

SUNSET LAKE

2019 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 and 2 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

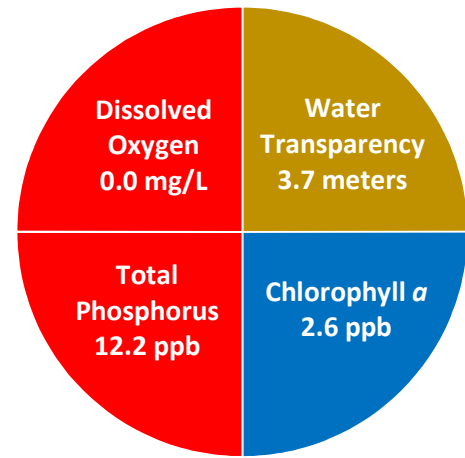


Figure 1. Sunset Lake Water Quality (2019)

Table 1. 2019 Sunset Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria¹

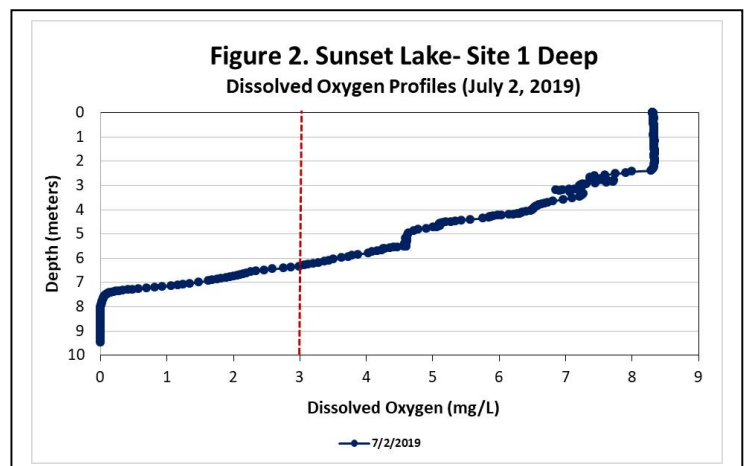
Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Sunset Lake Average (range)	Sunset Lake Classification
Water Clarity (meters)	> 4.0 – 7.0	2.5 - 4.0	< 2.5	3.7 meters (single value)	Mesotrophic
Chlorophyll α ¹ (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	2.6 ppb (single value)	Oligotrophic
Total Phosphorus ¹ (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	12.2 ppb (single Value)	Eutrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	0.0 mg/L (0.0 – 0.1)	Eutrophic

* Dissolved oxygen concentrations were measured between 7.5 and 9.5 meters, in the cold bottom water layer, on July 2, 2019.

Table 2. 2019 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	20.4 color units (Single value)	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	20.0 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			7.6 standard units (range: 7.5 – 7.6)	Optimal range for fish growth and reproduction
Specific Conductivity (μ S/cm)	< 50 μ S/cm Characteristic of minimally impacted NH lakes		50-100 μ S/cm Lakes with some human influence	> 100 μ S/cm Characteristic of lakes experiencing human disturbances		276.8 μ S/cm (range: 276.1 – 277.3)	Characteristic of lakes experiencing human disturbances

Figure 2. Site 1 Deep dissolved oxygen profiles were collected on July 2, 2019. 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.



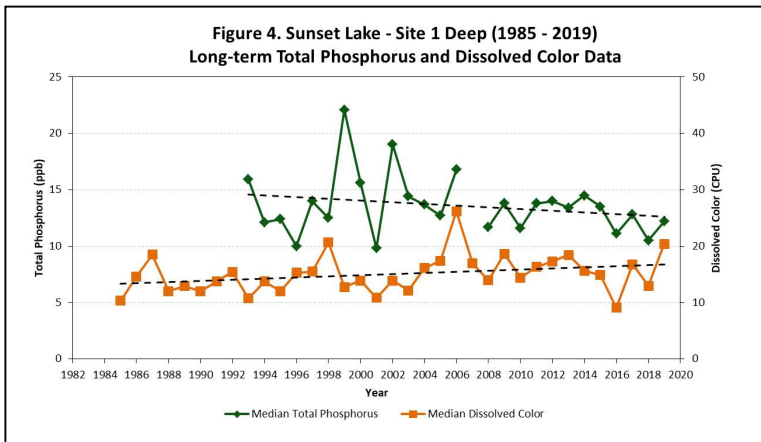
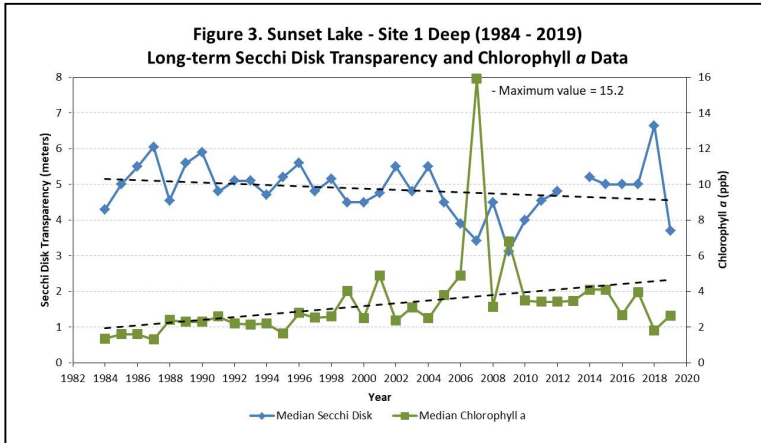
LONG-TERM TRENDS

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 was relatively stable between 2014 and 2017 before varying widely the past two years.

