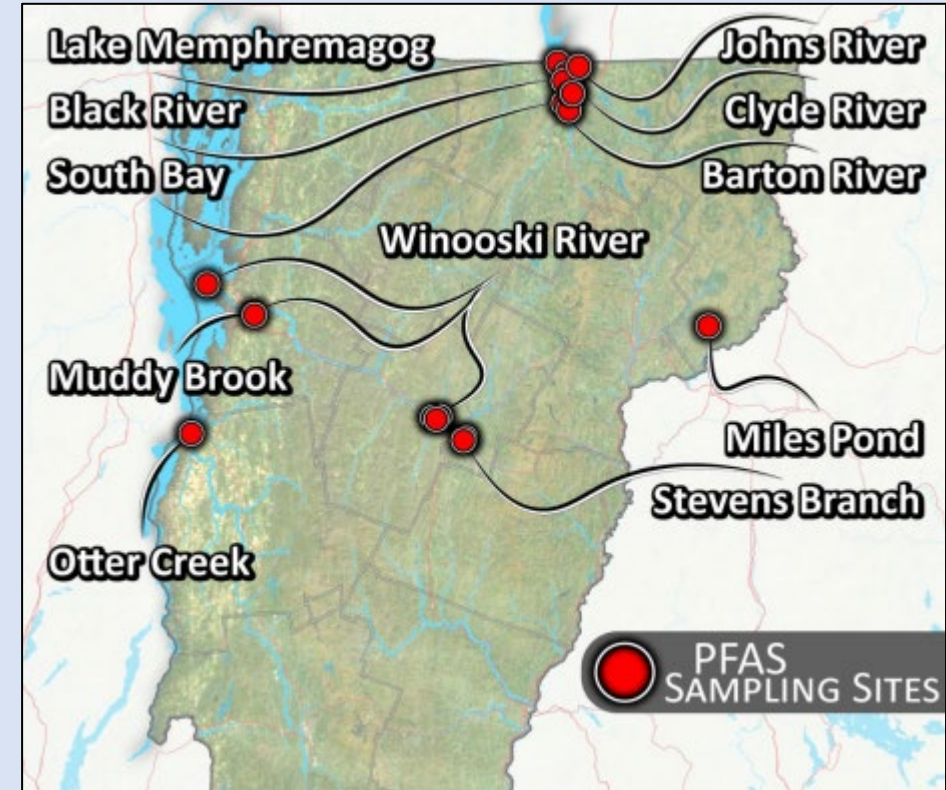


VERMONT AGENCY OF NATURAL RESOURCES

2021 Vermont Per- and Polyfluoroalkyl Substances (PFAS) Surface Water, Fish Tissue, and Wastewater Treatment Facility Effluent Monitoring Report

April 4, 2022



- Surface water at 19 sites, including 10 sites in Lake Memphremagog and its watershed in collaboration with Quebec partners
- Fish tissue at eight of the 19 sites
- Effluent at three wastewater treatment facilities (WWTFs)

