CONWAY LAKE

2013 SAMPLING HIGHLIGHTS

CONWAY & EATON, NH

NEW HAMPSHIRE
LAKES LAY MONITORING

Conway Lake volunteers collected water quality data between June 5 and September 13, 2013. A more in depth water quality survey of the Conway Lake deep sampling station was conducted by the Center for Freshwater Biology on August 16, 2013.

Light Blue = Outstanding = Ultraoligotrophic

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Light Gray = No Data

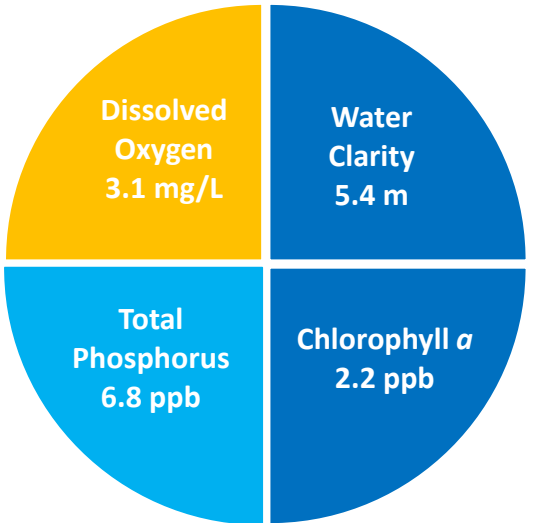


Figure 1. Average Water Quality

2013 RESULT HIGHLIGHTS

WATER CLARITY: Water clarity, measured as Secchi disk depth, averaged 5.4 meters (m) in Conway Lake. The 2013 water clarity increased relative to the 2012 water clarity.

CHLOROPHYLL: Chlorophyll *a*, a measure of microscopic plant life within the lake, averaged 2.2 parts per billion (ppb) in Conway Lake. The 2013 Conway Lake chlorophyll a concentration was slightly higher (greener water) than the 2012 level.

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. Total phosphorus concentrations collected in the surface waters measured 6.8 parts per billion (ppb) and remained below 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 collected in the deeper waters ranged from 2.5 to 3.8 milligrams per liter (mg/L) on August 16, 2013. 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 Conway Lake color averaged 30.3 color units (CPU).

ALKALINITY/pH: Alkalinity measures the resistance the lake has against acid rain. The average Conway Lake alkalinity measured 4.7 milligrams per liter (mg/L) and indicates a moderate vulnerability to acid rain. Conway Lake's **pH,** a measure of lake acidity, measured 6.9 units in the surface waters and remained within the acceptable range for most aquatic organisms.

SPECIFIC CONDUCTIVITY: Specific conductivity is a general indicator of pollution. The Conway Lake specific conductivity ranged from 39.0 to 40.0 micro-Siemans per centimeter (*u*S/cm) and indicates low to moderate concentrations of dissolved substances such as nutrients (e.g. phosphorus and nitrogen) and other dissolved salts (e.g. sodium and chloride).

CYANOBACTERIA: Cyanobacteria are the measure of potentially harmful plant-like bacteria. Conway Lake did not participate in the 2013 cyanobacteria-monitoring. Please refer to the recommendation section for further information.

Note: Site 2 Gull (see map) was used as the reference point to give an overall representation of the Conway Lake water quality discussed above. For a more detailed discussion of water quality measurements, please refer to the executive summary within the annual Conway Lake report. The annual Conway Lake report includes a discussion of data collected at additional sampling locations.

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

Parameter	Ultraoligotrophic "Outstanding"	Oligo "Excellent"	Meso "Fair"	Eutrophic "Poor"	Conway Lake Average (range)	Conway Lake Classification
Water Clarity (meters)	> 7.0	4.0 – 7.0	2.5 - 4.0	< 2.5	**5.4** meters (range: 4.9 – 5.9)	Oligotrophic
Chlorophyll *a* (ppb)	< 2.0	2.0 - 3.0	3.0 - 7.0	> 7.0	**2.2** ppb (range: 1.6 – 3.1)	Oligotrophic
Total Phosphorus (ppb)	< 7.0	15.0 – 7.0	15.0 - 25.0	> 25.0	**6.8** ppb (range: 6.8 – 6.8)	Ultraoligotrophic
Dissolved Oxygen (mg/L)	> 7.0	5.0 – 7.0	2.0 – 5.0	<2.0	**3.1** mg/L (range: 2.5 – 3.8)	Mesotrophic
Cyanobacteria (cell counts, microcystin concentration & Water safety)	The Massachusetts Department of Public Health considers dangerous microcystin (MC) levels to be 14 micrograms per liter (ug/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 bottom layers**

LONG TERM TRENDS

WATER CLARITY: The Conway Lake water clarity data display a relatively stable trend over the past thirty-one years (1983-2013). The trend is not a statistically significant trend.

