



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

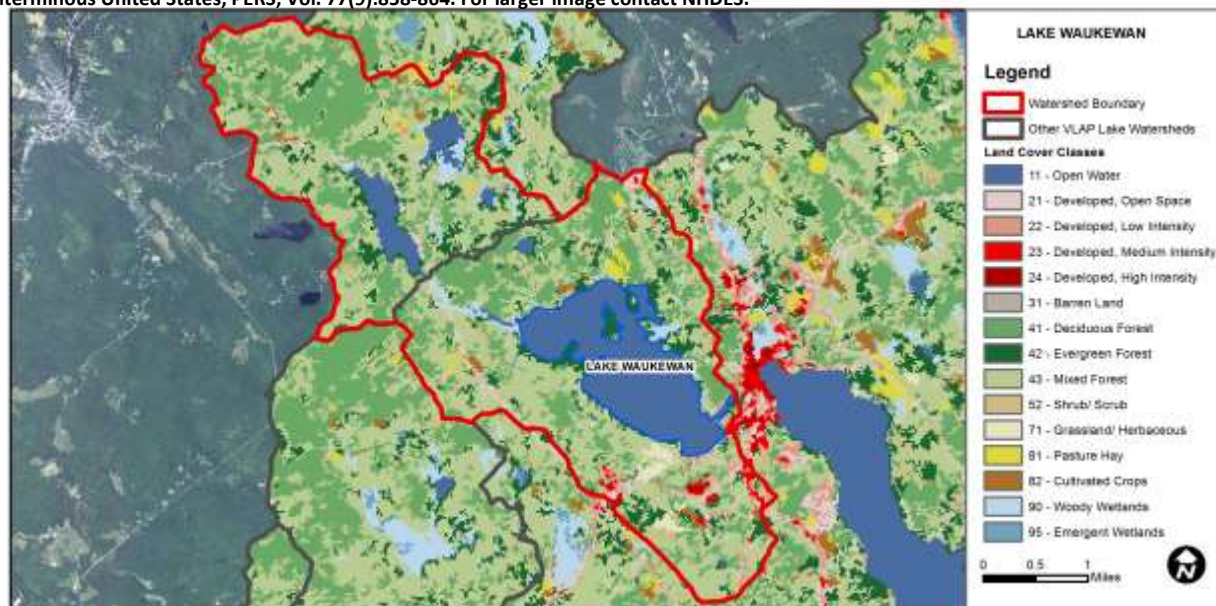
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Dissolved oxygen saturation	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 hepatotoxin	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.
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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



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

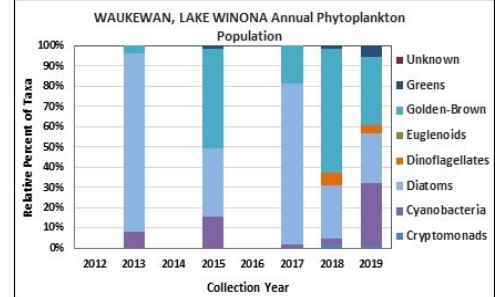
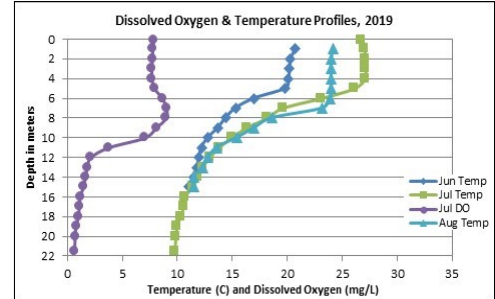
LAKE WAUKEWAN, WINONA STN., MEREDITH

2019 DATA SUMMARY

RECOMMENDED ACTIONS: Lake quality is representative of oligotrophic, or high quality, conditions. However, epilimnetic conductivity and chloride levels have 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 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. Investigate sources of phosphorus upstream and 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 very low in June, increased to a moderate level in July, and then decreased to a low level in August. Average chlorophyll level remained stable with 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:** 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. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began and significantly increasing chloride levels since 2009. Brookside Lane Stream and Boat Launch conductivity and chloride levels were elevated and much greater than the state medians and Boat Launch chloride levels approached the state chronic chloride standard.
- **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 and Metalimnetic phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus level increased from 2018 but remained less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus levels fluctuated within a moderate range and were highest in August when the turbidity was also elevated. Boat Launch phosphorus level was greatly elevated and sample was noted to be highly colored and contain organic matter. Brookside Lane Stream phosphorus level was low.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June and increased (improved) as the summer progressed. Average NVS transparency decreased slightly from 2018 but was much higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) transparency since monitoring began.
- **TURBIDITY:** Epilimnetic and Metalimnetic turbidity levels fluctuated within a low range. Hypolimnetic turbidity level was low in June and increased to an elevated level by August indicating potential formation and accumulation of organic compounds under anoxic (no dissolved oxygen) conditions. Brookside Lane Stream turbidity levels, while within a low range, were slightly elevated for that station following a significant storm event.
- **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Hypolimnetic, Boat Launch and Brookside Lane Stream 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)

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

Station Name	Table 1. 2019 Average Water Quality Data for LAKE WAUKEWAN, WINONA 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	2.30	32	17	134.6	6	7.50	8.16	0.26	6.82
Metalimnion					133.5	7			0.47	6.78
Hypolimnion					138.2	11			2.10	6.27
Boat Launch			125		500.0	157				6.44
Brookside Lane Stream			75		283.0	6			1.02	6.37

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)	Stable	Trend not significant; data highly variable.

