Norton Brook (LOCNB0.2) 2023 & 2024 Water Quality Data Report

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Prepared for Addison County River Watch Collaborative
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Norton Brook in the Town of New Haven Vermont drains to Little Otter Creek. The brook's water quality was monitored in the summers of 2023 and 2024. 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 both years. 2023 monitoring results identified that site as having elevated concentrations of most measured analytes and water quality standard exceedances for TP, *E. coli* and turbidity. 2024 results are similar with exceedances of TP and *E. coli*. Turbidity measured consistently below the water quality standard in 2024 which may be influenced by the differing rainfall and river flow in each year.

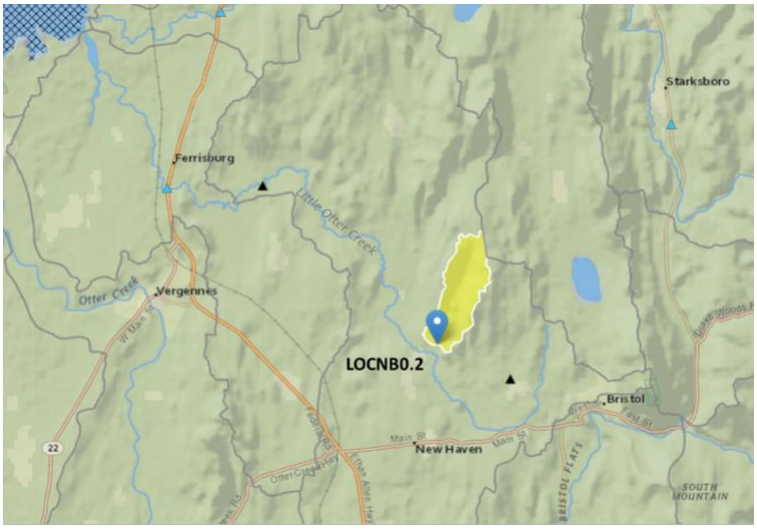

Figure 1. LOCBN0.2 monitoring location. Drainage area delineated in yellow.

Precipitation patterns and the associated river flow differed between 2023 and 2024 over the same months (Figure 2). In 2023, one sampling date (June) coincided with flows below the low median monthly flow condition (LMM). Two sampling days in 2024 occurred when flows were at or below the LMM (June and September). Despite the one very large rain event in July of 2024, Little Otter Creek flows were on average slightly lower in the summer of 2024 (74 cfs) than 2023 (81 cfs). 2023 was characterized by more regular higher flow events throughout July and August while 2024 flows were more consistently low following the large mid-July storm event.

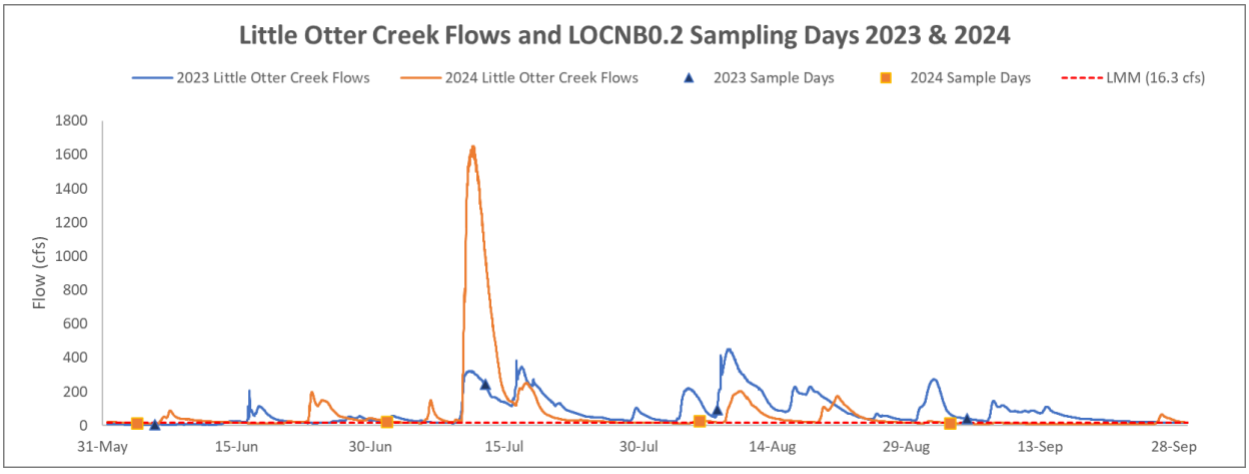

Figure 2. River flow in the Little Otter Creek and associated sample days in Norton Brook in 2023 and 2024.

