

CHOCORUA LAKE

2014 SAMPLING HIGHLIGHTS

Station – 1 South

Tamworth, NH



University of New Hampshire
Cooperative Extension

Refer to the 2014 Chocorua Lake Annual Report for additional information.

Blue = Excellent =
Oligotrophic

Yellow = Fair =
Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

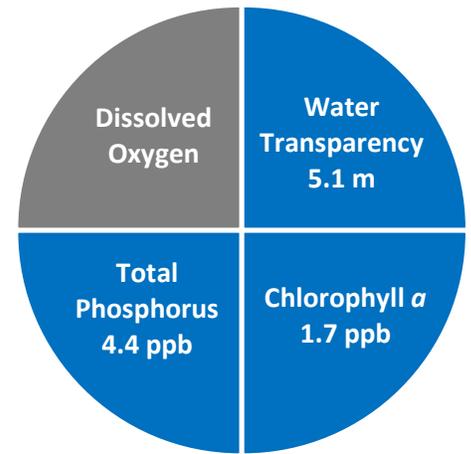


Figure 1. Chocorua Lake Water Quality (2014)

Table 1. 2014 Chocorua Lake Seasonal Averages and NH DES Trophic Level Classification Criteria

| Parameter | Oligotrophic "Excellent" | Mesotrophic "Fair" | Eutrophic "Poor" | Chocorua Lake Average (range) | Chocorua Lake Classification |
|-------------------------|--------------------------|--------------------|------------------|-------------------------------|------------------------------|
| Water Clarity (meters) | > 4.0 | 2.5 – 4.0 | < 2.5 | 5.1 meters (3.7 – 6.1) | Oligotrophic |
| Chlorophyll a (ppb) | < 3.3 | 3.3 – 5.0 | > 5.0 | 1.7 ppb (1.2 – 3.1) | Oligotrophic |
| Total Phosphorus (ppb) | < 8.0 | 8.0 – 12.0 | > 12.0 | 4.4 ppb (3.5 – 7.7) | Oligotrophic |
| Dissolved Oxygen (mg/L) | 5.0 – 7.0 | 2.0 – 5.0 | < 2.0 | N/A | N/A |

Table 2. 2014 Chocorua Lake Seasonal Average Accessory Water Quality Measurements

| Parameter | Assessment Criteria | | | | | Chocorua Lake Average (range) | Chocorua Lake Classification |
|-------------------------------|--|--------------------------------|--|---|-----------------------|---------------------------------------|--|
| | < 10 uncolored | 10 – 20 slightly colored | 20 – 40 lightly tea colored | 40 – 80 tea colored | > 80 highly colored | | |
| Color (color units) | < 10 uncolored | 10 – 20 slightly colored | 20 – 40 lightly tea colored | 40 – 80 tea colored | > 80 highly colored | 20.7 color units (12.3 – 27.1) | Lightly tea colored |
| Alkalinity (mg/L) | < 0.0 acidified | 0.1 – 2.0 extremely vulnerable | 2.1 – 10 moderately vulnerable | 10.1 – 25.0 low vulnerability | > 25.0 not vulnerable | 4.0 mg/L (2.8 – 5.2) | Moderately vulnerable |
| pH (std units) | < 5.5 suboptimal for successful growth and reproduction | | 6.5 – 9.0 optimal range for fish growth and reproduction | | | 6.9 standard units (range: 6.6 – 7.0) | Optimal range for fish growth and reproduction |
| Specific Conductivity (uS/cm) | < 50 uS/cm Characteristic of minimally impacted NH lakes | | 50-100 uS/cm Lakes with some human influence | > 100 uS/cm Characteristic of lakes experiencing human disturbances | | 32.7 uS/cm (range: 31.0 – 33.6) | Characteristic of minimally impacted NH lakes |

