



Volunteer Lake Assessment Program Individual Lake Reports

HIGHLAND LAKE, ANDOVER, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	3,264	Max. Depth (m):	13.4	Flushing Rate (yr¹)	1.5	Year	Trophic class	
Surface Area (Ac.):	211	Mean Depth (m):	5	P Retention Coef:	0.59	1978	MESOTROPHIC	
Shore Length (m):	4,700	Volume (m³):	4,278,500	Elevation (ft):	645	1994	MESOTROPHIC	

TROPHIC CLASSIFICATION

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2020 305(b) report on the status of N.H. waters, and are based on data collected from 2010-2019. Detailed waterbody assessment and report card information can be found at [NHDES' Water Quality Assessment Website](#).

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	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; 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

HIGHLAND LAKE - TOWN BEACH	Escherichia coli	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
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VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.



HIGHLAND LAKE AND ANDOVER VOLUNTEER LAKE ASSESSMENT PROGRAM

STATIONID	STATION NAME
HIGANDD	DEEP SPOT
HIGANDL	LOWER MAPLE ST BROOK
HIGANDO	OUTLET
HIGANDT	TILTON BROOK
HIGANDW	WEST INLET

Source: The data layers are derived from NHDES data and are under constant revision. NHDES is not responsible for the use or interpretation of this information. Not intended for legal use. NHDES Watershed Management Bureau Date: 2/17/2021





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Highland Lake, Andover

2020 Data Summary

Recommended Actions: Great job sampling in 2020! Lake quality is representative of borderline oligotrophic/mesotrophic, or high quality to average, conditions. The stable water quality trends and improving lake clarity (transparency) are a positive sign and we hope to see this continue! Drought conditions and the lack of flushing of systems rich in dissolved organic matter that imparts a tea, or brown, coloring to the water resulted in clear water color conditions which resulted in low turbidity levels and higher water clarity (transparency). Logging activities occurred upstream of West Inlet resulting in elevated phosphorus levels and the growth of filamentous algae on stream bottom substrate. The algal growth was a new occurrence at this station. Continue to closely monitor any changes to the inlet and consider conducting a spring snowmelt/runoff sample to analyze for phosphorus. Epilimnetic pH levels appear to be improving and likely due to the recovery of NH's surface waters from historical acid precipitation. For more information consult the NHDES "Acid Rain Status and Trends" report. Keep up the great work!

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

- ◆ **Chlorophyll-a:** Chlorophyll level was within a low range in July and decreased in August. Average chlorophyll level increased slightly from 2019 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- ◆ **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Lower Maple St. Bk., Outlet, and Tilton Brook conductivity and/or chloride levels were low and less than or approximately equal to the state medians. Historical trend analysis indicates stable epilimnetic conductivity levels since monitoring began. West Inlet conductivity and chloride levels were slightly greater than the state medians yet less than a level of concern.
- ◆ **Color:** Apparent color measured in the epilimnion indicates water was clear, with no tea or brown coloring in July, and then darkened slightly to within a borderline clear to lightly tea colored, or light brown, range in August.
- ◆ **Total Phosphorus:** Epilimnetic phosphorus level was within a low range in July and increased slightly in August. Average epilimnetic phosphorus level decreased slightly from 2019 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus level was slightly elevated in July potentially due to a significant storm event prior to sampling. Hypolimnetic phosphorus levels were slightly elevated and the turbidity of the samples was also slightly elevated. Lower Maple St. Brook, Tilton Brook and Outlet phosphorus levels fluctuated within a moderate range for those stations and were slightly higher in July following a significant storm event. West Inlet phosphorus levels were greatly elevated in July and September and were above average for this station likely due to logging activities upstream combined with low flow conditions due to drought.
- ◆ **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in July and decreased slightly in August but remained above average for the lake. Average NVS transparency increased (improved) from 2019 and was higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) NVS transparency since monitoring began.
- ◆ **Turbidity:** Epilimnetic, Metalimnetic, Lower Maple St. Bk., Outlet, and Tilton Brook turbidity levels fluctuated within a low range. Hypolimnetic turbidity level was slightly elevated in July. West Inlet turbidity level was elevated in August and lab data noted highly colored water.
- ◆ **pH:** Epilimnetic and Tilton Brook pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Metalimnetic, Lower Maple St. Bk. and Outlet pH levels were slightly less than desirable. Hypolimnetic and West Inlet pH levels were slightly acidic and less than desirable.

Station Name	Table 1. 2020 Average Water Quality Data for HIGHLAND LAKE - ANDOVER									
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
							NVS	VS		
Epilimnion	6.6	2.93	6	20	37.6	7	5.25	5.25	0.31	7.03
Metalimnion					35.2	14			0.80	6.33
Hypolimnion					43.0	17			2.36	6.12
Lower Maple St. Bk.					41.3	19			0.48	6.42
Outlet					40.8	17			0.94	6.41
Tilton Brook					30.1	19			0.94	6.74
West Inlet			10		82.0	74			8.92	6.06

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

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	Stable	Trend not significant; data show low variability.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Improving	Data significantly increasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately.

