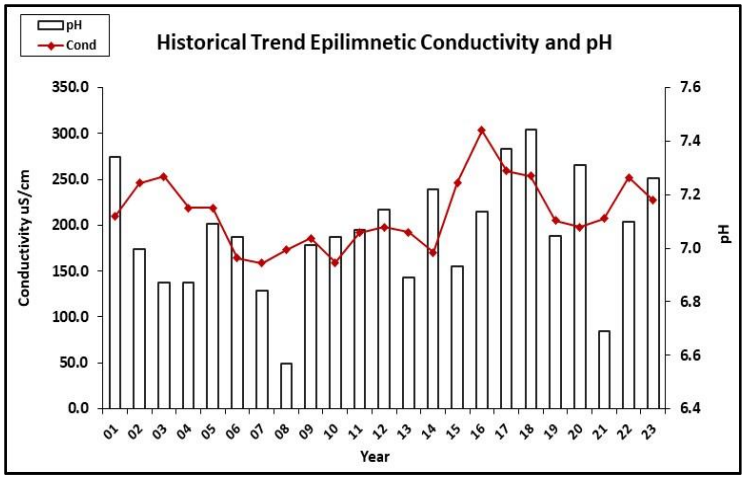
2023 VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
CAPTAINS POND, SALEM

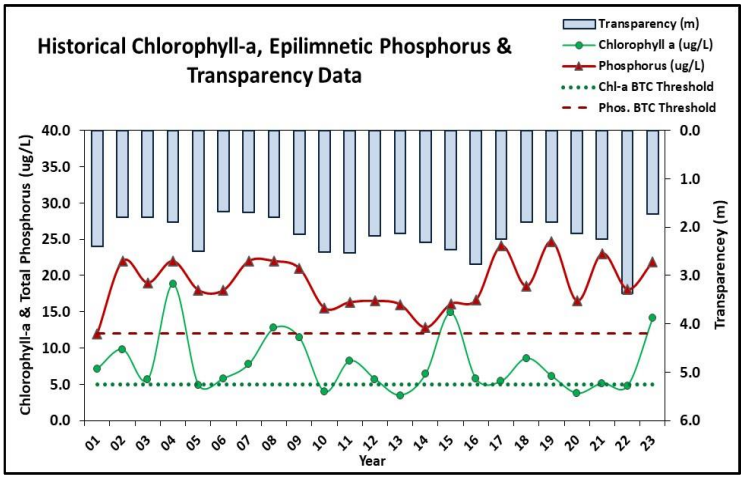
Recommended Actions: Pond phosphorus, chlorophyll (algal growth) and turbidity levels were elevated in late July following a month of excessive rainfall and stormwater runoff. Chlorophyll levels were indicative of an algal or cyanobacteria bloom and a cyanobacteria advisory was issued in August. Continue to be alert for any signs of cyanobacteria surface scums or blooms and notify NHDES' Harmful Algal Bloom Program if observed. This highlights the importance of minimizing external loads of phosphorus from the watershed and internal loads from bottom sediments, boating activity and aquatic plant management. Continue development of a watershed management plan to identify and quantify nutrient loads and recommend remediation activities. Continue waterfowl management efforts to reduce nutrient and bacteria loads. Educate shorefront property owners on becoming certified LakeSmart through NH LAKES' lake-friendly living program and to utilize NHDES' NH Homeowner's Guide to Stormwater Management. Increase monitoring frequency to once per month in the summer to better understand seasonal and annual variations in water quality. Keep up the great work!

