VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
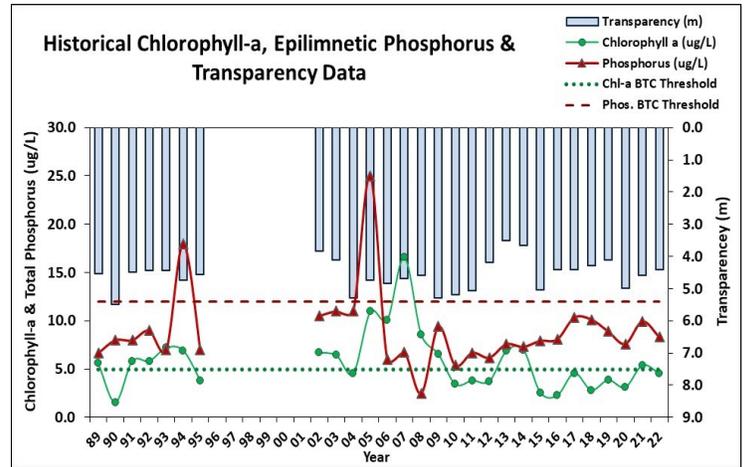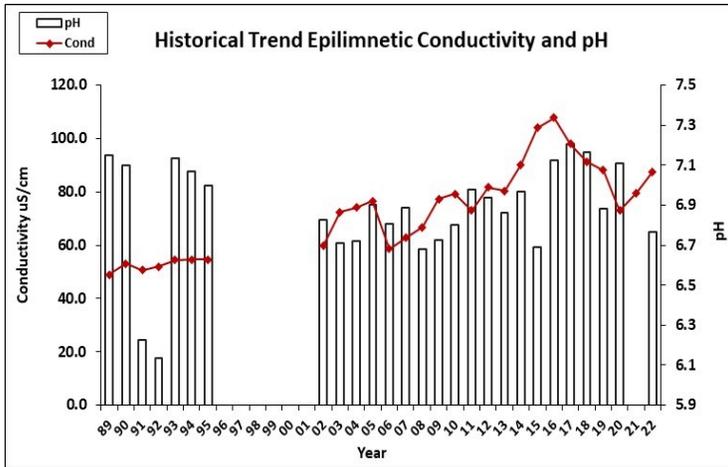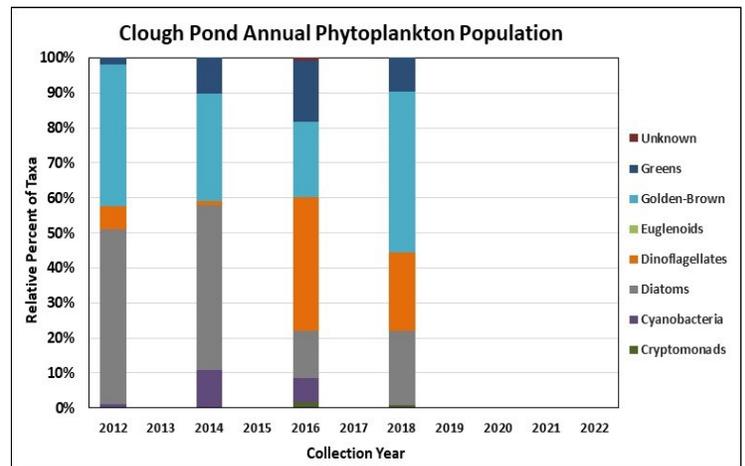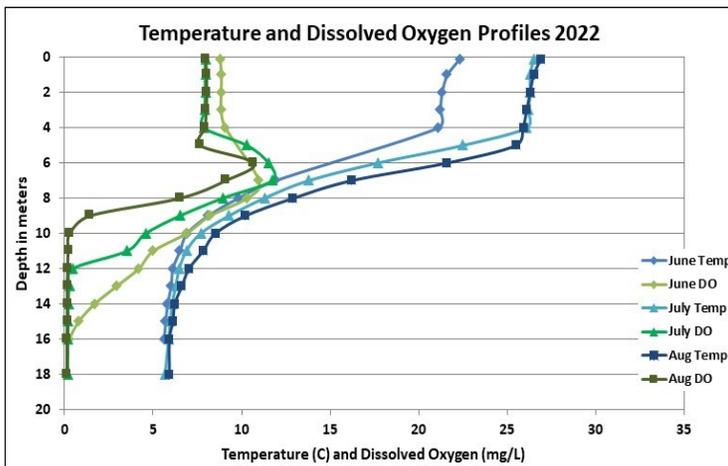## CLOUGH POND, LOUDON
2022 DATA SUMMARY

