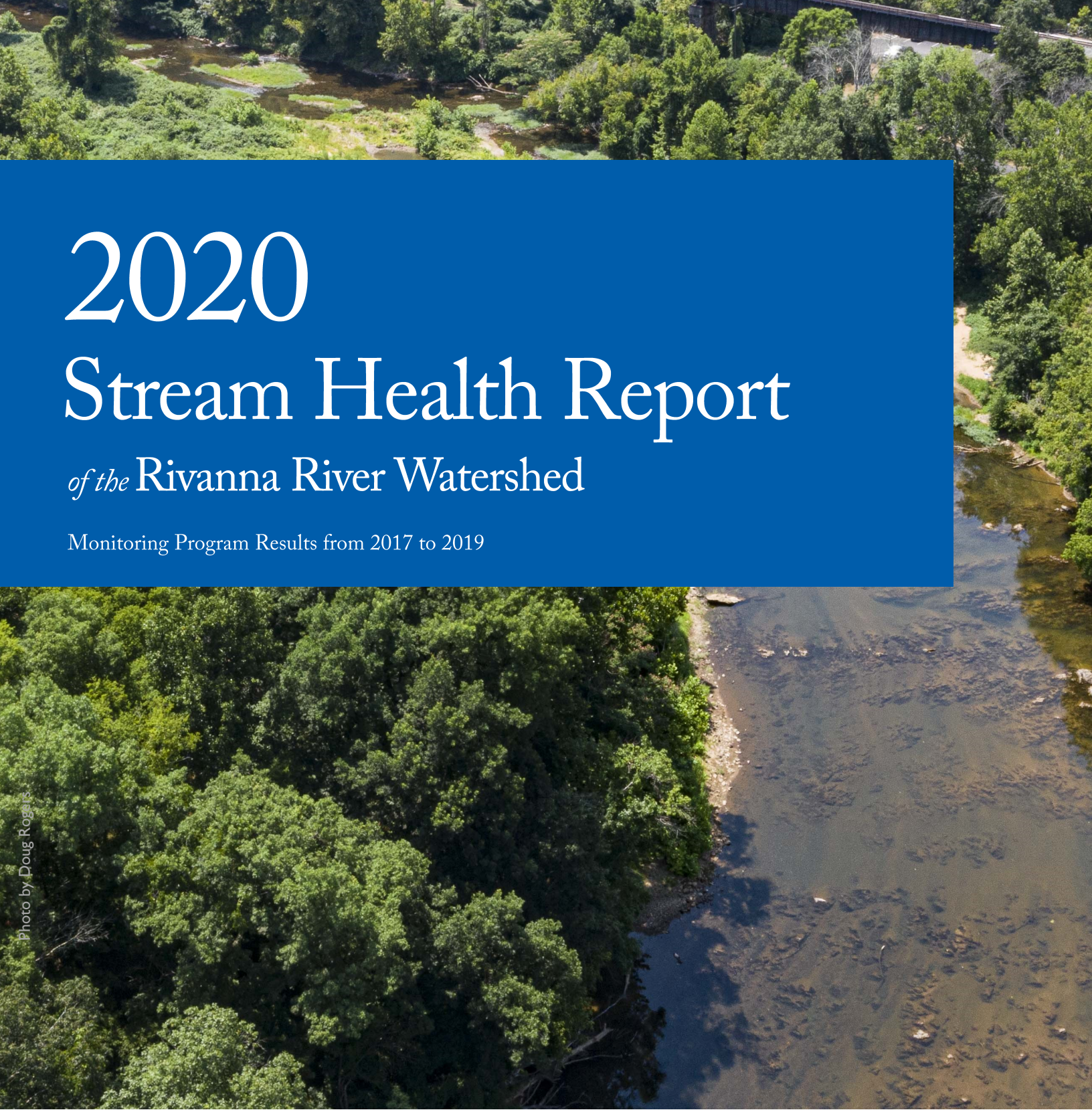


2020 Stream Health Report

of the Rivanna River Watershed

Monitoring Program Results from 2017 to 2019

Photo by Doug Rogers

Our Mission

Working with the community to conserve the Rivanna River and its tributaries through monitoring, restoration, education, and advocacy.

Our Vision

We envision a healthy Rivanna River and watershed that benefit an engaged community.

