

SUNSET LAKE

2018 SAMPLING HIGHLIGHTS

Station – 1 Deep

Hampstead, NH



Water quality data displayed in Tables 1, 2 and 3 are surface water measurements with the exception of the dissolved oxygen data that were collected near the lake bottom. The data reported in Tables 1, 2 and 3 were collected at the deep and centrally located sampling location, Site 1 Deep (Figure 5).

Blue = Excellent = Oligotrophic
Yellow = Fair = Mesotrophic
Red = Poor = Eutrophic
Gray = No Data

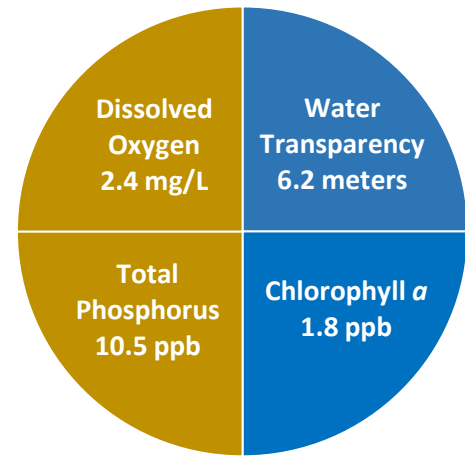


Figure 1. Sunset Lake Water Quality (2018)

Table 1. 2018 Sunset Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria¹

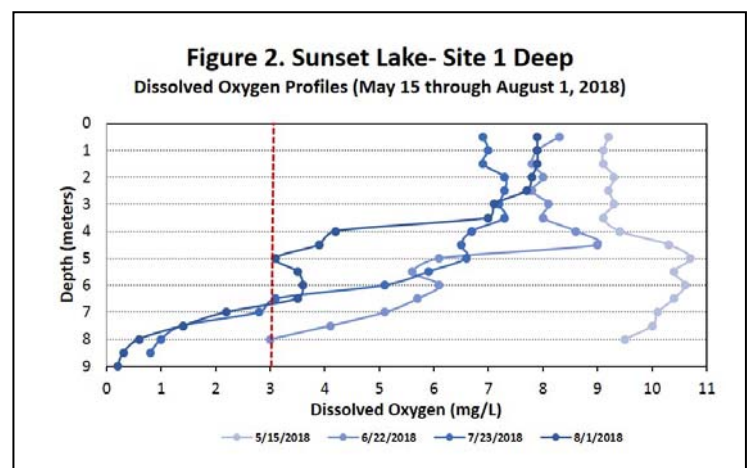
| Parameter | Oligotrophic "Excellent" | Mesotrophic "Fair" | Eutrophic "Poor" | Sunset Lake Average (range) | Sunset Lake Classification |
|-------------------------------------|--------------------------|--------------------|------------------|-----------------------------|----------------------------|
| Water Clarity (meters) | > 4.0 – 7.0 | 2.5 - 4.0 | < 2.5 | 6.2 meters (4.0 – 7.5) | Oligotrophic |
| Chlorophyll a ¹ (ppb) | < 3.3 | > 3.3 – 5.0 | > 5.0 – 11.0 | 1.8 ppb (single value) | Oligotrophic |
| Total Phosphorus ¹ (ppb) | < 8.0 | > 8.0 – 12.0 | > 12.0 – 28.0 | 10.5 ppb (Single Value) | Mesotrophic |
| Dissolved Oxygen (mg/L) | 5.0 – 7.0 | 2.0 – 5.0 | <2.0 | 2.4 mg/L (0.2 – 4.2) | Mesotrophic |

* Dissolved oxygen concentrations were measured between 4.0 and 9.0 meters, in the layer of rapidly decreasing temperatures, on August 1, 2018.

Table 2. 2018 Sunset Lake Seasonal Average Accessory Water Quality Measurements

| Parameter | Assessment Criteria | | | | | Sunset Lake Average (range) | Sunset 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 | 13.0 color units (Single value) | Slightly 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 | 19.2 mg/L (Single value) | Low vulnerability |
| pH (std units) | < 5.5 suboptimal for successful growth and reproduction | | 6.5 – 9.0 optimal range for fish growth and reproduction | | | 7.5 standard units (range: 7.4 – 7.5) | 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 | | 303.5 uS/cm (range: 297.0 – 310.2) | Characteristic of lakes experiencing human disturbances |

Figure 2. Site 1 Deep dissolved oxygen profiles were collected between May 15 and August 1, 2018. The vertical red line indicates the oxygen concentration commonly considered the threshold for successful growth and reproduction of warm water fish such as bass and perch. Notice the low oxygen concentrations near the lake bottom.



