

2018 NHDES Trophic Rating:
Mesotrophic
1999 NHDES Trophic Rating:
Oligotrophic

Round Pond is a natural, dammed pond that serves as a public water supply for the City of Rochester. No boating, fishing, or swimming is permitted on the pond. The 2016 sample event occurred during a five-foot drawdown. One previous lake trophic survey in 1999 classified the pond as oligotrophic. This current trophic survey changed the classification to mesotrophic. The change in classification was due to several factors. In 1999, the pond was assessed as an unstratified waterbody, which does not take into account dissolved oxygen levels in the water column. The current survey assessed Round Pond as a stratified waterbody, so that low dissolved oxygen levels in the lower water column factored into the trophic assessment. Additionally, the pond had a 40% reduction in Secchi depth and chlorophyll-a concentration doubled since 1999. These three factors shifted Round Pond from an oligotrophic to a mesotrophic classification. Total phosphorus levels increased by 75% in the epilimnion and tripled in the hypolimnion, suggesting excess nutrients are entering the lake. While pH was similar to the 1999 value, acid neutralizing capacity tripled, cations increased by ~5-30%, and the pollutant sulfate decreased by a third. This suggests a partial recovery from acid rain inputs, driven by air quality improvements from legislation such as the Clean Air Act. A great blue heron, two common loons, and two belted kingfishers were observed over the three-year sample period.

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>



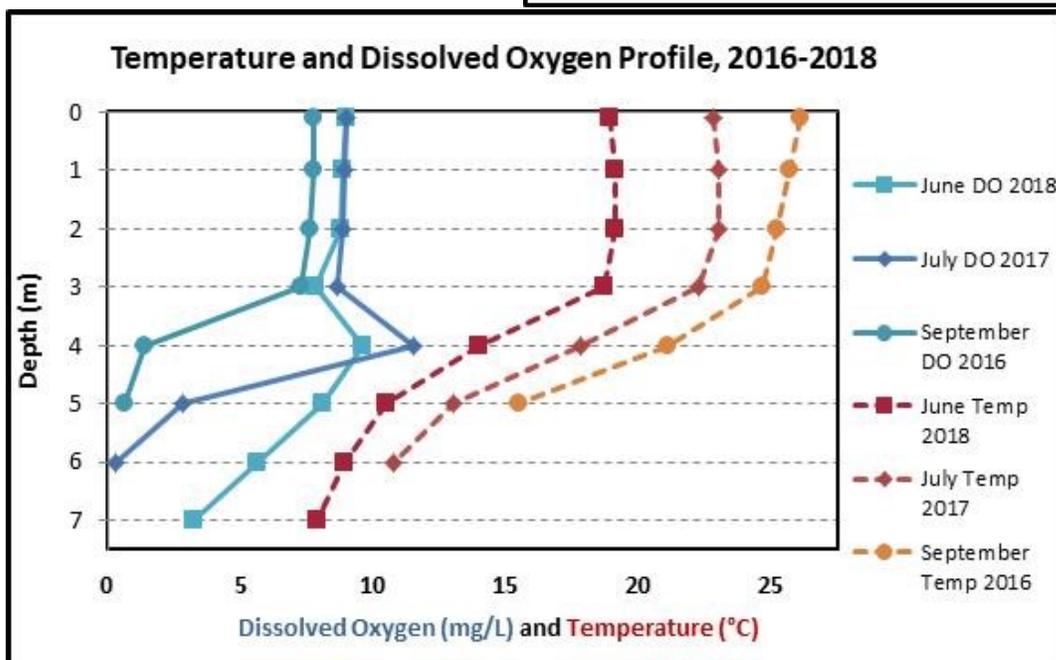
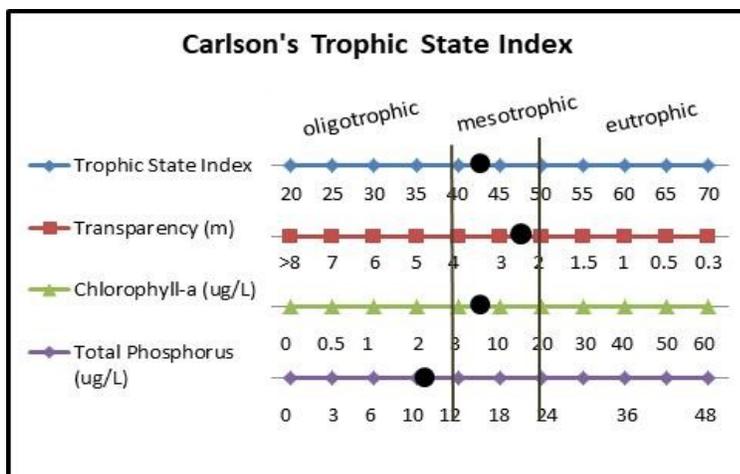
Physical Characteristics			
Elevation:	119.2 m (391 ft)	Lake area:	0.439 km ²
Mean depth:	2.6 m	Volume:	1,145,600 m ³
Maximum depth:	7.4 m	Average Hypolimnion Volume:	80,500 m ³
Relative depth:	1.0%	Average Anoxic Volume:	6,100 m ³
Shore Length:	3700 m	Flushing rate:	0.74 yr ⁻¹
Shore Configuration:	1.56	P retention coeff:	0.82
Watershed area:	2.28 km ²	Areal water load:	1.93 m/yr
% Watershed Poned:	0.00%	Lake type:	natural w/ dam

