

Long Pond is a natural pond that abuts Route 153 in Eaton, NH. Access is via a short gravel launch directly off of Route 153. Long Pond was surveyed under the Lake Trophic Survey Program once previously in 1988, where it was classified as oligotrophic. The most recent survey has reclassified the pond as mesotrophic. The reclassification is largely due to the fact that Long Pond was assessed as an unstratified waterbody in 1988, but was stratified during sampling in 2016 – 2018. As a stratified waterbody, the trophic assessment takes into consideration dissolved oxygen levels, and Long Pond had low oxygen levels at the bottom of the water column. Additionally, the aquatic plant survey documented plant density as scattered/common; whereas the 1988 survey had found plant density to be scattered. Other biochemical parameters were similar to the 1988 survey; however, conductivity, chloride, and sodium were approximately 25%, 75%, and 75% higher than in 1988, respectively. This is likely due to road salt inputs from Route 153. Bullfrog tadpoles, freshwater mussels, a great blue heron, a belted kingfisher, and a common loon were observed over the three year sampling period.

2018 NHDES Trophic Rating:

**Mesotrophic**

1988 NHDES Trophic Rating:

**Oligotrophic**

### What is a lake trophic survey?

A lake trophic survey evaluates physical, biological and chemical parameters in lakes or ponds greater than 10 acres, to assess a lake's overall productivity, a.k.a. trophic status. Oligotrophic, mesotrophic and eutrophic are the most common trophic classifications. Oligotrophic lakes are nutrient-poor, with few plants and very clear water. Eutrophic lakes are highly productive, with lots of plants and/or algae and less clear water. Mesotrophic lakes are in-between. Trophic surveys provides a record and catalog of water quality parameters, serve as a basis for understanding environmental impacts and help inform water quality management polices. For additional explanations of lake terminology, please visit <http://des.nh.gov/organization/divisions/water/wmb/vlap/glossary.htm>



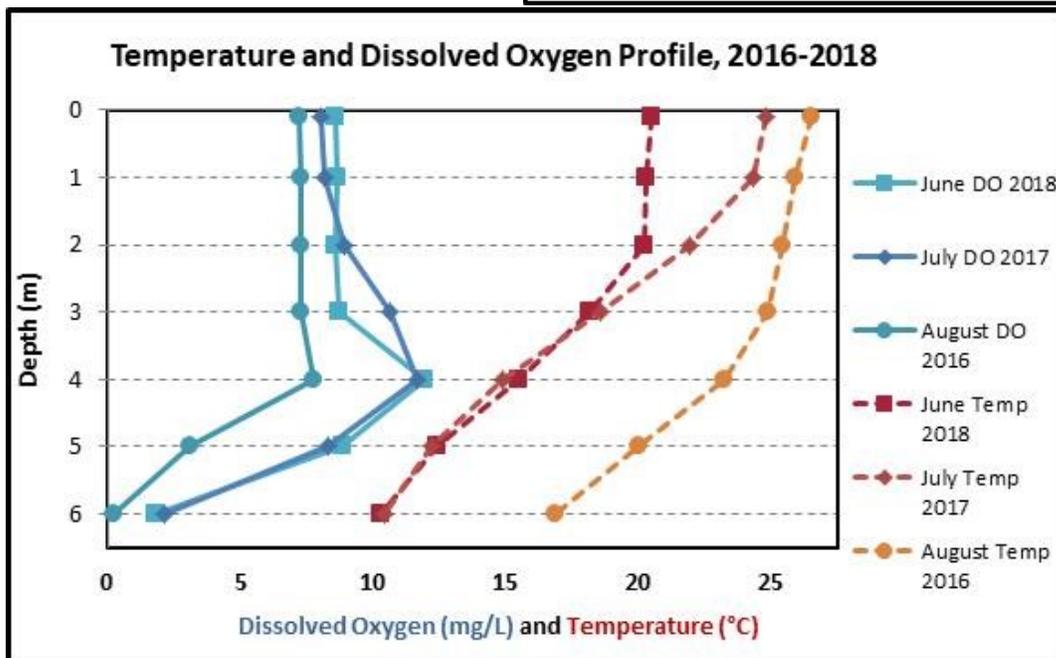
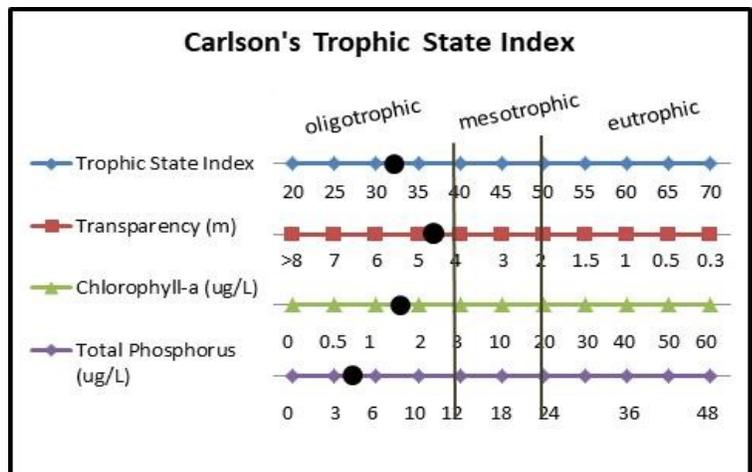
Physical Characteristics			
Elevation:	140.8 m (462 ft)	Lake area:	0.096 km <sup>2</sup>
Mean depth:	2.0 m	Volume:	188,400 m <sup>3</sup>
Maximum depth:	6.5 m	Average Hypolimnion Volume:	34,600 m <sup>3</sup>
Relative depth:	1.9%	Average Anoxic Volume:	0.48 m <sup>3</sup>
Shore Length:	2000 m	Flushing rate:	17.25 yr <sup>-1</sup>
Shore Configuration:	1.79	P retention coeff:	0.42
Watershed area:	6.747 km <sup>2</sup>	Areal water load:	33.78 m/yr
% Watershed Poned:	0.67%	Lake type:	natural

