

White River Partnership 2021 Water Quality Report

The White River Partnership (WRP) is a grassroots, nonprofit organization bringing people and communities together to improve the long-term health of the White River and its watershed in east-central Vermont. A watershed is an area of land that drains to a common waterway – in our case, the White River.

This report summarizes water quality data collected by WRP staff and volunteers at 22 sites along the White River and its tributaries during summer 2021.

Why Do We Monitor Water Quality?

In 2001 the WRP launched the first citizen-based, water quality monitoring program in the White River watershed in response to concerns that bacteria and other pollution might be making the White River unsafe for recreation.

To address these concerns about the safety of the river for swimming, tubing, and paddling, the WRP Water Quality Monitoring Program goals are:

- To identify and address water quality problems;
- To raise awareness about water quality in the White River watershed; and
- To promote long-term stewardship.



The White River is a popular recreational destination.

What Do We Monitor?

Every other Wednesday from late-May through early-September, WRP staff and trained volunteers monitor bacteria, conductivity, and turbidity at 22 swimming holes and recreational access sites along the White River (see map on page 2).

Bacteria

Monitoring bacteria is a practical way to identify potential water quality problems. Bacteria are microscopic, single-celled organisms that can be found in virtually any environment. One type of bacteria, *Escherichia coli* (*E. coli*), is commonly found in water.

E. coli is a rod-shaped bacterium that lives in the intestines of all warm-blooded animals. There are many different strains of *E. coli* and most are harmless to humans. *E. coli* bacteria found in the river come from many sources, including animal droppings, faulty or leaking sewage systems, stormwater runoff, and disturbed soil or stream sediments.

Because *E. coli* is common and easy to detect, our monitoring protocol uses *E. coli* to “indicate” the presence of other disease-causing pathogens. In other words, the presence of *E. coli* in the river means that there is an increased risk of exposure to pathogens.

Conductivity and Turbidity

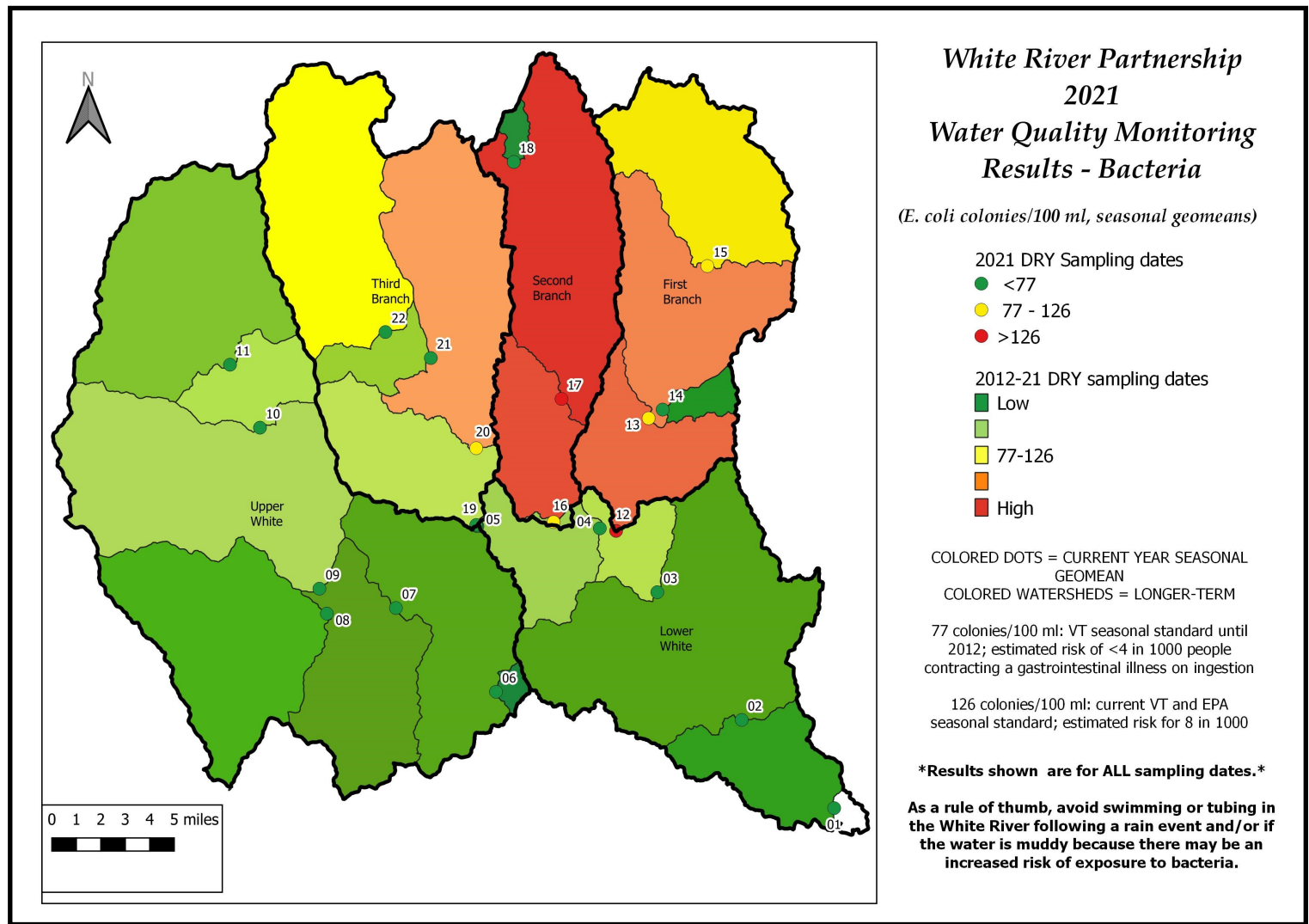
Conductivity and turbidity are also important indicators of water quality. Conductivity indicates the presence of dissolved salts and other compounds in the water. High conductivity readings may indicate increased runoff from roads and other sources. Turbidity indicates how clear or cloudy the water is. A high turbidity reading means that a high number of suspended solids are in the water, likely from erosion.