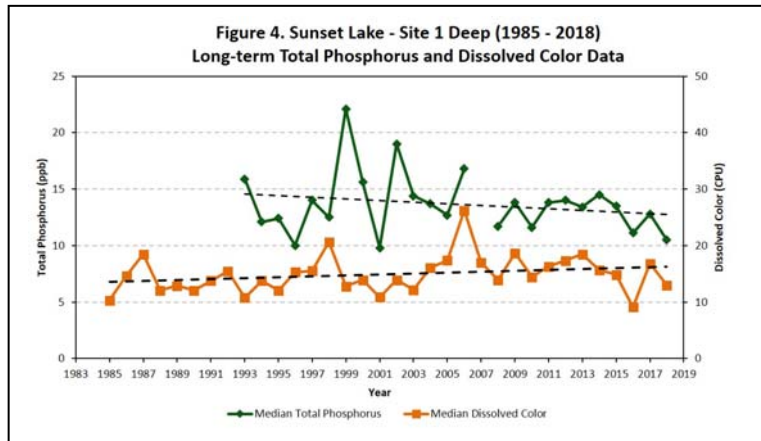
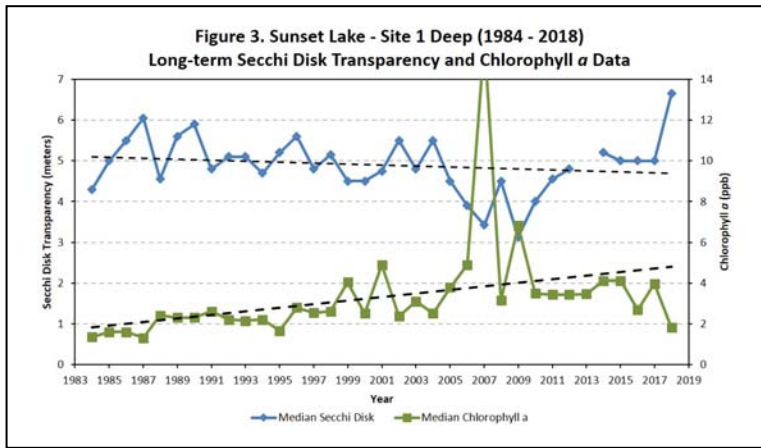
LONG-TERM TRENDS

WATER CLARITY: The Site 1 Deep water clarity measurements, measured as Secchi Disk transparency, display a trend of decreasing water clarity since 1984 (Figure 4). On a positive note, the Secchi Disk transparency has stabilized over the past four years with particularly clear water documented during the 2018 sampling season.

CHLOROPHYLL: The Site 1 Deep chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of increasing concentrations since 1984 (Figure 4). On a positive note, the chlorophyll *a* concentrations have stabilized since 2010.

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Site 1 Deep total phosphorus concentrations have oscillated among years while the long-term trend suggest a slight reduction (improvement) in total phosphorus concentrations (Figure 5).

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 1985 and 2018 (Figure 5).



Recommendations:

Implement Best Management Practices within the Sunset Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Sunset 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/Resource004159_Rep5940.pdf
- <http://soaknh.org/wp-content/uploads/2016/04/NH-Homeowner-Guide-2016.pdf>
- <https://extension.unh.edu/resource/rain-gardens-design-and-installation>

Figures 3 and 4. Changes in the Site 1 Deep water clarity (Secchi Disk depth), chlorophyll *a* and total phosphorus concentrations measured between 1984 and 2018. **These data illustrate the relationship between plant growth and water clarity. Total phosphorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Long-term trends are based on the analysis of annual median concentrations.

Table 3. Sunset Lake near-shore total phosphorus measurements collected on August 1, 2018 as part of a shoreline survey. The total phosphorus concentrations were relatively stable among sampling locations during the August 1, 2018 survey.

