



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 ⁻¹)	1.8
Surface Area (Ac.):	19	Mean Depth (m):	2.9	P Retention Coef:	0.66
Shore Length (m):	1,100	Volume (m ³):	217,000	Elevation (ft):	206

TROPIC CLASSIFICATION

Year	Trophic class
1981	EUTROPHIC
1997	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

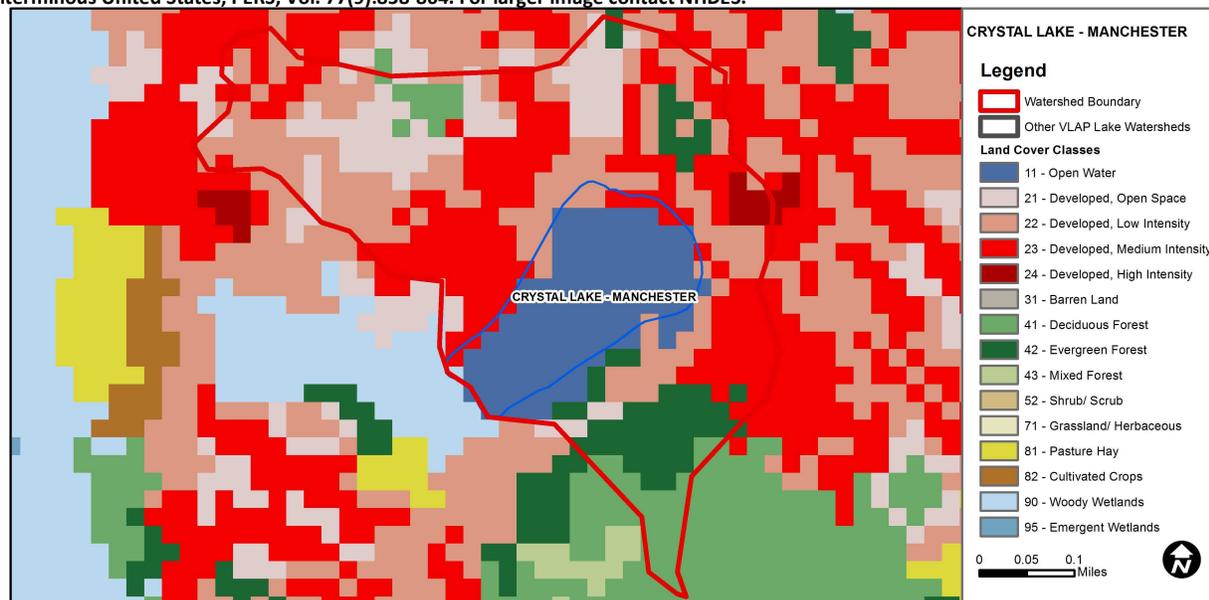
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	The calculated median is fewer than 5 samples but > indicator and the chlorophyll a indicator is okay. More data needed.
	pH	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.
	Oxygen, Dissolved	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CRYSTAL LAKE - MELODY PINES DAY CAMP BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
CRYSTAL LAKE-TOWN BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.

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



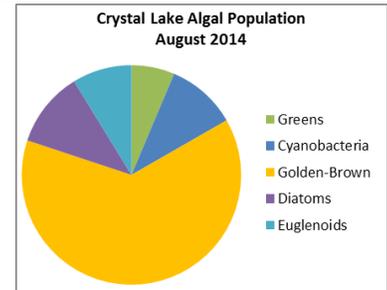
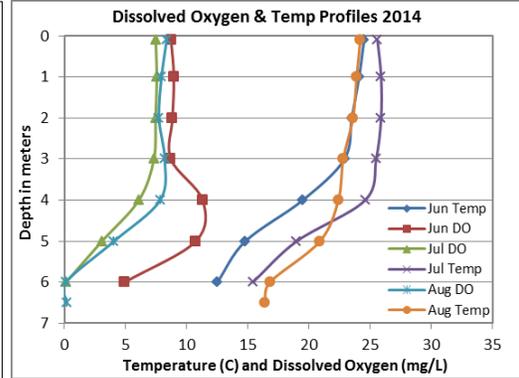
VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

CRYSTAL LAKE, MANCHESTER

2014 DATA SUMMARY

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

- CHLOROPHYLL-A:** Chlorophyll levels decreased from June to July and increased slightly from July to August. Average chlorophyll levels decreased from 2013 and were less than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- CONDUCTIVITY/CHLORIDE:** Conductivity and chloride remained elevated and much greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- TOTAL PHOSPHORUS:** Deep spot phosphorus levels remained fairly stable from June through August and throughout the water column, but were slightly greater than the state median. Metalimnetic (middle water layer) phosphorus was slightly higher in June corresponding with the higher chlorophyll level and algal growth. Historical trend analysis indicates significantly increasing (worsening) epilimnetic phosphorus since monitoring began.
- TRANSPARENCY:** Transparency improved from June to August as the chlorophyll levels and algal growth decreased. Average transparency was slightly lower (worse) than 2013 however better than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- TURBIDITY:** June turbidity was slightly higher at all deep spot stations. Dissolved oxygen and saturation levels were high from the surface to five meters in June and indicative of above average algal growth throughout the water column which likely led to the higher turbidity measured at each station. Turbidity levels decreased to normal levels in July and August.
- pH:** Deep spot pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- DISSOLVED OXYGEN/TEMP:** Dissolved oxygen levels were high in June and were indicative of elevated algal growth. July and August dissolved oxygen levels decreased in the hypolimnion as a result of the decomposition of organic material in bottom sediments.
- RECOMMENDED ACTIONS:** Epilimnetic phosphorus levels have significantly increased since monitoring began. The increased frequency and intensity of storm events and resulting stormwater runoff may be contributing to the phosphorus entering the lake. Identifying areas of stormwater runoff and implementing best management practices to capture and infiltrate stormwater before it enters the lake is recommended. Utilize DES' "Homeowner's Guide to Stormwater Management" is a great resource. Educate watershed residents and local officials on ways to reduce the application of winter de-icing materials to help reduce the increasing conductivity trend. Keep up the great work!



Station Name	Table 1. 2014 Average Water Quality Data for CRYSTAL LAKE								
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Chloride mg/l	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	17.6	3.01	448.7	101	13	3.48	3.68	1.22	7.03
Metalimnion			446.7		14			1.60	7.15
Hypolimnion			449.3		13			1.63	7.03

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

- Alkalinity:** 4.9 mg/L
- Chlorophyll-a:** 4.58 mg/m³
- Conductivity:** 40.0 uS/cm
- Chloride:** 4 mg/L
- Total Phosphorus:** 12 ug/L
- Transparency:** 3.2 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	Stable	Trend not significant, data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant, data show low variability.
			Phosphorus (epilimnion)	Worsening	Data significantly increasing.