### Trophic Classification

The NHDES Trophic Classification System was initiated in the early 1970s and revised in 1989 and 2013. This index assigns numeric values to summer bottom dissolved oxygen (D.O.), Secchi disk transparency (S.D.), aquatic vascular plant abundance (Plant) and epilimnetic chlorophyll-*a* concentration (Chl-*a*). Lakes are now surveyed once a year for three consecutive years during the summer, whereas historically lakes were only surveyed once. For consistency with the historical trophic surveys, lakes are assigned numeric values with each annual survey, and after three years, these values are summed to a grand total, which determines the lake's trophic status. This index allows for direct comparisons to be made to historic data, which better track changes in trophic status. The NHDES Trophic Classification System is one of many ways to determine a lake's trophic status. The Carlson's Trophic State Index (TSI) is a more broadly used trophic assessment tool; however, the results are less comparable to historic NHDES data. For a more in-depth explanation of NHDES classification methodology, please visit:

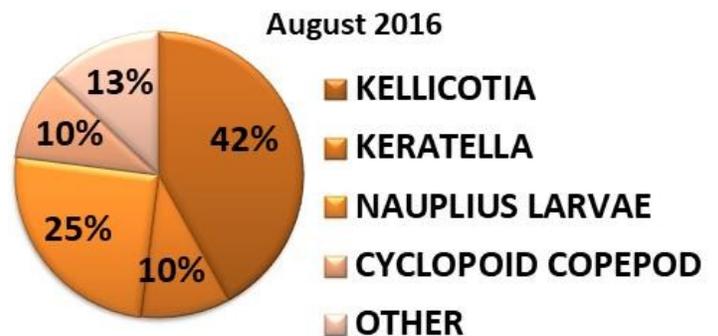
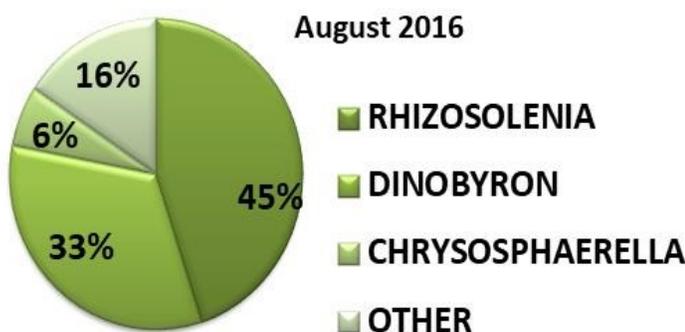
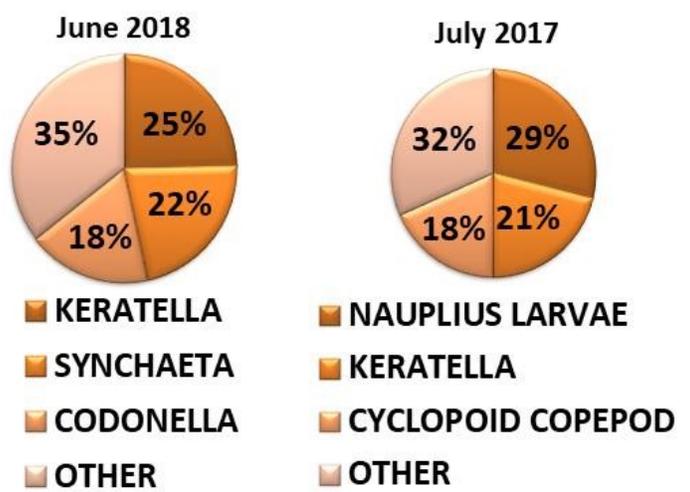
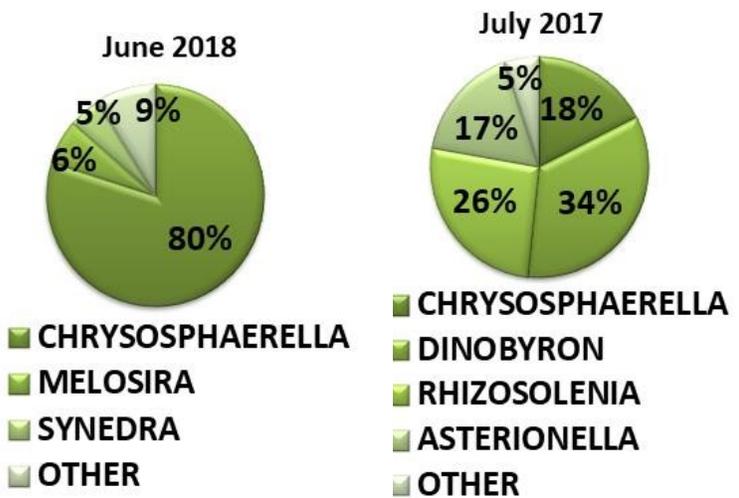
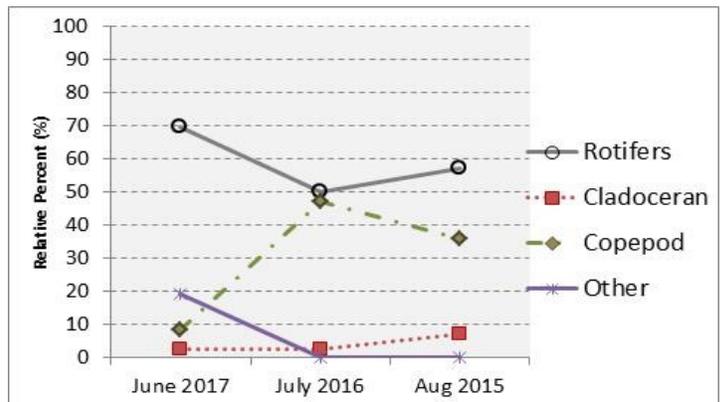
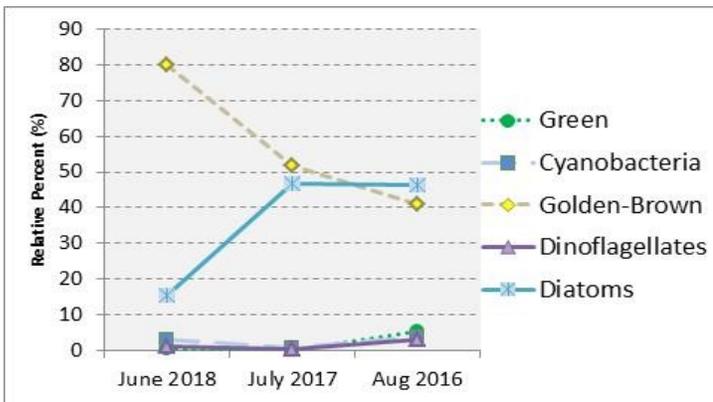
<https://www.des.nh.gov/organization/divisions/water/wmb/lakes/documents/lake-trophic-2013-info.pdf>

