



2023 VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

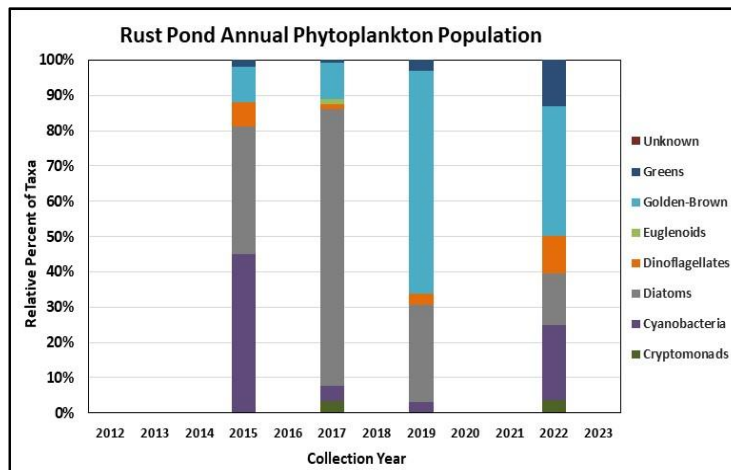
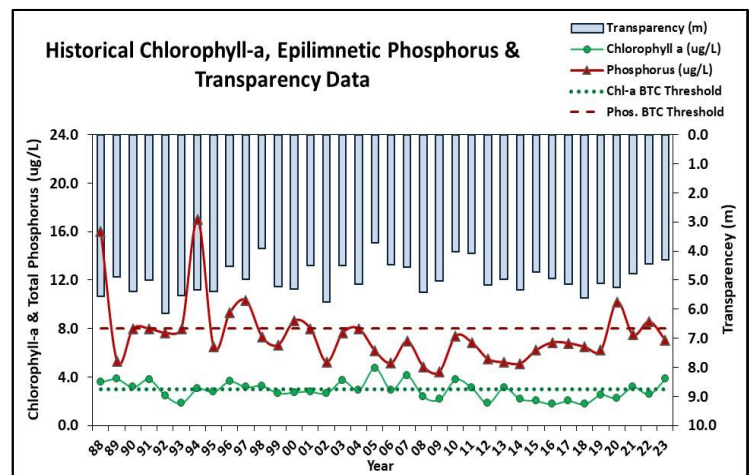
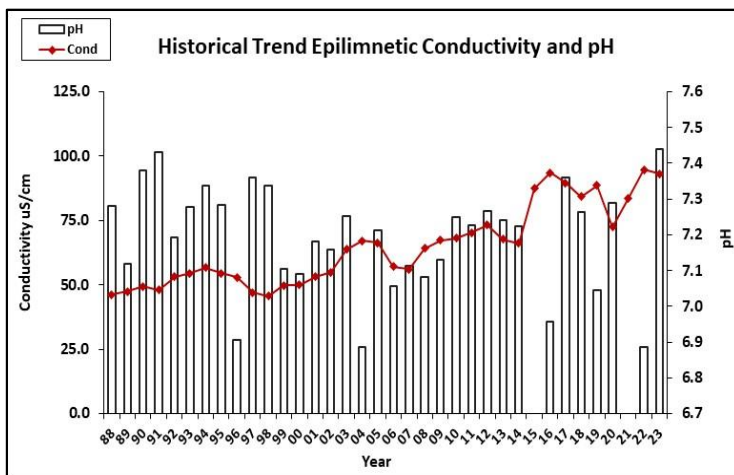
RUST POND, WOLFEBORO

Recommended Actions: Great job sampling in 2023! Pond quality is representative of oligotrophic, or high quality, conditions. However, epilimnetic phosphorus levels have remained within a higher range since 2020 and hypolimnetic phosphorus data suggest nutrient (phosphorus) release from bottom sediments under anoxic conditions in late summer which tends to fuel cyanobacteria growth in our oligotrophic lake systems. Keep an eye on the pond in late summer for any signs of cyanobacteria surface scums/blooms and [notify NHDES' Harmful Algal Bloom Program](#) if observed. The varying climate conditions in recent years highlights the delicate balance of the lake system and impacts to water quality with changing periods of ice cover, earlier ice out, droughts, water level fluctuations, nutrient flushing or retention, and flashier storm events and runoff. It is important to minimize nutrient loading and sediment erosion to the pond by controlling stormwater runoff, [maintaining septic systems](#), minimizing erosion of shoreline, and maintaining vegetative buffers. [NH LAKES](#) and [NHDES](#) have educational and outreach materials to educate homeowners. Encourage shorefront property owners to be certified [LakeSmart](#) through NH LAKES' lake-friendly living program. Keep up the great work!