Table 3. Near-shore Total Phosphorus Inter-comparison (2018)

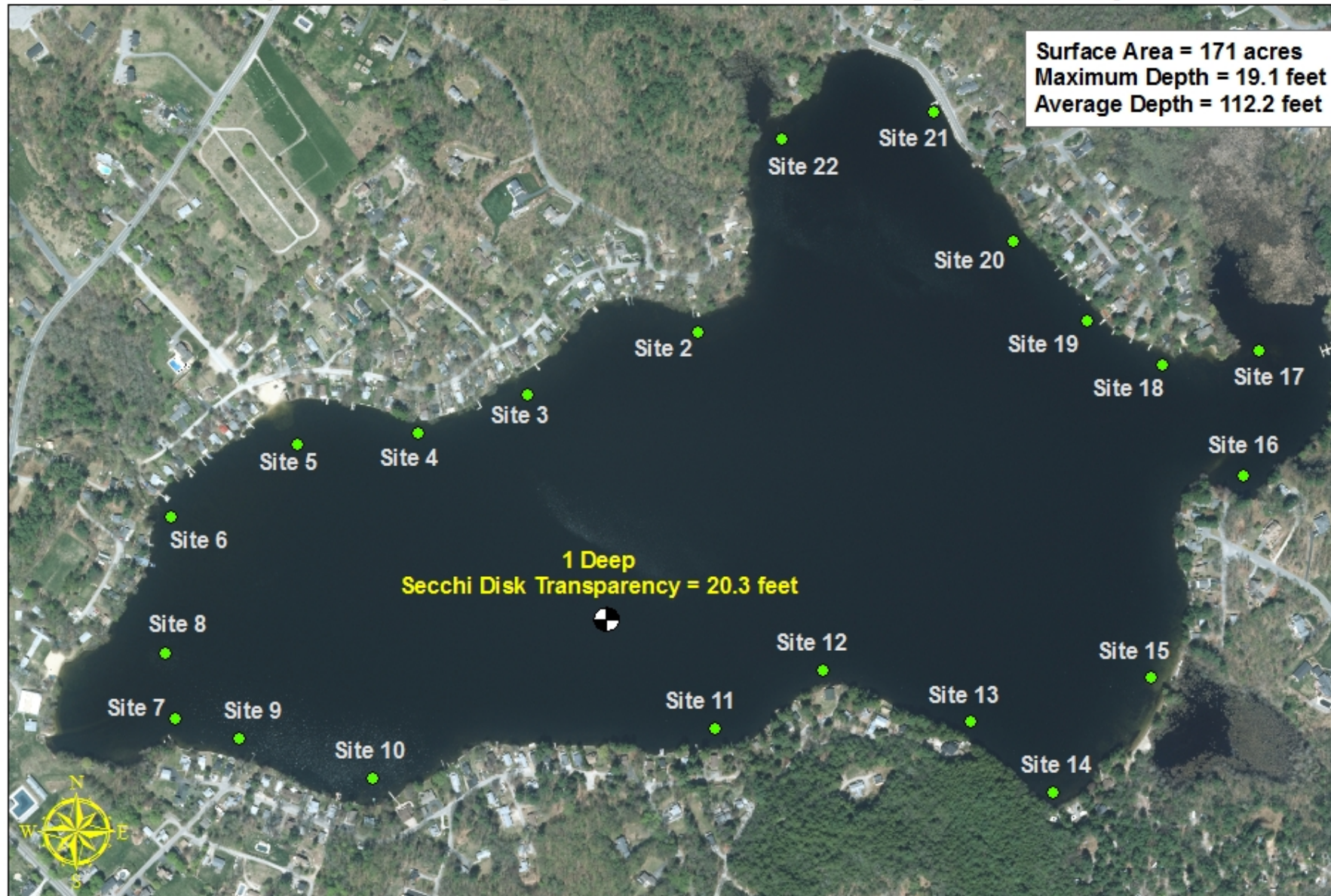
| Site | Total Phosphorus (ppb) |
|------|------------------------|
| S-02 | 9.5 |
| S-05 | 8.9 |
| S-07 | 9.9 |
| S-12 | 9.2 |
| S-15 | 8.9 |
| S-17 | 10.0 |
| S-22 | 10.9 |

- *Total phosphorus samples were collected on August 1, 2018 around the shoreline of Sunset Lake. The near-shore total phosphorus samples were collected at a standardized depth of 0.5 meters.*

Figure 5. Sunset Lake

Hampstead, NH

2018 Deep water sampling station and seasonal average water clarity



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



Extension

