



Volunteer Lake Assessment Program Individual Lake Reports

PINE ISLAND POND, MANCHESTER, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	44,204	Max. Depth (m):	3	Flushing Rate (yr ¹)	326
Surface Area (Ac.):	42	Mean Depth (m):	1.5	P Retention Coef:	0
Shore Length (m):	3,385	Volume (m ³):	265,000	Elevation (ft):	151

TROPHIC CLASSIFICATION

Year	Trophic class
1980	EUTROPHIC
1997	EUTROPHIC

KNOWN EXOTIC SPECIES

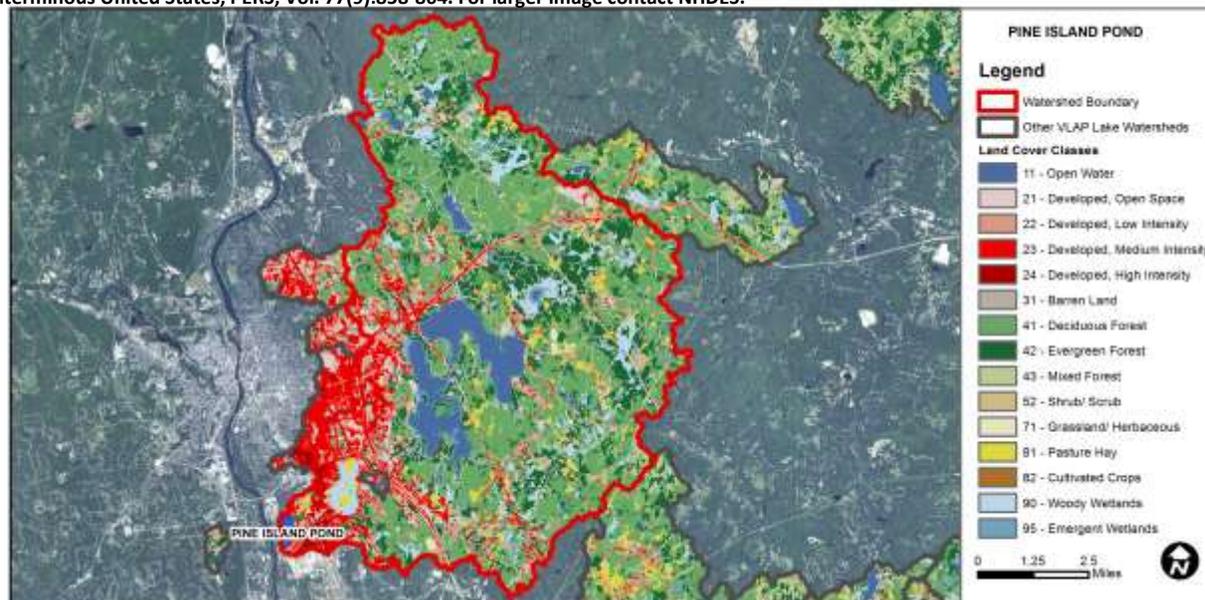
Variable Milfoil

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 a given parameter by a small margin.
	Oxygen, Dissolved	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Dissolved oxygen satura	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	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.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small 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	5.63	Barren Land	0.47	Grassland/Herbaceous	0.28
Developed-Open Space	6.6	Deciduous Forest	37	Pasture Hay	3.09
Developed-Low Intensity	8.16	Evergreen Forest	16.64	Cultivated Crops	0.86
Developed-Medium Intensity	6.32	Mixed Forest	2.22	Woody Wetlands	7.2
Developed-High Intensity	1.01	Shrub-Scrub	1.25	Emergent Wetlands	2.99