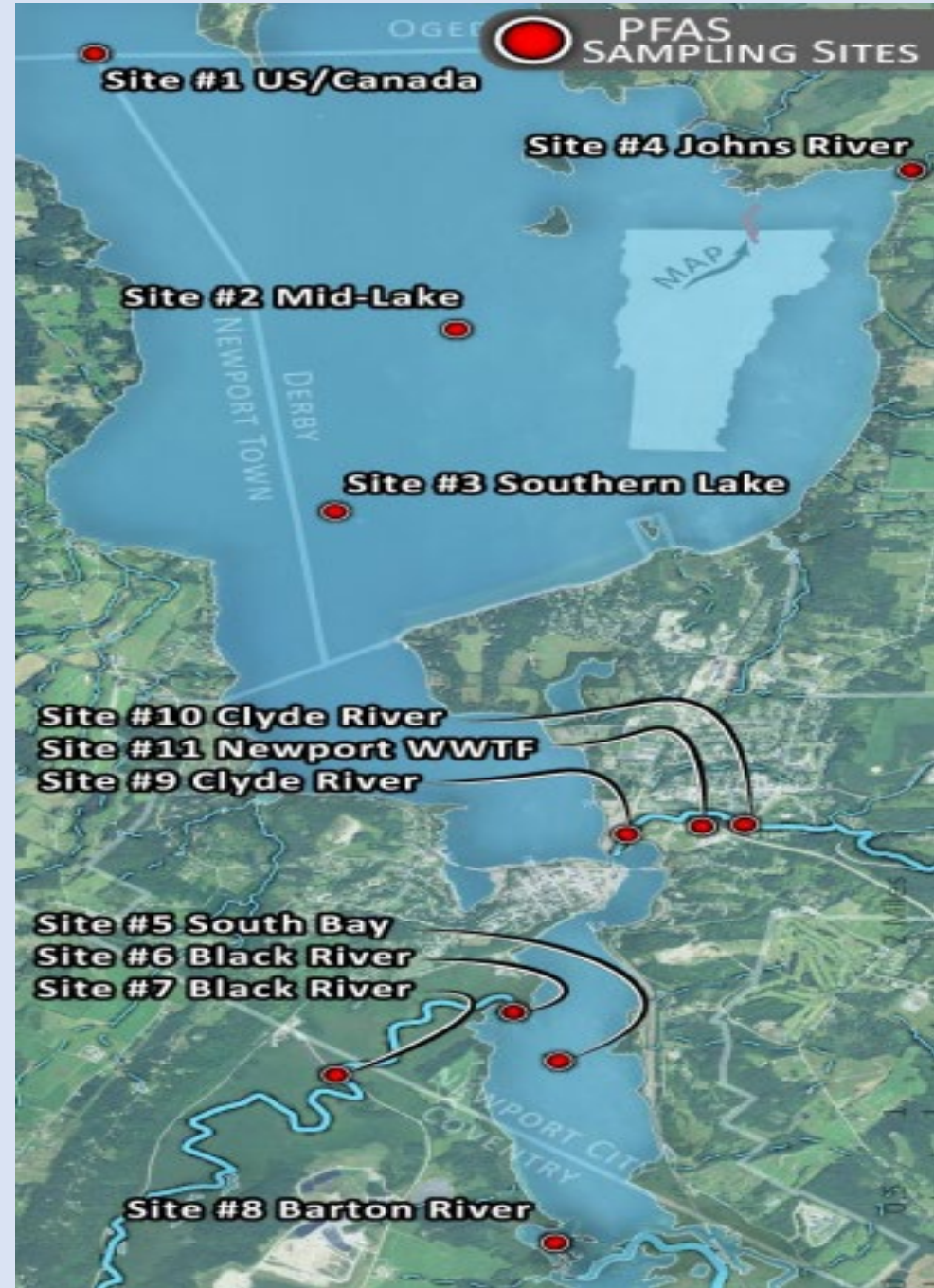
2021 PFAS Monitoring Overview

- Purpose of monitoring is to better understand the concentration of PFAS in surface waters and fish tissue.
- Collected surface water, fish tissue, and WWTF effluent samples between July and October 2021.
- Drinking water advisory of 20 ppt for the sum of five PFAS (PFHpA, PFHxS, PFOA, PFNA, PFOS) serves as a benchmark for assessing PFAS concentrations in surface waters in the absence of Vermont Water Quality Standards for PFAS.
- Surface water samples in the Lake Memphremagog watershed were collected from the ten sites three times- in July, August, and October, likewise the
- Wastewater effluent samples from Newport City WWTF were collected three times during the same period.
- Fish tissue sampling at the four Memphremagog sites was conducted in August 2021.

- To assist with the joint international effort to characterize PFAS within the Lake Memphremagog watershed, VT DEC and Saint-Francis Watershed Governance Council (COGESAF) collaborated on field sampling and interlaboratory PFAS analysis.
- Field quality control samples were analyzed during the first round of sampling in July 2021. Duplicate samples were collected at the US/Canada border site and Newport City WWTF and sent to Alpha Analytical Laboratory in the U.S. and analyzed for 36 PFAS compounds, and to Bureau Veritas in Ontario, Canada for analysis of 27 PFAS compounds.
- These paired duplicate samples measured field and analytical precision, assessed through the collection and analysis of field duplicates, and estimated by relative percent difference (RPD). Results of the interlaboratory analysis were good; laboratory detection limits, recovery percentages, and quality control practices met data quality objectives.
- A summary of this collaboration can be found in Appendix F. In addition to the quality control samples collected and analyzed at the two Vermont sites, COGESAF sampled several additional sites on Lake Memphremagog and tributaries in Quebec in 2021.