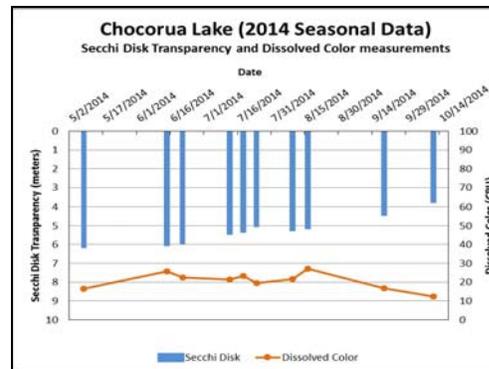
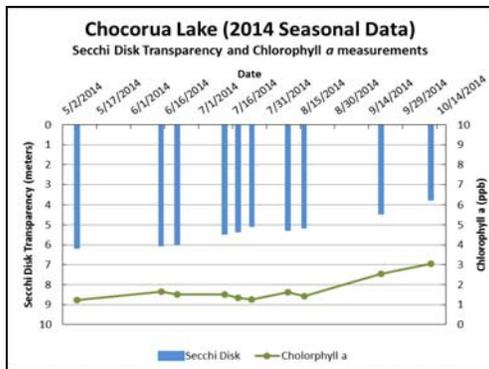


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll a changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll a and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll a and/or color concentrations.

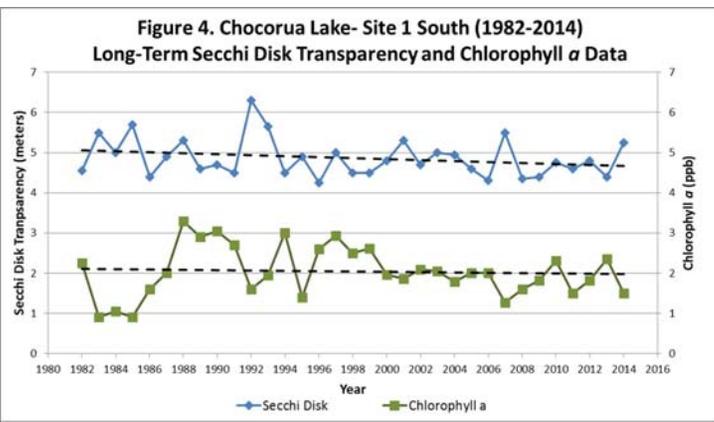
LONG TERM TRENDS

WATER CLARITY: Water clarity, measured as Secchi disk depth, decreased between 1982 and 2014 (Figure 4). Water transparency data collected before (1982-1999) and after (2000-2014) the implementation of erosion control measures along the Route 16 travel corridor both display a trend of decreasing water clarity (Figures 6 and 7).

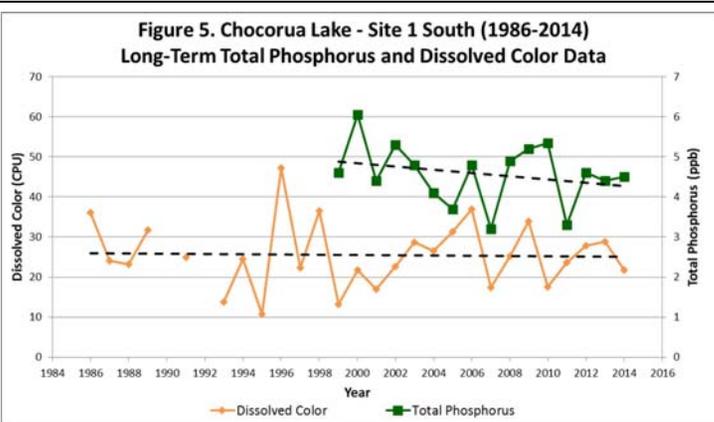
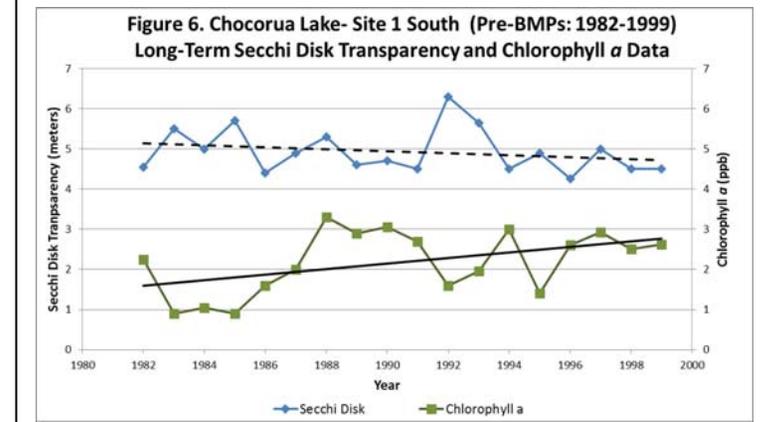
CHLOROPHYLL: Chlorophyll *a*, a measure of microscopic plant life within the lake, increased between 1982 and 2014. An examination of the chlorophyll data collected before and after the installation of erosion control measures along the Route 16 travel corridor indicates the water quality has improved in recent years. The chlorophyll *a* concentrations increased by approximately 2.0 parts per billion (ppb) between 1982 and 1999 (Figure 6) while the chlorophyll *a* concentrations documented between 2000 and 2014 (Figure 7), following the installation of erosion control measures, have stabilized.

