Volunteer Lake Assessment Program Individual Lake Reports

CRYSTAL LAKE, GILMANTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	17,627	**Max. Depth (m):**	16.2	**Flushing Rate (yr^{-1}):**	3.8
Surface Area (Ac.):	441	**Mean Depth (m):**	5	**P Retention Coef:**	0.48
Shore Length (m):	7,600	**Volume (m^3):**	8,998,500	**Elevation (ft):**	623

TROPHIC CLASSIFICATION

Year	Trophic class
1989	OLIGOTROPHIC
2003	OLIGOTROPHIC

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

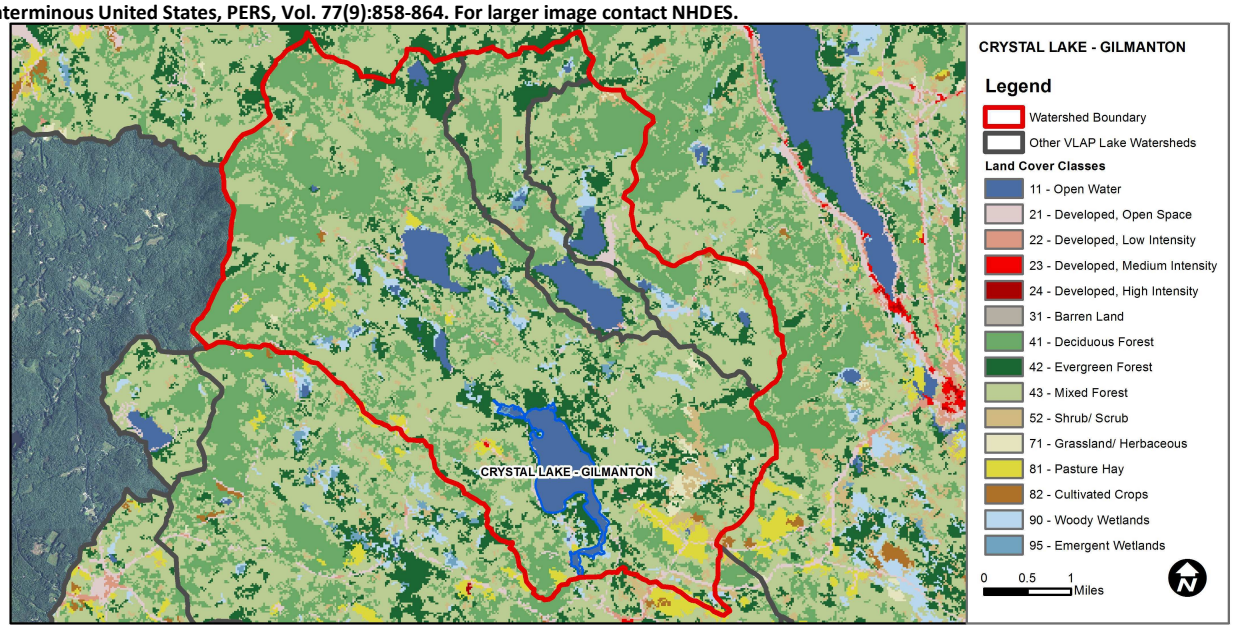
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved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



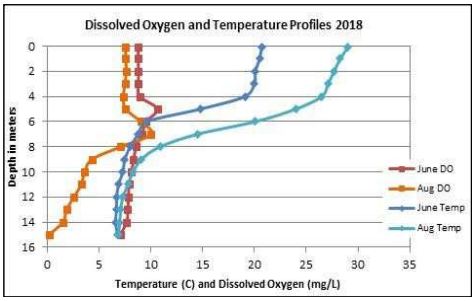
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	6.31	Barren Land	0	Grassland/Herbaceous	0.65
Developed-Open Space	1.27	Deciduous Forest	27.82	Pasture Hay	1.57
Developed-Low Intensity	0.13	Evergreen Forest	12.1	Cultivated Crops	0.1
Developed-Medium Intensity	0.01	Mixed Forest	44.52	Woody Wetlands	2.22
Developed-High Intensity	0	Shrub-Scrub	2.8	Emergent Wetlands	0.52

