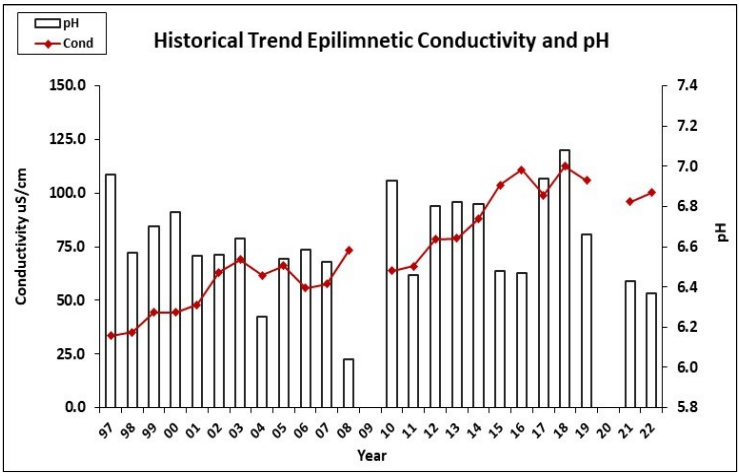
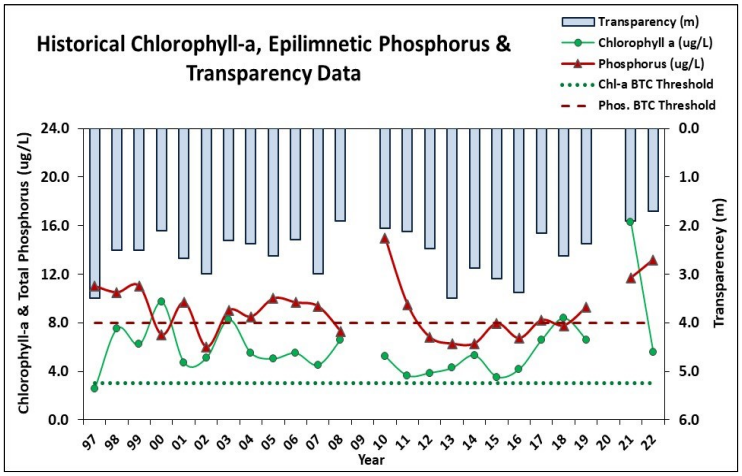
Volunteer Lake Assessment Program Individual Lake Reports
Sunrise Lake, Middleton
2022 Data Summary

Recommended Actions: Great job sampling in 2022! Lake quality is generally representative of oligotrophic, or high quality, conditions, however chlorophyll levels tend to fluctuate above the threshold for oligotrophic lakes. Phosphorus levels remained within an elevated range for the lake in 2022. The increased frequency and intensity of storm events combined with increasing occurrence of drought conditions can result in transport and retainment of nutrients in the lake. This highlights the importance of managing phosphorus (nutrient) loads within the watershed through stormwater management, septic system management, fertilizer use, shoreline stabilization, erosion controls at beach areas, and education of property owners. Great job developing a watershed management plan to identify and quantify nutrient sources and loads and make recommendations on ways to reduce loading. Increase sampling frequency to once per month, typically June, July and August, to better assess seasonal and annual variations in water quality. Keep up the great work!

Historical Water Quality Trend Analysis

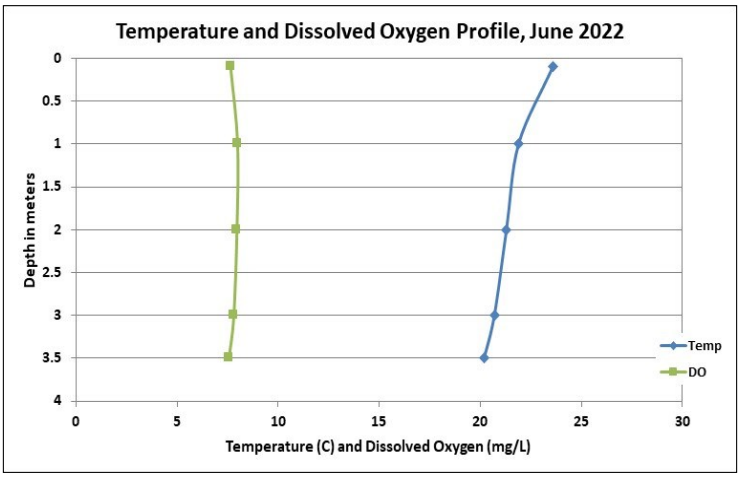
Parameter	Trend	Parameter	Trend
Conductivity	Worsening	**Chlorophyll-a**	Stable
pH (epilimnion)	Stable	**Transparency**	Stable
		Phosphorus (epilimnion)	Stable

