

LAKE WENTWORTH

2013 SAMPLING HIGHLIGHTS

WOLFEBORO, NH



Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Light Gray = No Data

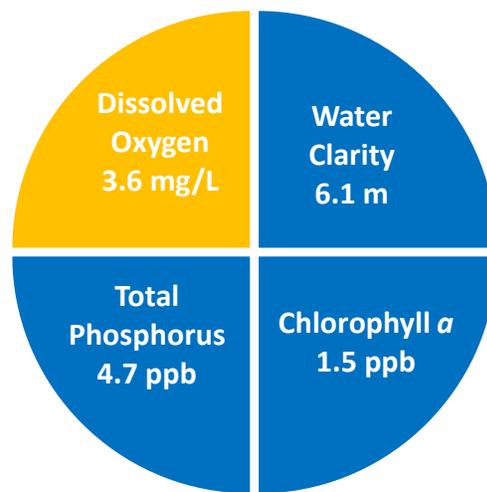


Figure 1. Average Water Quality Conditions

Wentworth volunteers collected water quality data between April 16 and September 17, 2013. A more in depth water quality survey of the Lake Wentworth deep sampling station was conducted by the Center for Freshwater Biology on August 5, 2013.

2013 RESULT HIGHLIGHTS

WATER CLARITY: Water clarity, measured as Secchi disk depth, averaged 6.1 meters (m) in Lake Wentworth. The 2013 Lake Wentworth water clarity was shallower than the 2012 water clarity.

CHLOROPHYLL: Chlorophyll *a*, a measure of microscopic plant life within the lake, averaged 1.5 parts per billion (ppb) in Lake Wentworth. The 2013 Lake Wentworth 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 taken from the surface waters averaged 5.2 parts per billion (ppb) and remained well 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 3.3 to 3.7 milligrams per liter (mg/L) on August 5 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 coldwater 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 Lake Wentworth color averaged 17.8 color units (CPU).

ALKALINITY: Alkalinity measures the resistance the lake has against acid rain. The Lake Wentworth alkalinity averaged 6.5 milligrams per liter (mg/L) and indicates a low vulnerability to acid rain. The Lake Wentworth pH, a measure of lake acidity, measured 7.0 units in the surface waters and remained within the acceptable range for most aquatic organisms on the August 5, 2013 sampling date.

SPECIFIC CONDUCTIVITY: Specific conductivity is a general indicator of pollution. Specific Conductivity measured 53.0 micro-Siemans per centimeter (*uS/cm*) in Lake Wentworth. The Lake Wentworth specific conductivity 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: Lake Wentworth did not take part in the 2013 cyanobacteria monitoring program. Please refer to the recommendation section for further information.

Note: Site 1 Fullers (see map) was used as the reference point to give an overall representation of the Lake Wentworth water quality discussed above. For a more detailed discussion of water quality measurements, please refer to the executive summary within the annual Lake Wentworth report. The annual Lake Wentworth Report includes a discussion of data collected at additional sampling locations.

Table 1. 2013 Lake Wentworth Seasonal Average Water Quality Readings and Trophic Level Classification Criteria used by the New Hampshire Department of Environmental Services

Parameter	Oligotrophic “Excellent”	Mesotrophic “Fair”	Eutrophic “Poor”	Lake Wentworth Average (range)	Lake Wentworth Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	6.1 meters (range: 5.4 – 7.1)	Oligotrophic
Chlorophyll <i>a</i> (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	1.5 ppb (range: 0.6 – 2.4)	Oligotrophic
Total Phosphorus (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	4.7 ppb (range: 3.7 – 5.7)	Oligotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	* 3.6 mg/L (range: 3.3 – 3.7)	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 (<i>ug/l</i>) 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 Lake Wentworth water clarity data display a trend of decreasing water clarity over the past thirty years. The trend is statistically significant.

CHLOROPHYLL: The Lake Wentworth chlorophyll *a* data display a trend of increasing chlorophyll *a* concentrations over the past thirty years. The trend is not statistically significant.

COLOR: The Lake Wentworth color data display a trend of increasing color concentrations over the twenty six year period during which color data were collected (1987 – 2013). The trend is not statistically significant.

TOTAL PHOSPHORUS: The Lake Wentworth total phosphorus concentrations have increased over twenty-four year period during which total phosphorus data were collected (1986 – 2013). The trend is not statistically significant.

In summary, there are indications that the Lake Wentworth water quality has declined over the past thirty years. Water transparency displayed a statistically significant trend of decreasing water clarity, while chlorophyll *a* and total phosphorous display trends of increasing concentrations.

