Volunteer Lake Assessment Program Individual Lake Reports

DANFORTH POND, LOWER, FREEDOM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	11,776	**Max. Depth (m):**	16.8	**Flushing Rate (yr^{1})**	31.6
Surface Area (Ac.):	32	**Mean Depth (m):**	7.1	**P Retention Coef:**	0.07
Shore Length (m):	1,400	**Volume (m^{3}):**	918,500	**Elevation (ft):**	408

TROPHIC CLASSIFICATION

Year	Trophic class
1983	MESOTROPHIC
2001	MESOTROPHIC

KNOWN EXOTIC SPECIES

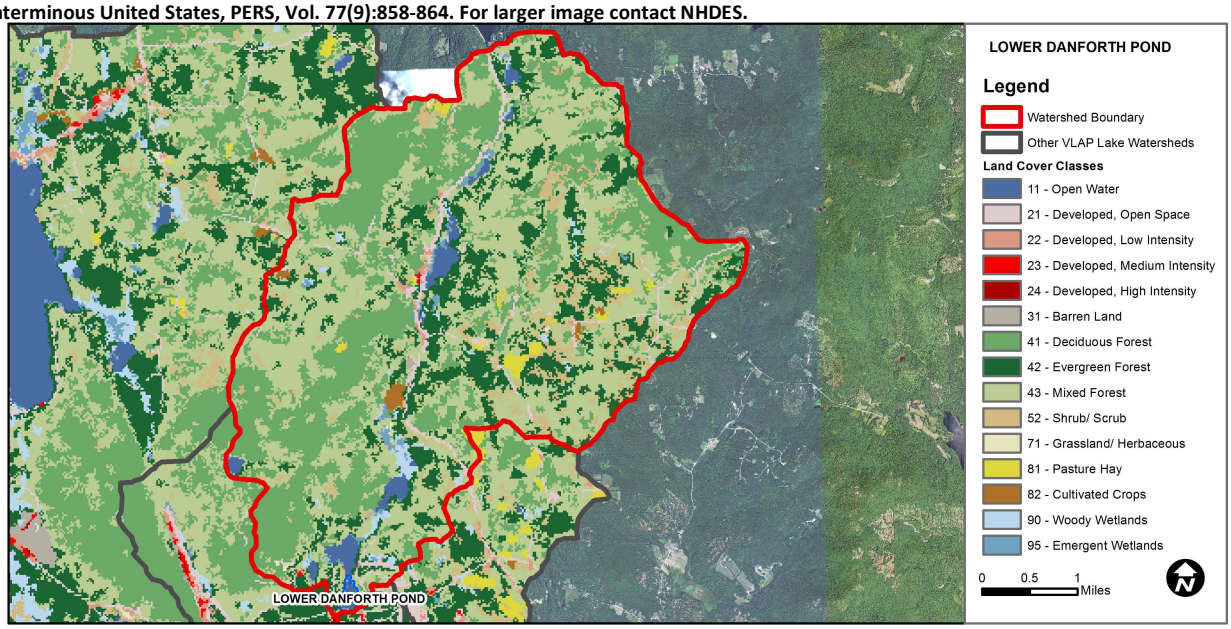
Variable Milfoil

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	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Encouraging	< 10 samples and no 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	No Data	No Data for this parameter.
	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.