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:

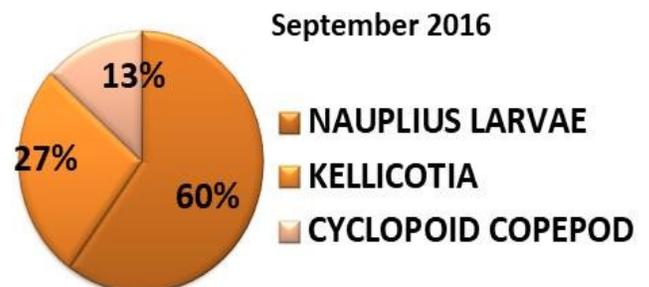
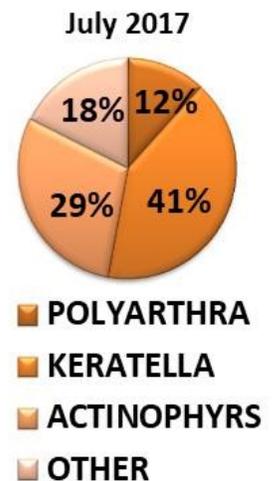
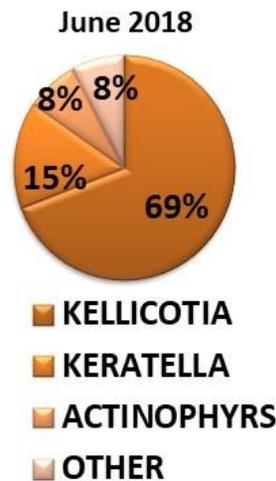
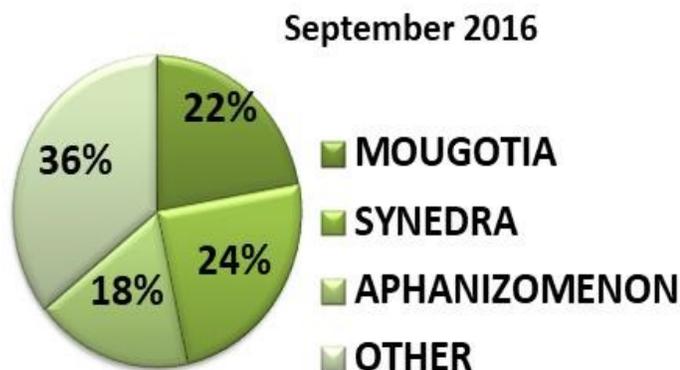
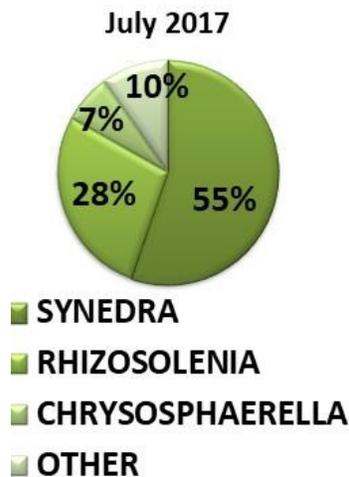
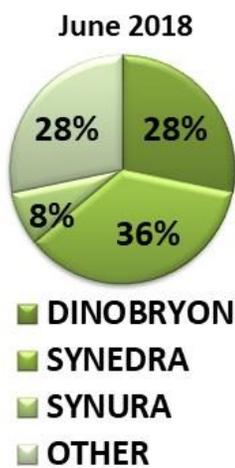
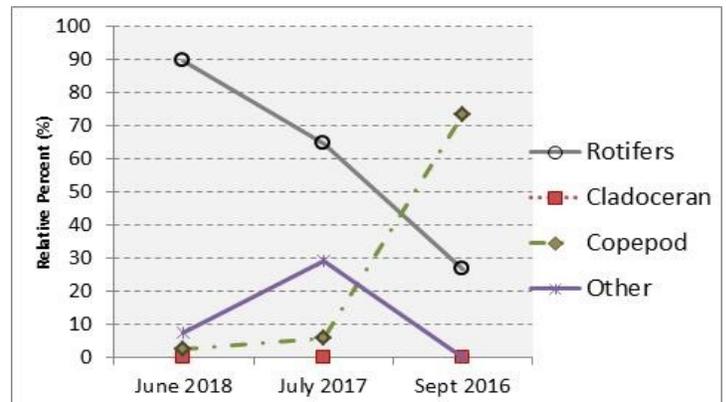
<https://www.des.nh.gov/organization/divisions/water/wmb/lakes/documents/lake-trophic-2013-info.pdf>

