1-1-2012

Volunteer lake assessment program individual lake reports: Crystal Lake, Manchester, NH

New Hampshire Department of Environmental Services

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

TROPHIC CLASSIFICATION

Year	Trophic class
1981	EUTROPHIC
1997	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

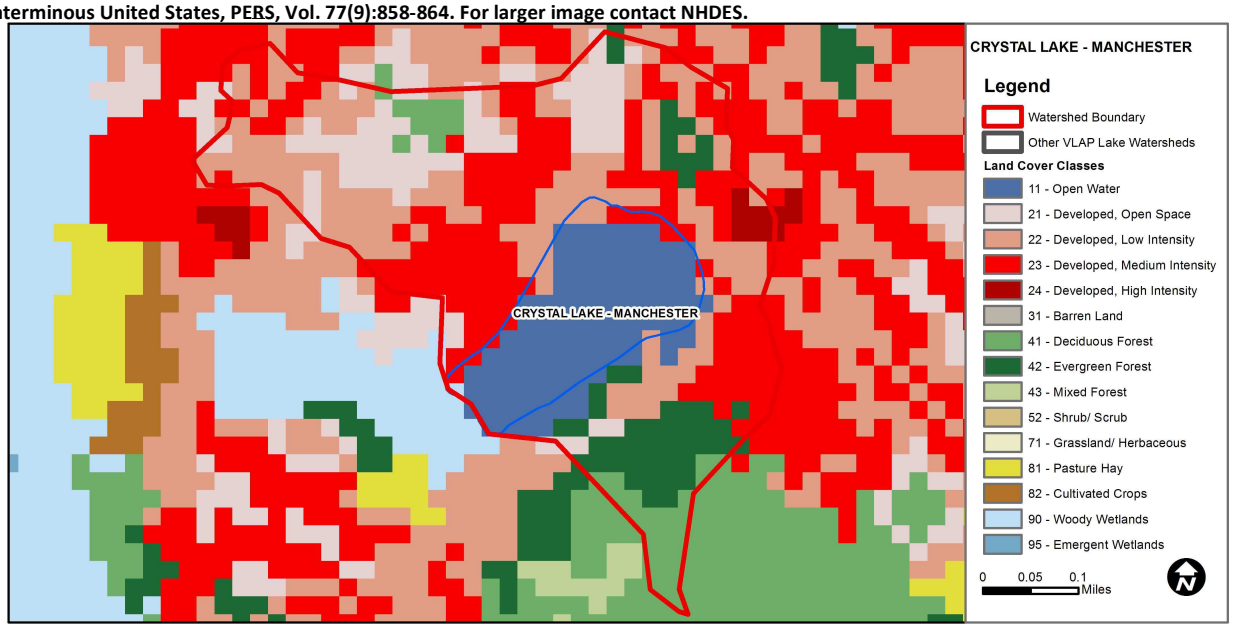
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Cautionary	<5 samples and median is > threshold. More data needed.
	pH	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.
	D.O. (mg/L)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Encouraging	>2 samples exist that are > 75% of geometric mean criteria, but not enough samples to calculate geomertic mean. No single sample exceedances. More data needed.
	Chlorophyll-a	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CRYSTAL LAKE - MELODY PINES DAY CAMP BEACH	E. coli	Cautionary	One exceedance of single sample criteria but not enough data to calcuate geometric mean. More data needed.
CRYSTAL LAKE-TOWN BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >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.



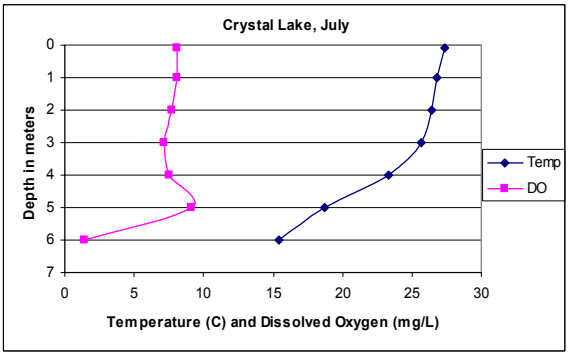
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	18.4	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	12.1	Deciduous Forest	5.74	Pasture Hay	0
Developed-Low Intensity	26.8	Evergreen Forest	9.18	Cultivated Crops	0
Developed-Medium Intensity	26.8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

