

Norton Brook 2023-2025 Water Quality Data Report

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Prepared for Addison County River Watch Collaborative
January 7, 2026

Norton Brook originates in the town of Monkton and flows through the town of Bristol before entering Little Otter Creek in the Town of New Haven Vermont. The brook's water quality was monitored during the summer months of 2023, 2024 and 2025. A site at the mouth of the brook (LOCNB0.2) was sampled for total phosphorus (TP), *E. coli*, turbidity, chloride and nitrate once per month in June, July, August and September of 2023 and 2024. In 2025, the same analytes were measured and an additional site further upstream (LOCNB0.7) was added. Monitoring in

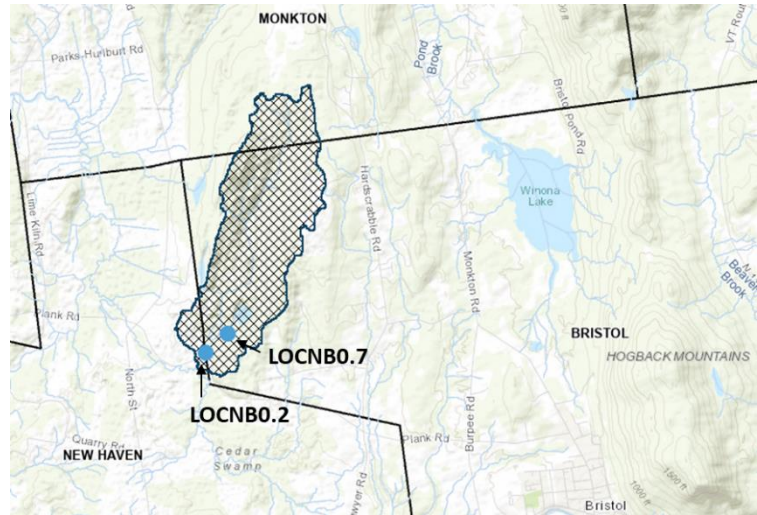


Figure 1. Norton Brook watershed and the two 2025 monitoring locations.

2023 and 2024 identified LOCNB0.2 as having elevated concentrations (and water quality standard exceedances) of *E. coli*, phosphorus, and turbidity (2023 only). Water quality results in 2025 indicate consistently elevated *E. coli* counts and concentration of phosphorus at LOCNB0.2 as well as higher concentrations of nitrate than previous years. The upstream site (LOCNB0.7) had lower concentrations of all measured analytes than LOCNB0.2. LOCNB0.7 did not exceed the water quality standard for *E. coli*, turbidity, nitrate, or chloride at any time during the 2025 sampling season. The phosphorus standard was exceeded at the upstream site on three of the four sampling dates but the concentrations were significantly below those measured at the downstream site.

Precipitation patterns and the associated river flow differed among the three years. In 2023, one sampling date (June) coincided with flows below the Low Median Monthly flow condition (LMM). In 2024, two sampling days occurred when flows were at or below the LMM (June and September) and in 2025, three sampling dates occurred when flows were at or below the LMM (July, August, and September). 2025 was characterized by historically dry conditions in the latter half of the summer following a very wet spring. Overall, flows in Little Otter Creek were lower in 2025 than 2024, and 2024 flows were lower than 2023.

At LOCNB0.2 the *E. coli* standard for primary contact recreation of not to exceed 235 organisms per 100 mL was exceeded on 75% of the sample days in 2023, 50% of sample days in 2024, and 50% in 2025. Overall, *E. coli* counts were higher in 2023 and 2024 than they were in 2025 (Figure 2). The highest count in 2025 was 501 MPN while in 2023 and 2024 the highest values were over 1,000 MPN. The lower rainfall in 2025 is a likely driver of the difference in *E. coli* counts between the years. No samples collected at the upstream monitoring location (LOCNB0.7) exceeded the *E. coli* water quality standard indicating the predominant source of the bacteria is downstream of LOCNB0.7 (Figure 3).

The phosphorus water quality standard is 27 ug/L when flows are at or below LMM. Three samples in 2025, two samples in 2024, and one sample in 2023 were collected when flows were below LMM. All sample dates are featured in Figure 2. Hence, the standard is not directly relevant to all of these data. However, all samples collected in all years at LOCNB0.2 exceeded 27 ug/L, irrespective of flow. At LOCNB0.7, the sample collected on June 3 (when flows were above LMM) was the only one that did not exceed 27 ug/L (Figure 3).

