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 (yr¹)	31.6		
Surface Area (Ac.):	32	Mean Depth (m):	7.1	P Retention Coef:	0.07		
Shore Length (m):	1,400	Volume (m³):	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 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	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
	Dissolved oxygen satura	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Good	Sampling data commonly 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.
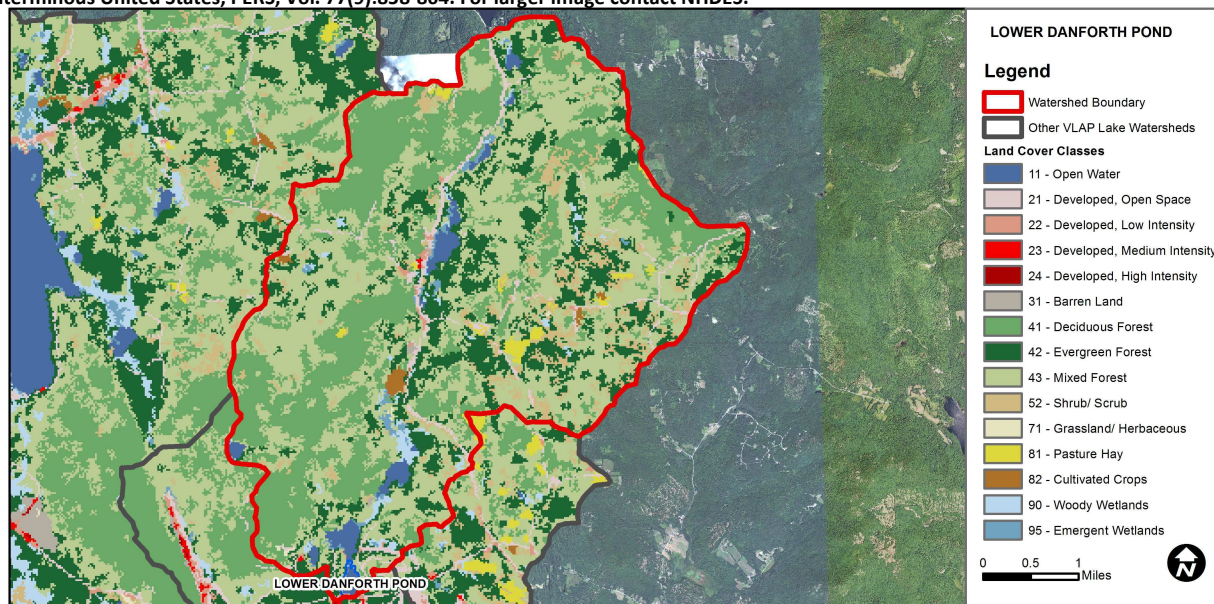
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	2.09	Barren Land	0.1	Grassland/Herbaceous	0.08
Developed-Open Space	2.61	Deciduous Forest	29.82	Pasture Hay	0.85
Developed-Low Intensity	0.26	Evergreen Forest	16.21	Cultivated Crops	0.41
Developed-Medium Intensity	0.03	Mixed Forest	40.01	Woody Wetlands	1.18
Developed-High Intensity	0	Shrub-Scrub	5.62	Emergent Wetlands	0.74

RECOMMENDED ACTIONS: Pond quality is generally representative of mesotrophic, or average quality, conditions. Phosphorus and chlorophyll levels were higher in surface waters in May, and clarity (transparency) was lower following above average spring rainfall. This indicates stormwater runoff is negatively impacting water quality. Educate and work with lake and watershed residents to identify areas impacted by stormwater runoff and implement best practices to reduce stormwater impacts. Encourage residents to stabilize steep slopes by planting and maintaining vegetative buffers. Continue measuring apparent color to evaluate relationships between water color and water clarity. Color data collected this year indicated that the water was almost two times darker than what was measured in 2001. Keep up the great work!

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

- **CHLOROPHYLL-A:** Chlorophyll levels were elevated in May, decreased to low levels in June and August, and then increased to moderate levels in September. Average chlorophyll level decreased slightly from 2016 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer) and Metalimnetic (middle water layer) conductivity and/or chloride levels were slightly greater than the state medians and increased as the summer progressed. Historical trend analysis indicates relatively stable epilimnetic conductivity levels with moderate variability between years. Hypolimnetic (lower water layer) conductivity levels were within a slightly elevated range and increased as the summer progressed likely due to depletion of dissolved oxygen in hypolimnetic waters and the release of ions from bottom sediments.
- **COLOR:** Apparent color was measured in the epilimnion and indicates the pond water is moderately tea colored or brown.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels fluctuated within a low range and were slightly higher in May and August. Average epilimnetic phosphorus level remained stable from 2016 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels with moderate variability between years. Metalimnetic phosphorus levels were low in May and September and slightly elevated in June and August. Hypolimnetic phosphorus increased from low levels to elevated levels as the summer progressed likely due to the release of phosphorus from bottom sediments under anoxic conditions, a process called internal loading.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in May and June potentially due to the above average spring and early summer rainfall, stormwater runoff and pollen. Transparency increased to high (good) levels in August and September. Average NVS transparency decreased slightly from 2016 and was slightly higher (better) than the state median. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **TURBIDITY:** Epilimnetic turbidity levels fluctuated within a low range and were highest in May when algal growth was elevated. Metalimnetic turbidity levels were lower in May and increased to a moderate level and remained stable from June through September. Hypolimnetic turbidity levels were elevated in May, August and September when samples were collected from a deeper depth that was more representative of conditions.
- **PH:** Epilimnetic pH levels were within the desirable range 6.5-8.0 units and historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Metalimnetic pH levels were slightly less than desirable, and hypolimnetic pH levels were slightly acidic and less than desirable.

Dissolved Oxygen and Temperature Profile Summer 2017

Lower Danforth Pond Annual Phytoplankton Population
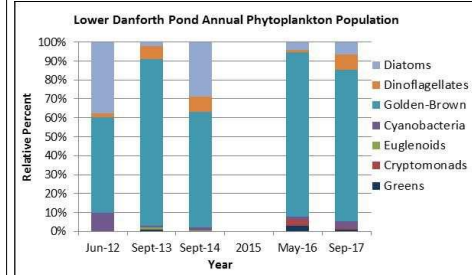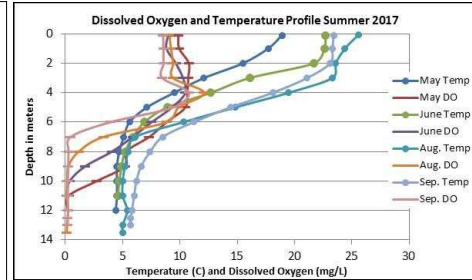
Station Name	Table 1. 2017 Average Water Quality Data for DANFORTH POND, LOWER-FREEDOM										
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color PCU	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	8.0	4.01	10	50	65.0	8	3.40	4.11	0.59	6.78
Metalimnion					69.8	12			0.81	6.41
Hypolimnion					115.0	18			7.04	6.22

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: 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 moderately variable.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data