<b>NHDES Trophic Classification: 2016 - 2018</b>				
Long Pond, Eaton, NH				
Year	D.O.	S.D.	Plant	Chl-a
2016	3	3	2	1
2017	2	3	2	0
2018	2	2	2	0
<b>Total Points:</b>				<b>22</b>
<b>Trophic classification:</b>				<b>Mesotrophic</b>



**Phytoplankton** are photosynthetic plants that contain chlorophyll-*a* but do not have true roots, stems or leaves. They grow on rocks, vascular plants, the lake bottom or free-floating in the water column and are a food source for zooplankton and mussels. As nutrients in the water increase, phytoplankton abundance also increases. Phytoplankton populations undergo natural succession throughout the summer, due to changes in light, nutrient availability, predation and temperature.

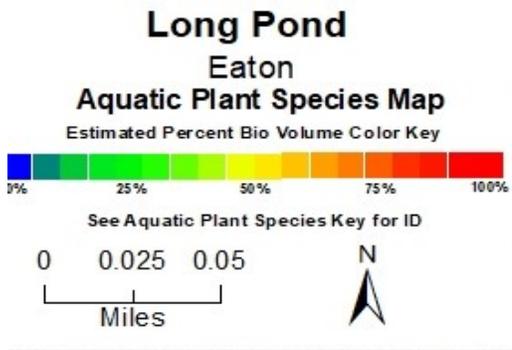
**Zooplankton** are microscopic animals that naturally inhabit New Hampshire lakes. They feed on phytoplankton, bacteria and other zooplankton while being an important food source for fish and mussels. Zooplankton also undergo natural succession throughout the summer, due to changes in light, nutrient availability, predation and temperature.