RIVANNA
CONSERVATION ALLIANCE

Water Quality Monitoring

2019 was a successful year for RCA's Water Quality Monitoring Program. Despite a wet spring and dry fall, we collected samples at all 50 of our long-term biological sites and processed and reported the results of 276 *E.coli* bacteria samples. We involved 120 volunteers, who graciously contributed 987 hours to our efforts. Our River Stewards also contributed important observational data to the program and we engaged over 900 students from diverse backgrounds in educational monitoring activities.

Tracking the long-term condition of our waterways is the foundation of our monitoring work, but it is only one of this program's many important contributions. RCA's monitoring program also helps improve the health of our waterways and our community. In our watershed, RCA's monitoring data help identify, track, and solve acute water quality problems, like a sewer leak we detected on Pollocks Branch and a fish kill we helped investigate on Meadow Creek. Our data also inform decisions about water quality protection and planning.

> *"The Rivanna Conservation Alliance was a critical partner in the development of the North Fork Rivanna benthic TMDL … RCA staff also played a key role in outreach to engage the local community in the development of the TMDL study …"*
>
> *- Nesha McRae, VADEQ Regional TMDL Coordinator*

In 2018 and 2019, RCA's data played an important role in the development of the North Fork Rivanna Total Maximum Daily Load (TMDL) cleanup plan. When streams and rivers are not meeting state-set water quality standards, (for aquatic health or recreation for example), TMDL plans are needed. The TMDL process identifies the causes of the water quality problems and develops a plan for how to reduce pollution from different sources to ensure streams and rivers will meet water quality standards in the future.

Developing an effective TMDL plan requires comprehensive and reliable data. The North Fork Rivanna TMDL stakeholder group, which included RCA staff and volunteers, used RCA's stream health data in conjunction with data collected by the Virginia Department of Environmental Quality (VADEQ) to inform their decisions. RCA provided benthic data for 19 of the 32 monitoring sites considered in the study. Having such a robust dataset helped the group develop a more thorough cleanup plan with a strong chance of success.

The reach of RCA's monitoring program also extends beyond the Rivanna watershed. As a regional leader in high-quality, volunteer-supported monitoring, RCA helped guide peer organizations in establishing their own Level III monitoring programs. Staff also presented information about RCA's program to a national audience at the 11th Annual National Water Quality Monitoring Conference in Denver, CO. As always, water quality improvements stemming from RCA's monitoring work have positive downstream impacts on the James River and Chesapeake Bay.

We greatly appreciate our funders and hard-working volunteers for making this program possible. If you are not already on our list (see the back cover), we invite you to get involved in supporting this important community effort.

With gratitude,

Rachel Pence
Monitoring Program Manager

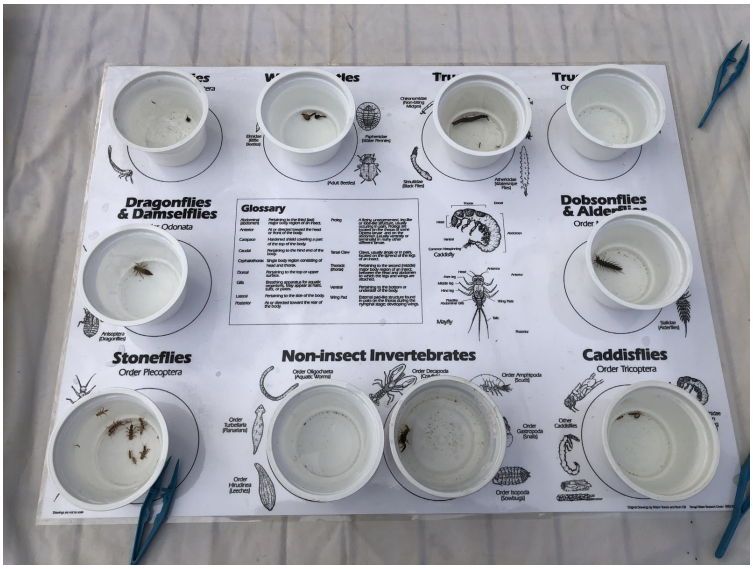
Lisa Wittenborn
Executive Director

Steward and Education Impact 2019

RCA's River Stewards and educational programs are integral to our efforts to monitor and inform the community about stream health in the Rivanna River watershed.

RCA's River Stewards help track stream health by serving as the community's eyes on the waterways. They routinely paddle sections of the Rivanna, major tributaries, and public reservoirs visually assessing water quality, identifying potential pollution sources, and documenting changes in the water and surrounding landscapes. The Stewards detail their findings in publicly-available reports and work with partners in local government, nonprofits, and water rescue groups to address significant issues.

