Rivanna River Watershed 2019 Stream Health Report

River Stewards Report Biological Monitoring Results Bacteria Monitoring Results

2018 was a year of highs for the Rivanna River watershed and RCA's Monitoring Program. Some were good highs. We moved into a new office on River Road with a much-improved lab space. We successfully completed our first full year of Level III bacteria sampling. We also welcomed a wonderful new Benthic Monitoring Manager, Rachel Pence. Others were more challenging highs. With historic precipitation levels and associated stormwater runoff and flooding, bacteria levels were up from previous years and the percentage of benthic sites failing to meet water quality standards increased.

The high water levels also hindered our collection of benthic samples, pushing the monitoring season later in the year. However, with a lot of perseverance and many layers of clothing, we got through the last benthic sample on a cold, snowy day at Moores Creek and wrapped up the year. Inside you will find the results from our monitoring efforts. We wish to thank all the dedicated volunteers who worked hard in challenging conditions to collect these important data. We couldn't do it without them.



Yours in water quality, Julia Ela and Lisa Wittenborn, RCA Co-Directors

Water Quality Monitoring

Long-term and comprehensive stream monitoring is a crucial component of successful stewardship of the watershed. RCA is a regional leader in collecting the highest quality data possible on stream and river conditions.

The Virginia Department of Environmental Quality (VADEQ) certified RCA's biological and bacterial water quality monitoring programs at **Level III**, the highest level in Virginia. RCA's collected data are equivalent in quality to those collected by VADEQ and can be used side by side with agency data to support essential water quality tracking and decision-making functions.

RCA's data are included in the VADEQ's 305(b) submission to the biennial National Water Quality Inventory Report to Congress and can be used to help list or delist waters from the 303(d) Impaired Waters List. The data help evaluate Virginia's progress in meeting Chesapeake Bay cleanup goals and in local MS4 stormwater program planning. In recent years, RCA's data have been instrumental in supporting the development of Total Maximum Daily Load (TMDL) cleanup plans for Cunningham Creek in Fluvanna County and for the North Fork of the Rivanna River. RCA's bacteria monitors have discovered several previously undetected sewer leaks leading to their quick resolution. RCA monitoring staff have also supported VADEQ in responding to fish kill incidents in the watershed, helping determine causes and conducting follow-up monitoring of the affected streams.

RCA Monitoring Types:

- Visual Assessments by the River Stewards (Page 2)
- **Biological Monitoring** through benthic macroinvertebrate sampling (Page 3)
- Bacteria Monitoring by measuring E. coli (Page 5)



2018 Rivanna River Stewards Impact

RCA's River Stewards inspect the river and its major tributaries by boat most weeks during the spring, summer, and fall. The Stewards visually assess water quality, identify potential pollution sources, identify safety issues, collect trash, and document changes in the river and landscape. The Stewards' weekly reports are distributed to local governments, nonprofit organizations, area water rescue teams, and other interested groups. The reports are publically available on RCA's website. Community leaders rely on these reports to inform decision-making and actions related to the river.





2018 Stewards by the Numbers:

- 21 paddles and corresponding reports
- 16 cleanups
- 111 miles of river paddled
- 3 paddles hosted for children's groups
- Significant amount of trash and tires removed from the river over the course of the year

The heavy rainfall in 2018 caused significant flooding to the Charlottesville area. RCA's River Stewards were active in identifying and reporting safety hazards from flood debris in the river. A major debris pile collected against the Crofton bridge (pictured above left), threatening boaters and the bridge itself. The River Stewards coordinated with the Virginia Department of Transportation and local rescue squads leading to a major cleanup effort to remedy the problem.







Biological Monitoring Results 2016 – 2018





Watershed Scores 2016 - 2018

The stream health ratings of these 50 sites help indicate overall watershed health. Streams rated as Very Good and Good meet Virginia's water quality standard for aquatic life. Those that rate as Fair, Poor, or Very Poor do not meet Virginia's standard. Over half of the streams RCA sampled from 2016 to 2018 (60%) failed to meet this important benchmark.