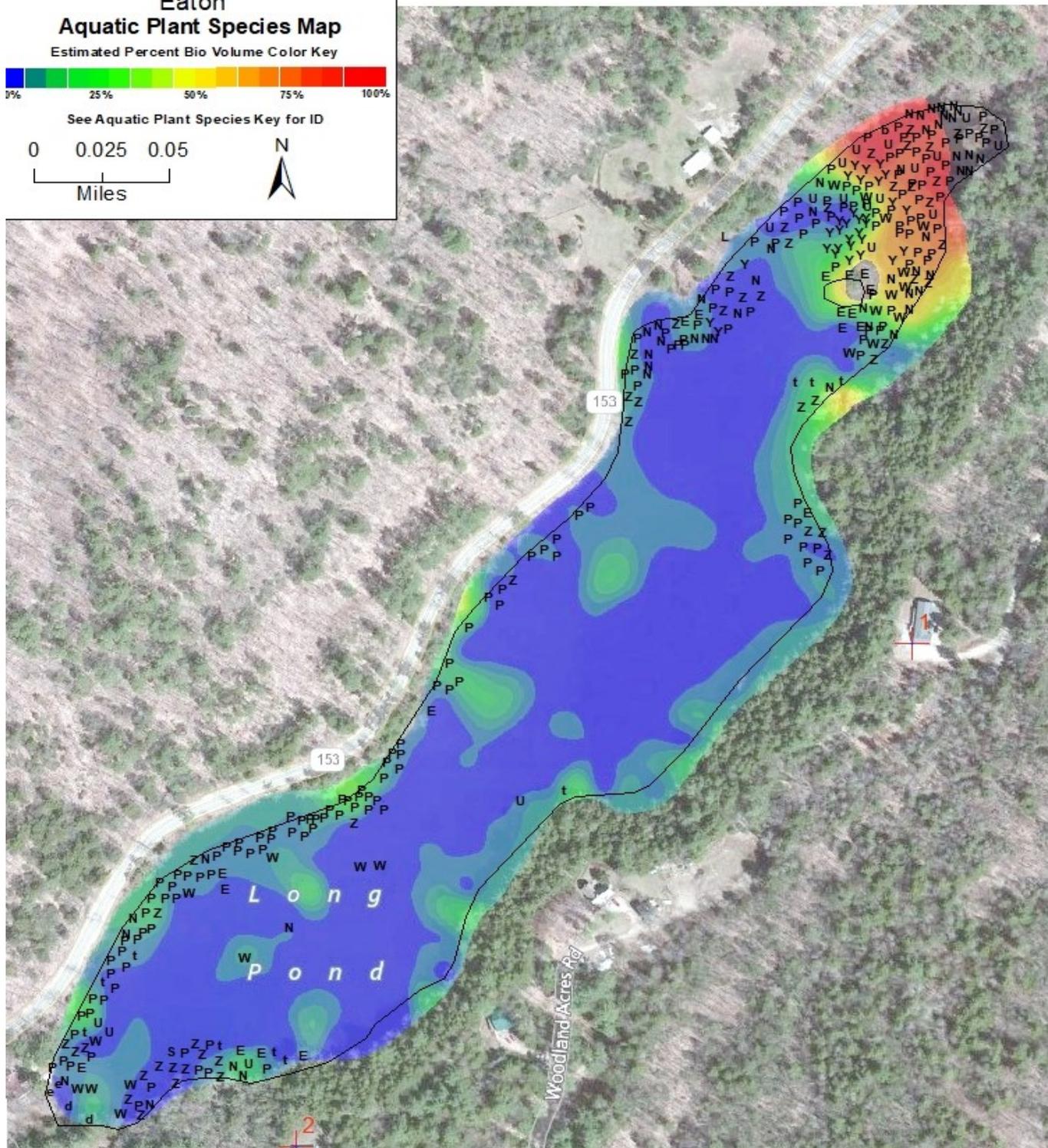
Chemical and Biological Characteristics	Mean	Standard Deviation	Median	Units	NH Median Values
<i>Epilimnetic Depth</i>	2.10	1.15	2.00	meter	x
pH	7.12	0.10	7.10	Units	6.60
Acid Neutralizing Capacity (ANC)	11.23	1.63	10.50	mg/L	4.50
Apparent Color	35.00	7.07	35.00	CPU	29.00
Secchi Depth	3.12	0.44	3.00	meter	3.30
Secchi Depth - Scope	3.90	0.42	3.90	meter	unk
Specific Conductance	66.93	1.84	67.40	µs/ cm	42.3
Total Kjeldahl Nitrogen (TKN)	< 0.25	0.00	< 0.25	mg/L	0.30
Nitrate + Nitrite Nitrogen	< 0.05	0.00	< 0.05	mg/L	< 0.05
Total Phosphorus	7.89	1.74	7.82	µg/L	11.00
Chloride	8.72	1.09	9.07	mg/L	5.00
Sulfate	2.80		2.80	mg/L	4.00
Calcium	4.56		4.56	mg/L	2.58
Magnesium	0.67		0.67	mg/L	0.56
Potassium	0.59		0.59	mg/L	0.48
Sodium	6.67		6.67	mg/L	3.80
Total Organic Carbon	2.40		2.40	mg/L	4.30
<i>Metalimnetic Depth</i>	4.67	0.76	4.50	meter	x
Chlorophyll-a	3.70	1.92	3.00	µg/L	4.39

The Waterbody Report Card table (below) is generated from the 2016 305(b) report on the status of New Hampshire waters and is based on data collected from 2003-2015. Additional information can be found at <http://des.nh.gov/organization/divisions/water/wmb/swqa/index.htm>

