



Volunteer Lake Assessment Program Individual Lake Reports

DEERING RESERVOIR, DEERING, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,816	Max. Depth (m):	11.3	Flushing Rate (yr ⁻¹)	1.3
Surface Area (Ac.):	315	Mean Depth (m):	3.5	P Retention Coef:	0.67
Shore Length (m):	8,850	Volume (m ³):	4,442,500	Elevation (ft):	921

TROPHIC CLASSIFICATION

Year	Trophic class
1980	MESOTROPHIC
1997	OLIGOTROPHIC

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

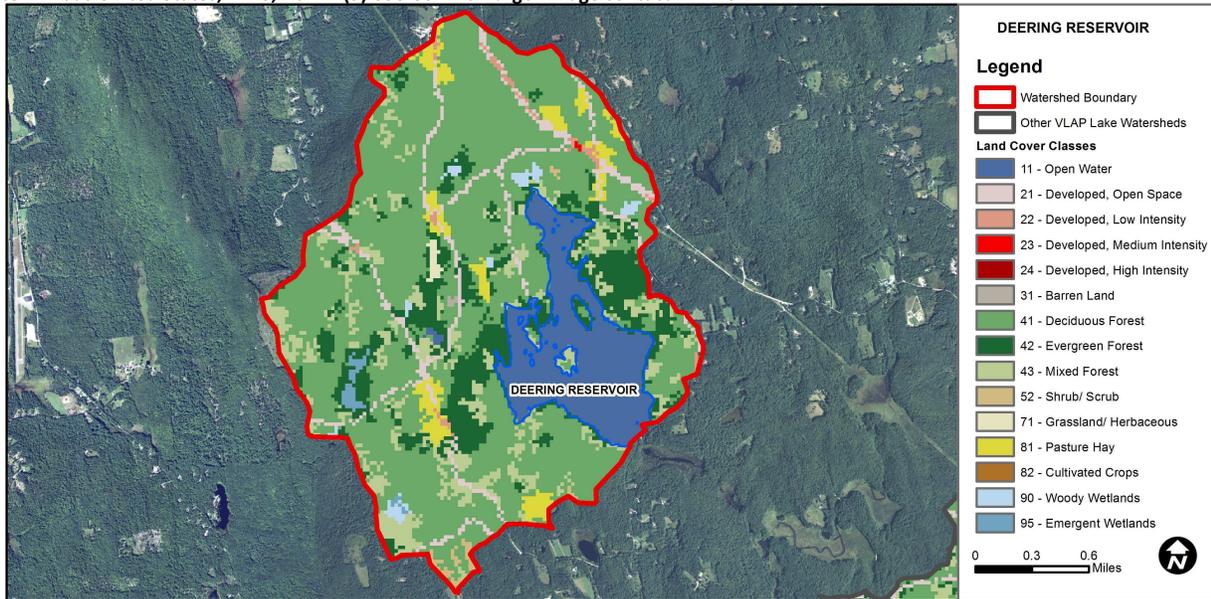
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen saturation	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	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

DEERING RESERVOIR - HOPKINTON INDEPENDENT SCHOOL BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
DEERING RESERVOIR - DEERING LAKE BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X 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	11.9	Barren Land	0.06	Grassland/Herbaceous	0.25
Developed-Open Space	4.22	Deciduous Forest	54.05	Pasture Hay	3.36
Developed-Low Intensity	0.71	Evergreen Forest	13.72	Cultivated Crops	0
Developed-Medium Intensity	0.03	Mixed Forest	9.69	Woody Wetlands	0.87
Developed-High Intensity	0	Shrub-Scrub	0.55	Emergent Wetlands	0.52



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

DEERING LAKE, DEERING

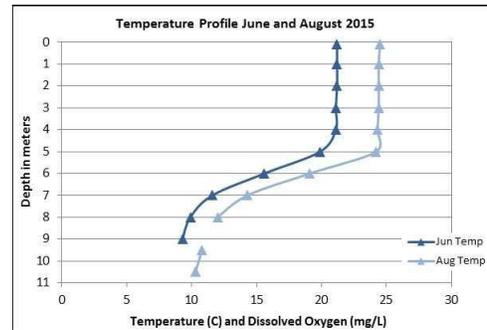
2015 DATA SUMMARY

RECOMMENDED ACTIONS: Lake water quality is generally indicative of Oligotrophic, or high quality water, conditions and we hope to see that continue. Morotta Inlet conductivity and chloride levels continue to be elevated. Work with road agents to follow best practices for winter road maintenance and encourage the obtaining of a NH Voluntary Salt Applicator license through UNH Technology Transfer Center's Green SnowPro Certification program. If a sand/salt mixture is utilized during the winter, encourage removal of accumulated sediments along roadways and in culverts after spring snow melt. Keep up the great work!

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

- CHLOROPHYLL-A:** Chlorophyll levels were slightly higher in June, decreased in July and remained stable in August. Chlorophyll levels remained within a low range, decreased greatly from 2014, and were much less than the state median. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- CONDUCTIVITY/CHLORIDE:** Deep spot, Outlet and Zowski Inlet conductivity and chloride levels were within an average range and slightly greater than the state median. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity levels with moderate variability between years. Main Inlet conductivity and chloride levels were slightly elevated, and Morotta Inlet conductivity and chloride levels remained elevated and chloride levels increased following a winter of above average snowfall and application of de-icing materials.
- TOTAL PHOSPHORUS:** Epilimnetic and metalimnetic (middle water layer) phosphorus levels were low and decreased as the summer progressed. Average epilimnetic phosphorus remained stable with 2014 and was much less than the state median. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began, particularly since 2008. Hypolimnetic (lower water layer) phosphorus was slightly elevated in July and August. Main Inlet phosphorus levels were elevated in July and the turbidity was also elevated during low flow conditions. Morotta Inlet, Outlet and Zowski Inlet phosphorus levels were within low to average ranges for those stations.
- TRANSPARENCY:** Transparency (NVS) was good in June, increased (improved) slightly in July, and then decreased slightly in August. Average NVS transparency increased (improved) slightly from 2014 and was much better than the state median. Historical trend analysis indicates stable transparency since monitoring began. Transparency measured with the viewscope (VS) increased (improved) as the summer progressed and was generally much better than NVS transparency and likely a better representation of actual conditions.
- TURBIDITY:** Epilimnetic and metalimnetic turbidities remained stable and low. Hypolimnetic turbidity was slightly elevated in July. Main Inlet turbidity was elevated in July and slightly elevated in August during low flow conditions. Morotta Inlet turbidity increased as the summer progressed but remained within an average range. Outlet and Zowski Inlet turbidities were low.
- pH:** Epilimnetic, metalimnetic, Morotta, Outlet, and Zowski Inlet pH levels were within the desirable range 6.5-8.0 units, however hypolimnetic and Main Inlet pH levels were slightly less than desirable. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began, however pH levels appear to be recovering since 2012.

Station Name	Table 1. 2015 Average Water Quality Data for DEERING LAKE								
	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	7.0	1.91	14	67.6	7	5.97	6.94	0.60	6.85
Metalimnion				67.6	7			0.76	6.78
Hypolimnion				66.2	16			1.64	6.22
Main Inlet			34	138.8	18			4.72	6.48
Morotta Inlet			109	373.7	16			1.30	6.84
Outlet			14	68.5	5			0.66	6.89
Zowski Inlet			16	100.8	11			0.87	6.98



NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

- Alkalinity:** 4.9 mg/L
- Chlorophyll-a:** 4.58 mg/m³
- 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 moderately variable.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
pH (epilimnion)	Worsening	Data significantly decreasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.