The River Stewards connect the community to the waterways and water quality issues through first-hand experiences. In 2019, RCA led paddling programs for several school and community groups, including the Boys and Girls Club of Central Virginia and Big Brothers, Big Sisters of the Blue Ridge. RCA led cleanups both on and off the water and organized the Rivanna River Race.

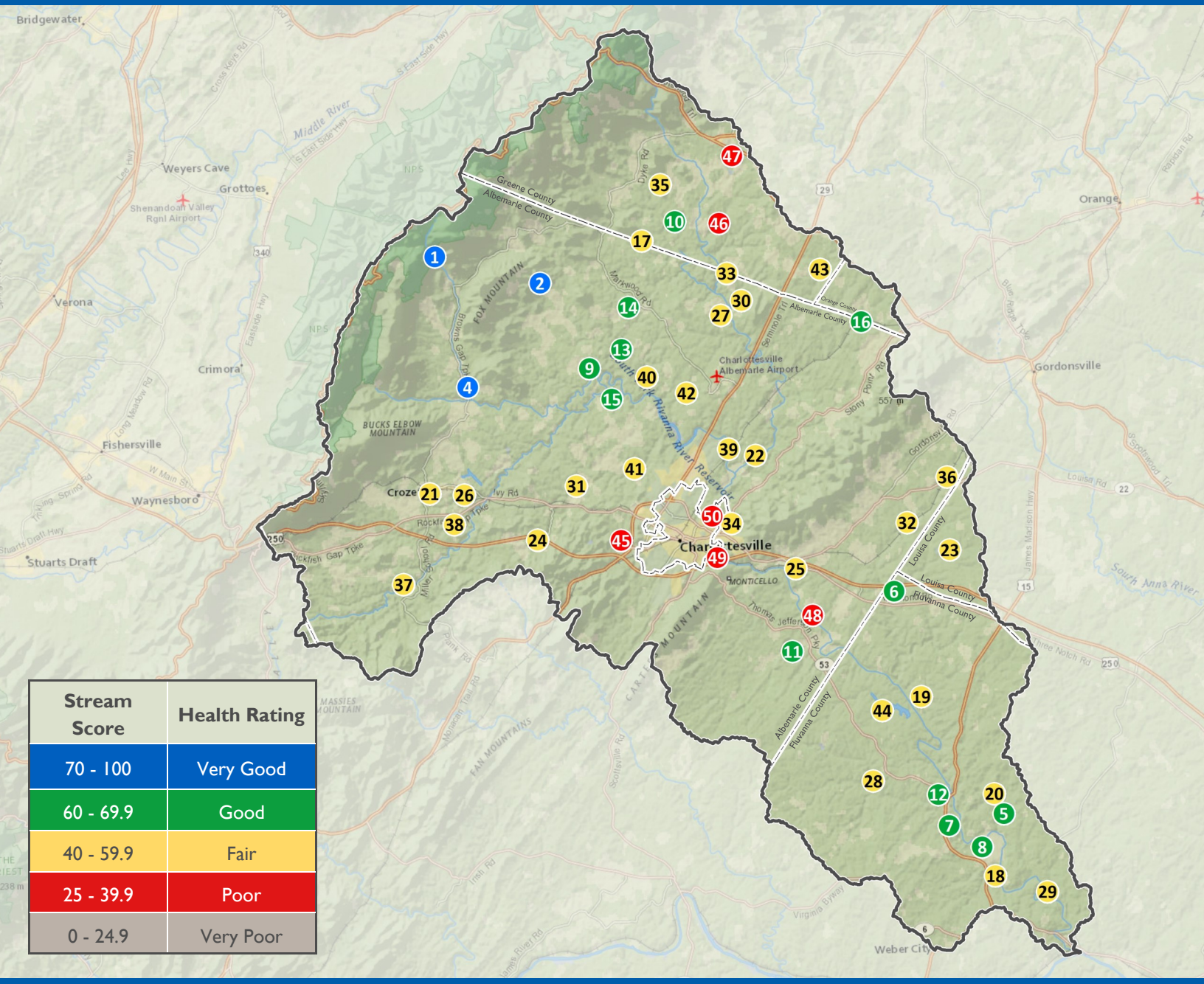


RCA's educational curriculum is built around water quality monitoring activities and uses local field data from our monitoring programs. Engaging students in hands-on monitoring deepens their understanding of water quality issues. Using data from familiar streams in our community increases the relevance of these issues and builds interest in local monitoring efforts. RCA works primarily with students from underserved and/or economically-disadvantaged communities to ensure that all students have opportunities to learn about and experience our waterways.