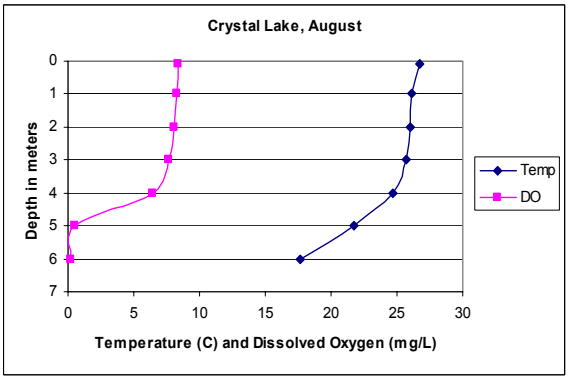
VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
CRYSTAL LAKE, MANCHESTER, NH
2012 DATA SUMMARY

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

- **CHLOROPHYLL-A:** Chlorophyll levels increased as the summer progressed, however average levels have remained fairly low since 2010. Historical trend analysis indicates chlorophyll levels tend to fluctuate annually.
- **CONDUCTIVITY/CHLORIDE:** Conductivity levels were elevated and indicative of the urbanized watershed.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) and metalimnetic (middle water layer) phosphorus levels were fairly average. Hypolimnetic (lower water layer) phosphorus levels were slightly higher due to anoxic conditions and subsequent release of phosphorus from lake sediments.
- **TRANSPARENCY:** Lake transparency was good in 2012, and average transparency has been higher since 2010, likely as a result of the decreased algal growth.
- **TURBIDITY:** Turbidity levels were normal for the lake.
- **PH:** pH was sufficient to support aquatic life.
- **RECOMMENDED ACTIONS:** Maintain current sampling program to collect samples three times per summer. This allows better evaluation of water quality trends. Recommend to Town/State road agents to implement a low salt zone in the watershed. Educate watershed residents on ways in which they can reduce stormwater impacts from their properties. Utilize the "Homeowner's Guide to Stormwater Management" to assist with outreach effort.

Dissolved Oxygen & Temperature Profile





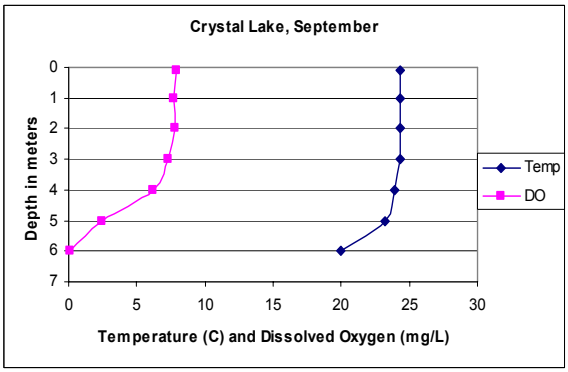


Table 1. 2012 Average Water Quality Data for CRYSTAL LAKE

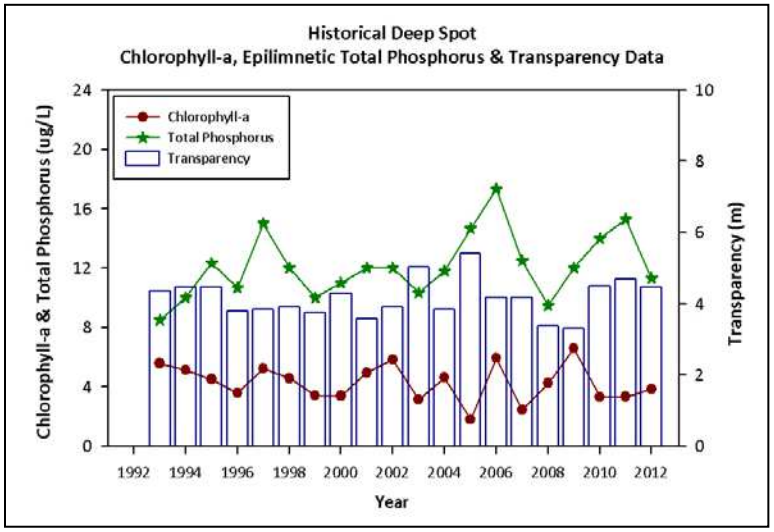
Station Name	Alk.	Chlor-a	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	uS/cm	ug/l	m		ntu	
					NVS	VS		
Deep Epilimnion	14.8	3.85	392.7	11	4.47	4.84	1.11	7.2
Deep Metalimnion			395.3	14			1	7.08
Deep Hypolimnion			395.8	17			1.35	6.91

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
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: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation
Chlorophyll-a	Variable	Data fluctuate greatly, but not significantly increasing or decreasing.
Transparency	Stable	Data not significantly increasing or decreasing.
Phosphorus (epilimnion)	Variable	Data fluctuate greatly, but not significantly increasing or decreasing.



This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact:
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