NHDES Trophic Classification: 2016 - 2018				
Round Pond, Barrington, NH				
Year	D.O.	S.D.	Plant	Chl-a
2016	5	3	1	0
2017	5	3	1	2
2018	1	3	1	0
Total Points:				25
Trophic classification:				Mesotrophic



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.

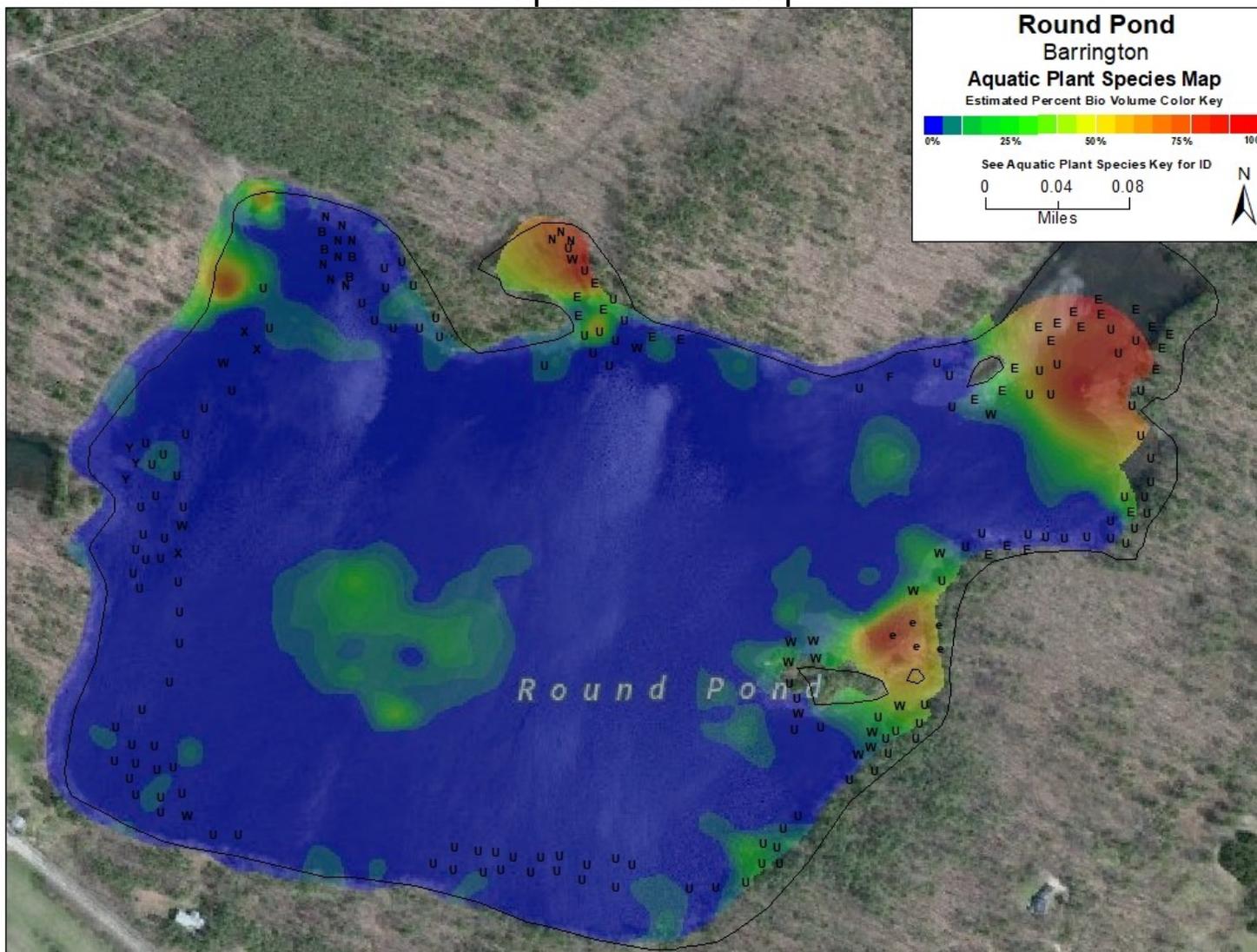


Chemical and Biological Characteristics	Mean	Standard Deviation	Median	Units	NH Median Values
<i>Epilimnetic Depth</i>	1.83	0.29	2.00	meter	x
pH	6.58	0.11	6.52	Units	6.60
Acid Neutralizing Capacity (ANC)	3.32	0.25	3.20	mg/L	4.50
Apparent Color	62.50	3.54	62.50	CPU	29.00
Secchi Depth	2.60	0.26	2.70	meter	3.30
Secchi Depth - Scope	3.17	0.06	3.20	meter	unk
Specific Conductance	55.53	13.72	49.00	µs/ cm	42.3
Total Kjeldahl Nitrogen (TKN)	0.25	0.11	0.29	mg/L	0.30
Nitrate + Nitrite Nitrogen	< 0.05	0.00	< 0.05	mg/L	< 0.05
Total Phosphorus	10.54	1.63	11.25	µg/L	11.00
Chloride	7.91	0.32	7.97	mg/L	5.00
Sulfate	2.70		2.70	mg/L	4.00
Calcium	1.81		1.81	mg/L	2.58
Magnesium	0.63		0.63	mg/L	0.56
Potassium	0.64		0.64	mg/L	0.48
Sodium	4.89		4.89	mg/L	3.80
Total Organic Carbon	4.70		4.70	mg/L	4.30
<i>Metalimnetic Depth</i>	4.17	0.29	4.00	meter	x
Chlorophyll-a	5.66	4.59	3.34	µg/L	4.39
<i>Hypolimnetic Depth</i>	5.25	1.06	5.25	meter	x
Total Phosphorus	24.40	8.49	24.40	µg/L	unk

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	Alkalinity	No data
	Chloride	Likely good
	Chl-a	Likely good
	DO Saturation	Likely good
	DO (mg/L)	Likely good
	pH	Likely bad
	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



