



## Volunteer Lake Assessment Program Individual Lake Reports

### CRYSTAL LAKE, MANCHESTER, NH

#### MORPHOMETRIC DATA

Watershed Area (Ac.):	200	Max. Depth (m):	6.4	Flushing Rate (yr <sup>1</sup> )	1.8
Surface Area (Ac.):	19	Mean Depth (m):	2.9	P Retention Coef:	0.66
Shore Length (m):	1,100	Volume (m <sup>3</sup> ):	217,000	Elevation (ft):	206

#### TROPHIC CLASSIFICATION

Year	Trophic class
1981	EUTROPHIC
1997	MESOTROPHIC

#### KNOWN EXOTIC SPECIES


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](http://www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm)

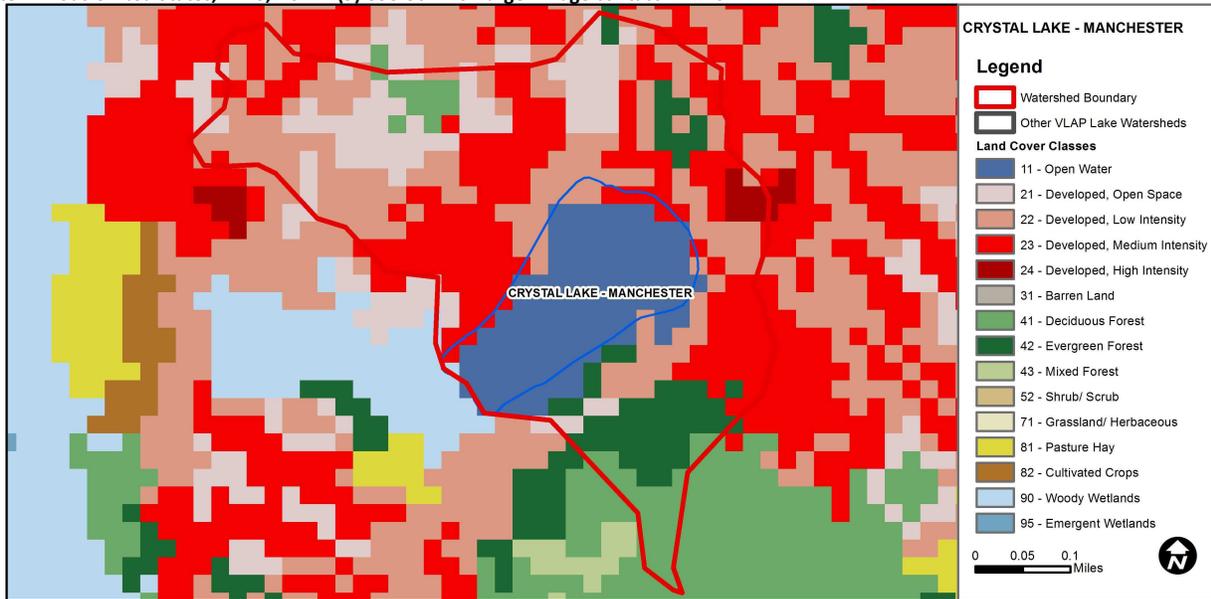
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	pH	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
	Oxygen, Dissolved	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Dissolved oxygen satura	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.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

#### BEACH PRIMARY CONTACT ASSESSMENT STATUS

CRYSTAL LAKE - MELODY PINES DAY CAMP BEACH	Escherichia coli	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
CRYSTAL LAKE-TOWN BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.

#### 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	18.4	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	12.1	Deciduous Forest	5.74	Pasture Hay	0
Developed-Low Intensity	26.8	Evergreen Forest	9.18	Cultivated Crops	0
Developed-Medium Intensity	26.8	Mixed Forest	0	Woody Wetlands	0.19
Developed-High Intensity	0.96	Shrub-Scrub	0	Emergent Wetlands	0



# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

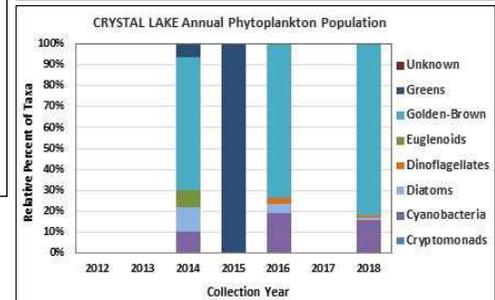
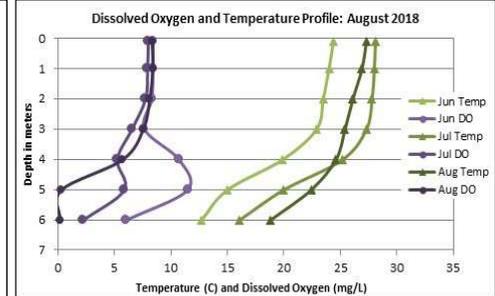
## CRYSTAL LAKE, MANCHESTER

### 2018 DATA SUMMARY

**RECOMMENDED ACTIONS:** Lake quality was representative of mesotrophic, or average, conditions. Nutrient levels and algal growth have remained below the threshold for mesotrophic lakes since 2016 and we hope to see this continue! The main concern is the increasing epilimnetic conductivity levels, and in particular, the elevated levels measured since 2016. Chloride levels are also elevated and are approaching the state chronic chloride standard. If possible, salt reduction and mitigation efforts should be a priority. Work with local and private winter maintenance companies to utilize best practices when applying de-icing materials on roads, parking lots, driveways and walkways. Encourage private winter maintenance companies to obtain a NH Voluntary Salt Applicator License through UNH Technology Transfer Center's Green SnowPro Certification program at [www.t2.unh.edu/road-salt-reduction](http://www.t2.unh.edu/road-salt-reduction). Keep up the great work!

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

- ◆ **CHLOROPHYLL-A:** Chlorophyll levels were low in June, decreased slightly in July, and then increased to a moderate level in August. Average chlorophyll level remained stable with 2017 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer) conductivity levels remained elevated and much greater than the state median. Epilimnetic chloride levels were elevated and much greater than the state median but less than the state chronic chloride standard. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began.
- ◆ **COLOR:** Apparent color was measured in the epilimnion and indicated the lake water is lightly tea colored, or light brown.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were slightly elevated in June and then decreased to a moderate range in July and August. Average epilimnetic phosphorus level remained stable with 2017 and was approximately equal to the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus levels increased from moderate to slightly elevated at the summer progressed.
- ◆ **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June and July and decreased slightly in August. Average NVS transparency increased (improved) slightly from 2017 and was slightly higher (better) than the state median. Historical trend analysis indicates highly variable transparency since monitoring began.
- ◆ **TURBIDITY:** Epilimnetic, Metalimnetic and Hypolimnetic turbidity levels were slightly elevated in August following above average rainfall for the month.
- ◆ **pH:** Epilimnetic, Metalimnetic and Hypolimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.



Station Name	Table 1. 2018 Average Water Quality Data for CRYSTAL LAKE - MANCHESTER									
	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	19.8	3.75	148	37	535.7	12	3.97	4.13	1.12	7.29
Metalimnion					529.0	15			1.17	7.04
Hypolimnion					515.0	19			2.10	6.72

**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<sup>3</sup>  
**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. 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)

### HISTORICAL WATER QUALITY TREND ANALYSIS

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

