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

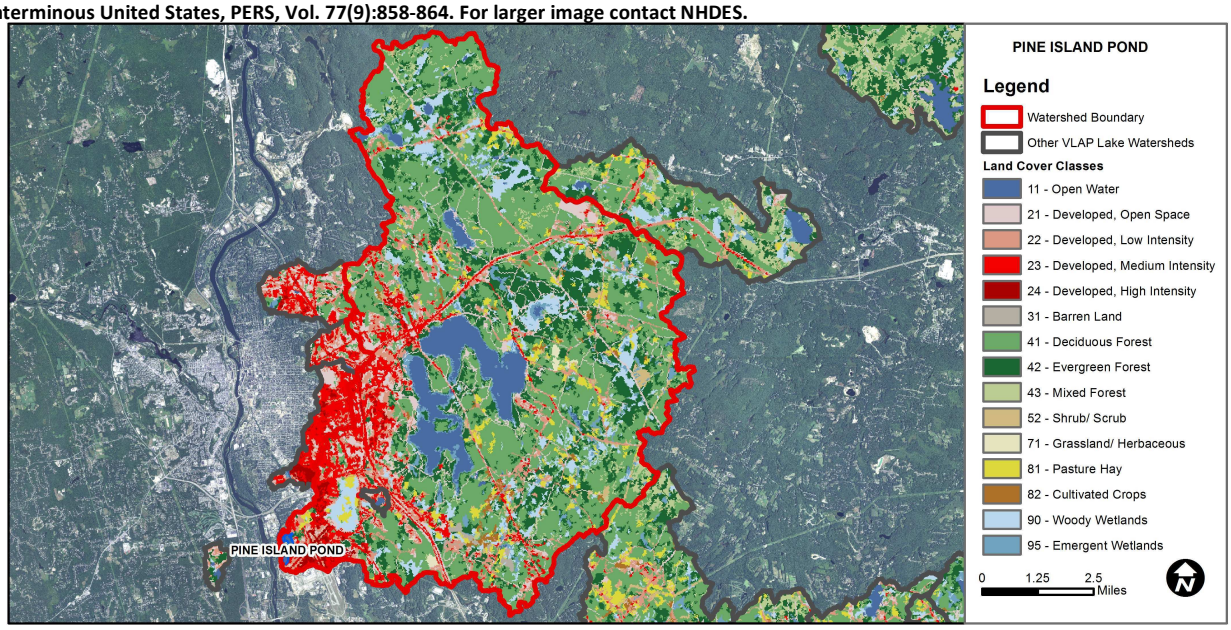
KNOWN EXOTIC SPECIES

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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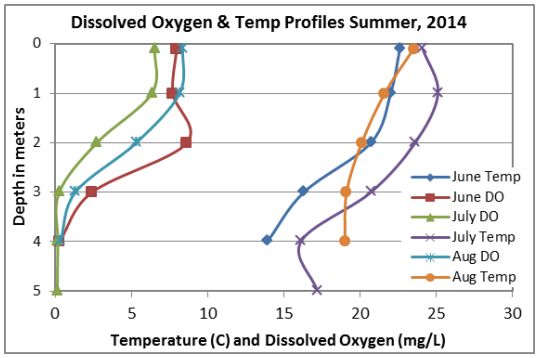
Pine Island Pond, Manchester

