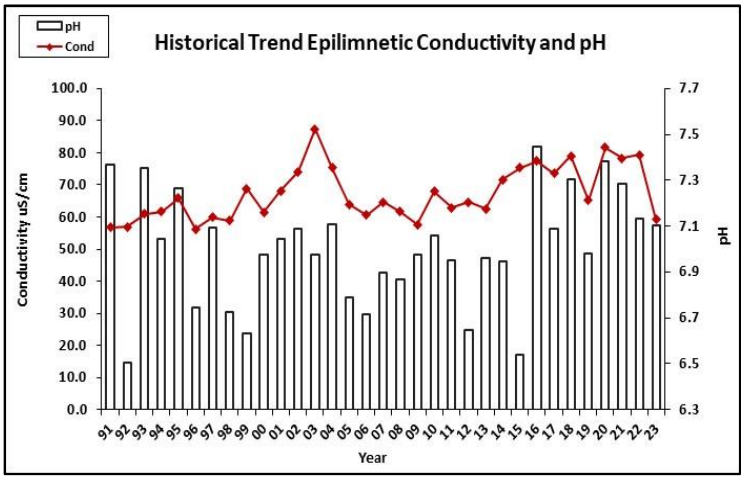
2023 VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
MASCOMA LAKE, ENFIELD

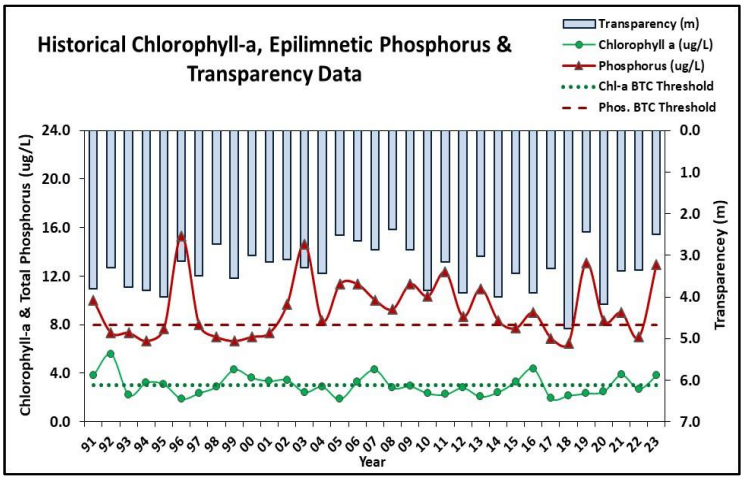
Recommended Actions: Great job sampling in 2023! Lake quality is generally representative of oligotrophic, or high quality, conditions. However, Lake nutrient levels and algal growth were elevated in 2023 due to excessive summer rainfall and the lake experienced cyanobacteria blooms in July and August prompting advisories to be issued. The lake has a history of elevated nutrient (phosphorus) levels and decreased water clarity, particularly following significant storm events. Several tributaries also experience elevated phosphorus and turbidity levels, particularly Browns and Shaker Brooks, following significant storm events. This highlights the importance of managing stormwater runoff within the watershed. Fluctuating climate conditions with increased frequency of summer droughts, high volume storm events, warmer water temperature, shorter periods of ice cover, and earlier ice out can have negative impacts on water quality. Consider partnering with Soak Up the Rain NH to implement stormwater improvement projects along the shoreline. Encourage shorefront property owners to become certified LakeSmart through NH LAKES lake-friendly living program. Nice job adjusting deep spot sample depths based upon the temperature profile. Continue to adjust these as necessary moving forward. Continue collaboration with the Mascoma River Local Advisory Committee in developing a management plan. Keep up the great work!