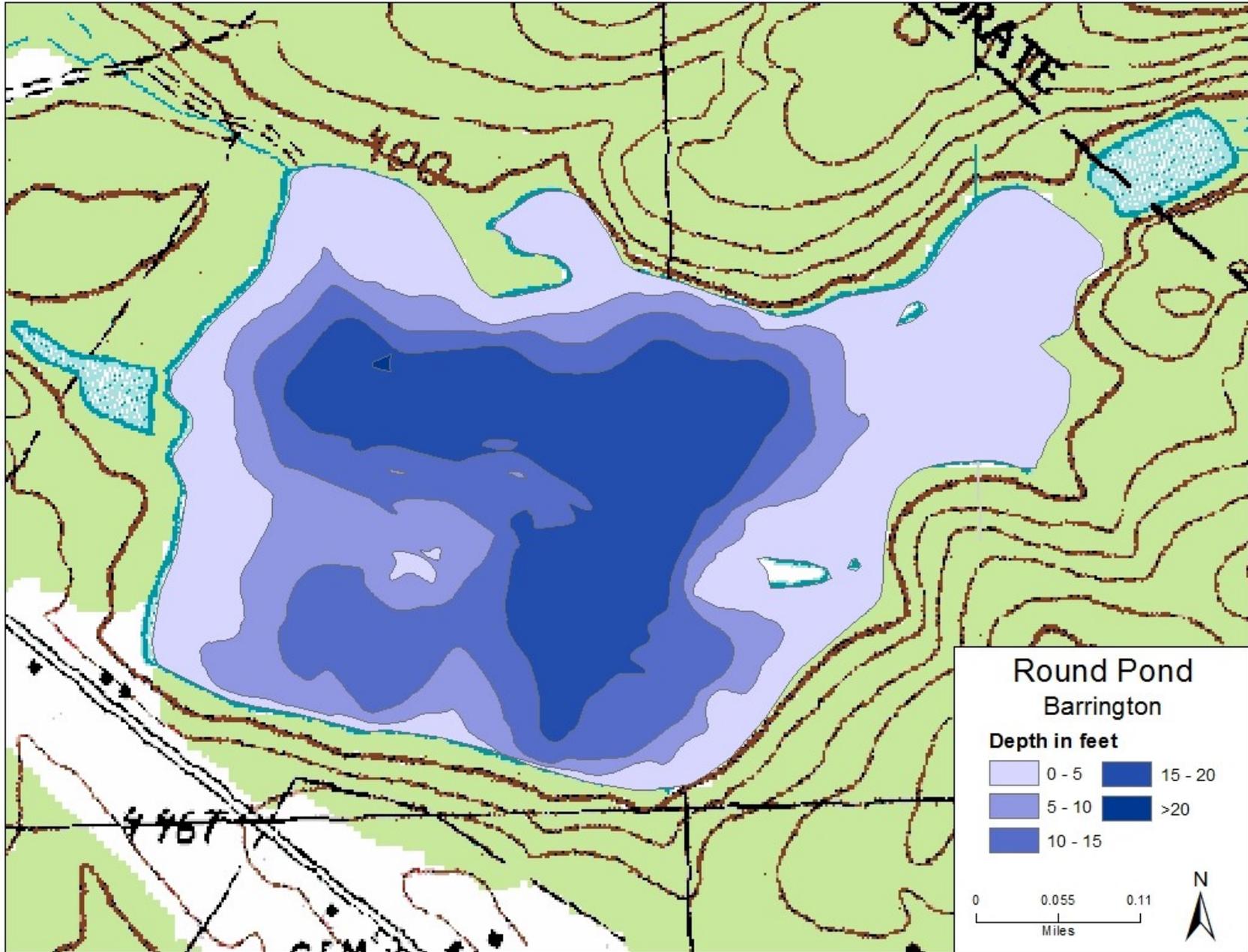
The aquatic plant map combines the aquatic plant species map and the aquatic plant biovolume map. The aquatic plant species map identifies surface aquatic plants, shoreline plants and submerged plants that were visible during the survey. The letter code placements were not georeferenced. Please see the 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

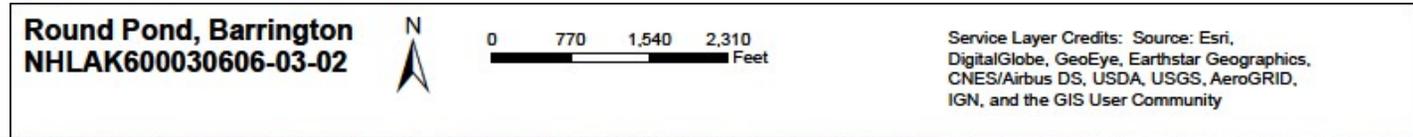
LAKE: ROUND POND	TOWN: BARRINGTON		DATE: 9/1/16
KEY	PLANT NAME		ABUNDANCE
	SCIENTIFIC	COMMON	
B	Brasenia schreberi	Water shield	Sparse
E	Eriocaulon septangulare	Pipewort	Sparse
e	Eleocharis	Spike rush	Sparse
F	Nymphoides cordatum	Floating heart	Sparse
N	Nymphaea	White water lily	Sparse
U	Utricularia	Bladderwort	Scattered
W	Potamogeton	Pondweed	Sparse
X		Sterile thread-like leaf	Sparse
Y	Nuphar	Yellow water lily	Sparse
OVERALL ABUNDANCE: SCATTERED			

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.

