Volunteer Lake Assessment Program Individual Lake Reports

HALFMOON LAKE, ALTON, NH

MORPHOMETRIC DATA

						TROPHIC CLASSIFICATION		**KNOWN EXOTIC SPECIES**
Watershed Area (Ac.):	4,352	**Max. Depth (m):**	8.2	**Flushing Rate (yr^{1})**	2	**Year**	**Trophic class**	Variable Milfoil
Surface Area (Ac.):	253	**Mean Depth (m):**	4.4	**P Retention Coef:**	0.57	1978	OLIGOTROPHIC	
Shore Length (m):	6,000	**Volume (m^3):**	4,545,000	**Elevation (ft):**	640	1992	MESOTROPHIC	

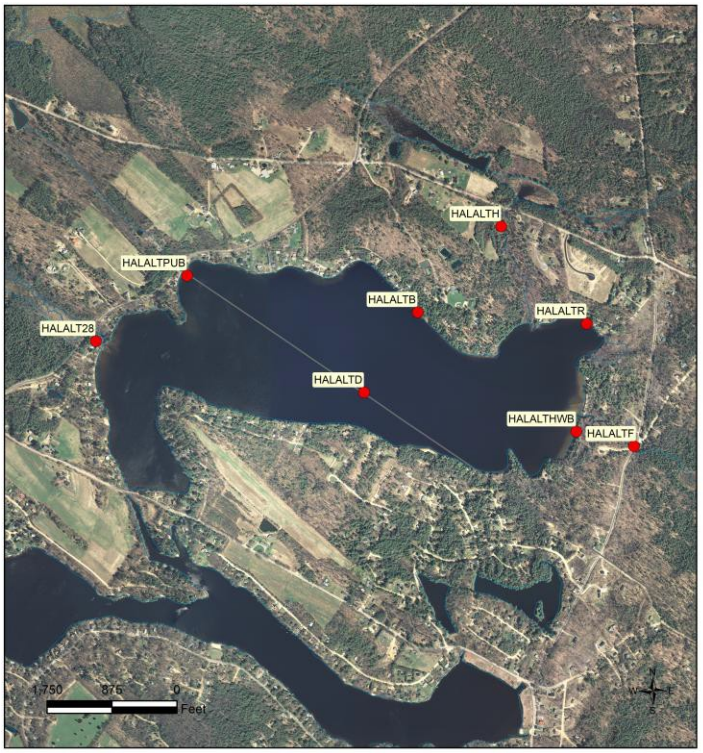
The Waterbody Report Card tables are generated from the DRAFT 2020 305(b) report on the status of N.H. waters, and are based on data collected from 2010-2019. Detailed waterbody assessment and report card information can be found at NHDES' Water Quality Assessment Website.

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	Data exceed water quality standards or thresholds for a given parameter by a small margin.
	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	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Slightly Bad	Data exceed water quality standards or thresholds for a given parameter by a small margin.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

HALFMOON LAKE - CAMP MI-TE-NA BEACH	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.



HALFMOON LAKE
BARNSTEAD
VOLUNTEER LAKE ASSESSMENT PROGRAM

STATIONID	STATION NAME
HALALTB	BOYS CAMP
HALALTD	DEEP SPOT
HALALTF	FERN HILL INLET
HALALTH	HORSE FARM INLET
HALALTR	RUSTIC SHORES
HALALT28	RT 28 INLET
HALALTPUB	PUBLIC BEACH
HALALTHWB	HOLLYWOOD BEACH

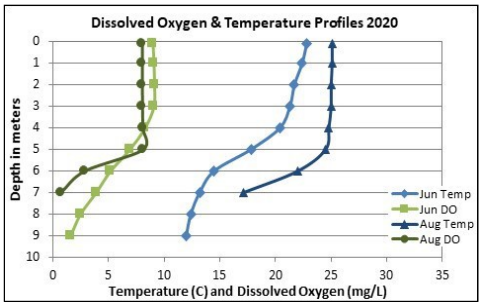
Source: The data layers are derived from NHDES data and are under constant revision. NHDES is not responsible for the use or interpretation of this information. Not intended for legal use.NHDES Watershed Management Bureau Date: 2/17/2021