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The long-term total phosphorus data display a trend of decreasing concentrations between 1999 and 2014 (Figure 5). Note: total phosphorus data were not collected consistently prior to the 1999 sampling season.

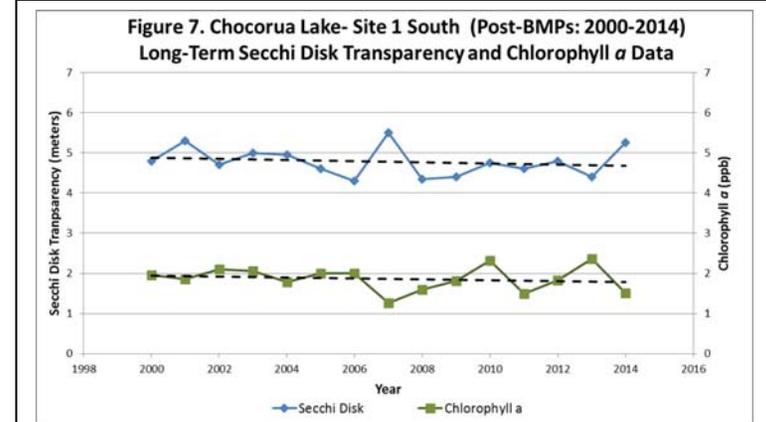
COLOR: Color is a result of naturally occurring “tea” color substances from the breakdown of soils and plant materials. Color has varied annually and displays a relatively stable trend between 1986 and 2014 (Figure 5).



Figures 4 and 5. Changes in the Chocorua Lake water clarity (Secchi Disk depth), chlorophyll *a*, total phosphorus and dissolved color concentrations measured between 1982 and 2014. **These data illustrate the relationship among plant growth, water color and water clarity. Total phosphorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Trendlines are displayed for each of the four water quality measurements.



Figures 6 and 7. Changes in the Chocorua Lake water clarity (Secchi Disk depth) and chlorophyll *a* measured before (1982-1999) and after (2000-2014) the installation of erosion control measures, known as best management practices (BMPs), along the Route 16 travel corridors. Trendlines are displayed for both the water clarity and chlorophyll *a* measurements..



Recommendations

Implement Best Management Practices within the Chocorua Lake watershed to minimize the adverse impacts of polluted runoff and erosion into Chocorua 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 homeowners can 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>

Figure 8. Chocorua Lake

Tamworth, NH

2014 Deep sampling site with seasonal average water clarity



0.2 0.1 0 0.2 Miles



Aerial Orthophoto Source: NH GRANIT
Site locations GPS coordinates collected by the UNH Center of Freshwater Biology



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