Stream Score	Health Rating	
70 - 100	Very Good	
60 - 69.9	Good	
40 - 59.9	Fair	
25 - 39.9	Poor	
0 - 24.9	Very Poor	

#	Site Name Change?
1	Doyles River upper at National Park Boundary
2	Albemarle County reference stream #2
3	Long Island Creek at 601
4	Rivanna River downstream of Palmyra
5	Raccoon Creek at 15
6	Doyles River at 674
7	Mechums River at 601
8	Buck Mountain Creek upper west of 665–A
9	Buck Island Creek at 729
10	Rivanna River at Crofton — A
11	Lynch River at 603
12	Buck Mountain Creek at 665 — A
13	Cunningham Creek at 15
14	Carys Creek at 15
15	Moormans River at 601
16	Rivanna River at Rivanna Mills
17	Rivanna River at Milton
18	Mechunk Creek at 759
19	North Fork at Forks of Rivanna
20	Rivanna River at Darden Towe
21	Fluvanna Co. Rural Stream — A (not shown)
22	Burnley Branch at Burnley Station Road
23	Ballinger Creek downstream of 625
24	Lickinghole Creek south of Fairwinds Lane
25	Powells Creek above Lickinghole Creek
26	Cunningham Creek Middle Fork near Bell Farms Lane
27	Little Ivy Creek Trib at Kingston Rd
28	North Fork at Advance Mills
29	Parker Branch at 633
30	Roach/Buffalo River north of 648
31	Ivy Creek in Rosemont
32	Beaverdam Creek East Prong upstream of 600
33	Marsh Run upstream of 641
34	Turkeysag Creek at 22
35	Mechunk Creek upper at 600
36	Stockton Creek at 683
37	Swift Run at 605
38	South Fork at Forks of Rivanna
39	Mechums River at 692 - B
40	Preddy Creek west of Rosewood Drive
41	Ivy Creek at 601
42	Fishing Creek west of Willwood Drive
43	Lake Monticello Trib #1 emptying to Jackson Cove
44	Naked Creek at 844 - B
45	Morey Creek south of Bellair
46	Carroll Creek in Glenmore
47	Quarter Creek in Twin Lakes
48	Stanardsville Run upstream of N. Ridge Way
49	Moores Creek near Woolen Mills
50	Meadow Creek west of Locust Lane Court

RCA's Biological Monitoring Program collects data on benthic macroinvertebrates, the small organisms that live along the bottoms of streams and rivers, at 50 long-term monitoring sites twice annually throughout the Rivanna watershed. Studying the types and diversity of organisms present at each site provides an important picture of water quality changes over time in each location and in the watershed as a whole.

How We Evaluate Stream Health





Volunteer monitors follow strict protocols to collect benthic macroinvertebrates with a net and then sort, count, and identify the organisms to the family-level. Each sample produces a score that is determined by factors such as the number, types, pollution sensitivity, and diversity of the organisms. RCA analyzes three years of data to determine the overall rating for the site.

The arrow icon in the table (▲) denotes a rating change from the previous report. A large portion of Rivanna basin streams lie between fair and good, and it is common for sites to switch between these two ratings from report to report. Eight sites changed from good to fair and two sites changed from fair to good since the last report. This overall downward trend is likely due to the record amount of rainfall the watershed received in 2018, which contributed significantly to stream flooding, scouring, bank erosion, and sedimentation. These factors tend to damage available macroinvertebrate habitat and negatively affect the benthic community.





Bacteria Monitoring Results 2018

RCA's Level III Bacteria Monitoring Program analyzes *Escherichia coli* (*E. coli*) levels in the waterways. *E. coli* are naturally occurring bacteria found in the guts of humans and other animals.

E. coli signal the presence of waste pollution and suggest that other pathogenic organisms may also be present. *E. coli* levels can also indicate whether the waterways are safe for recreational use.