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 with the two lower seasonal average values documented over the past two seasons.

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 suggests 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 trend of decreasing concentrations between 1985 and 2019 (Figure 5).



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 2019. **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. Median values reduce the impact of atypically high or low values and are preferred over the use of average values for long-term trend analysis. When a single measurement is collected, the mean and median values are identical.

Table 3. Sunset Lake near-shore total phosphorus measurements collected on July 2, 2019 as part of a shoreline survey. The July 2, 2019 total phosphorus concentrations were relatively stable among sampling locations.

Table 3. Near-shore Total Phosphorus Inter-comparison (2019)

Site	Total Phosphorus (ppb)
S-03	12.9
S-05	13.4
S-07	12.1
S-08	11.9
S-10	11.2
S-12	11.8
S-14	11.3
S-15	10.8
S-17	15.3
S-20	10.5
S-22	10.3

- *Total phosphorus samples were collected on July 2, 2019 around the shoreline of Sunset Lake. The near-shore total phosphorus samples were collected at a standardized depth of 0.5 meters.*

Recommendations:

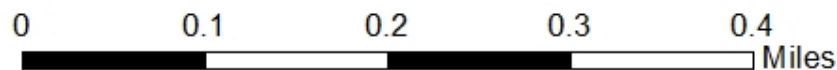
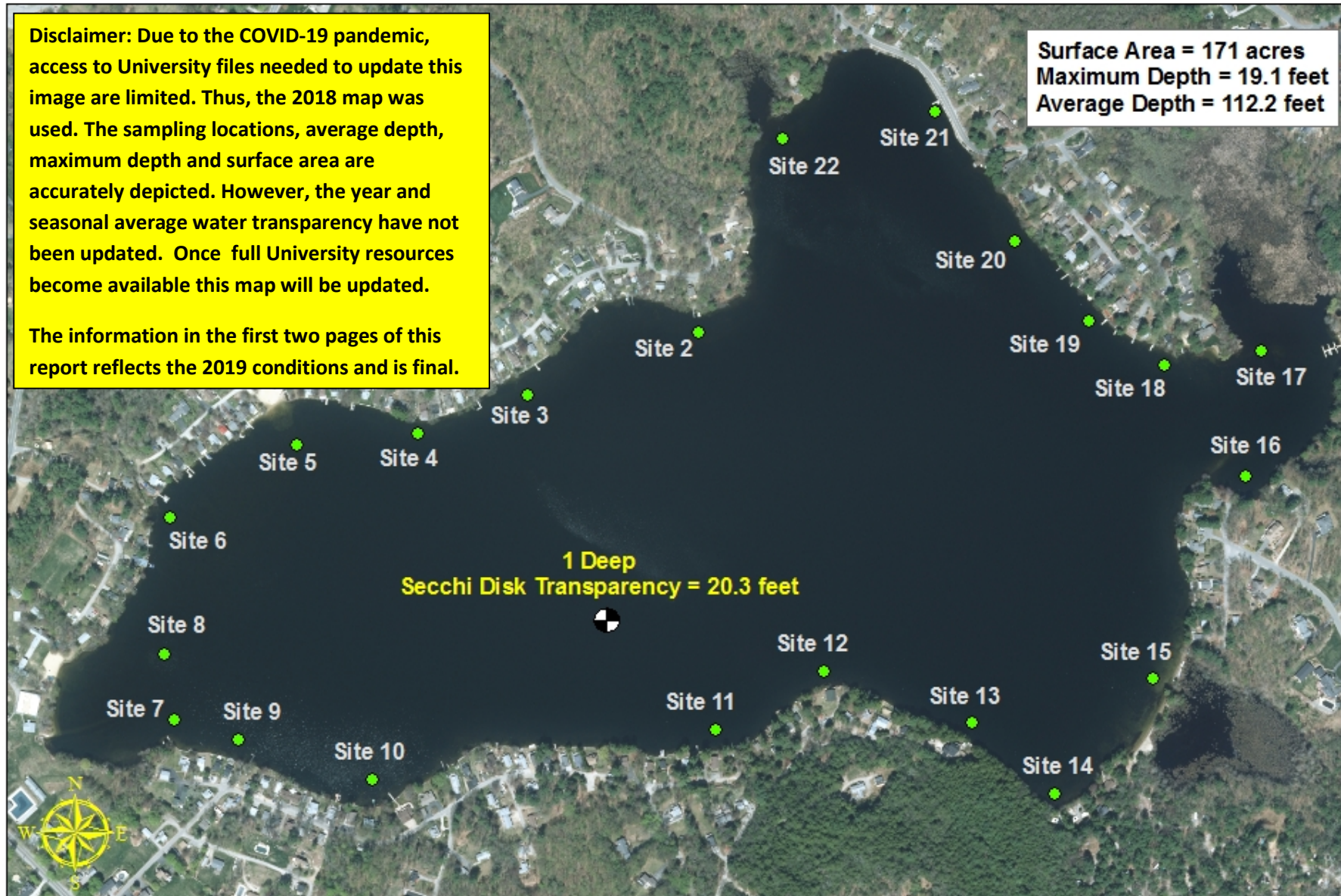
Implement Best Management Practices within the Sunset Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Sunset Lake. Refer to “Landscaping at the Water’s Edge: An Ecological Approach” and “New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself Stormwater 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
- <https://www.des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>
- <https://extension.unh.edu/resource/rain-gardens-design-and-installation>

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

