

NORTHEAST POND

2013 SAMPLING HIGHLIGHTS

MILTON, NH



Northeast Pond volunteers collected water quality data between April 30 and October 8, 2013. A more in depth water quality survey of Northeast Pond was conducted by the Center for Freshwater Biology on July 16, 2013.

Light Blue = Outstanding = Ultraoligotrophic

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Light Gray = No Data

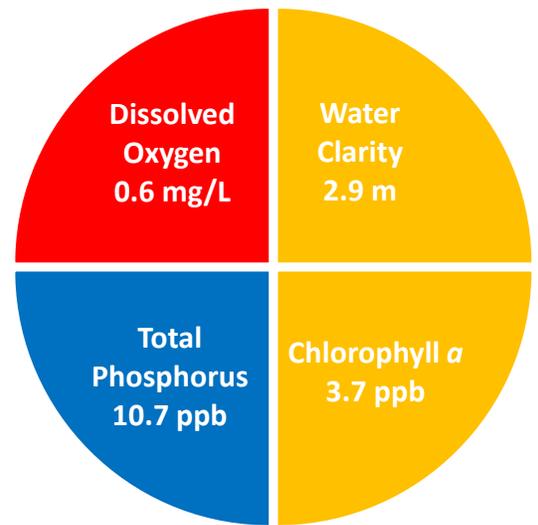


Figure 1. Average Water Quality Conditions

2013 RESULT HIGHLIGHTS

WATER CLARITY: Water clarity, measured as Secchi disk depth, averaged 2.9 meters (m) in Northeast Pond. The 2013 Northeast Pond water clarity was shallower than the 2012 water clarity.

CHLOROPHYLL: Chlorophyll *a*, a measure of microscopic plant life within the lake, averaged 3.7 parts per billion (ppb) in Northeast Pond. The 2013 Northeast Pond chlorophyll *a* concentration was lower (less green water) than the 2012 level.

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. Total phosphorus concentrations collected from the Northeast Pond surface waters averaged 10.7 parts per billion (ppb) and exceeded 10 ppb. A total phosphorus concentration of 10 ppb is considered sufficient to support green water events that are referred to as algal blooms.

DISSOLVED OXYGEN: Dissolved oxygen is important for healthy fisheries. Dissolved oxygen concentrations measured in the bottom waters ranged from 0.1 to 1.3 milligrams per liter (mg/L) on July 16, 2013. The dissolved oxygen concentrations became reduced below 5.0 mg/L near the lake bottom. A dissolved oxygen concentration of 5.0 mg/L is considered the threshold for the growth and reproduction of cold water fish that include trout and salmon.

COLOR: Color is a result of naturally occurring “tea” color substances from the breakdown of soils and plant materials. The Northeast Pond color averaged 53.4 color units (CPU).

ALKALINITY: Alkalinity measures the resistance the lake has to acid rain. The Northeast Pond alkalinity averaged 10.1 milligrams per liter (mg/L) and indicated a low vulnerability to acid precipitation. The Northeast Pond pH, a measure of lake acidity, ranged from 7.0 to 7.2 units in the surface waters and remained well within the acceptable range for most aquatic organisms.

SPECIFIC CONDUCTIVITY: Specific conductivity is a general indicator of pollution. The Northeast Pond specific conductivity ranged from 75.3 to 75.6 micro-Siemans per centimeter ($\mu\text{S}/\text{cm}$). The Northeast Pond specific conductivity indicates moderate to high concentrations of dissolved substances such as nutrients (e.g. phosphorus and nitrogen) and other dissolved salts (e.g. sodium and chloride).

CYANOBACTERIA: Cyanobacteria are potentially harmful plant-like bacteria. Northeast Pond was not sampled as part of the 2013 cyanobacteria monitoring program. Please see recommendation section for further information.

Note: For a more detailed discussion of water quality measurements, refer to the executive summary within the annual Milton Three Ponds report. The report includes a discussion of data collected in Depot, Northeast and Townhouse Pond, as well as, data collected at stream inlet sampling locations.

