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

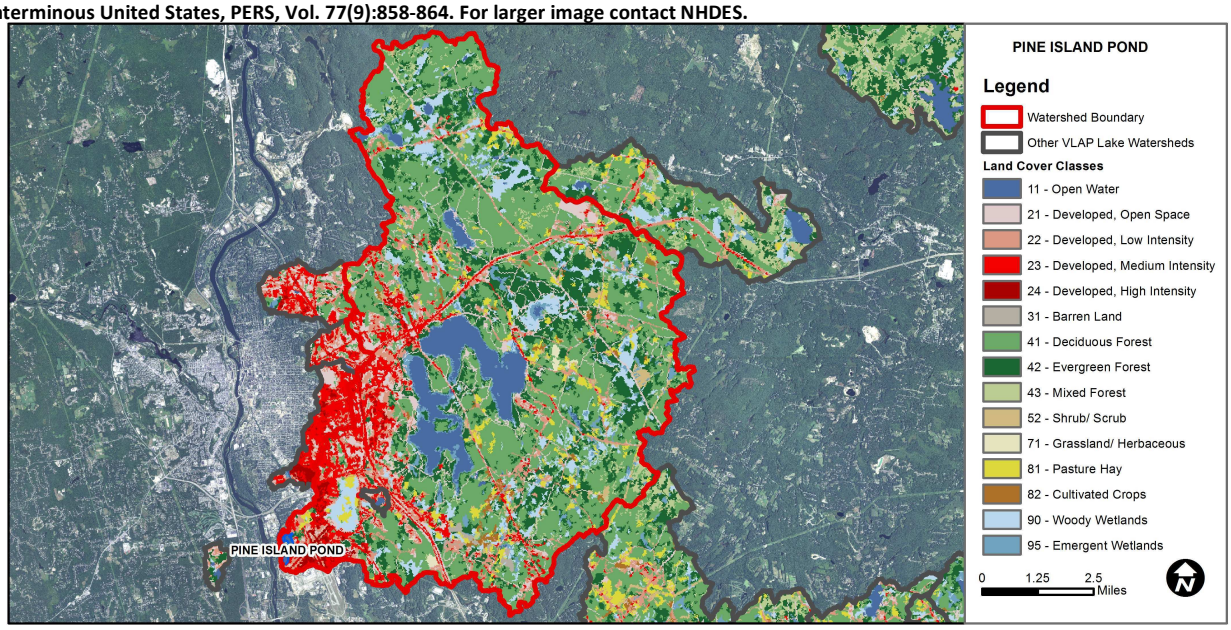
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Bad	There are >10% of samples (minimum of 2), exceeding criteria with one or more samples considered large exceedance.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Slightly Bad	There are >10% of samples (minimum of 2), exceeding indicator.

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

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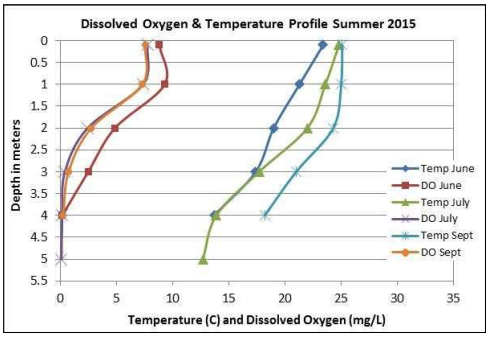
Pine Island Pond, Manchester