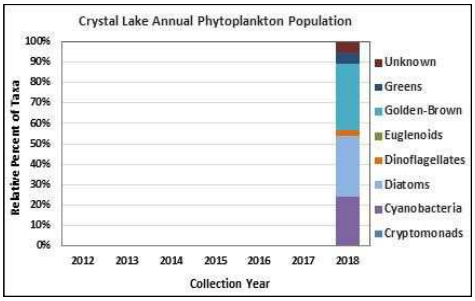
Volunteer Lake Assessment Program Individual Lake Reports
Crystal Lake, Gilmanton
2018 Data Summary

Recommended Actions: Lake quality is generally representative of oligotrophic, or high quality, conditions. The improving chlorophyll levels are a positive sign and we hope to see this continue. Epilimnetic conductivity levels are increasing, however chloride levels remain very low, suggesting potential groundwater inputs and associated dissolved minerals that are contributing to conductivity levels. However, the proximity of Crystal Lake Rd. to the lake highlights the importance of following best practices for winter road salt application. Encourage town road agents to obtain NH Voluntary Salt Applicator License through UNH Technology Transfer Center's Green SnowPro Certification program. Encourage town road agents to collect excess sand/salt along the roadside, in ditches and culverts in the spring to prevent runoff into the lake. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated in June, decreased to a low level in August, and then increased slightly in September. Average chlorophyll level remained stable from 2017, was less than the state median, and was slightly greater than the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity levels remained within a low range and less than the state median. Epilimnetic (upper water layer) chloride levels were also low, approximately equal to the state median, and much less than the state chronic chloride standard. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began.
- **Color:** Apparent color was measured in the epilimnion and indicates the lake water is lightly tea colored, or light brown.
- **Total Phosphorus:** Epilimnetic phosphorus levels remained low from June through September. Average epilimnetic phosphorus decreased from 2017, was much less than the state median, and slightly less than the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) phosphorus levels fluctuated within a low to moderate range. Covered Bridge Bk., Wood Bridge Bk. and Outlet phosphorus levels fluctuated within low ranges for those stations. Nat's Bridge Bk. phosphorus levels were slightly elevated in August following a significant storm event. The Brook phosphorus levels were slightly higher in August and September but were within a low range for that station.
- **Transparency:** Transparency measured without the viewscope (NVS) was high (good) in June and then decreased (worsened) as the summer progressed. Average NVS transparency increased (improved) from 2017 and was higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began. Viewscope transparency (VS) was much higher (better) than NVS transparency and a better measure of actual conditions.
- **Turbidity:** Epilimnetic, Metalimnetic and tributary turbidity levels fluctuated within a low range. Hypolimnetic turbidity levels were slightly elevated in September.
- **pH:** Epilimnetic, Covered Bridge Bk., Nat's Bridge Bk., Outlet, and Wood Bridge Bk. pH levels were within the desirable range 6.5-8.0 units, however epilimnetic pH levels have historically fluctuated below the desirable range. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Metalimnetic and Hypolimnetic pH levels were slightly acidic and less than desirable.





Station Name	Table 1. 2018 Average Water Quality Data for CRYSTAL LAKE - GILMANTON									
	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	5.2	3.87	5	37	33.8	7	4.55	5.48	0.49	6.91
Metalimnion					34.2	10			0.89	6.22
Hypolimnion					34.0	11			1.39	6.08
Covered Bridge Brook					32.5	9			0.57	6.80
Nat's Bridge Brook					39.5	18			1.13	6.51
Outlet					38.4	8			0.81	6.54
The Brook					22.6	19			0.30	6.37
Wood Bridge Brook					26.4	10			0.36	6.78

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 mg/m^3
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	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.