



Volunteer Lake Assessment Program Individual Lake Reports

PINE ISLAND POND, MANCHESTER, NH

MORPHOMETRIC DATA

TROPIC CLASSIFICATION

KNOWN EXOTIC SPECIES

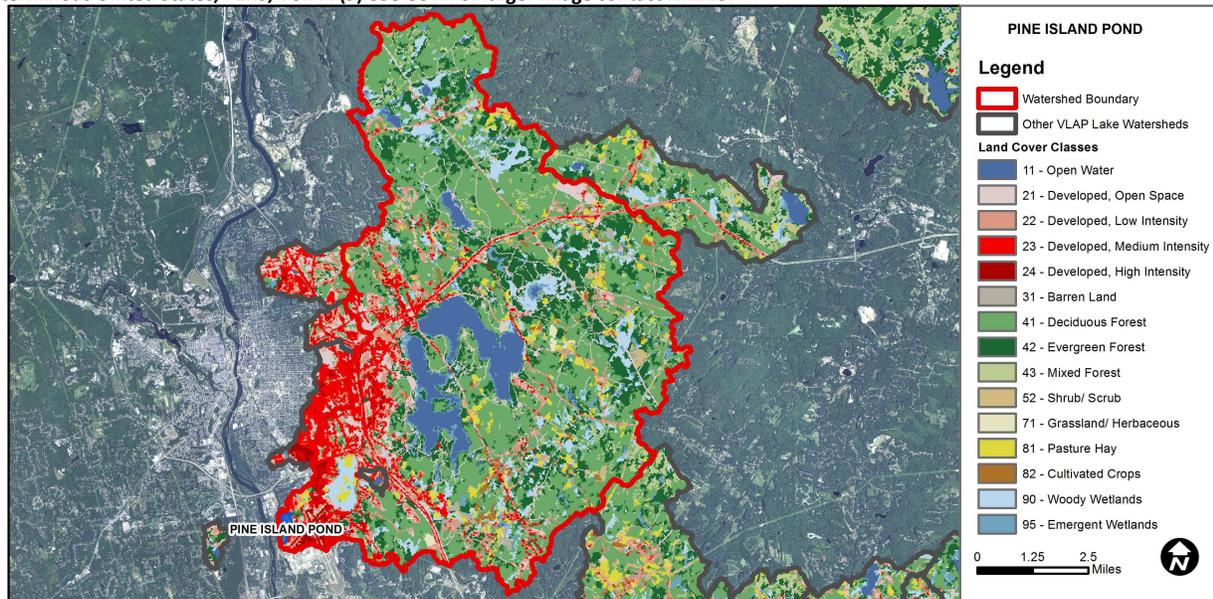
Watershed Area (Ac.):	44,204	Max. Depth (m):	3	Flushing Rate (yr ¹)	326	Year	Trophic class	Variable Milfoil
Surface Area (Ac.):	42	Mean Depth (m):	1.5	P Retention Coef:	0	1980	EUTROPHIC	
Shore Length (m):	3,385	Volume (m ³):	265,000	Elevation (ft):	151	1997	EUTROPHIC	

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	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.
	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

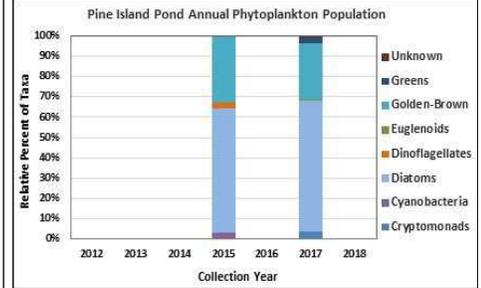
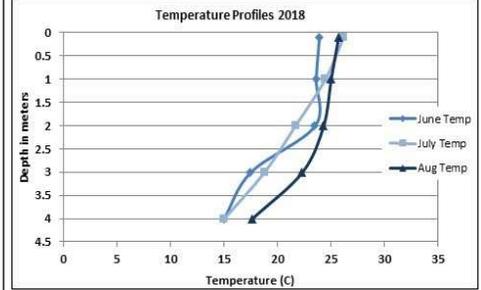
PINE ISLAND POND, MANCHESTER

2018 DATA SUMMARY

RECOMMENDED ACTIONS: Pond quality remained stable with that measured in 2017 and chlorophyll levels indicated above average algal growth in June and July. This improved in August following a month of above average rainfall that helped to flush nutrients out of the system. Be aware of how milfoil management activities may impact phosphorus levels and sedimentation in the pond as this could contribute nutrients available for algal growth and further exacerbate internal loading in the hypolimnion. Pond chloride levels approached the state chronic chloride standard in June. This highlights the importance of working to reduce and manage chloride loading to the pond. Work with the City and private 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 levels were slightly elevated in June and July. The August chlorophyll value was invalidated due to an analytical error; we apologize for this inconvenience. Average chlorophyll level remained stable with 2017, was much greater than the state median, and was slightly greater than 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 June at all stations, and then decreased as the summer progressed, particularly in August following above average rainfall. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began.
- **COLOR:** Apparent color was measured in the epilimnion and indicated the pond water was highly tea colored, or dark brown in June and July, and then decreased to within a moderately tea colored range in August following the above average rainfall.
- **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were elevated in July when algal growth was elevated following a period of dry, hot conditions. Average epilimnetic phosphorus level remained stable with 2017, was much greater than the state median, and was less than the threshold for eutrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus levels were elevated and increased as the summer progressed likely due to the release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions. Inlet and Outlet phosphorus levels were also slightly elevated in July.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average in June, decreased slightly (worsened) in July, and then increased (improved) to an average level in August. Average transparency decreased slightly from 2017 and historical trend analysis indicates significantly decreasing (worsening) transparency levels since monitoring began. Algal growth and water color likely played a role in the below average transparency. Viewscope transparency (VS) was slightly higher (better) than NVS transparency and likely a better measure of actual conditions.
- **TURBIDITY:** Epilimnetic, Metalimnetic and Outlet turbidity levels were slightly elevated in July likely due to algal growth. Hypolimnetic turbidity levels were elevated in July and August due to the accumulation of organic compounds formed under anoxic conditions. Inlet turbidity levels were slightly elevated in June, but were within a normal range for that station.
- **pH:** Epilimnetic, Metalimnetic, Hypolimnetic, Inlet, and Outlet pH levels were within the desirable range 6.5-8.0 on each sampling event. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.



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/m³
- 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. 2018 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
							NVS	VS		
Epilimnion	21.1	12.47	115	113	452.0	24	1.56	2.17	1.93	7.16
Metalimnion					442.3	26			2.89	6.88
Hypolimnion					517.0	46			15.46	6.64
Inlet			136		525.0	22			1.98	7.04
Outlet			112		445.7	23			1.73	7.20

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)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.