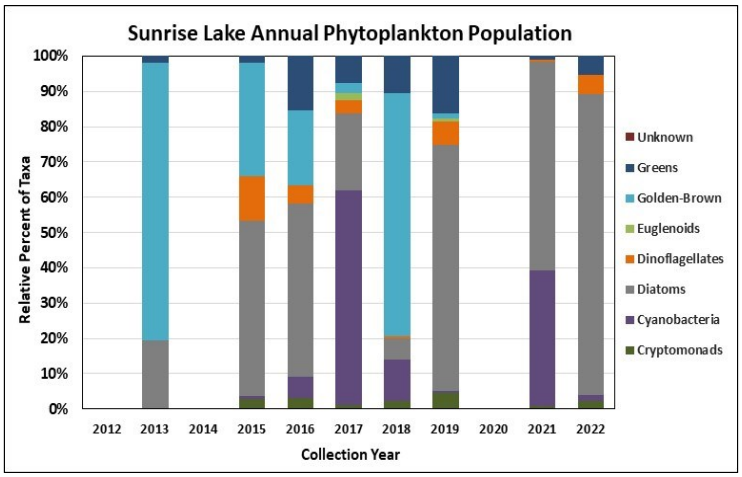




Dissolved Oxygen and Phytoplankton

(Note: Information may not be collected annually)





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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 from that measured in 2021, but remained greater than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable, yet variable, chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Hypolimnetic (lower water layer), Bartletts Cove, Hampshire Brook, Main Beach, Pinkham Cove, and Tanglewood Brook conductivity and/or chloride levels remained slightly greater than the state medians, yet chloride levels were much less than the state chronic chloride standard. 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 moderately tea colored, or brown, in June.
- **E. coli:** Main Beach, Nicola Beach and Town Beach E. coli levels were very low and much less than the state standard of 88 cts/100 mL for public beaches.
- **Total Phosphorus:** Epilimnetic and Hypolimnetic phosphorus levels remained slightly elevated, increased from that measured in 2021, and were slightly greater than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Bartletts Cove, Hampshire Brook, Main Beach, Pinkham Cove, and Tanglewood Brook phosphorus levels were also slightly elevated and above average for those stations.
- **Transparency:** Transparency measured without the viewscope (NVS) was low (poor) in June potentially due to wind and wave conditions while sampling and slightly elevated levels of algal growth. NVS transparency decreased (worsened) from 2021, 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 higher (better) than NVS transparency but also below average for the lake.
- **Turbidity:** Epilimnetic, Bartletts Cove, Main Beach, and Pinkham Cove turbidity levels were within average ranges for those stations. Hampshire Brook turbidity level was within a low range. Hypolimnetic and Tanglewood Brook turbidity levels were slightly elevated.
- **pH:** Epilimnetic and Hampshire Brook pH levels were slightly less than the low end of the desirable range 6.5-8.0 units. Historical trends analysis indicates relatively stable epilimnetic pH levels since monitoring began. Hypolimnetic, Bartletts Cove, Main Beach, Pinkham Cove, and Tanglewood Brook pH levels were within the desirable range.

Station Name	Table 1. 2022 Average Water Quality Data for SUNRISE LAKE - MIDDLETON										
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	E. coli (mpn/100 mL)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
								NVS	VS		
Epilimnion	5.5	5.57	23	50	100.3		13	1.70	2.42	1.32	6.37
Hypolimnion					100.6		13			1.66	6.78
Bartletts Cove			22		101.1		13			1.31	6.81
Hampshire Brook			21		102.7		13			0.08	6.40
Main Beach			25		101.7	3	11			1.19	6.75
Nicola Beach						9					
Pinkham Cove			22		100.5		15			1.27	6.76
Tanglewood Brook			17		86.9		22			2.14	6.72
Town Beach						8					

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)