Table 1. 2013 Northeast Pond Seasonal Average Water Quality Readings and Trophic Level Classification Criteria used by the New Hampshire Lakes Lay Monitoring Program

Parameter	Ultraoligo “Outstanding”	Oligo “Excellent”	Meso “Fair”	Eutrophic “Poor”	Northeast Pond Average (range)	Northeast Pond Classification
Water Clarity (meters)	> 7.0	4.0 – 7.0	2.5 - 4.0	< 2.5	2.9 meters (range: 1.9 – 3.6)	Mesotrophic
Chlorophyll <i>a</i> (ppb)	< 2.0	2.0 - 3.0	3.0 - 7.0	> 7.0	3.7 ppb (range: 2.5 – 6.6)	Mesotrophic
Total Phosphorus (ppb)	< 7.0	7.0 – 15.0	15.0 - 25.0	> 25.0	10.7 ppb (range: 7.9 – 13.4)	Oligotrophic
Dissolved Oxygen (mg/L)	> 7.0	5.0 – 7.0	2.0 – 5.0	< 2.0	0.6 mg/L (range: 0.1 – 1.3)	Eutrophic
Cyanobacteria (cell counts, microcystin concentration & Water safety)	The Massachusetts Department of Public Health considers dangerous microcystin (MC) levels to be 14 micrograms per liter ($\mu\text{g}/\text{L}$) lake water, and/or 70,000 cyanobacteria cells per milliliter lake water.			The New Hampshire Department of Environmental services posts warnings at State beaches when cyanobacteria cell numbers exceed 70,000 cells per milliliter lake water.		

* Dissolved oxygen concentrations taken from the bottoms

LONG TERM TRENDS

WATER CLARITY: The Northeast Pond water clarity data display a trend of decreasing water clarity over the past twenty-three years. The trend is not statistically significant.

CHLOROPHYLL: The Northeast Pond chlorophyll *a* data display a trend of increasing chlorophyll *a* concentrations over the past twenty-three years. The trend is not statistically significant.

COLOR: The Northeast Pond color data display a relatively stable trend over the twenty-two years color data have been collected. The trend is not statistically significant.

TOTAL PHOSPHORUS: The Northeast Pond total phosphorus data display a trend of decreasing concentrations over the seven years total phosphorus data have been collected. The trend is not statistically significant.

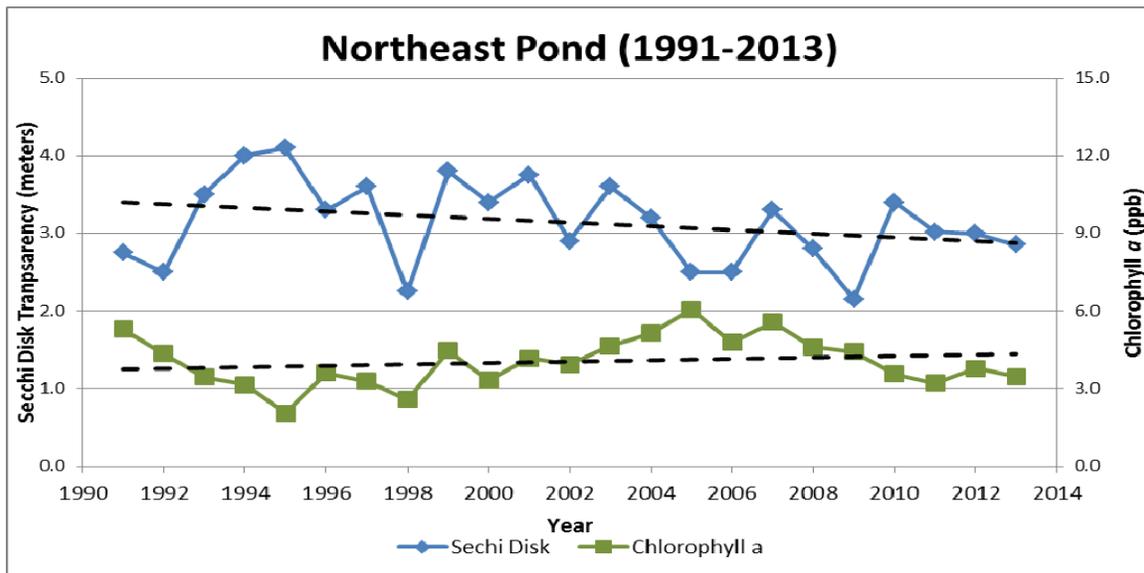


Figure 2. Changes in water clarity (Secchi disk depth) and chlorophyll *a* measured between 1991 and 2013 in Northeast Pond. The long-term water clarity data indicate a trend of decreasing water clarity (dashed line). The long-term algal growth (chlorophyll *a*) indicate a trend of increasing concentrations (dashed line). Neither the Secchi Disk transparency nor the chlorophyll *a* trend is statistically significant.