Designated Use	Parameter	Category
Aquatic Life	Chloride	Likely good
	Chl-a	Likely bad
	DO Saturation	Likely good
	DO (mg/L)	Likely good
	pH	Likely good
	Total Phosphorus	Likely bad
	Turbidity	Likely good
Drinking Water	Sulfates	Likely good
Fish Consumption	Mercury	Poor
Primary Contact Recreation	E. Coli	No data
	Chl-a	Likely good
Secondary Contact Recreation	E. Coli	No data
Wildlife	Wildlife	No data



## Aquatic Plant Map



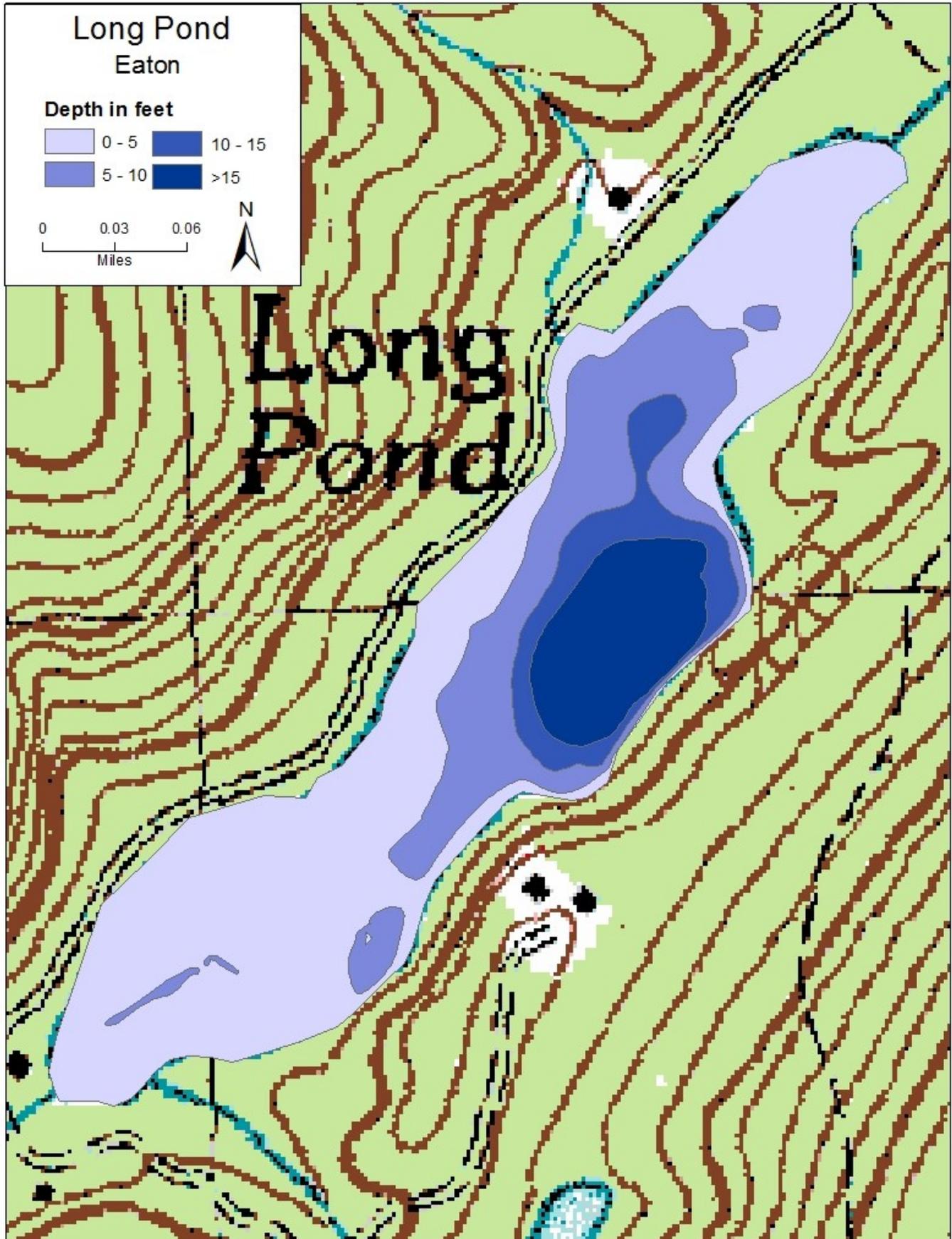
The aquatic plant map combines the aquatic plant species map and the aquatic plant biovolume map. The aquatic plant species map identifies surface aquatic plants, shoreline plants and submerged plants that were visible during the survey. The letter code placements were not georeferenced. Please see the next page for the species key. The aquatic plant biovolume map indicates the percentage of the water column occupied by aquatic plants. High percentages are indicated by the color red, and low percentages are indicated by the color blue.

