Volunteer Lake Assessment Program Individual Lake Reports

WAUKEWAN, LAKE, NEW HAMPTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	7,551	**Max. Depth (m):**	21.4	**Flushing Rate (yr^{-1}):**	0.6
Surface Area (Ac.):	913	**Mean Depth (m):**	6.7	**P Retention Coef:**	0.7
Shore Length (m):	13,000	**Volume (m^3):**	24,809,000	**Elevation (ft):**	539

TROPHIC CLASSIFICATION

Year	Trophic class
1982	OLIGOTROPHIC
1994	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2018 305(b) report on the status of N.H. waters, and are based on data collected from 2008-2017. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm

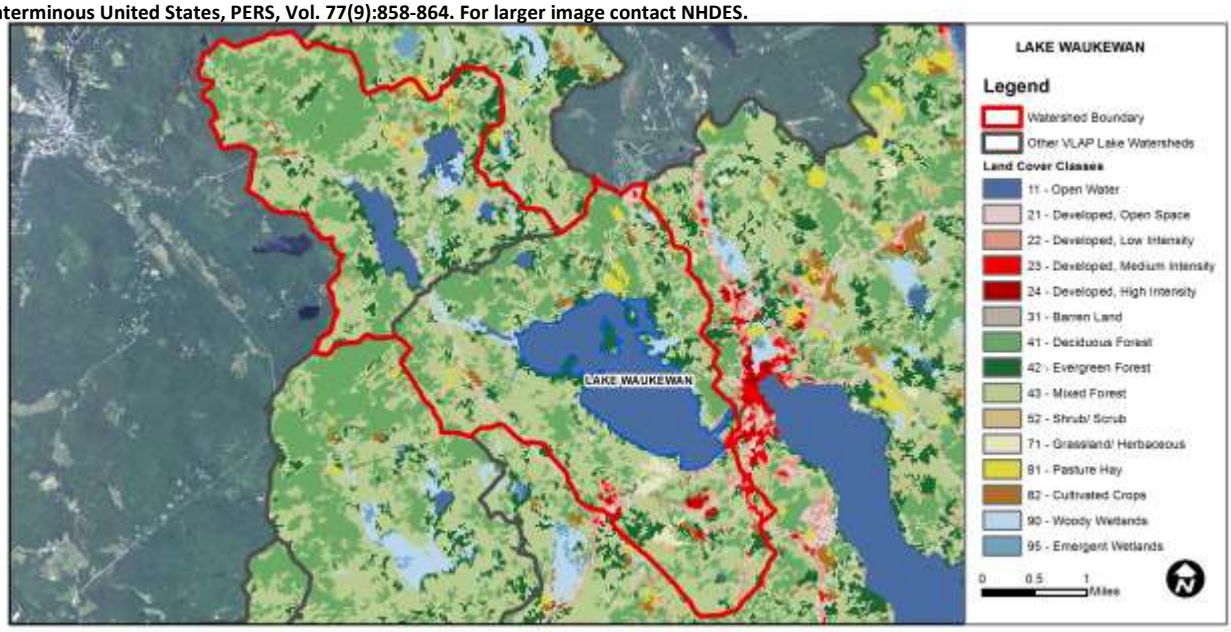
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Dissolved oxygen satura	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	Encouraging	Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAKE WAUKEWAN - TOWN BEACH	Escherichia coli	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	14.6	Barren Land	0.02	Grassland/Herbaceous	0.79
Developed-Open Space	3	Deciduous Forest	25.15	Pasture Hay	1.08
Developed-Low Intensity	1.29	Evergreen Forest	9.6	Cultivated Crops	0.74
Developed-Medium Intensity	0.56	Mixed Forest	39.35	Woody Wetlands	1.81
Developed-High Intensity	0.14	Shrub-Scrub	1.83	Emergent Wetlands	0.05