The applicable turbidity standard is not to exceed 25 NTU in dry weather base flow condition. In 2025, one sample at LOCNB0.2 exceeded the turbidity standard (in September). All 2024 sample days were below the turbidity standard (irrespective of flow conditions) and the 2023 samples exceeded the standard once in September and were otherwise below the threshold (Figure 2). All samples collected at LOCNB0.7 were below the water quality standard for turbidity (Figure 3).

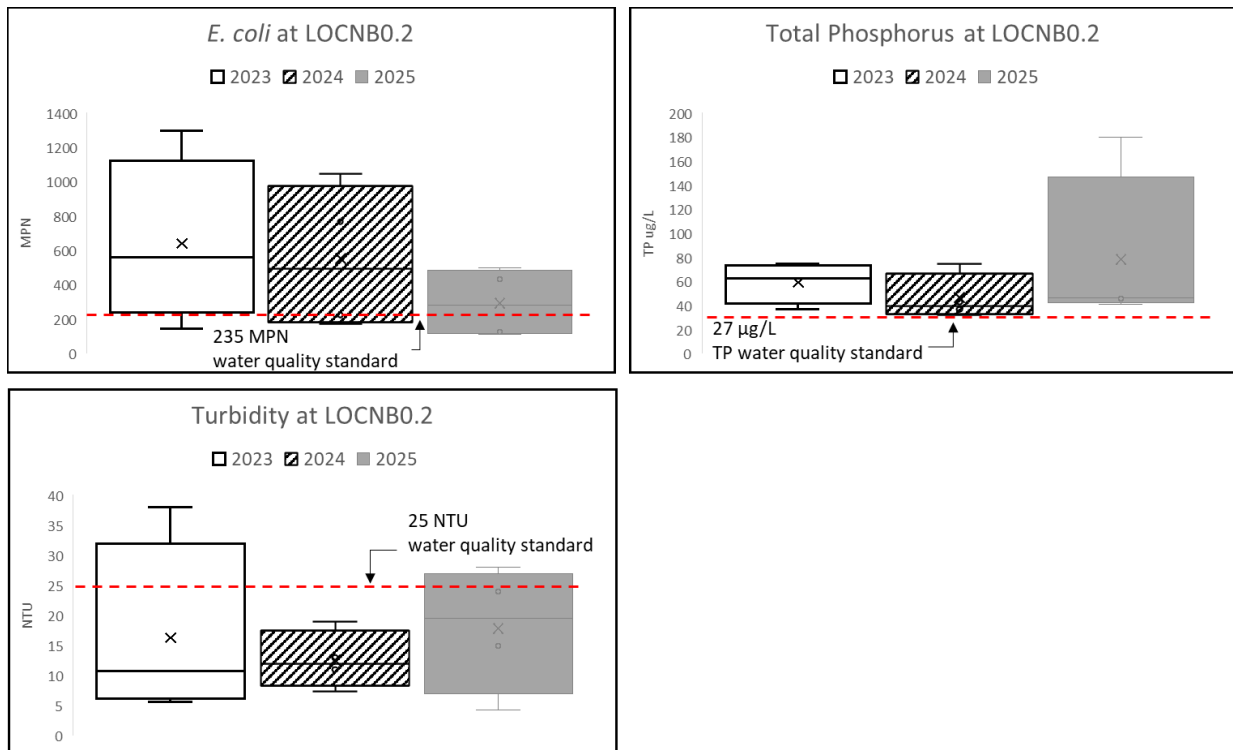


Figure 2. Comparison of concentrations of *E. coli*, total phosphorus, and turbidity in years 2023 through 2025 at site LOCNB0.2. These graphs include all samples collected irrespective of flow conditions.

