



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

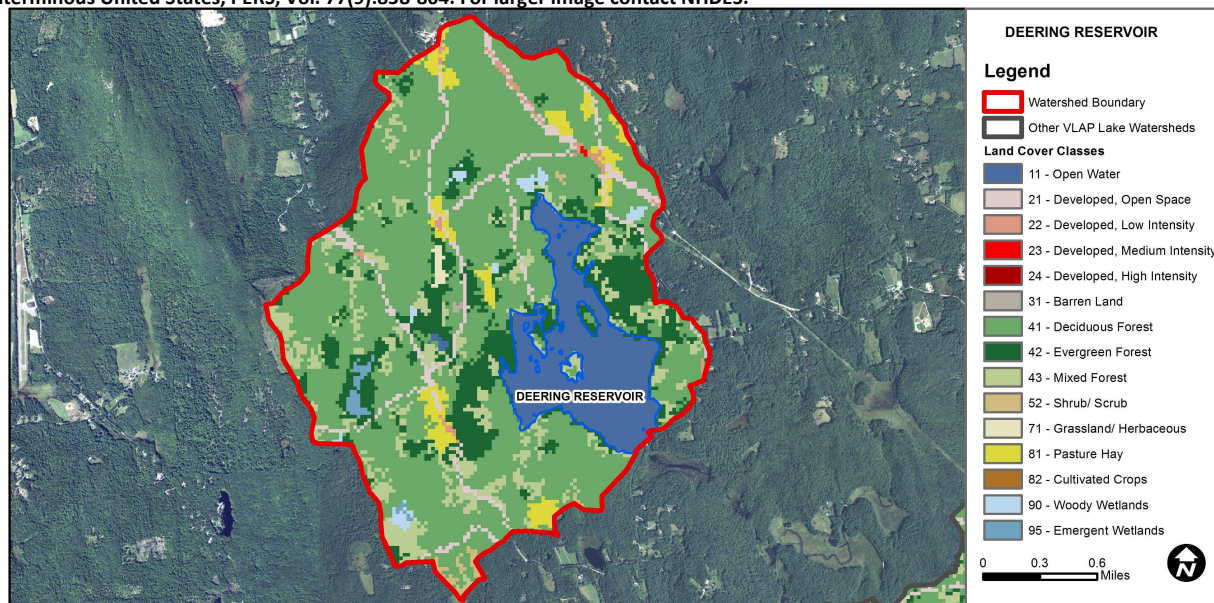
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Oxygen, Dissolved	Encouraging	Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter.
	Dissolved oxygen satura	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

DEERING RESERVOIR - DEERING LAKE BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
DEERING RESERVOIR - HOPKINTON INDEPENDENT SCHOOL BEACH	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

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

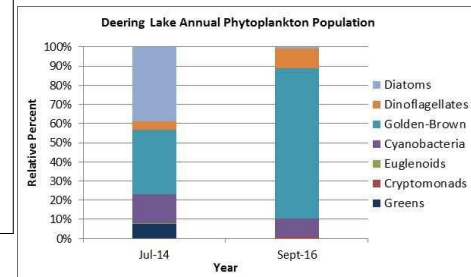
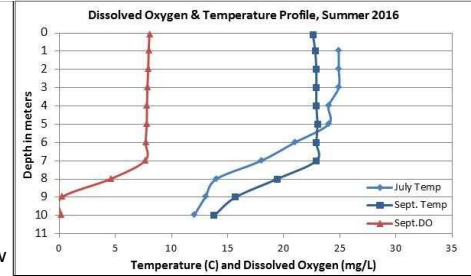
DEERING LAKE, DEERING

2016 DATA SUMMARY

RECOMMENDED ACTIONS: Water quality is indicative of oligotrophic, or high quality, conditions and we hope to see this continue. Epilimnetic pH continues to experience a significantly decreasing trend, however pH levels have improved since 2012 and we expect that to continue, which is a good sign. Epilimnetic phosphorus level has become more stable since 2012, however chlorophyll levels have become increasingly variable and appear to be better correlated with Metalimnetic phosphorus levels. 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 obtainment 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 average in June, decreased to low levels in July and then increased to average levels in August. The 2016 average chlorophyll level increased slightly from 2015 but remained much less than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with high variability between years.
- CONDUCTIVITY/CHLORIDE:** Deep spot and Outlet conductivity and chloride levels were slightly greater than the state medians however did not exceed a level of concern. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity levels with moderate variability between years. Main Inlet and Zowski Inlet conductivity levels were slightly greater than 100 uS/cm indicating potential human influences. Morotta Inlet conductivity and chloride levels were elevated and much greater than the deep spot and other tributaries indicating winter de-icing materials are likely impacting the tributary.
- TOTAL PHOSPHORUS:** Epilimnetic, Metalimnetic (middle water layer), Hypolimnetic (lower water layer), and Outlet phosphorus levels remained relatively stable and low from June through September. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Main Inlet and Zowski Inlet phosphorus levels were within low to average ranges for those stations. Morotta Inlet phosphorus levels were slightly higher than normal potentially due to low flow conditions and higher turbidity levels.
- TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June, increased (improved) in July when algal growth decreased, and then decreased slightly in August as algal growth increased. Average NVS transparency decreased slightly from 2015 and was much higher (better) than the state median. VS transparency was generally much better than NVS transparency and likely a better representation of actual conditions.
- TURBIDITY:** Deep spot turbidity levels were stable and low from June through September. Tributary turbidity levels were within low to average ranges for those stations.
- pH:** Epilimnetic, Metalimnetic and tributary pH levels were within the desirable range 6.5-8.0 units, however have historically fluctuated below the desirable range. Hypolimnetic pH level was within the desirable range in June and then decreased to less than desirable by September. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began.



Station Name	Table 1. 2016 Average Water Quality Data for DEERING RESERVOIR-DEERING								
	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	6.6	2.75	13	84.5	7	5.72	6.44	0.69	6.91
Metalimnion				83.4	7			0.70	6.90
Hypolimnion				81.8	10			1.24	6.58
Main Inlet			23	151.4	14			0.64	6.81
Morotta Inlet			63	328.0	22			1.56	7.03
Outlet			13	83.1	6			0.77	6.93
Zowski Inlet			19	126.3	13			0.96	7.11

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.