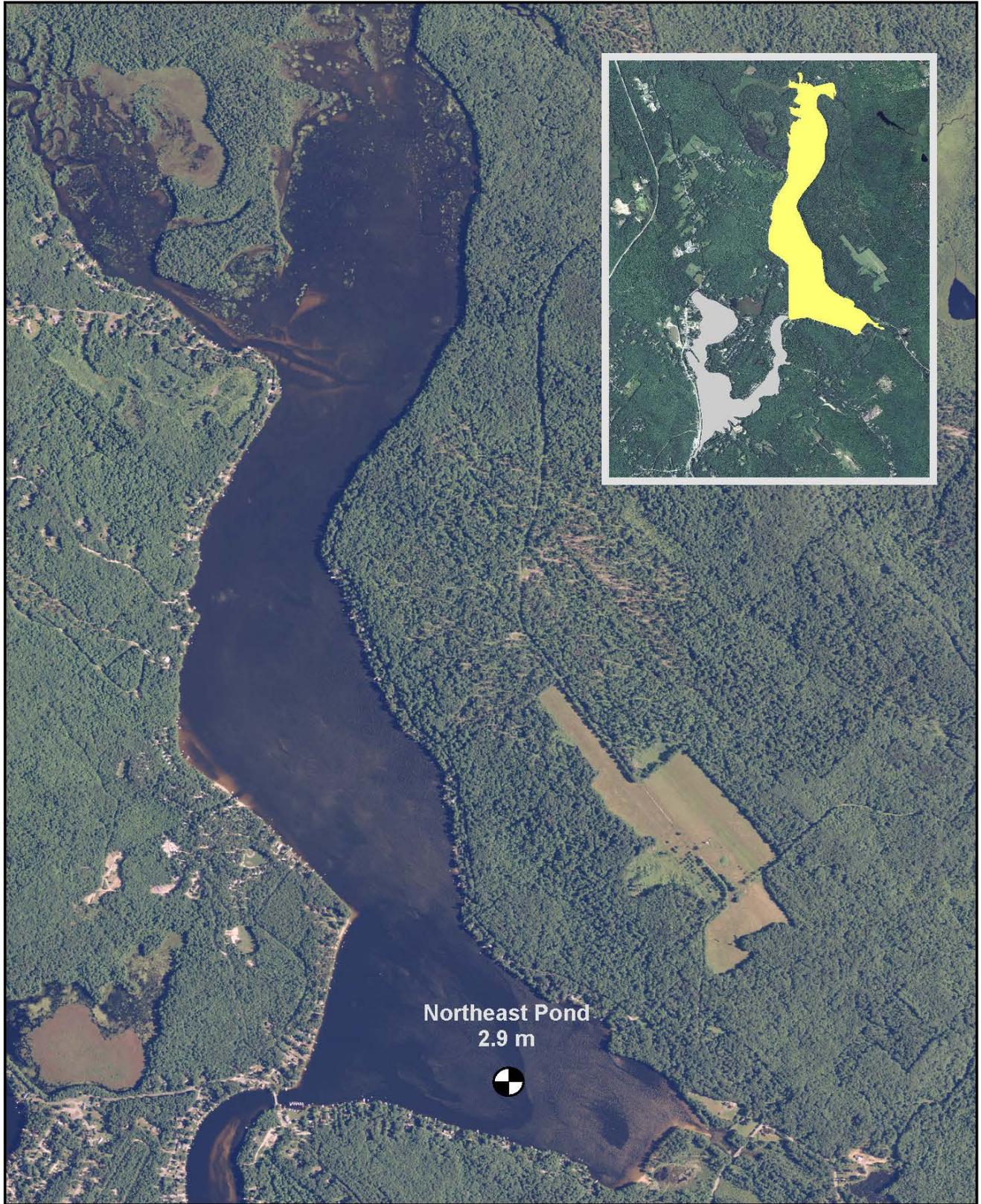
Recommendations:

- Implement Best Management Practices within the Northeast Pond watershed to minimize the adverse impacts of polluted runoff and erosion into the lake. Refer to “Landscaping at the Water’s Edge: An Ecological Approach” and “New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home” for suggestions that can help reduce nutrient loading caused by overland run-off.
 - http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
 - <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>
- Implement a simple cyanobacteria monitoring routine into the conventional water quality monitoring methods. Cyanobacteria collections throughout the spring through fall months can give insight into how these populations are distributed throughout the seasons and when they are most likely to reach harmful levels. If you are interested in discussing additional water quality monitoring options that would meet your needs please contact **Bob Craycraft @ 862-3696** or via email, bob.craycraft@unh.edu.
- Continue early season sampling (April/May) to document Northeast Pond’s reaction to the heavy spring runoff period. Most lakes receive a large percentage of the phosphorus and water inputs during this high flow period and collecting early season data will continue to document the Northeast Pond response to early season nutrient, color and sediment loading.

Northeast Pond

Milton, NH

2013 Deep water sampling sites with average water clarity



Aerial Orthophoto Source: NH Grantit
Site Locations GPS coordinates collected by the UNH Center for Freshwater Biology