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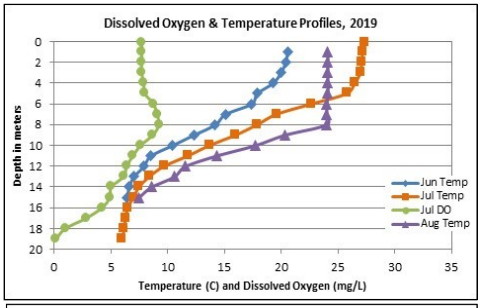
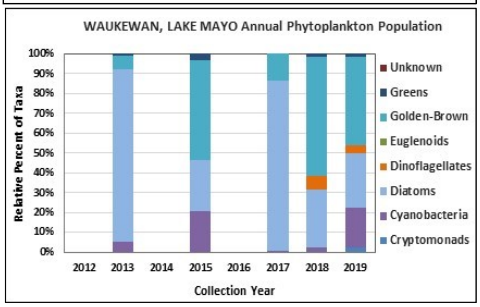
Lake Waukewan, Mayo Stn., Meredith
2019 Data Summary

Recommended Actions: Lake quality is representative of oligotrophic, or high quality, conditions, and the improving water quality trends are a great sign. However, epilimnetic conductivity and chloride levels have significantly increased in the lake likely due to the application of winter de-icing materials on roads, parking lots, driveways, and walkways. Increasing chloride levels can negatively impact drinking water and aquatic life. Encourage local and private winter maintenance companies to obtain a NH Voluntary Salt Applicators License through UNH Technology Transfer Center's Green SnowPro Certification program. 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. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll level was low in June, increased to a moderate level in July, and then decreased to a low level in August. Average chlorophyll level increased slightly from 2018 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot, Inlet, Outlet, Perkins Cove, Sayward Bk., and Sayward Bk. at Rock Ridge conductivity and/or chloride levels were slightly elevated and greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity levels since monitoring began and significantly increasing chloride levels since 2009. Camp Rd. Trib., EE Brook and Mayo Farm Brook conductivity and chloride levels were low and slightly less than the state medians.
- **Color:** Apparent color measured in the epilimnion indicates the water was clear with little to no tea coloring from June to August.
- **Total Phosphorus:** Epilimnetic phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus level increased from 2018 but remained 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 (middle water layer) phosphorus level was slightly elevated in June and then decreased to a low level. Hypolimnetic (lower water layer) phosphorus level was slightly elevated in July. Camp Rd. Trib., EE Brook, Inlet, Mayo Farm Bk., Outlet, and Perkins Cove phosphorus levels were low. Sayward Bk. and Sayward Bk. at Rock Ridge phosphorus levels were within a moderate range but normal for those stations.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June and increased (improved) slightly as the summer progressed. Average NVS transparency decreased slightly from 2018 and was much higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) transparency since monitoring began.
- **Turbidity:** Deep spot, Camp Rd. Trib., EE Brook, Inlet, Mayo Farm Bk., Outlet, Perkins Cove, and Sayward Bk. at Rock Ridge turbidity levels fluctuated within a low range. Sayward Bk. turbidity levels were slightly elevated potentially due to a beaver dam upstream and significant rainfall prior to sampling.
- **pH:** Epilimnetic, Metalimnetic, EE Brook, Inlet, Mayo Farm Bk., Outlet, Perkins Cove, Sayward Bk., and Sayward Bk. at Rock Ridge pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Hypolimnetic and Camp Rd. Trib. pH levels were slightly less than desirable.





Station Name	Table 1. 2019 Average Water Quality Data for LAKE WAUKEWAN, MAYO STN.									
	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	8.1	2.99	33	20	132.5	5	7.27	7.62	0.28	6.73
Metalimnion					132.2	6			0.49	6.81
Hypolimnion					135.0	9			0.87	6.23
Camp Rd. Trib.			4		34.4	7			0.92	6.33
EE Brook			4		35.3	10			0.84	6.49
Inlet			25		105.4	6			0.53	6.60
Mayo Farm Bk.			4		34.0	7			0.71	6.51
Outlet			33		138.7	7			0.50	6.91
Perkins Cove			34		140.3	7			0.62	6.89
Sayward Bk.			27		124.8	12			1.66	6.91
Sayward Bk. at Rock Ridge			30		135.1	19			1.19	6.87

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)

NH Median Values: Median values for specific parameters 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

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.