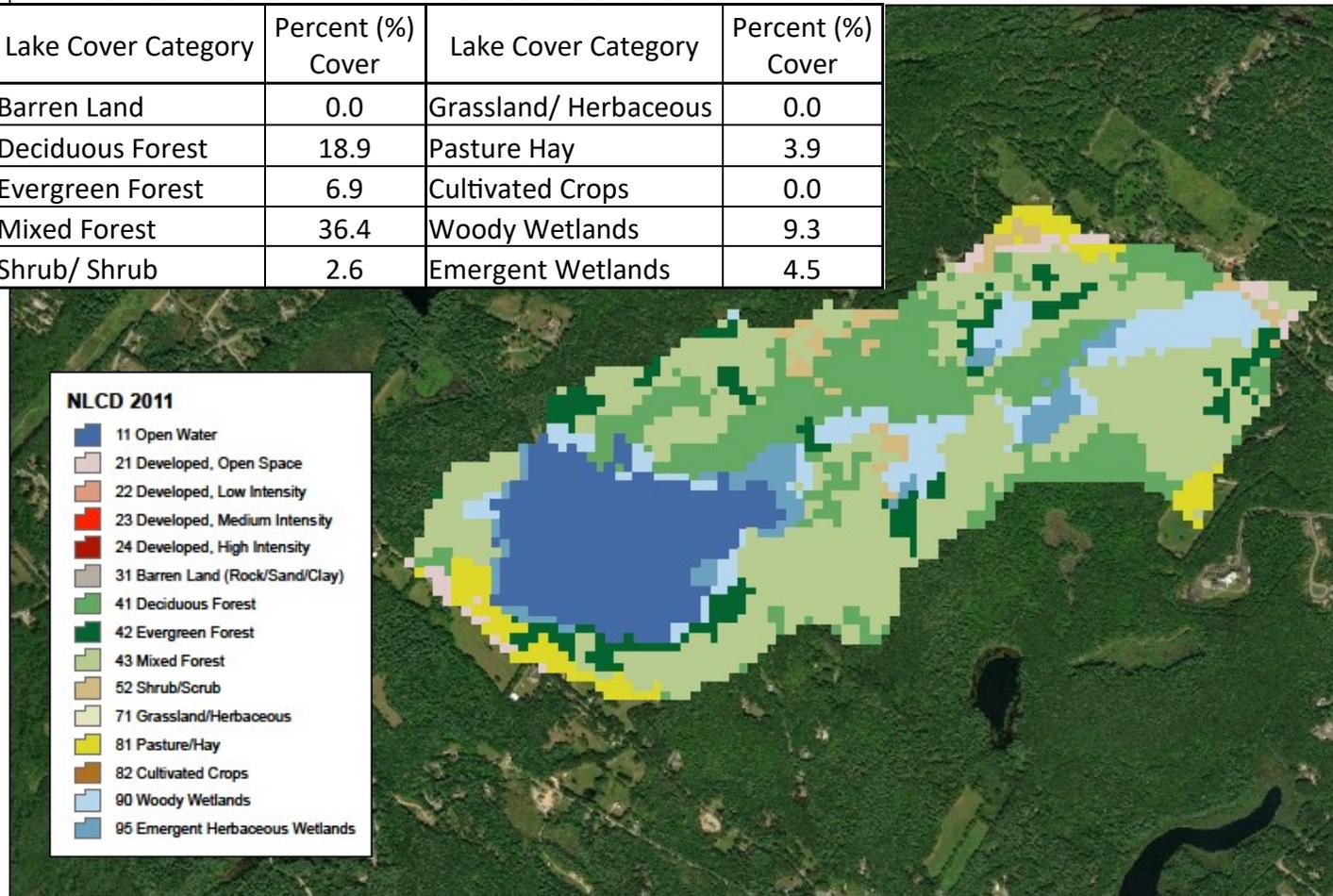
Lake Bathymetry and Depth Contours



Watershed Land Use Map



Lake Cover Category	Percent (%) Cover	Lake Cover Category	Percent (%) Cover	Lake Cover Category	Percent (%) Cover
Open Water	15.8	Barren Land	0.0	Grassland/ Herbaceous	0.0
Developed, Open Space	1.7	Deciduous Forest	18.9	Pasture Hay	3.9
Developed, Low	0.0	Evergreen Forest	6.9	Cultivated Crops	0.0
Developed, Medium	0.0	Mixed Forest	36.4	Woody Wetlands	9.3
Developed, High	0.0	Shrub/ Shrub	2.6	Emergent Wetlands	4.5



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	3/17/2016		Units
	1.9	6	
<i>Depth</i>	1.9	6	<i>meter</i>
pH	5.96	6	Units
Acid Neutralizing Capacity (ANC)	3.1	2.6	mg/L
Apparent Color	50	50	CPU
Secchi Depth	3		meter
Secchi Depth - Scope	3.25		meter
Specific Conductance	46.4	45.1	µs/ cm
Total Kjeldahl Nitrogen (TKN)	< 0.25	< 0.25	mg/L
Nitrate + Nitrite Nitrogen	0.053	0.052	mg/L
Total Phosphorus	17.9	18.6	µg/L
Turbidity	0.6	0.67	NTU
Chloride	5.8	6.2	mg/L
Chlorophyll-a	4.59	2.21	µg/L