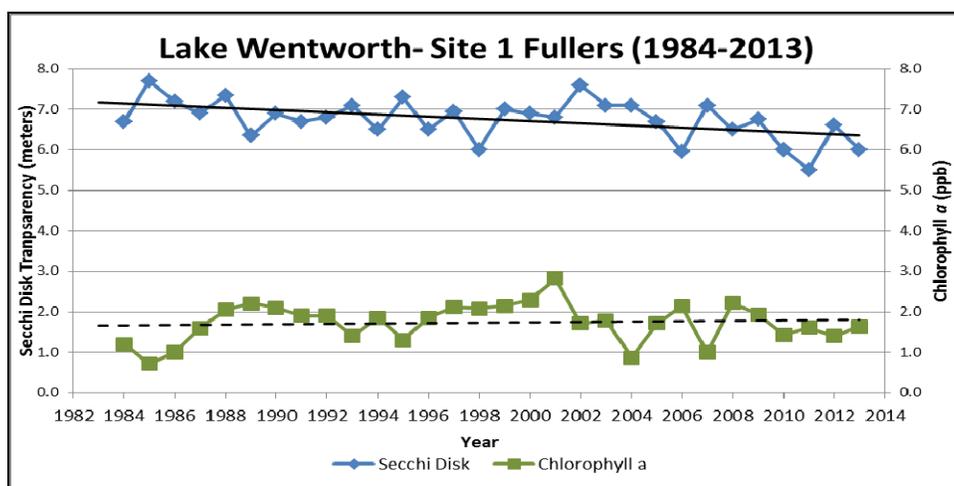


Figure 2. Changes in water clarity (Secchi disk depth) and chlorophyll *a* measured between 1984 and 2013 at Site 1 Fullers. The long-term water clarity data indicate a trend of increasing water clarity (solid line). The long-term algal growth (chlorophyll *a*) indicate a trend of increasing concentrations (dashed line). The long-term water clarity trend is statistically significant while the long-term chlorophyll *a* trend is not statistically significant.

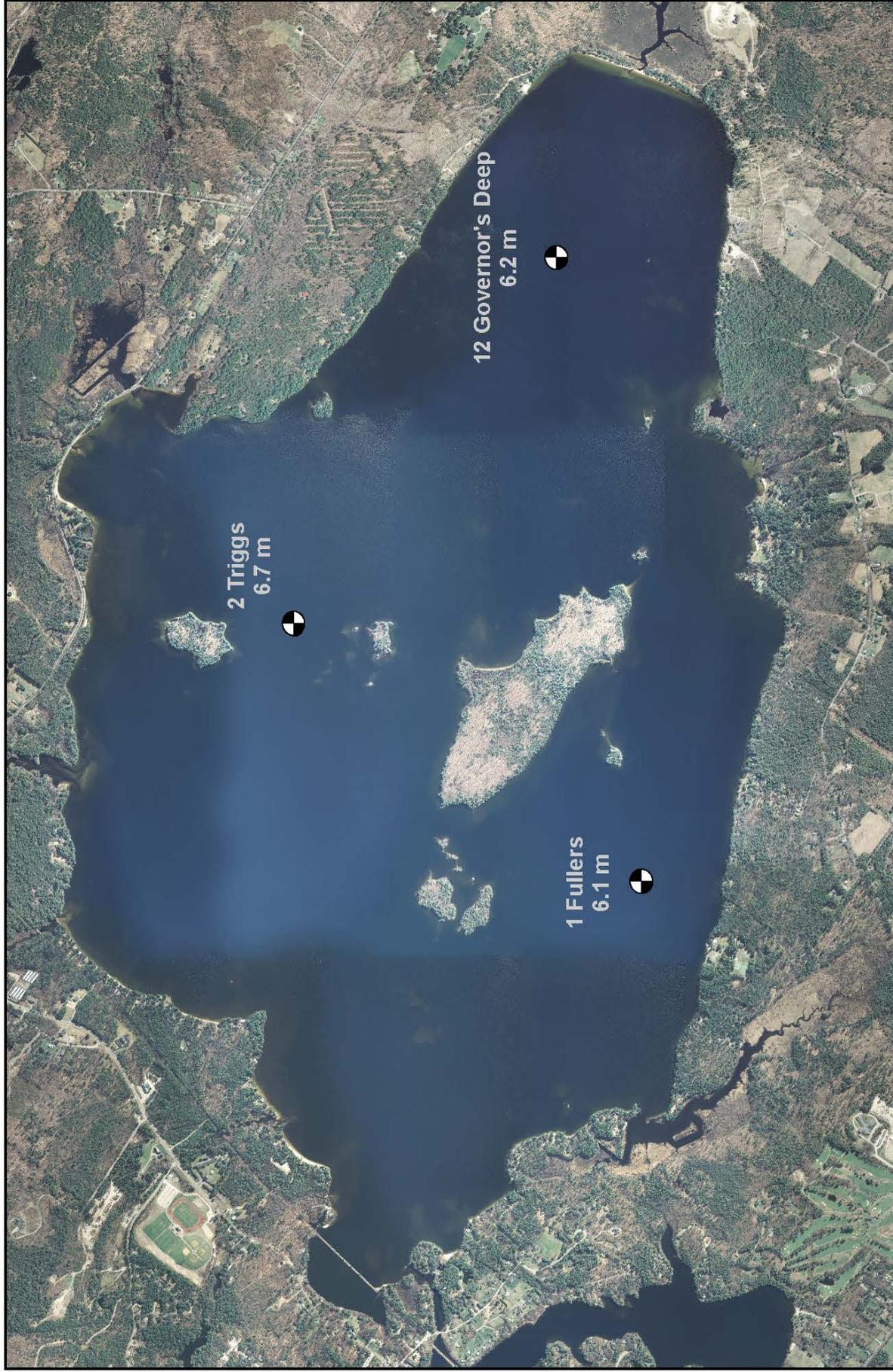
Recommendations:

- Review the Lake Wentworth and Crescent Lake Watershed Management Plan that provides an assessment of the Lake Wentworth water quality and discusses management strategies that can stabilize and improve water quality, <http://des.nh.gov/organization/divisions/water/wmb/was/documents/lake-wentworth-crescent-lake.pdf>
- 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](mailto:Bob.Craycraft@862-3696) or bob.craycraft@unh.edu.

Lake Wentworth

Wolfeboro, NH

2013 Deep water sampling sites with average seasonal water clarity



Miles
0 0.15 0.3 0.6 0.9 1.2



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Cooperative Extension

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