Volunteer Lake Assessment Program Individual Lake Reports
Halfmoon Pond, Barnstead
2020 Data Summary

Recommended Actions: Great job sampling in 2020! The improving phosphorus and chlorophyll levels are encouraging however levels continue to fluctuate above the thresholds for oligotrophic lakes. Hypolimnetic phosphorus levels have been elevated in late summer indicating the potential for an internal load of phosphorus to the lake. As dissolved oxygen levels decrease below 1.0 mg/L phosphorus bound in the sediment can be released into the water column. This phosphorus is readily available for uptake by algae and cyanobacteria and can be mixed into the water column during storm events with high winds that result in temporary breakdown of thermal layers in weakly stratified lakes. This highlights the importance of minimizing stormwater runoff and erosion of sediments to the lake. Consider developing a watershed management plan to identify and quantify nutrient (phosphorus) loading to the lake and make recommendations on ways to reduce and manage nutrient loads. For more information contact the NHDES Watershed Assistance Section. Encourage shoreline property owners to be certified LakeSmart through NHLAKES lake-friendly living program www.nhlakes.org/lakesmart/. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll level was slightly elevated in June and then decreased to a low level in August. Average chlorophyll level decreased slightly from 2019, 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:** Epilimnetic (upper water layer) and Hypolimnetic (lower water layer) conductivity and/or chloride levels were slightly greater than the state medians, yet less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Fern Hill Inlet conductivity and chloride levels were low and less than the state medians. Horse Farm Inlet and Rt. 28 Inlet conductivity and chloride levels were slightly elevated but chloride levels remained much less than the state chronic chloride standard.
- **Color:** Apparent color measured in the epilimnion indicates the water was moderately tea colored, or brown, in June and then lightened to a clear range with little to no tea coloring in August.
- **Total Phosphorus:** Epilimnetic phosphorus level was within a moderate range in June and then decreased to a low level in August. Average epilimnetic phosphorus level remained stable with 2019, was less than the state median, and was approximately equal to the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus level was moderate in June and increased to an elevated level in August likely due to the sample being collected in a narrow band of elevated phosphorus and turbidity levels at the sediment water interface on the lake bottom, and/or the elevated phosphorus levels are indicative of the release of phosphorus from bottom sediments under anoxic (low dissolved oxygen) conditions. Fern Hill Inlet phosphorus levels were elevated in June and lab data noted low levels of organic matter in the sample. Horse Farm Inlet phosphorus levels were elevated but were also within an average range for that station. Rt. 28 Inlet phosphorus levels were also elevated and field data noted low flow with beaver activity in the area.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in June when algal growth and water color were higher, and then increased (improved) to an above average (good) range in August. Average NVS transparency decreased (worsened) slightly from 2019 and was slightly higher (better) than the state median. Historical trend analysis indicates relatively stable NVS transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity levels fluctuated within a low range. Hypolimnetic turbidity level was elevated in August likely due to the formation and accumulation of organic compounds in hypolimnetic waters and at the sediment water interface with the lake bottom. Fern Hill Inlet turbidity level was slightly elevated and lab data noted low levels of organic matter in the sample. Horse Farm Inlet and Rt. 28 Inlet turbidity levels were slightly elevated during low flow conditions and lab data noted colored water.
- **pH:** Epilimnetic pH level was within the desirable range 6.5-8.0 units and historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Rt. 28 Inlet pH levels were approximately equal to the low end of the desirable range. Hypolimnetic, Fern Hill Inlet and Horse Farm Inlet pH levels were slightly acidic and potentially critical to aquatic life.



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)

Station Name	Table 1. 2020 Average Water Quality Data for HALFMOON LAKE - ALTON									
	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	5.2	3.64	14	30	57.5	8	3.50	4.38	0.48	7.06
Hypolimnion					57.0	30			13.64	5.92
Fern Hill Inlet			4		26.1	55			1.63	6.03
Horse Farm Inlet			30		101.8	34			2.60	5.96
Rt. 28 Inlet			25		109.3	60			2.85	6.46

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

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 moderately variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.