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

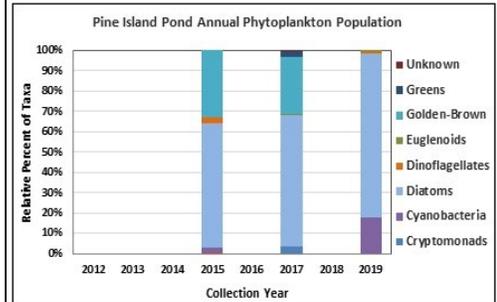
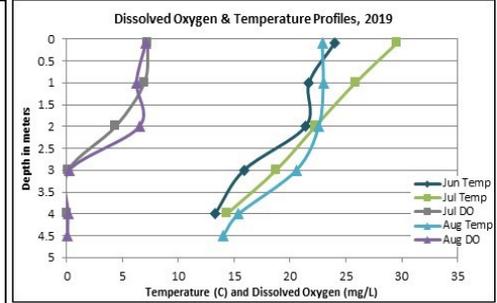
PINE ISLAND POND, MANCHESTER

2019 DATA SUMMARY

RECOMMENDED ACTIONS: Pond chlorophyll levels (algal growth) have remained within a higher range since 2015 and levels indicated an algal bloom likely occurred in July and August. Pond phosphorus levels were also higher in 2019 throughout the water column. Be aware of how milfoil management activities and fluctuating water levels may impact phosphorus levels and sedimentation in the pond. Weed management, low water levels and lack of flushing can influence nutrient availability for algal growth and further exacerbate internal loading in the hypolimnion. Pond chloride levels continue to be elevated and approach the state chronic chloride standard. This highlights the importance of working to reduce and manage chloride loading to the pond. Work with the local winter maintenance companies to obtain NH Voluntary Salt Applicator License through the UNH Technology Transfer Center's Green SnowPro Certification program. Keep up the great work!

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

- ◆ **CHLOROPHYLL-A:** Chlorophyll level was low in June and then increased to elevated levels in July and August indicative of an algal bloom. Average chlorophyll level increased from 2018 and was much greater than the state median and the threshold for eutrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Inlet, and Outlet conductivity and/or chloride levels remained elevated and much greater than the state medians. Chloride levels approached the state chronic chloride standard in the Inlet in August. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began, particularly since 2015.
- ◆ **COLOR:** Apparent color measured in the epilimnion indicates the water was highly tea colored, or dark brown.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was moderate in June, increased to an elevated level in July, and then decreased in August. Average epilimnetic phosphorus level increased from 2018, was much greater than the state median, and was approximately equal to the threshold for eutrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were elevated on each sampling event and increased as the summer progressed likely due to the release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions. Inlet phosphorus levels were slightly elevated in June following rainfall and then decreased to low levels as the summer progressed. Outlet phosphorus levels fluctuated within a moderate range.
- ◆ **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average (worse) in June, increased (improved) slightly in July, and decreased significantly in August. Average NVS transparency decreased (worsened) from 2018 and was much lower than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Viewscope transparency (VS) was higher (better) than NVS transparency and a better measure of actual conditions.
- ◆ **TURBIDITY:** Epilimnetic and Metalimnetic turbidity levels were slightly elevated in June and increased to an elevated level as the summer progressed likely due to the elevated algal growth. Hypolimnetic turbidity levels were elevated on each sampling event and lab data note moderately to highly colored water indicating high levels of decomposition and depletion of dissolved oxygen in hypolimnetic waters. Inlet turbidity levels were slightly elevated in June following rainfall and decreased to low levels as the summer progressed. Outlet turbidity levels were low in June and July and slightly elevated in August.
- ◆ **pH:** Epilimnetic, Metalimnetic, Hypolimnetic, Inlet, and Outlet pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. We hope to see this continue!



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 ug/L

Conductivity: 42.3 uS/cm

Chloride: 5 mg/L

Total Phosphorus: 11 ug/L

Transparency: 3.3 m

pH: 6.6

Station Name	Table 1. 2019 Average Water Quality Data for PINE ISLAND POND - MANCHESTER									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	Total P mg/l	Trans. m		Turb. ntu	pH
Epilimnion	29.1	16.81	136	133	494.7	29	1.38	1.97	3.42	7.14
Metalimnion					481.0	34			5.49	6.80
Hypolimnion					488.0	50			12.34	6.61
Inlet			167		591.8	17			1.64	7.22
Outlet			133		490.7	24			2.27	7.34

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