CHLOROPHYLL: The Conway Lake **c**hlorophyll *a* data display a trend of increasing chlorophyll *a* concentrations over the past thirty-one years (1983-2013). The trend is statistically significant

COLOR: The Conway Lake color data display a trend of increasing color concentrations over the twenty-nine years during which color data were collected (1985-2013). The trend is statistically significant.

TOTAL PHOSPHORUS: The Conway Lake total phosphorus concentrations have decreased over the past thirty-one years (1983-2013). The trend is not statistically significant.

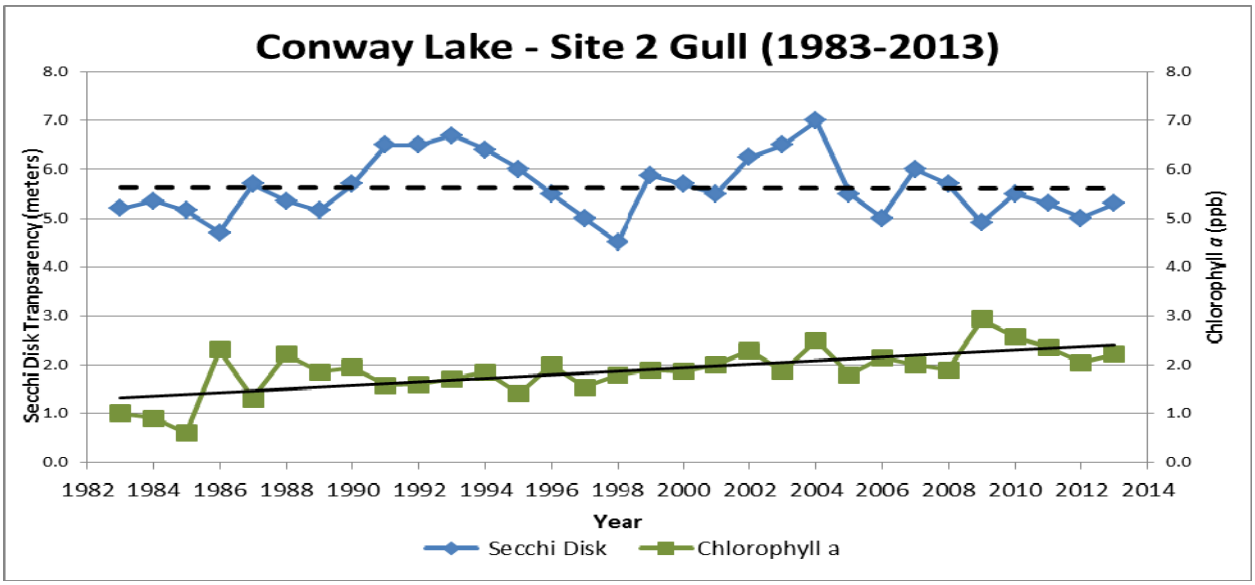


Figure 2. Changes in water clarity (Secchi disk depth) and chlorophyll *a* measured between 1983 and 2013 at Site 2 Gull. The annual Secchi Disk transparency has varied among years although the long-term trend indicates relatively stable water clarity (dashed line). The long-term algal growth (chlorophyll *a*) data indicate a trend of increasing concentrations (solid line). The long-term water clarity trend is not statistically significant while the long-term chlorophyll *a* trend is statistically significant.

