Volunteer Lake Assessment Program Individual Lake Reports

LEES POND, MOULTONBORO, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	17,664	**Max. Depth (m):**	11.3	**Flushing Rate (yr^{1})**	12.9
Surface Area (Ac.):	179	**Mean Depth (m):**	3.7	**P Retention Coef:**	0.37
Shore Length (m):	4,000	**Volume (m^{3}):**	2,675,000	**Elevation (ft):**	508

TROPHIC CLASSIFICATION

Year	Trophic class
1992	MESOTROPHIC
2009	EUTROPHIC

KNOWN EXOTIC SPECIES

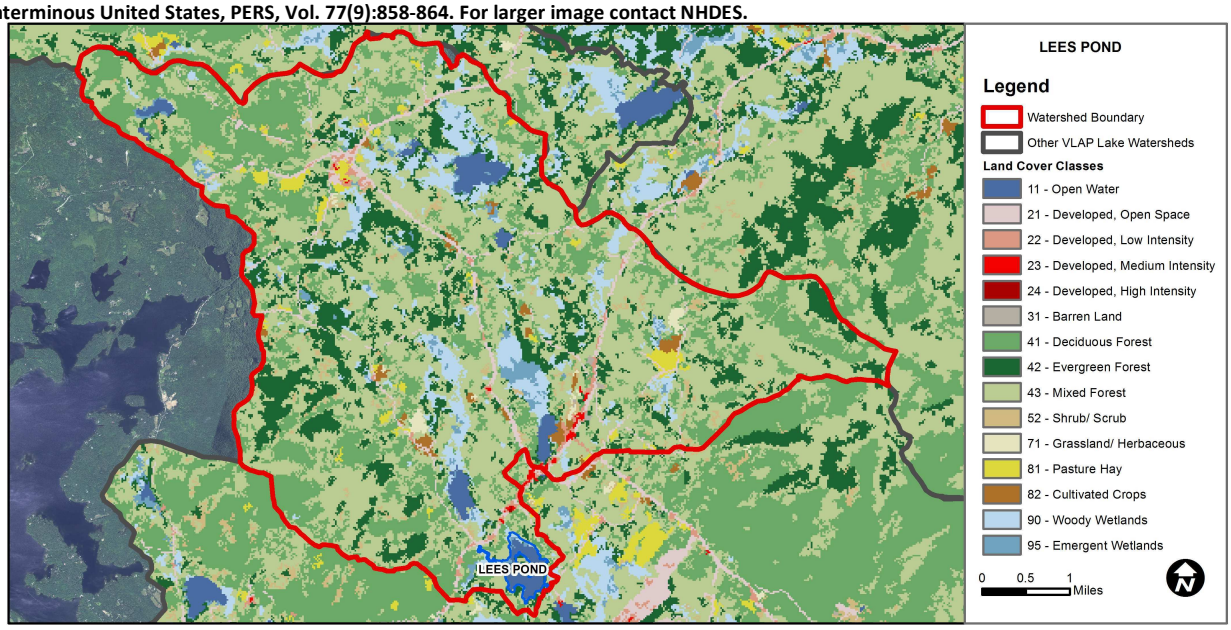
Variable Milfoil

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Cautionary	< 10 samples and 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	>/=5 samples and median is < threshold but > 1/2 threshold value.
Primary Contact Recreation	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
	Chlorophyll-a	Very Good	At least 10 samples with 0 exceedances of criteria.

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	2.39	Barren Land	0.08	Grassland/Herbaceous	0.38
Developed-Open Space	2.69	Deciduous Forest	22.71	Pasture Hay	1.25
Developed-Low Intensity	0.63	Evergreen Forest	13.64	Cultivated Crops	0.75
Developed-Medium Intensity	0.15	Mixed Forest	45.77	Woody Wetlands	6.36
Developed-High Intensity	0.01	Shrub-Scrub	1.77	Emergent Wetlands	1.34

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
LEES POND, MOULTONBORO, NH
2013 DATA SUMMARY

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

- **CHLOROPHYLL-A:** Chlorophyll levels were unusually low for the pond in June and much less than the state median. Higher water levels and flushing rate from significant storms may have contributed to the lower chlorophyll levels, as well as sampling error. Historical trend analysis indicates stable chlorophyll levels with low variability between years.
- **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity levels were relatively low and slightly greater than the state median. However, historical trend analysis indicates significantly increasing (worsening) epilimentic conductivity since monitoring began.
- **E. COLI:** E. coli levels were very low and much less than state standards for public beaches and surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was slightly elevated in July and August and average levels increased from 2012 and were slightly greater than the state median. The above average rainfall and significant storm events may have contributed to the elevated epilimnetic phosphorus. Historical trend analysis indicates relatively stable epilimnetic phosphorus with high variability between years. Metalimnetic phosphorus was elevated in August and the turbidity was also elevated indicating a layer of algae at that depth. Hypolimnetic phosphorus increased as the summer progressed and dissolved oxygen levels decreased suggesting internal phosphorus loading. Inlet phosphorus was slightly elevated in July following significant storm event.
- **TRANSPARENCY:** With the decreased chlorophyll levels, one would expect transparency to have improved in 2013, however it decreased from 2012. This indicates that the significant storm events prior to sampling may have contributed to the decreased lake clarity. Historical trend analysis indicates relatively stable transparency with high variability between years.
- **TURBIDITY:** Epilimnetic turbidity was slightly above average on each sampling event; either from algal growth, pollen or suspended sediments from stormwater runoff. Metalimnetic turbidity was elevated in August indicating a layer of algae, and hypolimnetic turbidity was elevated in August when dissolved oxygen levels were lowest indicating the release of organic compounds from bottom sediments. Inlet and Outlet turbidity were low on each sampling event.
- **PH:** Metalimnetic and hypolimnetic pH levels were slightly less than desirable range of 6.5 – 8.0 on the June and August sampling events. Historical trend analysis indicates relatively stable epilimnetic pH with high variability between years.
- **RECOMMENDED ACTIONS:** Chlorophyll composite samples should be collected from 5 meters to the surface; the below average chlorophyll levels did not reflect the higher phosphorus and decreased transparency. Stormwater runoff from significant storm events in June and July may have also contributed nutrients and suspended sediments that contributed to the higher phosphorus and decreased transparency. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff from lake and watershed residents, dirt/ gravel roads, and steep slopes. Add chloride monitoring to determine if the increasing conductivity trend is related to winter road maintenance activities. Keep up the great work!

Table 1. 2013 Average Water Quality Data for LEES POND

Station Name	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	10.8	1.20	71.3		13	2.38	2.78	1.28	6.92
Metalimnion			65.6		13			1.76	6.48
Hypolimnion			80.4		22			4.66	6.51
Inlet			65.5		12			0.91	6.92
Nelson Beach				1					
Outlet			66.6		9			0.71	7.00

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: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
Conductivity	Degrading	Data significantly increasing.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.