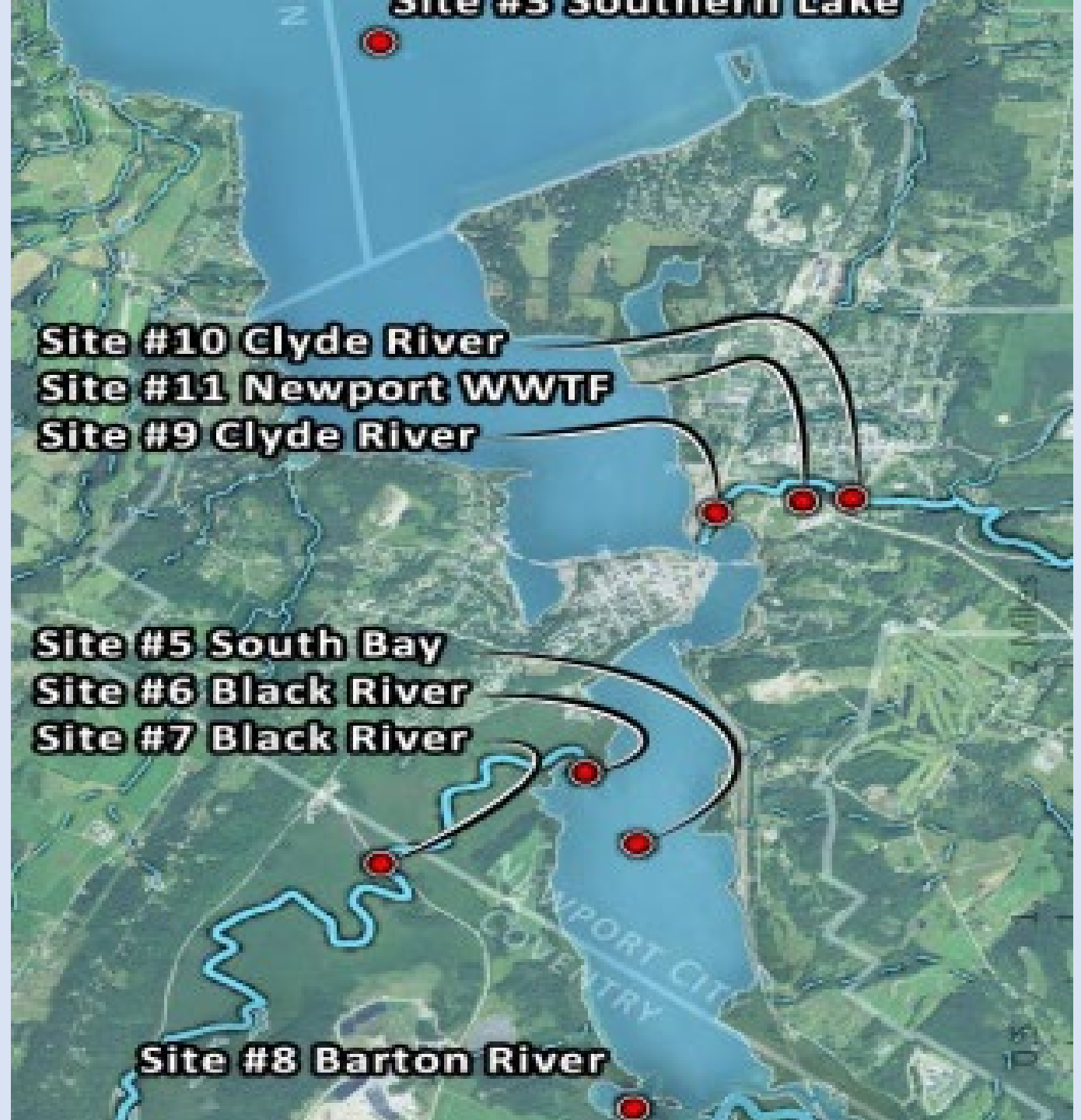
PFAS in Surface Water

- All surface water results were below the Vermont Drinking Water Advisory of 20 ppt for the sum of the five Vermont-Regulated PFAS.
- There were only two PFAS detected above the Reporting Limits within the Lake Memphremagog watershed and these detections were very low – in the single part per trillion.