Where Do We Monitor?

The White River is the longest, undammed tributary to the Connecticut River. The entire watershed covers 711 square miles and is generally divided into five subwatersheds:

1) Lower White River, 2) Upper White River, 3) First Branch, 4) Second Branch, and 5) Third Branch.

In 2020 WRP staff and volunteers collected water quality samples from the 22 locations depicted below.



Lower White River	First Branch
1. Old River Rd Ledges–Hartford	12. Mouth of 1st Branch–Royalton
2. West Hartford Bridge–Hartford	13. Tunbridge Fairgrounds
3. The Sharon Academy–Sharon	14. Tunbridge Town Pool Tributary
4. Pinch Rock–Royalton	15. Chelsea Recreation Park
	Second Branch
Upper White River	16. Mouth of 2nd Branch–Royalton
5. Peavine Park–Bethel	17. Dugout Road–Randolph
6. Silver Lake–Barnard	18. Sunset Lake–Brookfield
7. Gaysville Bridge–Stockbridge	Third Branch
8. Mouth of Tweed–Stockbridge	19. Mouth of 3rd Branch–Bethel
9. Peavine Observation Site–Stockbridge	20. Stock Farm Road–Bethel
10. Lion’s Club Park–Rochester	21. Randolph Recreation Park
11. Taylor Meadow Road–Hancock	22. Riford Brook Road–Braintree

How Do We Analyze Our Data?

We analyze water samples for bacteria using the Idexx QuantiTray 2000 system. We then compare our results to two different EPA standards for recreational waters:

1. The “single sample” or “daily” standard looks at one sample from one site on one particular day. The **EPA daily standard is 235 colonies/100 mL** for contact recreation, which means that roughly 8 in every 1,000 people in that water may have an increased risk of getting sick.
2. Because bacteria levels are constantly changing, the EPA “geometric mean” or “seasonal” standard looks at bacteria levels over the course of a whole season for one site. The **EPA seasonal standard is 126 colonies/100 mL**. By calculating the seasonal standard, we can identify trends occurring at each sampling site over time. At the suggestion of state scientists, we also calculate the seasonal standard for each location based on “wet” (recent significant rain) and “dry” weather conditions.