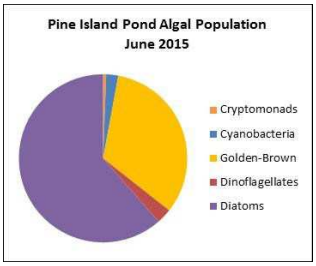
2015 Data Summary

Recommended Actions: Volunteers notified DES of a potential Variable milfoil infestation in the pond. The infestation was confirmed after the biologist visit in June. A management plan has been developed and we encourage association members, the City and interested parties to be active in milfoil management in 2016 and years to come. The elevated chlorophyll levels indicate an algal bloom, likely a Diatom bloom, occurred in June and July. This contributed to elevated phosphorus and turbidity and the low transparency. Chloride levels are approaching the state chronic chloride standard and efforts should be made to try and reduce chloride loading to the pond from the surrounding watershed. Educate local officials and residents on best practices when applying winter de-icing materials on roads, driveways and walkways. The steep slopes on the southern end of the pond should be stabilized with vegetative buffers and stormwater management activities should be implemented to reduce and prevent erosion. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels were greatly elevated in June and July indicating an algal bloom was occurring. June phytoplankton data indicate that Diatoms were likely blooming in the pond. The 2015 average chlorophyll level increased sharply from 2014 and was much greater than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot, Inlet and Outlet conductivity and chloride levels remained elevated and much greater than the state medians. Chloride levels are approaching the state chronic chloride standard of 230 mg/L, but have not exceeded the standard to date. Historical trend analysis indicates highly variable epilimnetic conductivity since monitoring began.
- **Total Phosphorus:** Epilimnetic phosphorus levels were elevated in June and decreased slightly as the summer progressed. Metalimnetic phosphorus levels were elevated in July and decreased slightly in September. Hypolimnetic phosphorus levels were elevated and increased as the summer progressed. The elevated phosphorus levels contributed to the elevated algal growth. Average epilimnetic phosphorus increased slightly from 2014 and was much greater than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus since monitoring began. Inlet phosphorus levels were slightly elevated in June and decreased to within an average range in July and September. Outlet phosphorus levels were slightly elevated in July and September.
- **Transparency:** Transparency was low (poor) in June and July due to the algal bloom and increased slightly in August. Average transparency decreased (worsened) from 2014 and was much less than the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Deep spot turbidities were elevated, particularly in July during the algal bloom. Inlet turbidity was elevated in June following a significant storm event. Outlet turbidity was slightly elevated in June and July.
- **pH:** Deep spot and tributary pH levels were within the desirable range 6.5-8.0 units and sufficient to support aquatic life. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.

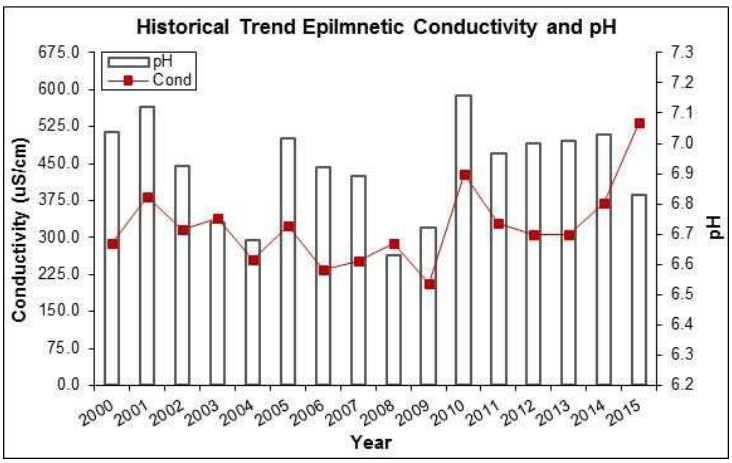
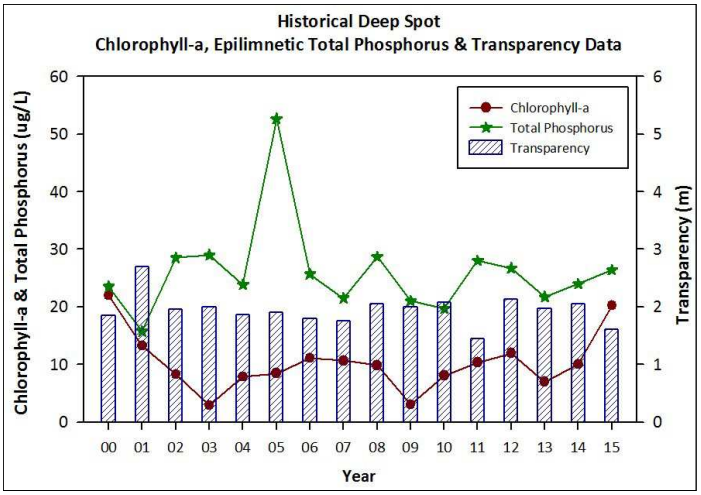




Station Name	Table 1. 2015 Average Water Quality Data for PINE ISLAND POND								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	30.0	20.26	130	533.7	26	1.61	2.06	4.45	6.83
Metalimnion				546.5	29			5.81	6.90
Hypolimnion				504.0	38			6.13	6.73
Inlet			138	580.5	15			2.11	6.99
Outlet			130	533.7	20			2.10	7.21

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 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 highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.