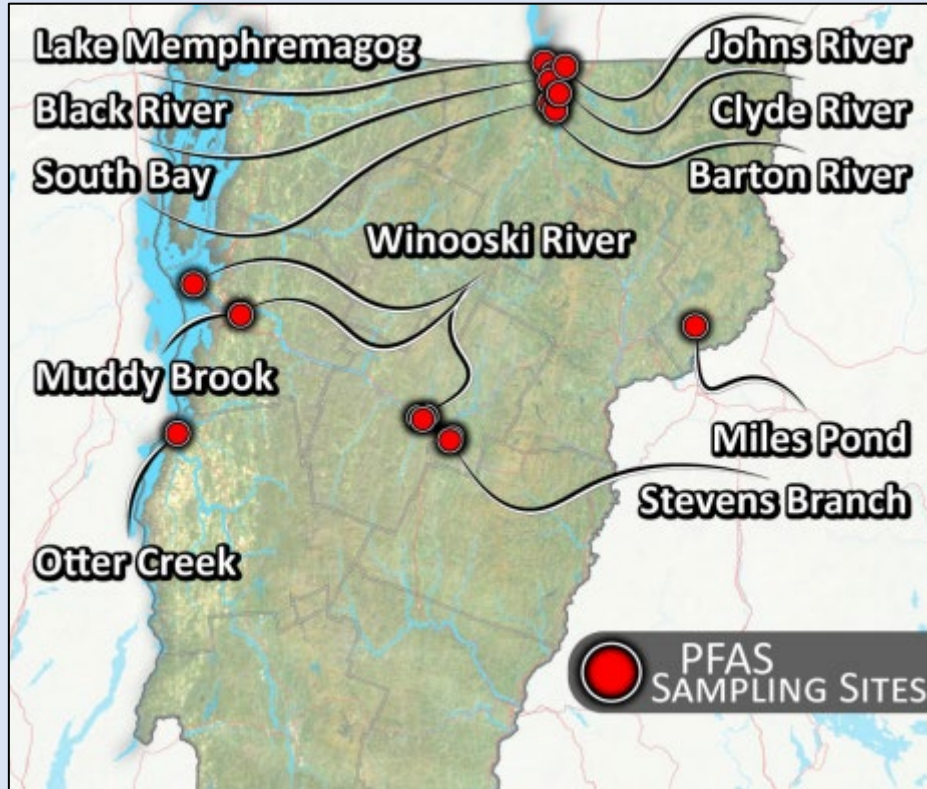


PFAS in WWTF Effluent

- The Newport City WWTF effluent had ten PFAS detected above the RL, with the sum of the five Vermont-regulated PFAS ranging from 17.0 ppt to 27.6 ppt.
- The Barre City WWTF effluent was very low in PFAS, with only four PFAS detected above the RL. The sum of the five Vermont-regulated PFAS was 2.53 ppt.
- The Montpelier City WWTF, which currently receives landfill leachate for treatment, had 12 PFAS detected above the RL, the sum of the five Vermont-regulated PFAS was 79.7 ppt.



PFAS in Fish Tissue



- Fish tissue collected at eight of the 19 sites

- Fish tissue PFAS results from the eight sites sampled showed only one of the five Vermont-regulated PFAS, PFOS, which is the most widely distributed and persistent PFAS, detected above the Reporting Limits.
- PFOS was detected in nearly all the fish tissue samples, with average PFOS concentrations of 2.4 ppb. Overall, PFAS concentrations were low.
- fish tissue data from this monitoring effort will be used by the Vermont Department of Health to determine if these levels pose any health risk to consumers.

CONCLUSIONS

- All surface water PFAS results for the Lake Memphremagog sites and additional sites (n=19), were below the Vermont Drinking Water Advisory of 20 ppt for the sum of the five Vermont- Regulated PFAS.
- There were only two PFAS detected above the analytical Reporting Limits within the Lake Memphremagog watershed and these detections were still very low – in the single parts per trillion.
- Fish tissue PFAS results from the eight sites sampled showed only one of the five Vermont- Regulated PFAS, PFOS, which is the most widely distributed and persistent PFAS, detected above the Reporting Limits.

CONCLUSIONS

- PFOS is also one of the most bioaccumulative PFAS, and it was detected in 96 percent of the fish tissue samples. Average PFOS concentrations observed were 2.4 ppb. These PFAS detections were low – PFOS fish tissue concentrations were in the single part per billion (ppb) at all sites.
- Compared to national fish tissue studies, these results are considered low. Nationally, PFAS have been detected in the hundreds parts per billion (ITRC September 2020)

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