### Aquatic Plant Species Key

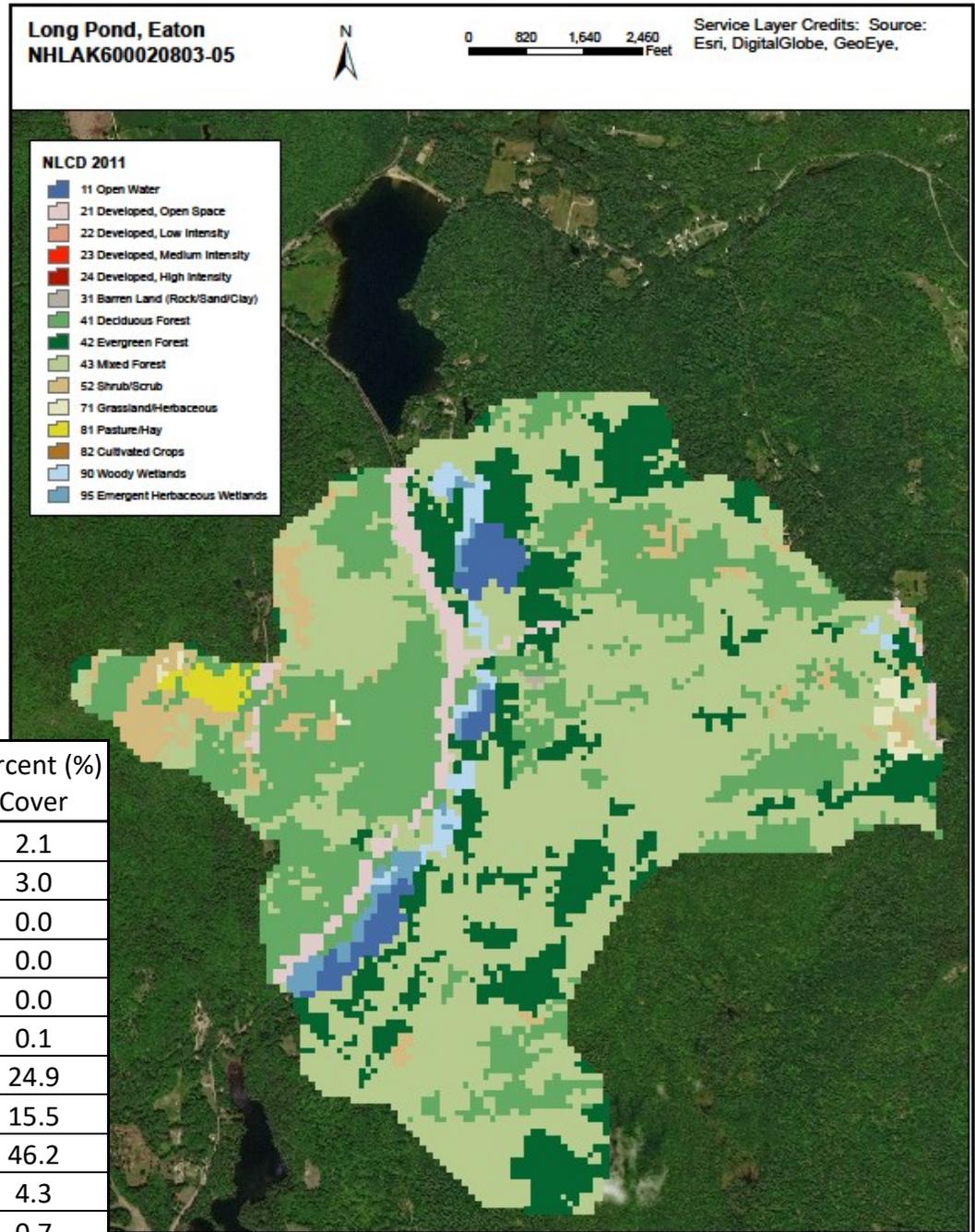
LAKE: LONG POND	TOWN: EATON		DATE: 8/2/16
KEY	PLANT NAME		ABUNDANCE
	SCIENTIFIC	COMMON	
b	Scirpus	Bulrush	Sparse
d	Dulichium arundinaceum	Three-way sedge	Sparse
e	Eleocharis	Spike rush	Sparse
E	Eriocaulon septangulare	Pipewort	Sparse
L	Lobelia cardinalis	Cardinal flower	Sparse
N	Nymphaea	White water lily	Scattered
P	Pontederia cordata	Pickerelweed	Scattered/Common
S	Sparganium	Bur reed (floating leaf)	Sparse
t	Myriophyllum tenellum	Water milfoil	Sparse
U	Utricularia	Bladderwort	Sparse
W	Potamogeton natans	Floating-leaf pondweed	Scattered
Y	Nuphar	Yellow water lily	Scattered
Z	Sparganium	Bur reed (erect leaf)	Scattered
<b>OVERALL ABUNDANCE: SCATTERED/COMMON</b>			

