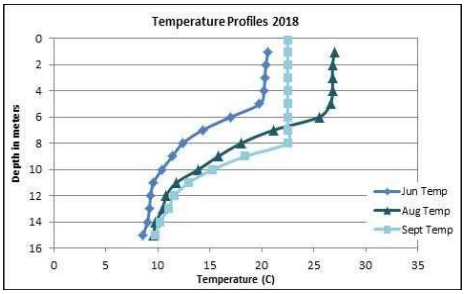
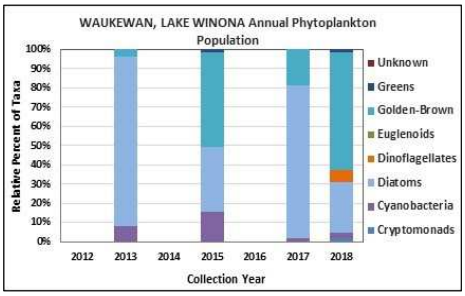
Volunteer Lake Assessment Program Individual Lake Reports
Lake Waukewan, Winona Stn., Meredith
2018 Data Summary

Recommended Actions: Lake quality is representative of oligotrophic, or high quality, conditions and the improving trends are a great sign. Conductivity has increased in the lake likely due to the application of winter de-icing materials on roads, parking lots, driveways, and walkways. Encourage local road agents and winter maintenance companies to obtain a NH Voluntary Salt Applicator License through UNH Technology Transfer Center's Green SnowPro Certification program. Boat Launch chloride and phosphorus levels were greatly elevated during spring snowmelt and runoff. Encourage road agents and homeowner's to clean up roadside ditches and culverts of any leftover sand/salt mixtures applied during winter months. Continue watershed management efforts to reduce nutrient loads and stormwater runoff and prioritize the Boat Launch site for stormwater management. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels were low in June and increased gradually into September but remained within a low range. Average chlorophyll level decreased slightly from 2017 and was less than the state median and 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) and Hypolimnetic (lower water layer) conductivity and/or chloride levels were slightly elevated and greater than the state medians, but chloride levels remained less than the state chronic chloride threshold. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Boat Launch conductivity and chloride levels were greatly elevated in May and chloride levels approached the chronic chloride standard. Brookside Lane Stream conductivity and chloride levels were also elevated and much greater than the state medians.
- **Color:** Apparent color was measured in the epilimnion and indicated the water fluctuated between clear and lightly tea colored, or light brown.
- **Total Phosphorus:** Epilimnetic phosphorus levels were stable and low. Average epilimnetic phosphorus decreased from 2017 and was much less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus levels fluctuated within a low range. Hypolimnetic phosphorus levels were low in June and elevated in August and September and the turbidity of the samples was also slightly elevated indicating potential dissolved oxygen depletion resulting in the release of phosphorus from bottom sediments. Brookside Lane Stream phosphorus levels were low. Boat Launch phosphorus levels were greatly elevated and lab data noted organic material in the sample.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was lower in June and then increased (improved) as the summer progressed. Average NVS transparency increased (improved) from 2017 and was much higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) transparency since monitoring began.
- **Turbidity:** Epilimnetic, Metalimnetic and Brookside Lane Stream turbidity levels were within a low range. Hypolimnetic turbidity levels were slightly elevated in August and September suggesting the accumulation of organic compounds formed under anoxic (low dissolved oxygen) conditions. Boat Launch turbidity levels were elevated and lab data noted organic material in the sample.
- **pH:** Epilimnetic, Metalimnetic, Boat Launch, and Brookside Lane Stream pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Hypolimnetic pH levels were slightly less than desirable.





NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Station Name	Table 1. 2018 Average Water Quality Data for LAKE WAUKEWAN, WINONA STN. - MEREDITH									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	Total P mg/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	8.7	2.34	29	27	129.9	3	7.85	8.41	0.40	7.10
Metalimnion					129.1	6			0.64	6.85
Hypolimnion					132.9	22			2.54	6.38
Boat Launch			182		715.0	57			23.30	6.74
Brookside Lane Stream			90		299.0	3			0.59	6.44

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.5 mg/L
Chlorophyll-a: 4.39 mg/m^3
Conductivity: 42.3 uS/cm
Chloride: 5 mg/L
Total Phosphorus: 11 ug/L
Transparency: 3.3 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Improving	Data significantly increasing.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.