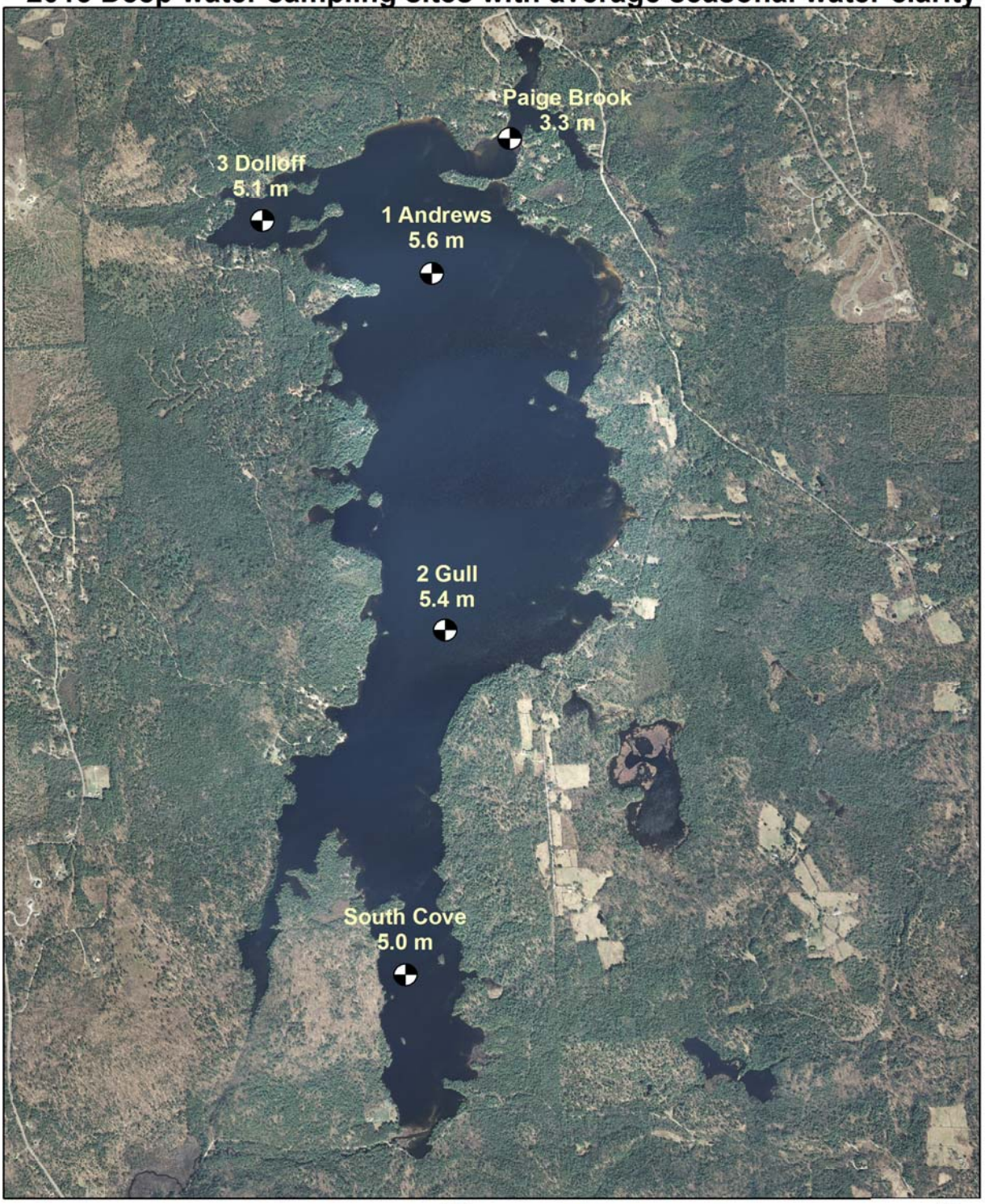
Recommendations:

- Start sampling earlier in the season (April/May) to document Conway Lake's reaction to the period of spring thaw and periods of high streamflow.
- Consider adding a simple cyanobacteria monitoring routine that is based on the existing water quality monitoring methods. Cyanobacteria collections throughout the summer and fall months can give insight as to how these populations are distributed throughout the seasons, and when they are most likely to be at 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 bob.craycraft@unh.edu.
- Implement Best Management Practices within the Conway Lake 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 more information on how to reduce nutrient loading caused by overland run-off.
    - https://extension.unh.edu/resources/files/Resource001799_Rep2518.pdf
    - http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf

Conway Lake

Conway & Eaton, NH

2013 Deep water sampling sites with average seasonal water clarity



N

0 0.175 0.35 0.7 1.05 1.4 Miles

Aerial Orthophoto Source: NH GRANIT
Site locations GPSed by the UNH Center of Freshwater Biology

University of New Hampshire
Cooperative Extension

New Hampshire Lakes Lay Monitoring