River Steward and Education Numbers

- 7 steward paddles documented
- 39 miles of river paddled
- 6 community group paddles hosted
- 8 cleanups conducted
- 133 volunteers engaged
- 435 volunteer hours logged
- 933 students engaged in water quality monitoring educational activities

Biological Monitoring Results 2017 - 2019



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

How We Evaluate Stream Health

1. Volunteer monitors follow strict protocols to collect benthic macroinvertebrates with a net.

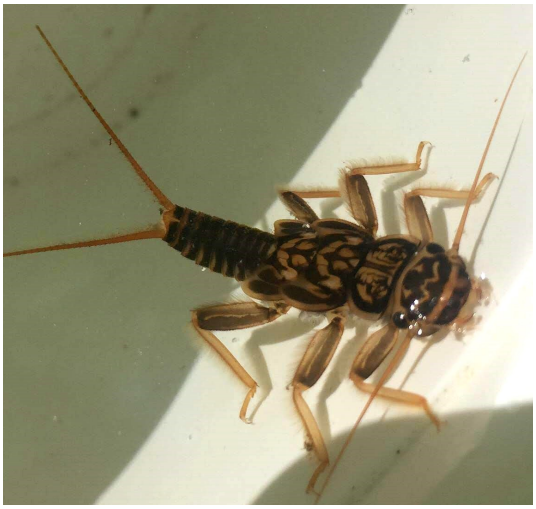
2. Volunteers sort, count, and identify the organisms to the family-level.

3. Each sample produces a score that is determined by factors such as the number, types, pollution sensitivity, and diversity of the organisms.

4. RCA analyzes three years of data to determine the overall rating for the site.

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

Background



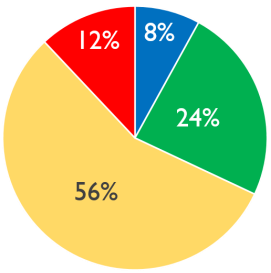
RCA's Level III Biological Monitoring Program collects data at 50 long-term monitoring sites twice annually throughout the Rivanna River watershed. Monitors sample benthic macroinvertebrates, the small organisms that live along the bottoms of rivers and streams. Because these organisms vary in sensitivity to pollution in known ways, the types and diversity present at each site can generate a stream health score. These scores show how conditions are changing over time.

Scores

Streams rated as Very Good and Good meet Virginia's water quality standard for aquatic life. Those rated as Fair, Poor, or Very Poor do not. A large portion of the Rivanna watershed streams score as Fair or Good, and it is common for sites to switch between these two ratings from report to report. Seven 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, and high flows and stream scouring events that occurred in 2018 and 2019.

One site jumped from Fair to Very Good due to the removal of an invalid sample included in the previous report, and the addition of new, higher-scoring data collected in 2019.

Over half of the streams (68%) RCA sampled from 2017-2019 failed to meet Virginia's water quality standard for aquatic life.



The color and direction of the arrows in the table (▼) show how ratings changed from the previous report. You can find past reports at rivannariver.org.