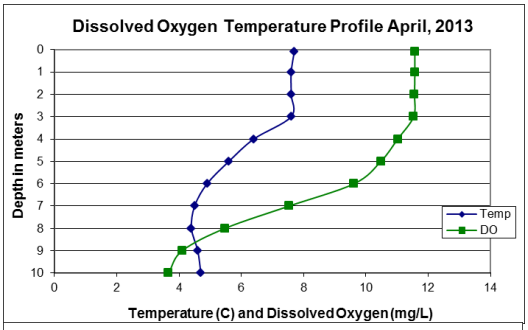


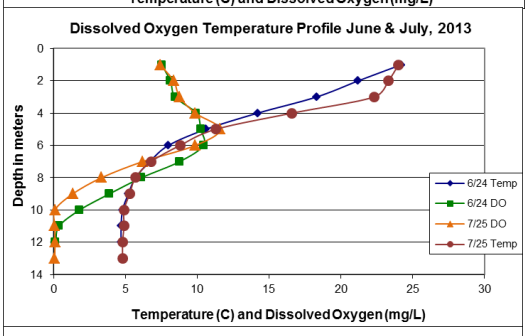
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	2.09	Barren Land	0.1	Grassland/Herbaceous	0.08
Developed-Open Space	2.61	Deciduous Forest	29.82	Pasture Hay	0.85
Developed-Low Intensity	0.26	Evergreen Forest	16.21	Cultivated Crops	0.41
Developed-Medium Intensity	0.03	Mixed Forest	40.01	Woody Wetlands	1.18
Developed-High Intensity	0	Shrub-Scrub	5.62	Emergent Wetlands	0.74

VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
LOWER DANFORTH POND, FREEDOM, NH
2013 DATA SUMMARY

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

- **CHLOROPHYLL-A:** Chlorophyll levels were low in May and June but elevated July through September and levels were indicative of an algal bloom. Phytoplankton data collected in September indicate a Golden-Brown algal bloom occurred. Historical trend analysis indicates relatively stable chlorophyll with low variability between years.
- **CONDUCTIVITY/CHLORIDE:** Deep spot conductivity levels were slightly greater than the state median. Hypolimnetic conductivity was greater than epilimnetic and metalimnetic levels likely due to a higher mineral content under anoxic conditions.
- **TOTAL PHOSPHORUS:** April phosphorus levels were elevated (range 17-22 ug/L) throughout the water column. Epilimnetic phosphorus decreased to low levels in May, spiked in June, decreased in July, and spiked again in September. Metalimnetic phosphorus was relatively low May through July and increased at the end of September. Hypolimnetic phosphorus was elevated in July and September. As dissolved oxygen levels decrease to below 1.0 mg/L, phosphorus typically bound in bottom sediment may be released into the Hypolimnion. Historical trend analysis indicates significant relatively stable epilimnetic phosphorus with moderate variability between years.
- **TRANSPARENCY:** Transparency was good in May but decreased and was the lowest in September during the algal bloom. 2013 average transparency was the lowest measured since monitoring began. Visual analysis of historical data indicates relatively stable transparency since monitoring began.
- **TURBIDITY:** Epilimnetic turbidity was elevated in early September and Metalimnetic turbidity was elevated in late September due to the algal bloom. Hypolimnetic turbidity was elevated July and late September potentially due to bottom sediment and/or the release of organic compounds under anoxic conditions.
- **PH:** Metalimnetic and hypolimnetic pH decreased to undesirable levels. Epilimnetic pH remained good and historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- **RECOMMENDED ACTIONS:** Epilimnetic phosphorus and chlorophyll levels increased in 2013 potentially due to stormwater runoff from significant storm events. Identify areas to implement stormwater improvement projects on lake front properties to capture and infiltrate stormwater before entering the lake or tributaries. DES' "NH Homeowner's Guide to Stormwater Management" is a useful resource. Keep up the great work!





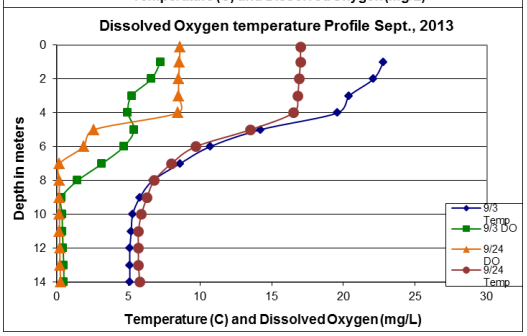
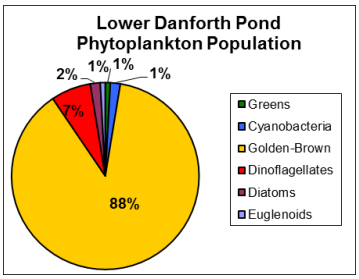


Table 1. 2013 Average Water Quality Data for LOWER DANFORTH POND

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	7.48	9.46	5	47.5	10	2.67	3.10	0.97	6.73
Metalimnion				52.2	9			1.03	6.41
Hypolimnion				86.0	16			7.21	6.20

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 moderately variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
Conductivity	Stable	Trend not significant; data show low variability.	Transparency		
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.