2021 Bacteria Summary (complete bacteria data online: <http://whiteriverpartnership.org/reports/>)

- **The 2021 sampling season featured “dry” conditions on 5 of 8 sampling dates.** The season started dry and hot (mainstem water temperatures were in the upper 70s and low 80s F by 9 am!), but moderate rains returned mid-summer and the region was largely out of “abnormally dry” or drought conditions (present in the preceding 7 years) by the end of the sampling season.
- **Readings on July 21 followed more than 2 inches of rain and included 15 of the total 29 daily standard exceedances for 2021, as well as all 5 chart maximum readings for the year.** This sampling date was sufficient to cause seasonal exceedances for First Branch sites at Chelsea Rec Park and Tunbridge Fairgrounds (see below, **What Do The Monitoring Results Mean?**).
- **Only 3 daily standard exceedances came on “dry” dates (2%).** All seasonal “dry date” exceedances since 2013 have been on “The Branches” rather than the mainstem, and we continue to probe this relationship in our additional adaptive monitoring program. We are especially monitoring changes following dam removals on each of “The Branches”, which started in 2016.
- **In 2021, 6 sites exceeded the seasonal standard — tying the second-lowest levels since 2013.** See the table below for more information.

	2013	2014	2015	2016	2017	2018	2019	2020	2021
# of samples exceeding the daily standard (235)	44 of 191 = 23%	45 of 195 = 23%	51 of 197 = 26%	41 of 195 = 21%	34 of 203 = 17%	23 of 202 = 11%	27 of 175 = 15%	37 of 175 = 21%	29 of 175 = 17%
# of samples exceeding the chart maximum (>2419)	4	2	8	5	5	1	1	11	5
# of sites exceeding the seasonal standard (126)	9 of 22	7 of 22	10 of 22	6 of 22	8 of 23	7 of 23	5 of 22	5 of 22	6 of 22

What Do The Monitoring Results Mean?

Because of the relationship between rainfall and bacteria levels, the WRP recommends taking precautions when deciding to swim or tube in the White River and its tributaries. We continue additional “adaptive” monitoring to help understand these trends and develop projects toward mitigation.

As a rule of thumb, avoid swimming or tubing in the White River following a rain event and/or if the water is muddy because there may be an increased risk of exposure to bacteria.

Conductivity and turbidity results are recorded and used to identify relationships between these data and bacteria levels.

How Do We Improve Water Quality?

Plant Trees Along the River

Native trees growing along riverbanks provide many benefits, including improving water quality by filtering pollutants out of surface runoff; improving habitat by providing food and cover for fish and wildlife; and reducing flood impacts by stabilizing riverbanks and slowing flood waters. Help us provide these benefits by protecting existing trees on your riverbank or having **FREE TREES** planted along your riverbank through the **WRP's Trees for Streams Program**.

Cleanup the River

Trash in the river can make water quality and recreational access unsafe. Help us keep the White River clean and accessible by removing trash along the river when you see it or by volunteering with the **WRP's River Cleanup Program**.

For more information about WRP Programs, visit www.whiteriverpartnership.org.



WRP staff and partners planted 7,950 trees and removed over 10,500 pounds of trash along the White River in 2021.

Upcoming Events

In 2022 WRP staff and volunteers will monitor water quality on May 25; June 8 and 22; July 6 and 20; and August 3, 17 and 31. Bacteria data will be posted online at www.whiteriverpartnership.org/water-quality-results and www.facebook.com/WhiteRiverPartnership.

Special Thanks

THANK YOU to our 2021 water quality volunteers: Joan Allen, Erik Anderson, Shay and Misti Berry, Jon Binhammer, Jon Bouton, Lisa Campbell, Ken and Debbie Hatch, Mark Heckmann, Clare Holland, Kathy Leonard, Jim Martin, Jeremy Mears, Julie Paye, Megan Payne, Cynthia Quilici, Maureen Rowe, Sue Sellow, Paul Shriver, and Edythe Wright.

THANK YOU to the businesses and partners that stored water samples in 2019: Corner Stop-South Royalton, Champlain Farms-Randolph, Floyd's General Store-Randolph Center, Green Mountain National Forest -Rochester Ranger Station, Irving/Maplefields-Royalton, Sharon Trading Post, and Will's Store-Chelsea. While the impacts of COVID-19 moved us to implement protocols that stored samples outside and reduced handling in 2020 and 2021, we deeply appreciate these relationships and the long-term support.

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For More Information

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