



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	MESOTROPIC
1997	OLIGOTROPIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2016 305(b) report on the status of N.H. waters, and are based on data collected from 2006-2015. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm

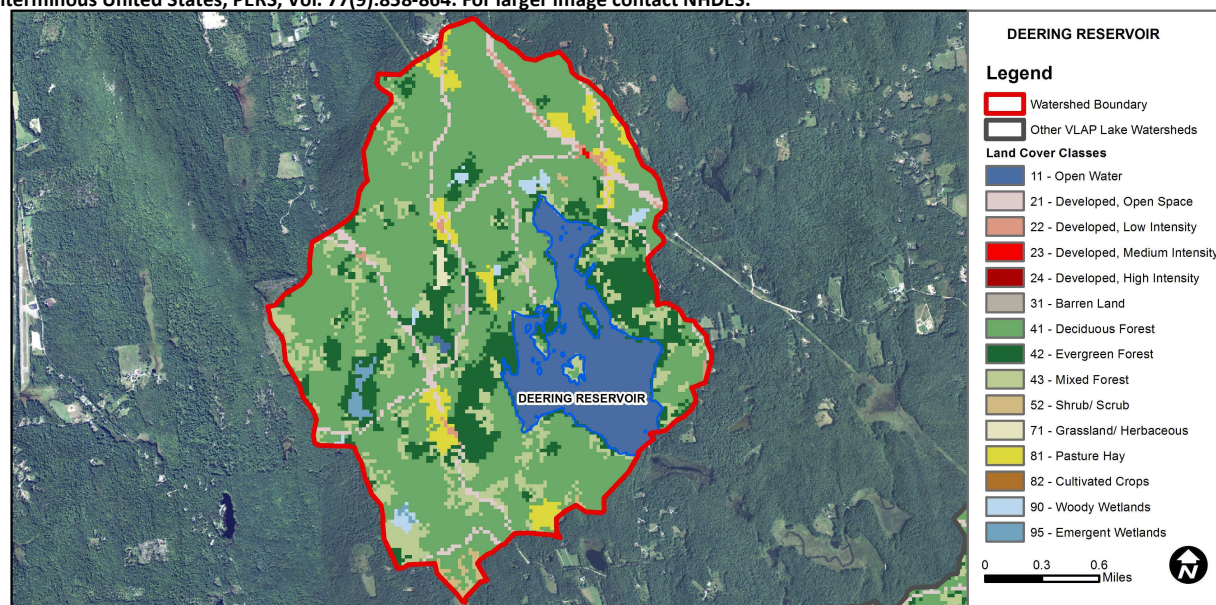
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Oxygen, Dissolved	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; 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

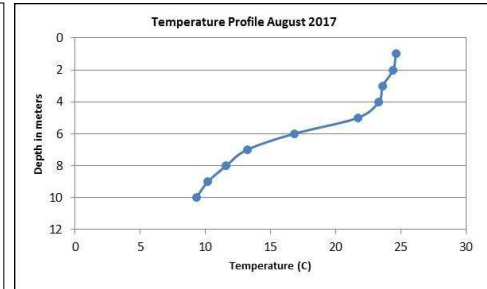
DEERING LAKE, DEERING

2017 DATA SUMMARY

RECOMMENDED ACTIONS: Lake quality was very good in 2017 and nutrient levels and algal growth remained within a low range representative of oligotrophic conditions. Epilimnetic pH levels have decreased since monitoring began, however since 2010 pH levels have improved and remained within a good range. We hope to see this continue. Morotta Inlet phosphorus levels were elevated following a significant storm event suggesting stormwater runoff impacts in the sub-watershed. Chloride levels were also elevated suggesting negative impacts of road salting activities in the sub-watershed. Efforts should focus on stormwater management, dirt/gravel road stabilization, and reduced road salt/sand application in this sub-watershed. Encourage road agents to obtain a NH Voluntary Salt Applicator License through UNH Technology Transfer Center's Green SnowPro Certification program. Encourage the town to conduct spring cleaning of roadsides, ditches and catch-basins to remove excess sand/salt that accumulated over the winter to reduce runoff into tributaries and the lake. Keep up the great work!

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

- ◆ **CHLOROPHYLL-A:** Chlorophyll levels were low in June, decreased in early August, and then increased slightly in late August but remained within a low range. Average chlorophyll level decreased slightly from 2016, was much less than the state median, and was slightly less than the threshold for oligotrophic lakes. Historical trend analysis indicates highly variable chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Outlet, and Zowski Inlet conductivity and chloride levels were greater than the state medians, however did not exceed a level of concern. Historical trend analysis indicates relatively stable epilimnetic conductivity levels with moderate variability between years. Main Inlet and Morotta Inlet conductivity and chloride levels were elevated and chloride levels in Morotta Inlet were particularly high.
- ◆ **COLOR:** Apparent color was measured in the epilimnion and indicates the lake water is clear and contains very little dissolved organic acids that impart a tea or brown color to the water.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic, Metalimnetic, Hypolimnetic, and Outlet phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus decreased from 2016 and was much less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Main Inlet phosphorus levels were elevated in early August when flows were low and lab dated noted highly colored water. Morotta Inlet phosphorus levels were elevated in June following a significant storm event. Zowski Inlet phosphorus levels were slightly higher in June following the storm event but remained within a low to moderate range.
- ◆ **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was lower in June following the storm event and increased (improved) slightly in July and remained stable into August. Average NVS transparency decreased slightly from 2016 but remained much higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began. Transparency measured with the viewscope (VS) was generally higher (better) than NVS transparency and likely a better measure of actual conditions.
- ◆ **TURBIDITY:** Epilimnetic and Metalimnetic turbidity levels decreased from moderate to low levels as the summer progressed while Hypolimnetic turbidity levels increased from low to moderate levels as the summer progressed. Main Inlet turbidity levels were elevated in August during low flows and lab data note highly colored water. Turbidity levels decreased in late August but remained slightly elevated. Morotta Inlet, Outlet and Zowski Inlet turbidity levels fluctuated within a low to moderate range.
- ◆ **pH:** Epilimnetic, Metalimnetic, Main Inlet, Morotta Inlet, Outlet, and Zowski Inlet pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH levels since monitoring began.



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. 2017 Average Water Quality Data for DEERING RESERVOIR-DEERING									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color PCU	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	6.6	2.21	16	20	87.2	4	5.33	6.11	0.72	7.05
Metalimnion					76.8	6			0.79	6.60
Hypolimnion					83.4	9			1.44	6.29
Main Inlet			34		172.5	14			8.59	6.58
Morotta Inlet			85		312.5	18			1.58	6.86
Outlet			17		77.4	4			0.68	6.85
Zowski Inlet			20		107.8	9			0.82	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/m³
- 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 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.