Chloride values were very low in both years – often below laboratory detection limits. Nitrate was well below the state standard of not to exceed 5 mg/L at flows above the LMM). There was a bigger range of values measured in 2024 with higher values overall (Figure 3). Note that two of four sample days in 2024 and three of sample days in 2023 conform with the nitrate standard conditions.

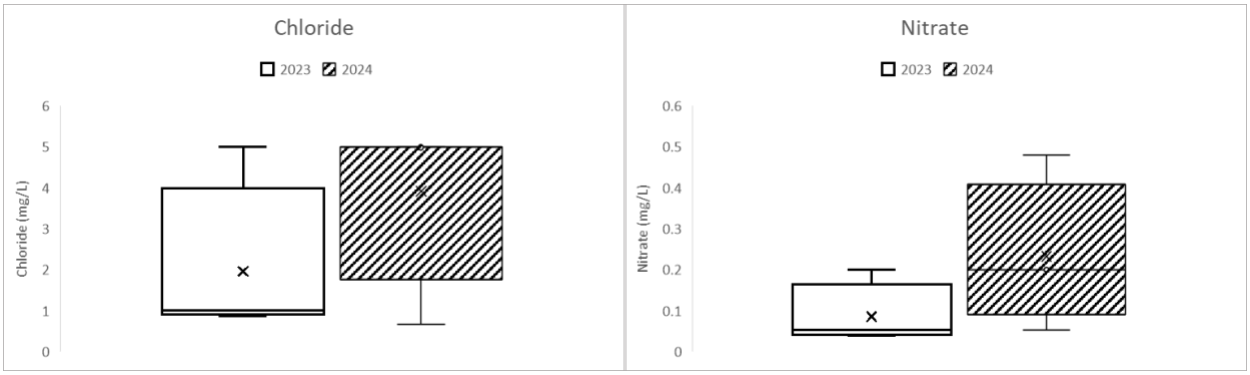

Figure 3. Comparison of chloride and nitrate concentrations in Norton Brook in 2023 and 2024.

The phosphorus water quality standard is 27 ug/L when flows are at or below LMM. Two sample days in 2024 were collected at that flow condition and only one sample in 2023 was collected when flows were below LMM (Figure 4). Hence, the standard is not directly relevant to all of these data. However, all samples collected exceeded 27 ug/L, irrespective of flow. The *E. coli* standard for primary contact recreation of 235 organisms per 100 mL was exceeded on half of the sample days in 2023 and 75% of sample days in 2024. The applicable turbidity standard is not to exceed 25 NTU in dry weather base flow condition. All 2024 sample days were below the turbidity standard (irrespective of flow conditions) while the 2023 samples exceeded the standard once in September and were otherwise below the water quality standard threshold.

