



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

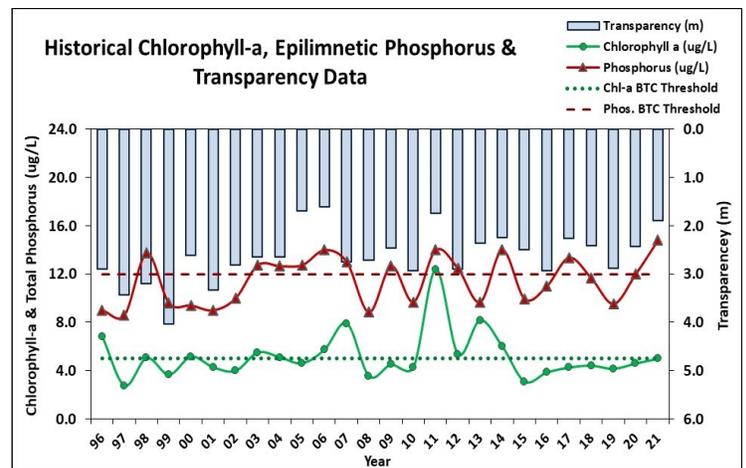
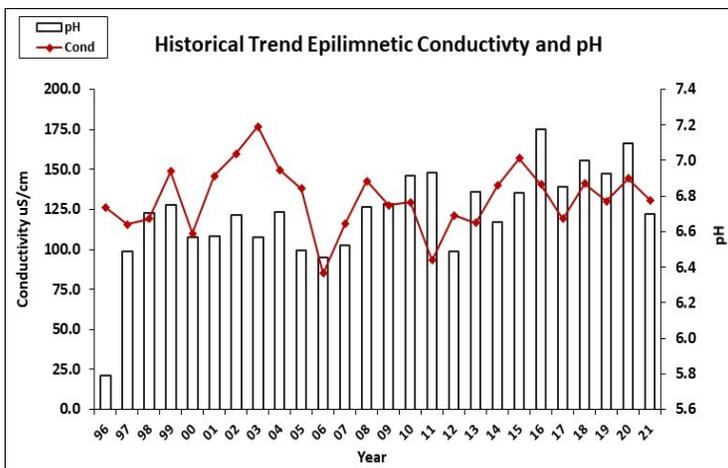
MESSER POND, NEW LONDON

2021 DATA SUMMARY

RECOMMENDED ACTIONS: Great job sampling in 2021! Pond quality is generally representative of mesotrophic, or average, conditions. However, the increased frequency and intensity of significant storm events and the record rainfall experienced in July of 2021 highlights the negative impacts of stormwater runoff and flushing of wetland systems rich in dissolved organic matter. These events cause pulses of nutrients, sediments and highly colored water to enter the pond. These conditions, combined with earlier ice outs, warmer water temperatures, and longer periods of thermal stratification set the stage for an internal release of nutrients from bottom sediments under anoxic conditions, as observed in September. Winter, spring and summer temperature and dissolved oxygen monitoring will occur in 2022 to measure the extent of dissolved oxygen depletion. Cyanobacteria represented a larger proportion of the phytoplankton population in September. Cyanobacteria are adapted to grow at low light levels and regulate their buoyancy in the water column to uptake nutrients from deeper water. Keep an eye out for potential cyanobacteria blooms in late summer/early fall as the internal load of nutrients could fuel rapid growth. Keep up the great work!

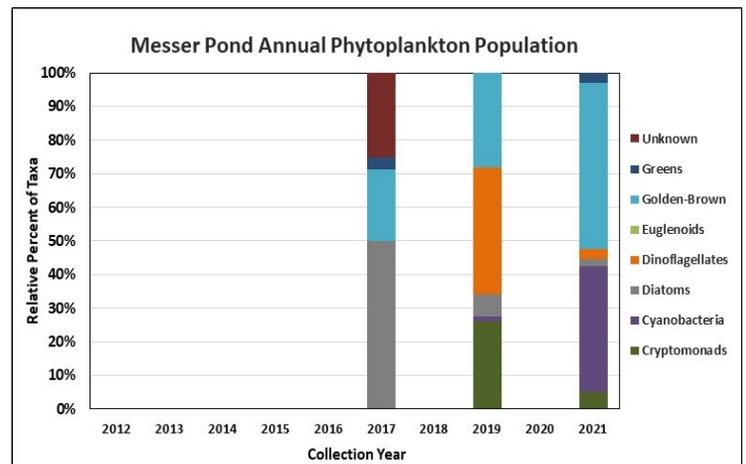
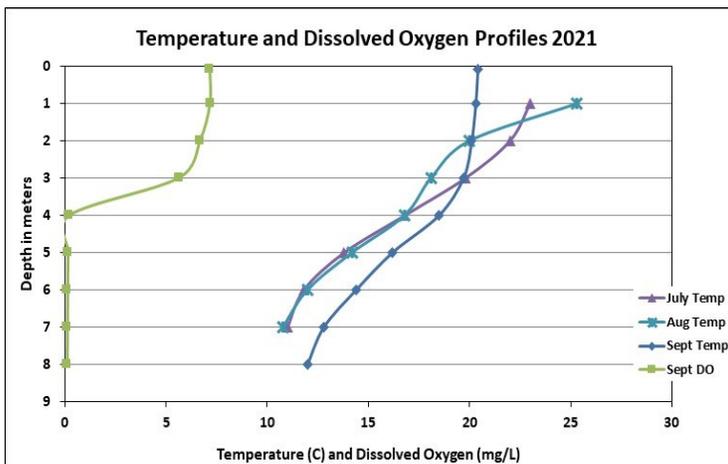
HISTORICAL WATER QUALITY TREND ANALYSIS