Bacteria Monitoring Results 2019

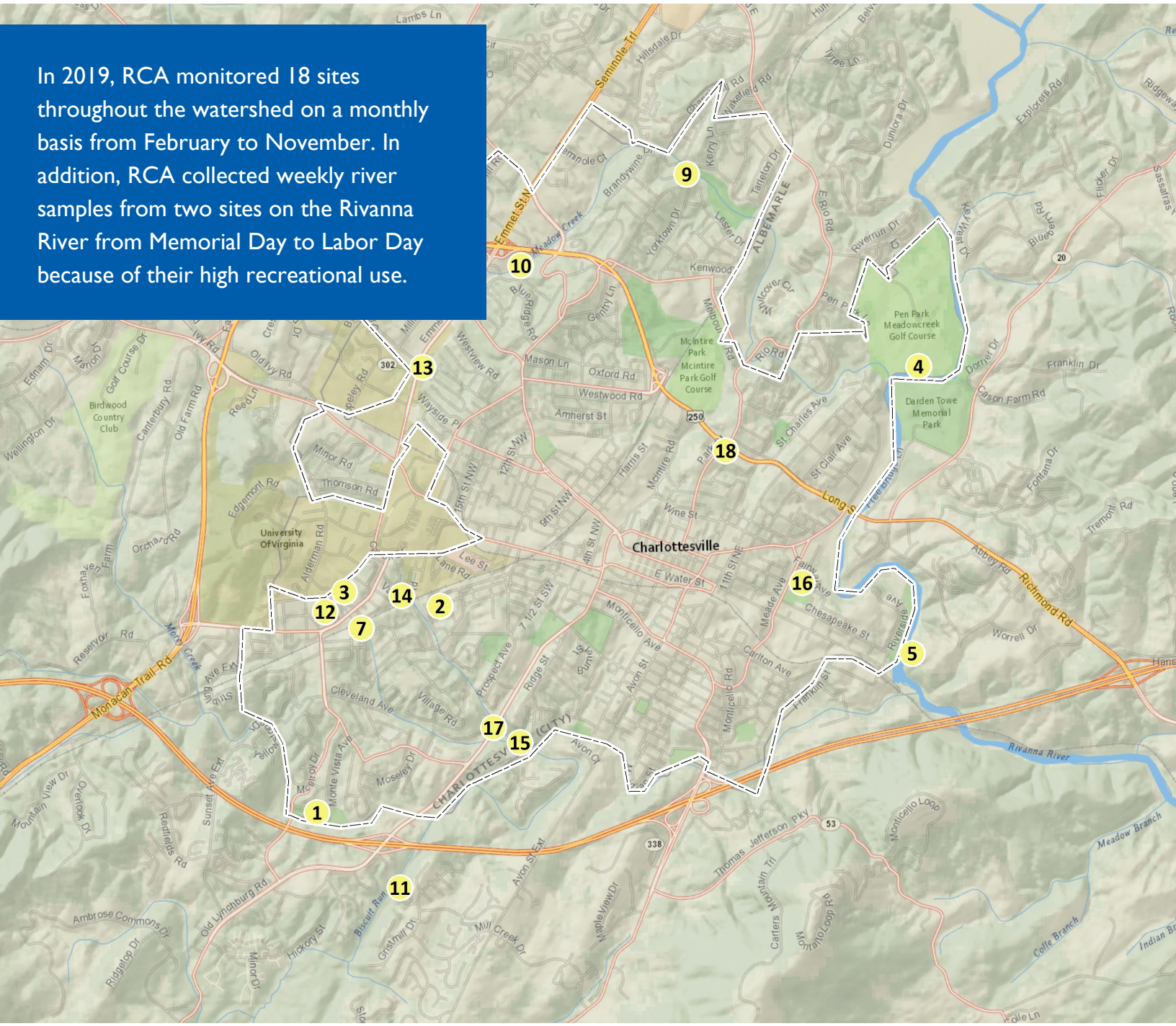
RCA's Level III Bacteria Monitoring Program analyzes Escherichia coli (*E. coli*) levels at 18 locations in the Rivanna River watershed.

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. When *E. coli* levels are too high, swimming or wading in the water are considered unsafe.

In an urban area like Charlottesville, sewer overflows, damaged sewage pipes, and animal waste are typically the most significant sources of bacteria contamination. RCA's bacteria monitoring helps protect pubic health by identifying these issues in our local waterways.

In 2019, a bacteria sample taken from Pollocks Branch indicated a problem. The City of Charlottesville investigated, discovered a sewer line breach, and quickly resolved the problem.

In 2019, RCA monitored 18 sites throughout the watershed on a monthly basis from February to November. 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.



Sites where more than 10% of samples exceed 235 Most Probable Number per100mL fail to meet the Virginia water quality standard for recreational use. Likely due in part to less rainfall, *E. coli* values from 2019 stream samples were generally lower than in 2018. Still, most sites failed to meet this important standard set by VADEQ.