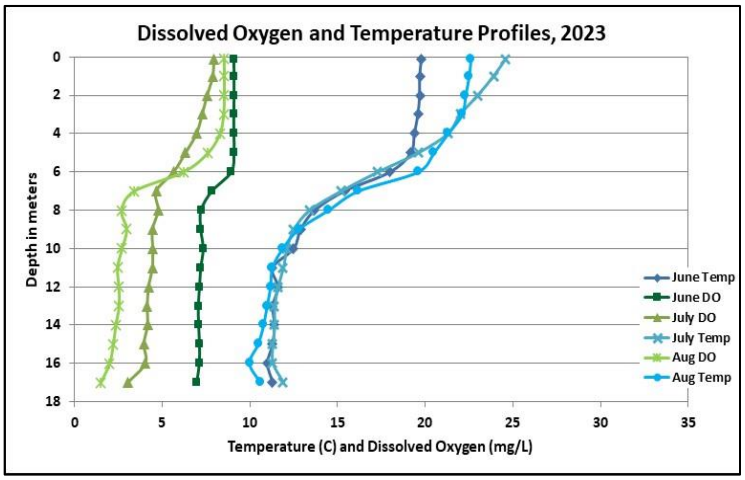
HISTORICAL WATER QUALITY TREND ANALYSIS

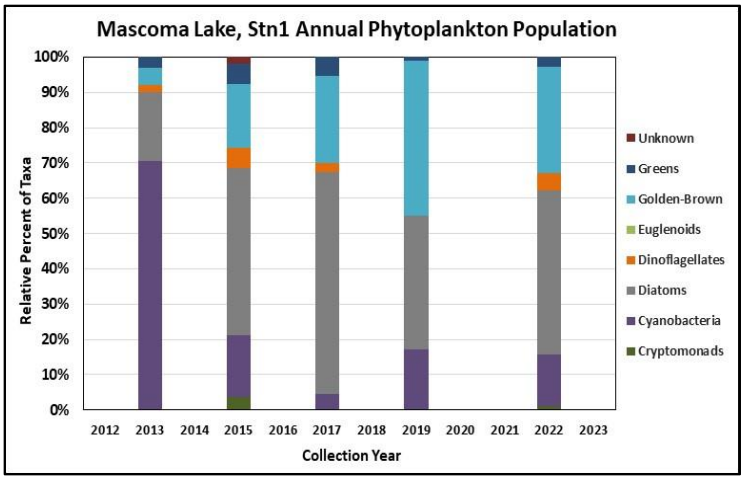
PARAMETER	TREND	PARAMETER	TREND
Conductivity	Worsening	**Chlorophyll-a**	Stable
pH (epilimnion)	Stable	**Transparency**	Stable
Phosphorus (hypolimnion)	Stable	**Phosphorus (epilimnion)**	Stable

HISTORICAL WATER QUALITY GRAPHICS









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

- **CHLOROPHYLL-A:** Chlorophyll level was low in June, remained stable in July, and increased to an elevated level in August prior to a cyanobacteria bloom. 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 relatively stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Outlet, Knox River, and Mascoma River conductivity and/or chloride levels remained greater than the state medians, yet less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Browns Bk. and Shaker Bk. conductivity and chloride levels were elevated and chloride levels were much greater than the state median, yet less than the state chronic chloride standard. LaSalette Bk. conductivity and chloride levels were very low.
- **COLOR:** Apparent color measured in the epilimnion indicates the water was moderately tea colored in June and darkened to highly tea colored conditions in July following excessive rainfall, and lightened slightly in August.
- **E. COLI:** Knox River and Mascoma River E. coli levels were low and less than the state standard for surface waters in July.
- **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were low in June, increased to elevated levels in July, and decreased slightly in August. Average epilimnetic phosphorus level increased from 2022 and was greater than the state median and the threshold for oligotrophic lakes. Hypolimnetic phosphorus level was moderate in June and increased gradually to an elevated level by August and the turbidity of the samples also increased. Historical trend analysis indicates relatively stable epilimnetic and hypolimnetic phosphorus levels since monitoring began. Browns Bk. phosphorus levels were elevated in July and August following excessive rainfall and during high flow conditions. Knox River, Mascoma River and Outlet phosphorus levels increased in July following excessive rainfall but were within average ranges for those stations. LaSalette and Shaker Bk. phosphorus levels were elevated in June and the turbidity of the samples was also elevated.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was average in June, decreased (worsened) in July following excessive rainfall, and decreased in August when algal/cyanobacteria levels were elevated. Average NVS transparency decreased from 2022 and was lower 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 July following excessive rainfall, and Metlimnetic turbidity was also elevated in August when algal/cyanobacteria levels were elevated. Hypolimnetic turbidity level increased to a slightly elevated level as the summer progressed. All tributaries experienced elevated turbidity levels in June and July during and after rain events and lab data noted colored water, and varying levels of sediment and/or organic matter is several samples.
- **PH:** Epilimnetic, Metalimnetic, and tributary pH levels were within the desirable range of 6.5-8.0 units. Historical trend analysis indicates stable, yet variable, epilimnetic pH levels since monitoring began. Hypolimnetic pH levels was slightly less than desirable.

Table 1. 2023 Average Water Quality Data for MASCOMA LAKE - ENFIELD

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	7.93	3.81	8	93	59.1	-	13	2.50	3.48	1.16	7.10
Metalimnion	-	-	-	-	58.9	-	11	-	-	1.40	6.74
Hypolimnion	-	-	-	-	59.4	-	16	-	-	1.93	6.42
Browns Brook	-	-	46	-	221.4	-	53	-	-	2.16	6.64
Dam Outlet	-	-	-	-	58.1	-	13	-	-	1.18	7.32
Knox River Inlet	-	-	15	-	96.0	29	17	-	-	2.15	7.05
LaSalette Brook	-	-	2	-	27.9	-	13	-	-	0.89	7.24
Mascoma River Inlet	-	-	8	-	65.5	94	19	-	-	2.95	7.13
Shaker Brook	-	-	86	-	443.7	-	29	-	-	2.02	7.46

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 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)