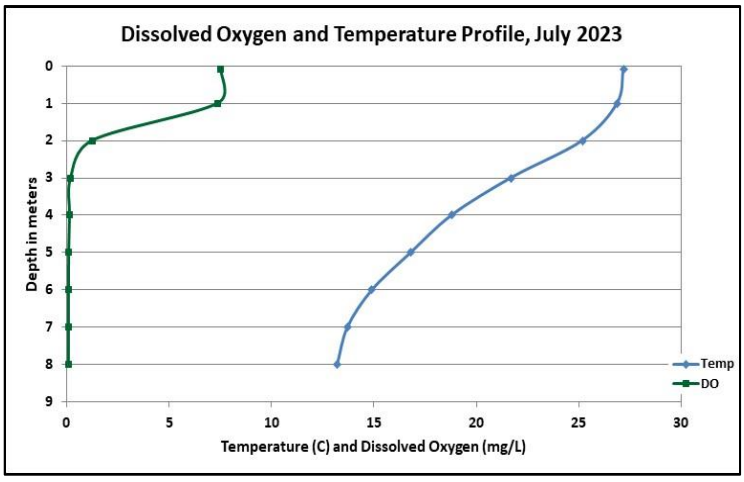
HISTORICAL WATER QUALITY TREND ANALYSIS

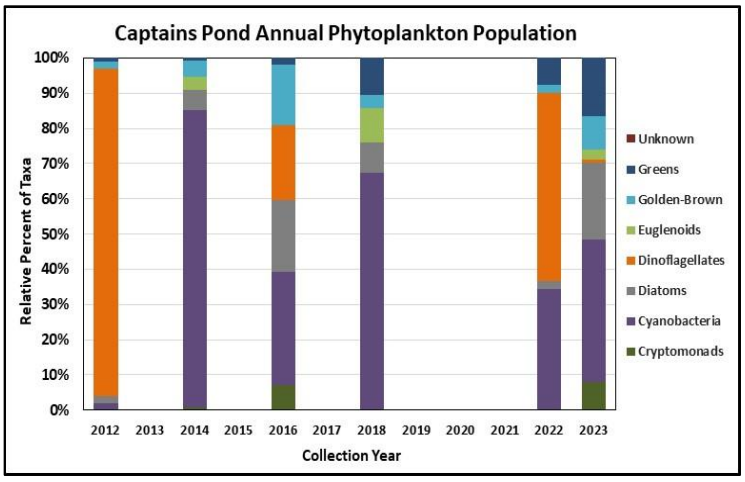
PARAMETER	TREND	PARAMETER	TREND
Conductivity	Stable	**Chlorophyll-a**	Stable
pH (epilimnion)	Stable	**Transparency**	Stable
Phosphorus (hypolimnion)	Stable	**Phosphorus (epilimnion)**	Stable

HISTORICAL WATER QUALITY GRAPHICS









2023 Volunteer Lake Assessment Program Individual Lake Reports

Captains Pond, Salem

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

- **Chlorophyll-a:** Chlorophyll level was elevated in July and indicative of a potential algal and/or cyanobacteria bloom. Average chlorophyll level increased greatly from 2022 and was much greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Inlet, Outlet and nearshore stations conductivity and chloride levels remained elevated and much greater than the state medians. Historical trend analysis indicates stable, yet variable, epilimnetic conductivity levels since monitoring began.
- **Color:** Apparent color measured in the epilimnion indicates the water was highly tea colored, or dark brown, in July.
- **E. coli:** Boat Lauch E. coli level was very low and much less than the state standards for public beaches and surface waters.
- **Total Phosphorus:** Epilimnetic and Metalimnetic phosphorus levels were elevated in July. Epilimnetic phosphorus level increased from 2022 and was much greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable, yet variable, epilimnetic and hypolimnetic phosphorus levels. Hypolimnetic phosphorus level was greatly elevated and the highest measured since monitoring began due to the release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions. 21 Plaisted Ext., 7 Captains Dr. Inlet, Outlet, and Gallow phosphorus levels were within a low to moderate range for those stations. Boat Launch and Buzzell Cove phosphorus levels were within an elevated range.
- **Transparency:** Transparency measured without the viewscope (NVS) was below average (worse) in July likely due to stormwater runoff from excessive summer rainfall and elevated algal and/or cyanobacteria growth. NVS transparency decreased from 2022, was lower (worse) than the state median, and was the lowest measured since monitoring began. Historical trend analysis indicates relatively stable NVS transparency since monitoring began. Viewscope (VS) transparency was slightly higher (better) than NVS transparency and likely a better measure of actual conditions, but was also below average in 2023.
- **Turbidity:** Epilimnetic, Metalimnetic, 7 Captains Dr., and Boat Launch turbidity levels were elevated likely due to elevated algal growth and stormwater runoff from excessive summer rainfall. Hypolimnetic turbidity level was elevated likely due to formation and accumulation of organic compounds under anoxic conditions. 21 Plaisted Ext., Buzzell Cove, Inlet, Outlet, and Gallow turbidity levels were low.
- **pH:** Epilimnetic, Metalimnetic, Hypolimnetic, 21 Plaisted Ext., 7 Captains Dr., Boat Launch, Buzzell Cove, Inlet, Outlet, and Gallow 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.

Table 1. 2023 Average Water Quality Data for CAPTAIN POND - SALEM

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	22.1	14.19	48	129	227.0	-	22	1.72	2.28	2.45	7.26
Metalimnion	-	-	-	-	255.0	-	24	-	-	5.04	6.68
Hypolimnion	-	-	-	-	266.5	-	79	-	-	7.06	6.72
21 Plaisted Ext.	-	-	52	-	227.0	-	18	-	-	0.82	7.14
7 Captains Dr.	-	-	54	-	229.0	-	17	-	-	2.52	7.14
Boat Launch	-	-	89	-	401.0	1	31	-	-	1.97	7.44
Buzzell Cove	-	-	54	-	229.0	-	29	-	-	0.98	7.05
Inlet	-	-	52	-	232.0	-	18	-	-	0.99	6.95
Outlet	-	-	-	-	230.0	-	20	-	-	0.86	6.86
Gallow	-	-	54	-	229.0	-	21	-	-	0.99	7.15

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)