth, as related to this and future projects for Albemarle County. Please contact us at your convenience to discuss the subject further.

Sincerely,

**Timmons Group**

Rebecca Napier, PE
Environmental Project Manager

Enclosures:

- Worksheet 3-13. Summary form of annual streambank erosion estimates for various study reaches.
- BANCS Assessment Map

**8.2 BMP Maintenance Workshop Flyer**

# Stormwater Facility Maintenance Workshop

Many local homeowners, businesses, and subdivisions are responsible for the maintenance of stormwater practices on their property. Learn what your responsibilities are, and how to best fulfill them. Albemarle County, the City of Charlottesville, the University of Virginia, and other members of the Rivanna Stormwater Education Partnership are offering a workshop to help residents and property managers **save money** and **prevent water pollution** through proper maintenance of privately-owned stormwater facilities.

## Who Should Attend?

Any resident or property manager responsible for maintaining a stormwater management facility is encouraged to attend the workshop and tour.

## How do I Register?

**Attendance is limited to 35** participants. Download the **registration form** from the web site below, or phone Martin Johnson at (434) 975-0224 Ex. 105. Attendance will be limited to the first 35 registration forms received,

## What Topics will be Covered?

Stormwater facilities collect rainwater runoff from rooftops, lawns, roads and parking lots through channels or a stormwater drain system. We will explain the major components of these systems, how they function, and how to inspect and maintain them. Catching problems early can save a lot of money later.

## When?

June 22 from 9:00 to 11:00 AM. Optional tour of stormwater facilities, 11:00 to 12:00.

## Where?

Hollymead Fire Rescue Station
#12 3575 Innovation Drive

Rivanna Stormwater Education Partnership

*For more information visit:* ***www.rivanna-stormwater.org***

**8.3 Draft MOU Regarding responsibilities for interjurisdictional drainage**

# Memorandum of Understanding

Between

## The County of Albemarle,

## The City of Charlottesville,

## And The University of Virginia

DRAFT

**1) Subject**

Sharing of responsibilities and pollutant reduction credits required for compliance with the Chesapeake Bay and approved local total maximum daily load (TMDL) special conditions in the General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4s).

**2) Purpose**

Albemarle County, the City of Charlottesville, and the University of Virginia (referred to as 'the Parties' below) all hold a General Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit) from the Virginia Department of Environmental Quality (DEQ). The parties have adjacent jurisdictional and MS4 regulated area boundaries and, in some places, shared or interconnected stormwater drainage areas. The purpose of this memorandum of understanding (MOU) is to define responsibilities for treating stormwater runoff which crosses these jurisdictional boundaries, as well as for the distribution of corresponding pollutant reduction credits.

**3) Understanding**

a) MS4 Service Area

As detailed in their respective Chesapeake Bay TMDL Action Plans, in order to address slight differences between digital maps, the Parties agree to use the City of Charlottesville's jurisdictional boundary as a common delineation between the permittees' MS4 regulated areas. The Parties agree to include within their MS4 regulated areas all lands that they solely own and operate that lie within another permittee's jurisdictional and MS4 regulated areas. The parties' respective MS4 General Permits and DEQ's Chesapeake Bay TMDL Special Condition Guidance Memo No. 15-2005 (Guidance Memo) outline how pollutant load reduction requirements are calculated based on the drainage area *served* by a jurisdiction's storm sewer system. Unfortunately, drainage area boundaries are not necessarily coincident with our respective

jurisdictional boundaries. There are areas where stormwater runoff flows over the land surface via sheet flow (not thru pipes or manmade channels) from one MS4 jurisdiction to an adjacent MS4 jurisdiction. The Guidance Memo states that the jurisdiction receiving this overland flow is responsible for the pollutant loads generated on the adjacent jurisdiction's land, but goes on to state that "alternatives to this approach will be considered as long as all lands are accounted for in [pollutant load] reduction calculations." The Parties agree to an alternative approach in that each party will be responsible for pollutant loads generated within their own jurisdictional boundaries regardless of whether the runoff leaves by overland flow or thru part of the storm sewer system. The Parties believe this is the most equitable approach, as it assigns responsibility based on who controls the land.

b) Pollutant Load Reduction Credits

Stormwater-based pollutant loads are reduced by best management practices (BMPs). Examples of BMPs include stormwater management ponds and wetlands, rain gardens, permeable pavement, and stream restoration. In some cases, treatment of stormwater in the originating jurisdiction may not be practical because of topography, storm sewer interconnectedness or other considerations. Pollutant load reduction activities should be encouraged to accelerate improvements in local water quality, with pollutant reduction credits assigned to the responsible jurisdiction(s) in an equitable manner.

TMDL-based pollutant load reductions will be credited to a single jurisdiction under the following circumstances: BMPs are installed within their jurisdictional boundary and funded by their jurisdiction, regardless if some of the stormwater runoff originates in a different jurisdiction.

The Parties reserve the right to enter into agreements in which TMDL credits are shared between jurisdictions co-funding BMP installation. In addition, if a BMP is paid for by one jurisdiction but located in another jurisdiction, the credits are claimed by the jurisdiction funding the project.

**4) Documentation**

If a BMP is funded by multiple jurisdictions OR if a BMP is paid for by one jurisdiction but located in a different jurisdiction, a formal agreement will be prepared that specifies the amount of the credits claimed by each jurisdiction and the maintenance responsibilities. This agreement shall be signed by the appropriate parties listed in Section 5.

No formal agreements are required regarding BMPs paid for by and located within a single jurisdiction.

DRAFT

**5) Signatures**

By signing below, the Parties agree to the terms of this memorandum of understanding.

*SIGNATURES TO BE OBTAINED FOLLOWING FINALIZATION OF MOU*

Thomas Foley
County Executive
Albemarle County

Date

*SIGNATURES TO BE OBTAINED FOLLOWING FINALIZATION OF MOU*

Maurice Jones
City Manager
City of Charlottesville

Date

*SIGNATURES TO BE OBTAINED FOLLOWING FINALIZATION OF MOU*

Don Sundgren
Chief Facilities Officer
The University of Virginia

Date

DRAFT