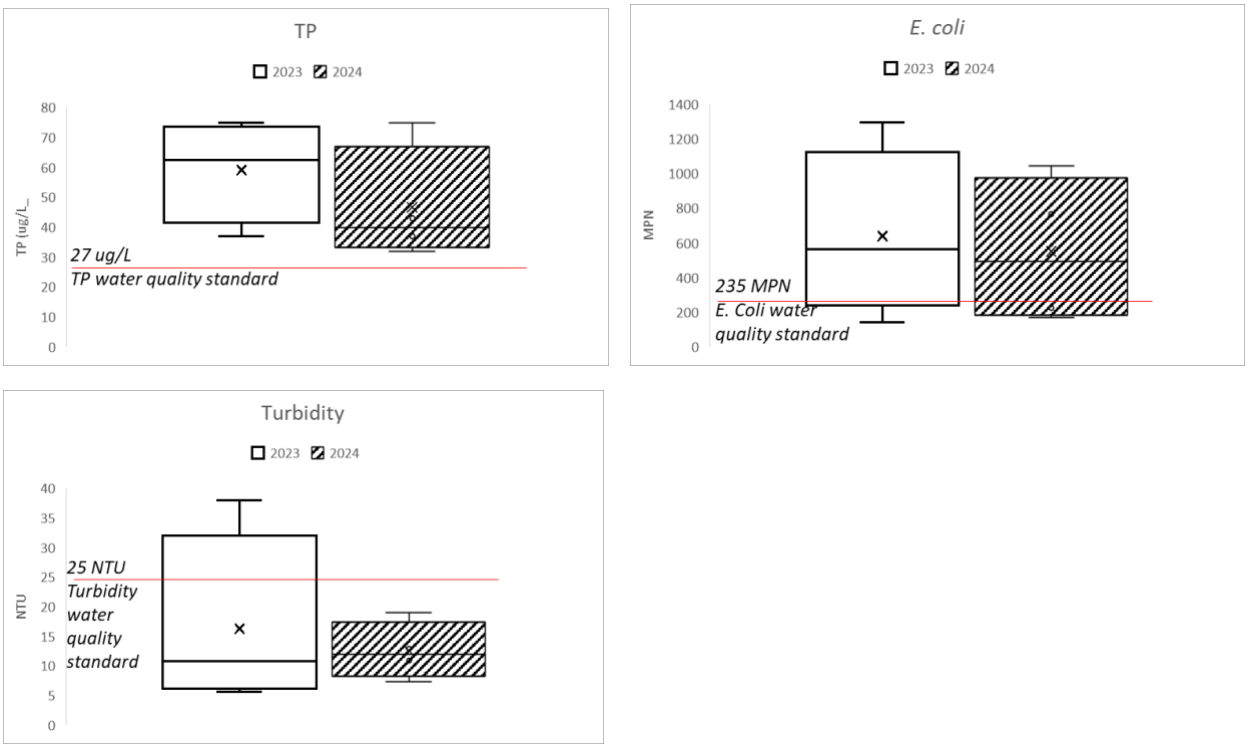

Figure 4. TP, E. coli, and turbidity data comparing 2023 & 2024

Summary

- Both chloride and nitrate-nitrogen values were well below state water quality standard thresholds on all sampling days in both monitoring years.
- TP standards are only applicable when flow is at or below the low median monthly flow condition between June and October. Those conditions occurred once in 2023 and twice in 2024. TP was elevated on all dates irrespective of flow condition. There is no significant discernable difference between total phosphorus concentrations measured in 2023 and 2024.
- The Vermont bacterial water quality standard for primary contact recreation (swimming) is not to exceed 235 *E. coli* organisms per 100 mL. This standard was exceeded on two of four sampling days in 2023 and three of four sampling days in 2024. Overall, there is no significant difference between *E. coli* colony counts measured in 2023 and 2024.
- Turbidity exceeded water quality threshold on one of four sampling dates in 2023 but none of the dates in 2024. The range of turbidity values measured in 2023 was greater than that measured in 2024. This difference may have been influenced by the higher overall flow conditions in 2023, causing greater sediment mobilization.

Raw Data at LOCNB0.2 from 2023 & 2024

Site ID	Date	Chloride (mg/L)	Nitrate-N (mg/L)	TP (ug/L)	E. coli (MPN/100ml)	Turbidity (NTU)
LOCNB0.2	6/4/2024	0.68	0.054	37	770.1	7.4
LOCNB0.2	7/2/2024	< 5	0.48	75	1046.2	19
LOCNB0.2	8/6/2024	< 5	< 0.2	43	224.7	13
LOCNB0.2	9/3/2024	< 5	< 0.2	32	172.3	11
LOCNB0.2	8/8/2023	< 1	< 0.04	70	1299.7	14
LOCNB0.2	7/13/2023	< 5	< 0.2	55	143.9	7.6
LOCNB0.2	6/6/2023	0.87	0.043	37	524.7	5.7
LOCNB0.2	9/5/2023	< 1	0.062	75	601.5	38