



# Volunteer Lake Assessment Program Individual Lake Reports

## TODD LAKE, NEWBURY, NH

### MORPHOMETRIC DATA

Watershed Area (Ac.):	12,212	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

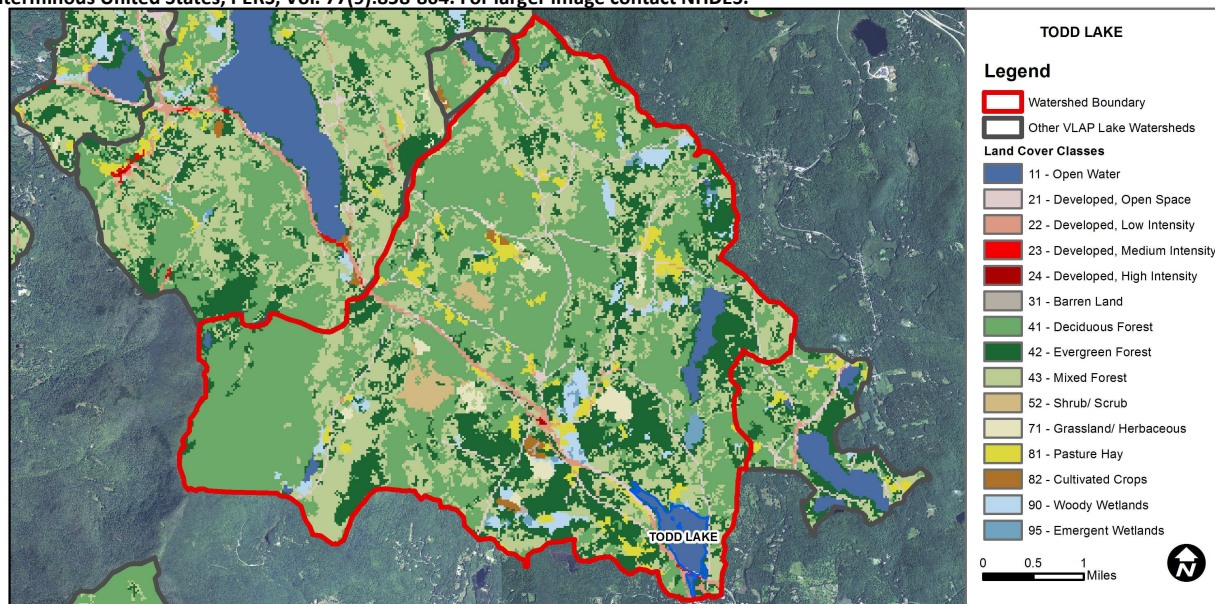
### KNOWN EXOTIC SPECIES


The Waterbody Report Card tables are generated from the 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](http://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	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Oxygen, Dissolved	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Dissolved oxygen saturation	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	Very Good	All sampling data meet water quality standards or thresholds 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	2.52	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

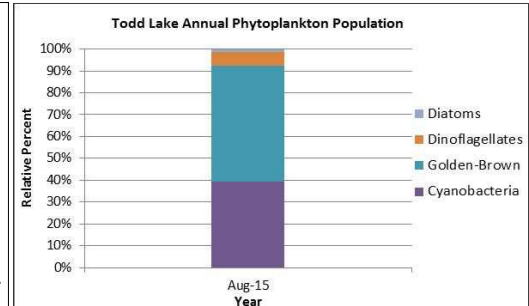
## TODD LAKE, NEWBURY

### 2016 DATA SUMMARY

**RECOMMENDED ACTIONS:** A cyanobacteria bloom was noted in the lake in August and this highlights the delicate balance of the lake ecosystem. Drought conditions and low water levels likely caused the lake to retain nutrients which fueled the cyanobacteria growth in August. Please alert DES if you observe any additional cyanobacteria growth in the lake so DES can positively identify the cyanobacteria and quantify cell counts and potential toxin production. Overall, lake clarity (transparency) has remained below average since 2000, however transparency measured using the viewscope tends to be higher (better) and within a more average range for the lake. Lake clarity was worse in August following a significant storm event which highlights the importance of managing stormwater runoff from lake and watershed properties, dirt/gravel roads, paved roads, and steep slopes. Planting and maintaining vegetative buffers along the shoreline helps to reduce erosion of the shoreline as well as infiltrate stormwater. DES' "NH Homeowner's Guide to Stormwater Management" and UNH Cooperative Extension's "Landscaping at the Water's Edge" are great resources. Keep up the great work!

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

- **CHLOROPHYLL-A:** Chlorophyll levels were within an average range in June and decreased slightly in August. The 2016 average chlorophyll level remained stable with 2015 and was slightly less than the state median. Historical trend analysis indicates stable chlorophyll levels with moderate variability between years.
- **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Hypolimnetic (lower water layer), Outlet, and Reservoir Brook conductivity levels remained within a low to average range and were approximately equal to the state median. Historical trend analysis indicates stable epilimnetic conductivity levels with moderate variability between years. Andrew Brook conductivity level was slightly greater than the state median and low tributary flow may have concentrated salts and minerals in the water.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus was low in June and increased to a slightly elevated level in August following a significant storm event during drought conditions. Average epilimnetic phosphorus increased from 2015 and was approximately equal to the state median. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus levels remained within an average range from June to August. Andrew Brook, Outlet and Reservoir Brook phosphorus levels were within average ranges for those stations.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average for the lake in June and August. Cyanobacteria growth was noted in the water column in August which could have impacted transparency. Average NVS transparency decreased (worsened) from 2015 and was less than (worse than) the state median. Historical trend analysis indicates stable transparency with high variability between years. Transparency measured with the viewscope (VS) was higher (better) than NVS transparency and within an average range for the lake.
- **TURBIDITY:** Epilimnetic turbidity levels were within an average range for that station and remained stable from June to August. Hypolimnetic and Andrew Brook turbidity levels were slightly elevated in June and lab data note a small amount of sediment in the samples. Outlet turbidity levels were slightly elevated in June and August likely due to low flows. Reservoir Brook turbidity level was low in June.
- **pH:** The pH levels were within the desirable range 6.5-8.0 units at all stations, however epilimnetic pH has historically fluctuated below the desirable range. Historical trend analysis indicates stable epilimnetic pH levels with moderate variability between years.



**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)

**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

Station Name	Table 1. 2016 Average Water Quality Data for TODD LAKE-NEWBURY							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
					NVS	VS		
Epilimnion	7.9	4.28	57.6	13	2.53	3.53	1.16	7.13
Hypolimnion			57.4	12			2.19	6.55
Andrew Brook			95.3	17			1.82	7.26
Outlet			58.3	11			1.26	7.03
Reservoir Brook			34.7	16			0.48	6.90

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