2014 Data Summary

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

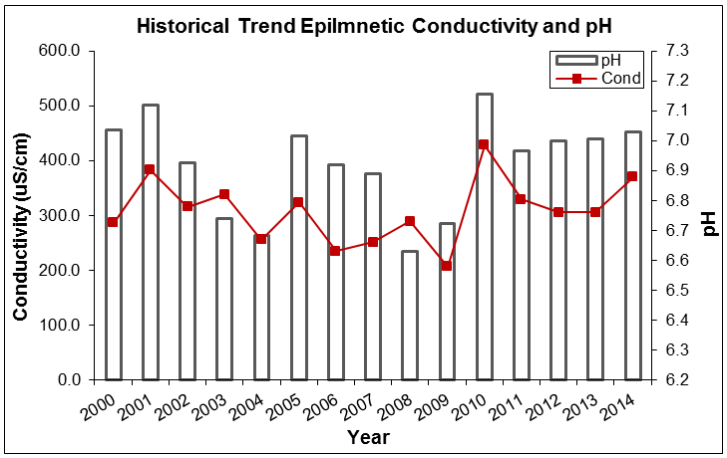
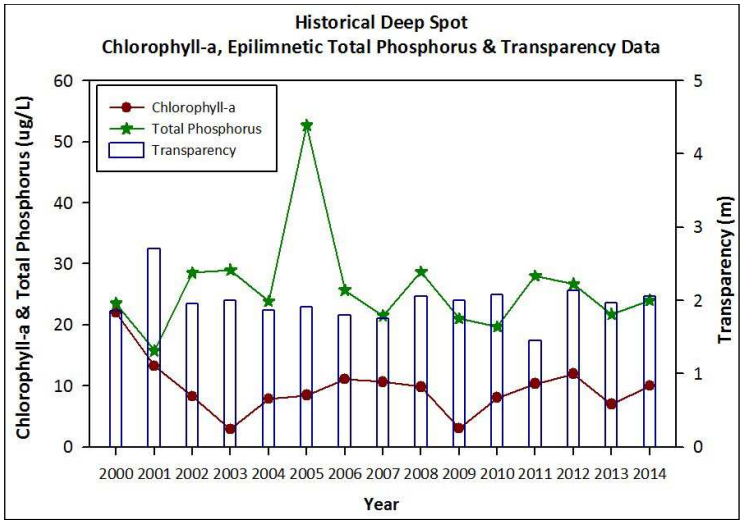
- **Chlorophyll-a:** Chlorophyll levels were lower in June and elevated above 10.0 ug/L in July and August and indicative of excessive algal growth. The 2014 average chlorophyll level was greater than 2013, and much greater than the state median. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride remained elevated and much greater than the state medians, and was indicative of the urbanized watershed. Historical trend analysis indicates highly variable epilimentic conductivity since monitoring began; however epilimnetic (upper water layer) conductivity has been notably lower since the spike in 2010.
- **Total Phosphorus:** Epilimnetic and metalimnetic (middle water layer) phosphorus levels were stable in June and July and slightly elevated in August when algal growth was greatest. Average epilimnetic phosphorus was greater than the state median and above average for most NH lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus was average for that station in June and increased greatly in July and August likely due to the release of phosphorus from bottom sediments under anoxic conditions. Inlet phosphorus was average and stable from June through August and Outlet phosphorus was average in June and July and increased in August.
- **Transparency:** Transparency remained fairly stable in June and July and decreased in August with the elevated algal growth. Transparency measured with the viewscope (VS) was much better than that measured without in June and July. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Epilimetic turbidity was average for that station in June and July and elevated in August due to the algal growth. Metalimnetic turbidity was low in June and increased in July and August due to the algal growth. Hypolimnetic turbidity above average and particularly elevated in July. This could be a result of the accumulation of organic compounds in hypolimnetic waters under anoxic conditions. Inlet and Outlet turbidities were within an average range for those stations.
- **pH:** Deep spot and tributary pH levels were within the desirable range of 6.5—8.0 units in 2014. However, historically, deep spot pH levels have been below the desirable range.
- **Recommended Actions:** The elevated phosphorus, chlorophyll-a, conductivity and chloride are indicative of the urban watershed. However, efforts should be made by shorefront and watershed residents to reduce pollution loading, such as phosphorus, from their properties. Utilize phosphate free fertilizers, maintain shoreline buffers, and implement stormwater management techniques to capture and infiltrate stormwater on the property before it enters a nearby stream or pond. DES' "Homeowner's Guide to Stormwater Management" is a great resource for property owners.



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. 2014 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	18.5	9.98	91	370.3	24	2.05	2.59	2.63	7.03
Metalimnion				377.0	25			2.83	6.81
Hypolimnion				378.3	58			10.56	6.62
Inlet			93	387.7	16			1.63	7.10
Outlet			89	377.0	20			1.44	7.32

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

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 highly 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.