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



DISSOLVED OXYGEN AND PHYTOPLANKTON

(Note: Information may not be collected annually)





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2021 DATA SUMMARY

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

- ◆ **CHLOROPHYLL-A:** Chlorophyll level was low in June, increased to a slightly elevated level in July, then decreased to a low level in August and remained stable in September. Average chlorophyll level increased slightly from 2020, was slightly greater than the state median, and was approximately equal to the threshold for mesotrophic 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), Columbus Ave., County Rd. 2, County Rd. Inlet, and Outlet conductivity and chloride levels remained greater than the state medians. Historical trend analysis indicates relatively stable epilimnetic conductivity levels since monitoring began. Brown and Nutter Inlet conductivity and chloride levels remained elevated and much greater than the state medians, however chloride levels were less than the state chronic chloride standard.
- ◆ **COLOR:** Apparent color measured in the epilimnion indicates the water was moderately tea colored in June and July, and then darkened significantly to highly tea colored conditions in August and September following record rainfall amounts in July.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels fluctuated within a slightly elevated range and were highest in August following record rainfall in July. Average epilimnetic phosphorus level increased from 2020 and was greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were elevated in August and September potentially due to record rainfall and the release of phosphorus from bottom sediments as the summer progresses and dissolved oxygen levels deplete below 1.0 mg/L, a process called internal loading. Brown Inlet phosphorus levels were elevated in July during low flows and August during high flows, and lab data noted colored water with sediment and organic matter. Columbus Ave. phosphorus levels were elevated in September during low flow conditions. County Rd. 2 phosphorus levels were greatly elevated in June during low flows and sediment and organic matter were noted in the sample. County Rd. Inlet phosphorus levels were elevated in August and lab data note colored water with sediment and organic matter. Nutter Inlet phosphorus levels were elevated from June through August and varying levels of color, sediment and organic matter were noted in samples. Outlet phosphorus level was elevated in June during low flows.
- ◆ **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average in June, remained stable in July, decreased (worsened) in August following record rainfall and a significant darkening of water color, and then increased (improved) in September. Average NVS transparency decreased (worsened) from 2020 and was lower (worse) than the state median. Historical trend analysis indicates significantly decreasing (worsening) NVS transparency since monitoring began. Viewscope transparency (VS) was higher (better) than NVS transparency but remained below average for the pond.
- ◆ **TURBIDITY:** Epilimnetic turbidity level was slightly above average in August. Metalimnetic turbidity level was slightly elevated in August. Hypolimnetic turbidity level was slightly elevated in August and September likely due to the release and formation of organic compounds under anoxic conditions. Tributary turbidity levels were generally elevated during both low and high flows and varying levels of color, sediment and organic matter were often noted in the samples.
- ◆ **PH:** Epilimnetic, Columbus Ave., County Rd. 2, Nutter 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. Metalimnetic pH levels fluctuated around the low end of the desirable range. Hypolimnetic, Brown Inlet and County Rd. Inlet pH levels were slightly less than desirable.

Station Name	Table 1. 2021 Average Water Quality Data for MESSER POND - NEW LONDON									
	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	8.75	4.99	25	102	130.8	15	1.88	2.25	0.91	6.70
Metalimnion			24		130.0	19			1.86	6.55
Hypolimnion			25		145.9	24			3.60	6.30
Brown Inlet			106		421.0	70			7.80	6.24
Columbus Ave.			14		105.2	30			1.84	6.93
County Rd. 2			14		108.2	38			5.09	6.71
County Rd. Inlet			12		98.0	27			1.77	6.38
Nutter Inlet			52		234.2	42			1.07	6.86
Outlet at Bog Rd.			26		133.2	15			2.10	6.60

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)