There are many sources of potentially harmful bacteria that can contaminate streams in an urban environment like Charlottesville. Sewer overflows and damaged pipes as well as animal waste can contribute bacteria to the waterways. In 2018, RCA's bacteria monitors discovered a sewer leak, leading to rapid response and quick repair.

E. coli monitoring results from 2018 were generally higher than in previous years.

This increase correlates with the exceptionally high levels of precipitation that fell in the Rivanna watershed in 2018. The National Weather Service shows parts of the Rivanna watershed receiving as much as 22 inches of precipitation above the average amount of 45 inches in a typical year.

Site #	Site Name	Percent of Samples Exceeding Standards	Minimum and Maximum** MPN
1	Biscuit Run	20%	43.2 - 2419.6
2	Rivanna River - Riverview Park*	22%	23.1 - 2419.6
3	Rivanna River - Crofton	29%	6.3 - 2419.6
4	Moores Creek Upper - Azalea Park	30%	32.7- 1413.6
5	Rivanna River - Darden Towe Park*	30%	18.7 - 2419.6
6	Meadow Creek - Copley Road	36%	91 - 2419.6
7	Rock Creek - Southeast of 5th Street	40%	110.4 - 2419.6
8	Western Trib. to Lodge Creek	45%	14.2 - 866.4
9	Rock Creek Tributary - Patton Street	45%	1.0 - 2419.6
10	Meadow Creek - SE Brandywine Dr.	50%	66.3 - 2419.6
11	Eastern Trib. to Lodge Creek	55%	22.6 - 1299.7
12	Lodge Creek - Southeast of 5th St.	64%	35.8 - 2419.6
13	Meadow Creek - Meadowbrook Rd.	67%	23.8 - 686.7
14	Lodge Creek - South of JPA	67%	104.3 - 2419.6
15	Rock Creek at Valley Road Extension	70%	31.3 - 920.8
16	Meade Creek - Meade Park	73%	119.8 - 2419.6

*Sites monitored weekly in the summer as well as monthly

**2419.6 MPN is the upper detection limit for the Colilert® test

Bacteria levels often increase after these large rainfall events, when stormwater carries waste into the waterways.



Volunteers collect water samples from the monitoring sites using sterile sample bottles, and return the samples back to RCA's certified lab.

How We Measure Bacteria Levels



Staff and volunteers then process and analyze the samples. They dissolve a growth medium into the water sample, pour it into a tray with multiple cells, then seal and incubate it.



After 24 hours they read the sample, recording a Most Probable Number (MPN) for *E. coli*.







In 2018, RCA monitored 16 sites throughout the watershed on a monthly basis. In addition, RCA collected weekly river samples from two sites on the Rivanna River from Memorial Day to Labor Day because of their high recreational use.

Thank you to all who made this report possible

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• Albemarle County • City of Charlottesville • Fluvanna County • The Nature Conservancy • Rivanna Water and Sewer Authority •

- The Rivanna Master Naturalists Thomas Jefferson Planning District Commission Master Gardeners
 - Thomas Jefferson Soil and Water Conservation District
 University of Virginia

2018 Data Collected by the Following Certified Volunteer Monitors:

Doni Ahearn Mary Ann **Brian Armontrout** Melba Atkinson Lanie Bailey **Nelson Bailey Rick Barnett** Dan Beisner Harriet Bell Linda Birch Tammy Bowers Isabel Boyce Rose Brown **Bill Buchholz** Pat Burkett Sara Byers Daphne Cole

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Our Mission

Protection of the Rivanna River and its tributaries through community involvement, conservation, education, recreation, restoration, water-quality monitoring and reporting.

Our Vision

A healthy, thriving community that values its rivers and streams.

The Rivanna River watershed drains 769 square miles of land from Shenandoah National Park to the confluence with the James River at Columbia, Virginia. The Rivanna River is an invaluable asset to the communities in the watershed, providing drinking water and contributing to the cultural, recreational, environmental and economic resources of the region. It also has regional importance as what flows down the Rivanna River impacts the James River and Chesapeake Bay downstream.