



# Volunteer Lake Assessment Program Individual Lake Reports

## TODD LAKE, NEWBURY, NH

### MORPHOMETRIC DATA

Watershed Area (Ac.):	384	Max. Depth (m):	6.1	Flushing Rate (yr <sup>-1</sup> )	0.5
Surface Area (Ac.):	168	Mean Depth (m):	2.2	P Retention Coef:	0.88
Shore Length (m):	5,100	Volume (m <sup>3</sup> ):	1,466,500	Elevation (ft):	670

### TROPHIC CLASSIFICATION

Year	Trophic class
1991	MESOTROPHIC
2009	MESOTROPHIC

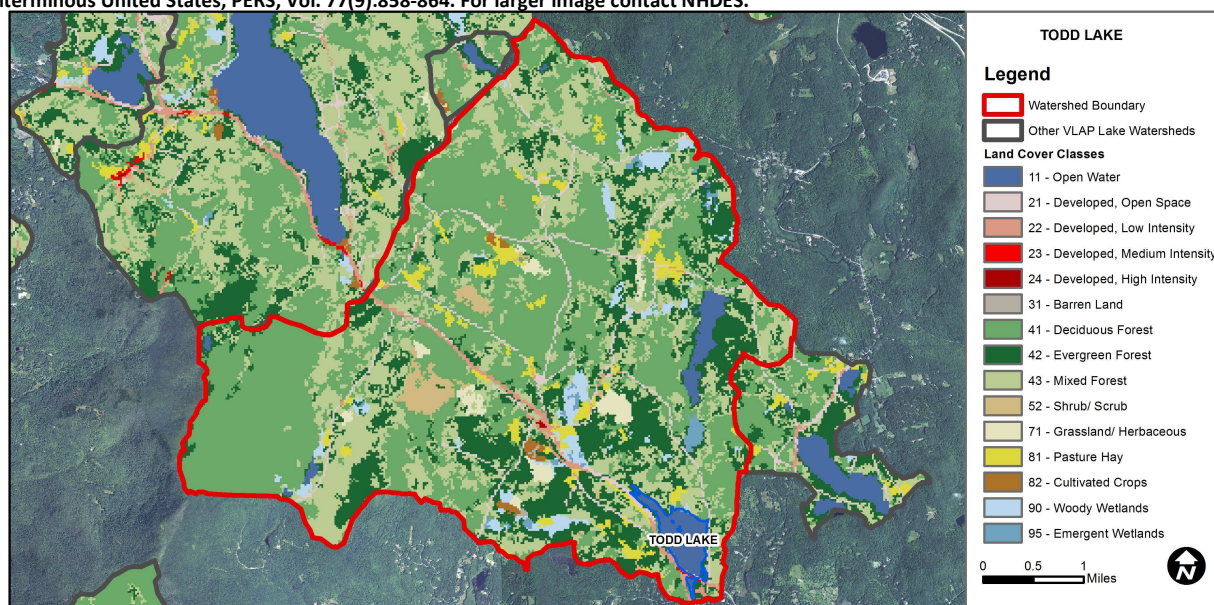
### KNOWN EXOTIC SPECIES


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)	Cautionary	< 10 samples and 1 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	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
	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	2.52	Barren Land	0.05	Grassland/Herbaceous	1.44
Developed-Open Space	2.83	Deciduous Forest	41.51	Pasture Hay	2.92
Developed-Low Intensity	1.03	Evergreen Forest	18.9	Cultivated Crops	0.31
Developed-Medium Intensity	0.04	Mixed Forest	23.99	Woody Wetlands	2.36
Developed-High Intensity	0.02	Shrub-Scrub	1.5	Emergent Wetlands	0.6



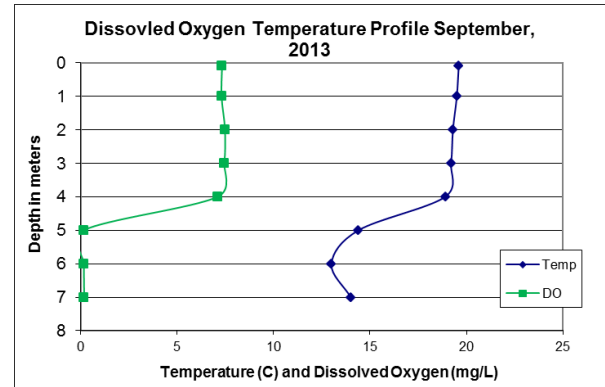
# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

## TODD LAKE, NEWBURY, NH

### 2013 DATA SUMMARY

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

- CHLOROPHYLL-A:** Average chlorophyll increased greatly in 2013 and was the highest measured since monitoring began. July chlorophyll levels were greater than 15.0 ug/L and indicative of an algal bloom. Chlorophyll levels had decreased to normal in September. Stormwater runoff from significant summer storm events likely contributed excess nutrients that increased algal growth.
- CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity were relatively low except for Andrew Brook which may be influenced by wetlands.
- TOTAL PHOSPHORUS:** Phosphorus levels in Andrew Brook and Reservoir Brook were slightly elevated in May following a rain event. Phosphorus levels in the Gillingham system in July and September were elevated and above average, the turbidity was also slightly elevated. Average epilimnetic phosphorus increased greatly from 2012 and was slightly elevated on each sampling event. Stormwater runoff from significant storm events likely caused the increased epilimnetic phosphorus. Historical trend analysis indicates relatively stable epilimnetic phosphorus with high variability between years.
- TRANSPARENCY:** Transparency remained fairly stable throughout the summer and was slightly less than the state median. Historical trend analysis indicates highly variable transparency between years.
- TURBIDITY:** Turbidity in Reservoir Brook was slightly elevated in May, in Andrew Brook and Gillingham in July, and in Gillingham Dr. Inlet in September; however 2013 values were average for the tributaries. Epilimnetic turbidity was elevated in July potentially due to algal growth, as well as stormwater runoff as 2013 turbidity was above average. Hypolimnetic turbidity increased as the summer progressed potentially due to the release of organic compounds from bottom sediment under low dissolved oxygen conditions.
- pH:** Deep spot pH was lower than desirable and historical trend analysis indicates a significantly decreasing (worsening) epilimnetic pH.
- RECOMMENDED ACTIONS:** Stormwater runoff from the increased frequency of high intensity and high volume storm events is likely transporting excess nutrients and sediments into the lake. Efforts should be made to identify areas prone to sediment erosion and implement best management practices (BMP) to reduce erosion, as well as reducing stormwater runoff from lake and watershed properties. Utilize DES' "Homeowner's Guide to Stormwater Management" for guidance on constructing stormwater BMPs.



**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)

**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<sup>3</sup>  
**Conductivity:** 40.0 uS/cm  
**Chloride:** 4 mg/L  
**Total Phosphorus:** 12 ug/L  
**Transparency:** 3.2 m  
**pH:** 6.6

Table 1. 2013 Average Water Quality Data for TODD LAKE

Station Name	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m	ntu		
						NVS	VS		
Andrew Brook			9	74.0	21			1.69	6.70
Epilimnion	7.13	9.00	4	41.3	14	2.73	3.01	1.41	6.27
Hypolimnion				41.6	17			3.64	6.16
Gillingham				33.8	26			2.74	6.04
Gillingham Dr Inlet			3	29.1	22			1.46	6.35
Outlet				43.8	10			0.78	6.66
Reservoir Brook				30.2	17			1.09	6.63

#### HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
pH	Degrading	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
Conductivity	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.