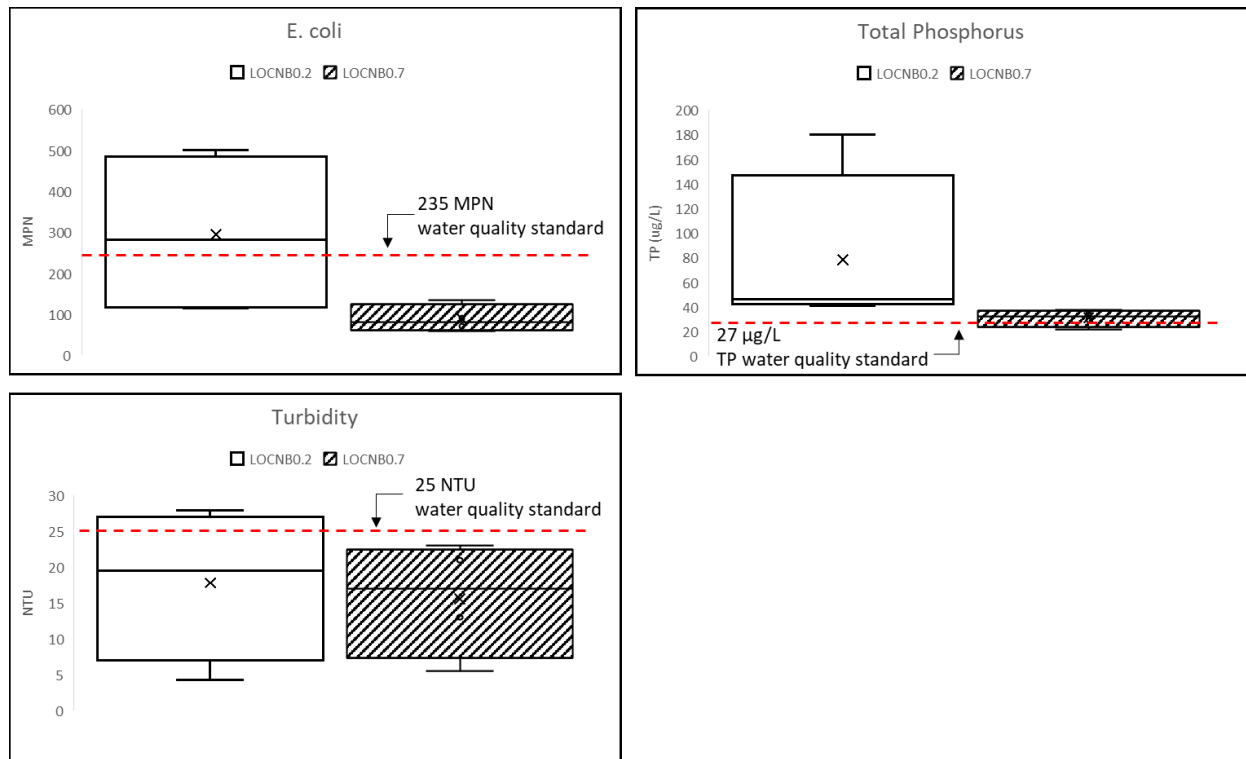


Figure 3. *E. coli*, phosphorus, and turbidity data comparing the downstream (LOCNB0.2) with the upstream monitoring location (LOCNB0.7) in 2025.

Instream chloride values were very low in all years and at both locations – often below laboratory detection limits. Nitrate was well below the state standard of not to exceed 5 mg/L at flows above the LMM in all years and at both monitoring locations. LOCNB0.2 did measure higher nitrate in 2025 than in either of the preceding years. The highest measured value was 1.1 mg/L on June 3 (the only monitoring date when flows exceeded LMM). Interestingly, the upstream site (LOCNB0.7) measured a nitrate value below the laboratory detection limit (<0.02 mg/L) on that same date. Graphical representations of the chloride and nitrate results are provided at the end of this report.

Results Summary

- The phosphorus standard only applies when flow is at or below the LMM flow condition between June and October. Those conditions occurred once in 2023, twice in 2024, and thrice in 2025. TP was elevated on all dates irrespective of flow condition in all monitoring years at site LOCNB0.2. Phosphorus concentrations were higher in 2025 than the preceding two years. Phosphorus concentrations were significantly lower at LOCNB0.7 than LOCNB0.2 in 2025.
- The Vermont bacterial water quality standard for primary contact recreation (swimming) is not to exceed 235 *E. coli* organisms per 100 mL. At LOCNB0.2 this standard was exceeded on three of four sampling days in 2023 and two of four sampling days in 2024 and 2025. *E. coli* concentrations were on average lower in 2025 than the preceding two monitoring years – likely as a result of lower flow conditions.