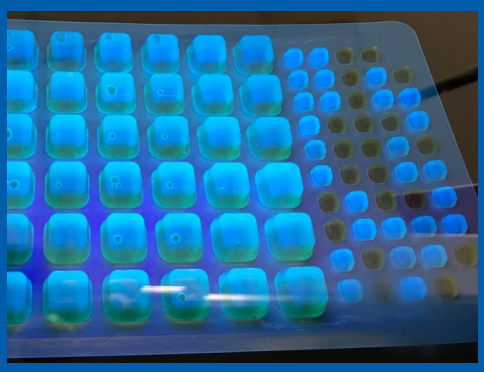
Site #	Site Name	Percent of Samples Exceeding Standards	Minimum and Maximum** MPN	# of Samples
1	Moores Creek Upper - Azalea Park	9.1%	30.5 - 980.4	11
2	Rock Creek Tributary - Patton St.	9.1%	18.1 - 2419.6	11
3	Eastern Trib. to Lodge Creek	25.0%	21.1 - 1732.9	12
4	Rivanna River - Darden Towe Park*	25.8%	11.4 - 2419.6	31
5	Rivanna River - Riverview Park*	25.8%	14.1 - 2419.6	31
6	Rivanna River - Palmyra (not shown)	27.3%	14.6 - 2419.6	11
7	Lodge Creek - South of JPA	36.4%	9.7 - 770.1	11
8	Rivanna River - Crofton (not shown)	36.4%	13.4 - 2419.6	11
9	Meadow Creek - SE Brandywine Dr.	41.7%	86.5 - 1299.7	12
10	Meadow Creek - Meadowbrook Rd.	42.9%	31.8 - 1119.9	14
11	Biscuit Run	50.0%	24.6 - 2419.6	10
12	Western Trib. to Lodge Creek	53.8%	33.6 - 2419.6	13
13	Meadow Creek - Copeley Rd.	53.8%	12.1 - 2419.6	13
14	Rock Creek at Valley Road Extension	58.3%	34.1 - 727.0	12
15	Rock Creek - Southeast of 5th St.	60.0%	119.8 - 2419.6	15
16	Meade Creek - Meade Park	61.5%	25.3 - 2419.6	13
17	Lodge Creek - Southeast of 5th St.	62.5%	55.6 - 1732.9	16
18	Schenks Branch near Rescue Station	66.7%	190.4 - 2419.6	12

*Sites monitored weekly in the summer as well as monthly
**2419.6 MPN is the upper detection limit for the Colilert® test
—— Sites below this line fail to meet VA's water quality standard

How We Measure Bacteria Levels

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

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*.

Thank you to all who made this report possible.

Funding for RCA's Monitoring Program Provided by:

• Albemarle County • Charlottesville Area Community Foundation • Chesapeake Bay Restoration Fund • City of Charlottesville • • Fluvanna County • National Fish and Wildlife Foundation • The Nature Conservancy • Patagonia • • Rivanna Water and Sewer Authority • University of Virginia • Virginia Environmental Endowment • Virginia Department of Environmental Quality • support from individual donors •

Community Partners for RCA's Monitoring Program:

• Albemarle County • City of Charlottesville • Fluvanna County • James River Association • The Nature Conservancy • The Rivanna Master Naturalists • Rivanna Water and Sewer Authority • Thomas Jefferson Planning District Commission • • Thomas Jefferson Soil and Water Conservation District • University of Virginia •

2019 Data Collected by the Following Volunteer Monitors:

**denotes monitors that have gone through the certification process*

Doni Ahearn
Melba Atkinson Cook*
Rick Barnett
Patricia Barth*
Harriet Bell
Tammy Bowers*
Bill Buchholz
Pat Burkett*
Sara Byers*
Tina Colom*
Peter Cooper
Eileen deCamp
Sandy DiCarlo*
John Edelen*
Ken Fizer
Mark Foley
Allen Freeman*
Alice Frei*
Warner Granade
Jill Greiner*
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Tana Herndon*
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Gareth Hunt
Shaina Huynh*
Tina Kastan
Gretl King
Beth Kuhn*
Gabriel Leggieri*
Bob Letts
Keggie Mallett
Bill Marley
Candace Mason
Ben Masters*
Kevin Mathias
Jim McCord
Neil Means*
Vicki Metcalf*
Brit Minor
Becky Minor*
Maggie Morris
Karen Mulder
Jeff Pacelli*
John Paul Ayala*
Katy Peterson
Art Petty
Dot Preis*
John Reed
Julie Reed*
Kristinia Reid Black*
Ami Riscassi*
Susan Roark
Wendy Roberman*
Cece Rosenberg*
Deana Sackett*
Evie Sackett*
Liz Schley*
Donna Shaunesey*
Marjorie Siegel
Karen Siegrist
Marilyn Smith*
David Smith*
Steve Spence*
Katie Spicer*
Leigh Surdukowski*
Jim Surdukowski
Kim Swartz
Ida Swenson*
John Tansey
Leigh Thomas
Bob Troy*
Laura Troy*
David Volin
Peyton Williams
Bobbie Williams
Jennifer Yates*

Thank you to RCA's Science Advisory Committee and landowners who allow river access.

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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 because the Rivanna River is a tributary to the James River and the Chesapeake Bay.