RECOMMENDED ACTIONS: Great job sampling in 2022! Pond quality remained representative of mesotrophic, or average, conditions and the improving chlorophyll (algal growth) levels are encouraging. However, the pond experienced another cyanobacteria bloom following blooms in both 2020 and 2021. The bloom occurred in August during drought conditions with low water levels and likely lack of flushing of nutrients out of the pond. Cyanobacteria are adapted to take advantage of warmer water temperatures and low light conditions to take up nutrients from deeper in the water column. The internal load of nutrients from bottom sediments likely helps to fuel this growth. The dissolved oxygen profiles indicated super-saturated conditions in Metalimnetic waters indicating layers of cyanobacteria that can occasionally surface as blooms or scums. Report any suspicious algal/cyanobacteria growth to NHDES' Harmful Algal Bloom Program. Inlet phosphorus level was elevated in July following a significant storm event and samplers noted murky water. Investigate potential sources of elevated turbidity and phosphorus such as beaver activity, and implement best management practices to reduce nutrient loading from this location. Continue efforts to manage stormwater runoff in the watershed. Encourage shoreline property owners to be certified LakeSmart through NH LAKES' lake-friendly living program. Educate shoreline property owners on proper septic system maintenance to further help reduce nutrient loading to the pond. Keep up the great work!

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Parameter	Trend
Conductivity	Worsening	Chlorophyll-a	Improving
pH (epilimnion)	Improving	Transparency	Stable
		Phosphorus (epilimnion)	Stable

Historical Trend Epilimnetic Conductivity and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data

DISSOLVED OXYGEN AND PHYTOPLANKTON

(Note: Information may not be collected annually)

Temperature and Dissolved Oxygen Profiles 2022

Clough Pond Annual Phytoplankton Population

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

- **CHLOROPHYLL-A:** Chlorophyll level was within a low range in June, increased slightly in July, and decreased in August. Average chlorophyll level decreased from 2021, was approximately equal to the state median, and was slightly less than the threshold for mesotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since 2002.
- **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Inlet, and Outlet conductivity and/or chloride levels remained slightly 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.
- **COLOR:** Apparent color measured in the epilimnion indicates the water was clear with little to no tea, or brown, coloring from June through August.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was within a low range in June, remained stable in July, and increased in August following a significant storm event. Average epilimnetic phosphorus level decreased from 2021 and was less than the state median and the threshold for mesotrophic lakes. Metalimnetic phosphorus level fluctuated within a slightly elevated range and was highest in July. Hypolimnetic phosphorus level was elevated in July and the turbidity of the sample was also slightly elevated indicating release of phosphorus from bottom sediments under anoxic (low dissolved oxygen) conditions. Inlet phosphorus level was elevated in July following a significant storm event and field data noted murky water. Outlet phosphorus level fluctuated within a low range.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was above average (good) in June and decreased (worsened) gradually as the summer progressed. Average NVS transparency decreased slightly from 2021 but remained higher (better) than the state median. Historical trend analysis indicates relatively stable NVS transparency since monitoring began.
- **TURBIDITY:** Epilimnetic turbidity level fluctuated within a low range. Metalimnetic turbidity level was slightly elevated in August potentially indicating a layer of algae/cyanobacteria at that depth. Hypolimnetic turbidity level was slightly elevated in July due to the formation and accumulation of organic compounds under anoxic conditions. Inlet turbidity level was elevated in July following a significant storm event. Inlet and Outlet turbidity levels were elevated in August when water levels were low and following a cyanobacteria bloom.
- **PH:** Epilimnetic, Metalimnetic, Inlet, and Outlet pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. Hypolimnetic pH level was slightly less than desirable.

Station Name	Table 1. 2022 Average Water Quality Data for CLOUGH POND - LOUDON									
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
							NVS	VS		
Epilimnion	9.2	4.56	16	23	87.6	8	4.41	4.86	0.57	6.76
Metalimnion					87.0	19			1.30	6.65
Hypolimnion					93.4	24			2.65	6.31
Inlet			14		84.6	16			7.61	6.81
Outlet			15		91.1	9			1.28	7.07

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)