- Turbidity exceeded the water quality threshold on one of four sampling dates in 2023, none of the dates in 2024, and one date in 2025. The range of turbidity values measured in 2023 was greater than that measured in 2024 and 2025. As with all other analytes, the upstream site at LOCNB0.7 measured lower turbidity than the downstream site (LOCNB0.2) and did not exceed the water quality standard at any time.
- Both chloride and nitrate-nitrogen values were well below the state water quality standard threshold on all sampling days in all monitoring years. At site LOCNB0.2 nitrate was significantly higher in 2025 than in previous monitoring years. LOCNB0.7 measured similar chloride concentrations and significantly lower nitrate concentrations in 2025 compared to its downstream counterpart.
- Based on these data, it appears evident that a source of pollutants to the waterbody is entering between the two monitoring points.

Quality Assurance Summary

Grab samples were collected by ACRWC volunteers in accordance with quality assurance procedures outlined in the EPA-approved Generic Quality Assurance Project Plan (QAPP) prepared by Vermont Department of Environmental Conservation (VTDEC). Samples were analyzed for all analytes at Endyne Laboratories in Williston Vermont.

Duplicate samples were collected at both locations on August 5, 2025 and analyzed for chloride and nitrate. 2025 was the only year of sampling when duplicate field samples were collected. Mean relative percent difference (RPD) values for three of the four sample pairs were 0% (the same value for both). The fourth sample pair indicated an RPD between the primary and duplicate nitrate samples as high (<100%); however, both concentrations (0.62 and 0.2 mg/L) are near the low end of the analytical range, where small absolute differences can result in disproportionately large RPD values, and therefore the elevated RPD reflects mathematical sensitivity at low concentration rather than a meaningful difference between the two samples in that pair. Further, the laboratory indicated a qualifier in the report on the primary sample that the laboratory fortified blank was greater than the defined acceptance limit, making the reported value biased high.

Analysis and data display in this report use the primary sample results on the day of duplicate sampling and do not include the duplicate concentration or an averaging of the duplicate and primary sample values.

Date	Site ID	Chloride RPD	Nitrate-N RPD
8/5/2025	LOCNB0.2	0%	102%
8/5/2025	LOCNB0.7	0%	0%

Raw Data at LOCNB0.2 and LOCNB0.7 from 2023-2025

Site ID	Date	Time	E. coli (MPN/100m l)	Chloride (mg/L)	Nitrate-N (mg/L)	TP (ug/L)	Turbidity (NTU)	DUP	Notes
LOCNB0.2	6/3/2025	7:35	128	2	1.1	180	4.3		
LOCNB0.2	7/1/2025	7:15	435.2 <	5 <	0.2	46	24		
LOCNB0.2	8/5/2025	7:20	501.2 <	5	0.62	41	15		Lab QAQC did not pass. Results may be biased high for nitrate.
LOCNB0.2	8/5/2025	7:20	<	5 <	0.2			DUP	
LOCNB0.2	9/2/2025	7:10	114.5 <	5	0.78	47	28		
LOCNB0.7	6/3/2025	7:15	135.4 <	0.5 <	0.02	22	5.5		
LOCNB0.7	7/1/2025	7:25	90.8 <	5 <	0.2	35	13		
LOCNB0.7	8/5/2025	7:45	59.1 <	5 <	0.2	38	21		
LOCNB0.7	8/5/2025	7:45	<	5 <	0.2			DUP	
LOCNB0.7	9/2/2025	7:30	71.2 <	5 <	0.2	30	23		
LOCNB0.2	6/4/2024	10:35	770.1	0.68	0.054	37	7.4		
LOCNB0.2	7/2/2024	8:15	1046.2 <	5	0.48	75	19		
LOCNB0.2	8/6/2024	8:18	224.7 <	5 <	0.2	43	13		
LOCNB0.2	9/3/2024	7:10	172.3 <	5 <	0.2	32	11		
LOCNB0.2	8/8/2023	7:02	1299.7 <	1 <	0.04	70	14		
LOCNB0.2	7/13/2023	14:26	143.9 <	5 <	0.2	55	7.6		
LOCNB0.2	6/6/2023	8:13	524.7	0.87	0.043	37	5.7		
LOCNB0.2	9/5/2023	12:10	601.5 <	1	0.062	75	38		

Additional Figures - Nitrate and Chloride Concentrations