Abundance	Points	Description
Sparse	0	Few emergent plants observed; generally < 10% overall cover.
Scattered	1	Several small patches or one to two large patches or much of the shoreline with a sparsely growing plant; Generally 11-20% coverage.
Scattered/Common	2	Plants covering approximately 21-35% of lake.
Common	3	Plants around most of the shoreline but not a problem to navigation or several large patches of plants. 36-55% cover.
Common/ Abundant	4	Intermediate between Common and Abundant. 56-74% cover.
Abundant	5	Plants around the entire shoreline and with large patches in several areas; submerged plants visible, ranging 75-89% cover.
Very Abundant	6	At least ½ of the surface with emergent, floating leaf or submerged plants; navigation and swimming is impaired in areas, 80-100% cover.

### Lake Bathymetry and Depth Contours



### Watershed Land Use Map



Lake Cover Category	Percent (%) Cover
Open Water	2.1
Developed, Open Space	3.0
Developed, Low	0.0
Developed, Medium	0.0
Developed, High	0.0
Barren Land	0.1
Deciduous Forest	24.9
Evergreen Forest	15.5
Mixed Forest	46.2
Shrub/ Shrub	4.3
Grassland/ Herbaceous	0.7
Pasture Hay	0.7
Cultivated Crops	0.0
Woody Wetlands	1.5
Emergent Wetlands	1.1

Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States - Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*, v. 81, no. 5, p. 345 - 354.

[Click here for an interactive map of all historic and current lake trophic survey reports](#)

## Spring Ice Out Sampling

Chemical and Biological Characteristics	3/29/2016		Units
	1.6	5	
<i>Depth</i>	1.6	5	<i>meter</i>
pH	6.61	6.74	Units
Acid Neutralizing Capacity (ANC)	11.1	10.4	mg/L
Apparent Color	9	9	CPU
Secchi Depth	4.5		meter
Secchi Depth - Scope	5.3		meter
Specific Conductance	60.9	64.5	μs/cm
Total Kjeldahl Nitrogen (TKN)	< 0.25	< 0.25	mg/L
Nitrate + Nitrite Nitrogen	0.063	0.062	mg/L
Total Phosphorus	6.2	< 5	μg/L
Turbidity	1.22	0.99	NTU
Chloride	7.5	7	mg/L
Chlorophyll-a	2.02	2.29	μg/L