HISTORICAL WATER QUALITY TREND ANALYSIS

PARAMETER	TREND	PARAMETER	TREND
Conductivity	Worsening	Chlorophyll-a	Stable
pH (epilimnion)	Stable	Transparency	Stable
Phosphorus (hypolimnion)	Stable	Phosphorus (epilimnion)	Improving

HISTORICAL WATER QUALITY GRAPHICS





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OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- ◆ **CHLOROPHYLL-A:** Chlorophyll level was slightly elevated in June, decreased to a low level in July, and increased slightly in August. Average chlorophyll level increased from 2022, was less than the state median, and was slightly greater than the threshold for oligotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), and Outlet conductivity levels remained slightly greater than the state median. Epilimnetic chloride levels were also slightly greater than the state median yet much less than the state chronic chloride standard. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Perry Brook conductivity levels were average for NH lakes and chloride levels were approximately equal to the state median. North Inlet conductivity and chloride levels were elevated in June and August, however excessive July rainfall resulted in low conductivity and chloride levels due to dilution of surface waters.
- ◆ **COLOR:** Apparent color measured in the epilimnion indicates the water was clear, with little to no tea coloring.
- ◆ **E. COLI:** North End Inlet and Outlet E. coli levels were very low and much less than the state standard for surface waters.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was stable and low from June through August. Average epilimnetic phosphorus level decreased from 2022 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus level was slightly elevated in July following excessive rainfall the week prior. Hypolimnetic phosphorus level was elevated in July and August and the turbidity of the samples was also elevated suggesting the potential for release of phosphorus from bottom sediments under anoxic (low dissolved oxygen) conditions. Historical trend analysis indicates relatively stable hypolimnetic phosphorus levels since monitoring began. North End Inlet phosphorus level was within a slightly elevated, but average, range for that station in June and August. Outlet phosphorus level fluctuated within a slightly elevated range for that station. Perry Brook phosphorus level fluctuated within an average range for that station.
- ◆ **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in June likely due to elevated algal growth, and increased (improved) steadily as the summer progressed. Average NVS transparency decreased slightly from 2022 but remained higher (better) than the state median. Historical trend analysis indicates relatively stable NVS transparency since monitoring began.
- ◆ **TURBIDITY:** Epilimnetic and Metalimnetic turbidity levels were slightly elevated in June and decreased as the summer progressed. Hypolimnetic turbidity levels were elevated in July and August potentially due to formation and accumulation of organic compounds under anoxic conditions. North End Inlet, Outlet and Perry Brook turbidity levels were slightly elevated in June and August.
- ◆ **pH:** Epilimnetic, Metalimnetic, North End Inlet, Outlet, and Perry Brook pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable, yet variable, epilimnetic pH levels since monitoring began. Hypolimnetic pH level was slightly less than desirable.

Table 1. 2023 Average Water Quality Data for RUST POND - WOLFEBORO

Station Name	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	E. coli (mpn/100mL)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
								NVS	VS		
Epilimnion	13.1	3.84	14	21	93.1	-	7	4.30	4.83	0.66	7.44
Metalimnion	-	-	-	-	95.4	-	11	-	-	0.71	6.78
Hypolimnion	-	-	-	-	103.5	-	27	-	-	3.83	6.41
North End Inlet	-	-	52	-	250.8	29	24	-	-	2.03	6.95
Outlet	-	-	-	-	93.0	2	10	-	-	1.20	7.34
Perry Brook	-	-	5	-	64.3	-	16	-	-	2.16	7.02

NH Median Values

Median values generated from historic lake monitoring data.

Alkalinity: 4.5 mg/L **Chlorophyll-a:** 4.39 ug/L
Conductivity: 42.3 uS/cm **Chloride:** 5 mg/L
Total phosphorus: 11 ug/L **Transparency:** 3.3 m
pH: 6.6

NH Water Quality Standards

Numeric criteria for specific parameters. Water quality violation if thresholds exceeded.

Chloride: > 230 mg/L (chronic) **Turbidity:** > 10 NTU above natural
E. coli: > 88 cts/100 mL (beach)
E. coli: > 406 cts/100 mL (surface waters)
pH: between 6.5-8.0 (unless naturally occurring)