SUNSET LAKE

2016 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.

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

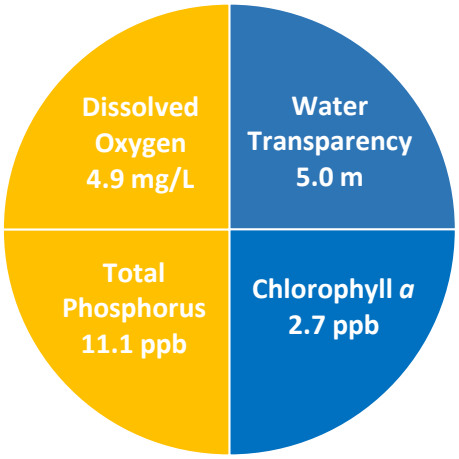


Figure 1. Sunset Lake Water Quality (2016)

Table 1. 2016 Sunset Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

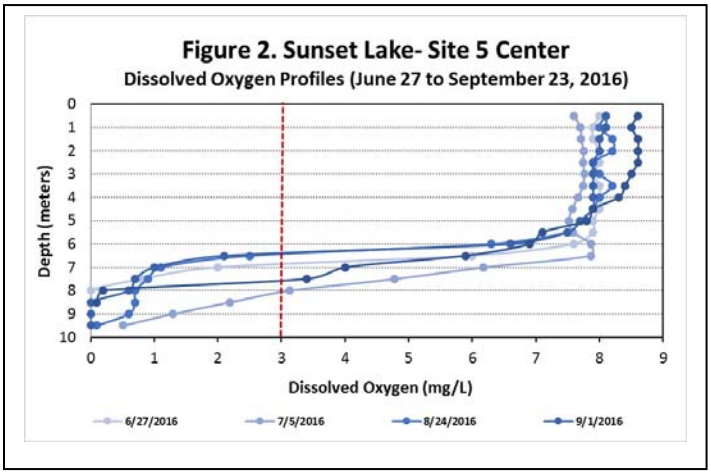
Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Sunset Lake Average (range)	Sunset Lake Classification
Water Clarity (meters)	> 4.0 – 7.0	2.5 - 4.0	< 2.5	**5.0** meters (4.5 – 5.6)	Oligotrophic
Chlorophyll *a* [1] (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	**2.8** ppb (1.3 – 3.9)	Oligotrophic
Total Phosphorus [1] (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	**11.1** ppb (Single Value)	Mesotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	**4.9** mg/L (0.5 – 7.9)	Mesotrophic

* Dissolved oxygen concentrations were measured between 5.0 and 9.0 meters, in the layer of rapidly decreasing temperatures, on July 5, 2016.

Table 2. 2016 Sunset Lake Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Sunset Lake 1 Deep Average (range)	Sunset Lake 1 Deep Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	**9.1** color units (8.7 – 9.5)	Uncolored
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 (19.7 – 20.2)	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 (7.4 – 7.5)	Optimal range for fish growth and reproduction
Specific Conductivity (*u*S/cm)	< 50 *u*S/cm Characteristic of minimally impacted NH lakes		50-100 *u*S/cm Lakes with some human influence	> 100 *u*S/cm Characteristic of lakes experiencing human disturbances		**297.6** *u*S/cm (292.0 – 301.0)	Experiencing human influences

Figure 2. Site 1 Deep dissolved oxygen profiles were collected between June 27 and September 23, 2016. 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 concentations near the lake bottom.*

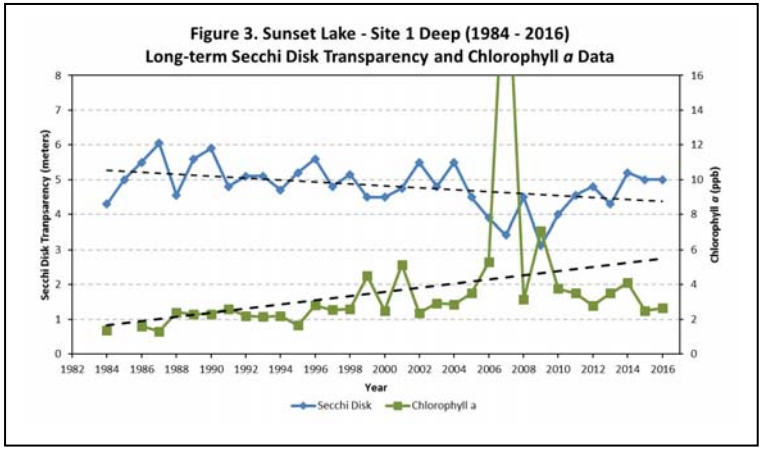


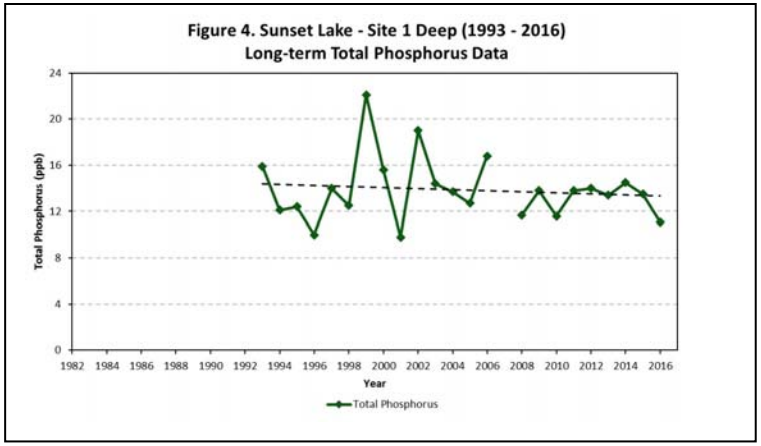
LONG-TERM TRENDS

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).

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).

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 is relatively stable (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 2016. **These data illustrate the relationship between plant growth and water clarity. Total phopshorus data are also displayed and are oftentimes correlated with the amount of plant growth.** Trendlines are displayed when sufficient data are available.

Table 3. Sunset Lake near-shore total phosphorus and specific conducivity measurements collected on July 5, 2016 as part of a shoreline survey. The specific conductivity measrements were similar among sampling locations while the total phosphorus concentrations were more variable among sampling locations.

Table 3. Near-shore Sample Site Water Quality Inter-comparison (2016)

Site	Total Phosphorus (ppb)	Specific Conductivity (uS/cm)
S-02	12.3	254
S-03	12.3	254
S-04	11.5	253
S-05	11.4	253
S-06	12.2	254
S-07	11.5	254
S-08	13.0	254
S-09	11.2	254
S-10	12.4	254
S-11	11.9	254
S-12	12.0	254
S-13	11.6	254
S-14	11.7	254
S-15	13.4	252
S-16	11.9	254
S-17	17.5	254
S-18	11.9	254
S-19	13.2	254
S-20	13.7	254
S-21	12.7	254
S-22	13.7	254

- *Total phosphorus and Specific Conductivity measurements were collected by the **CFB** on July 5, 2016 around the shoreline of Sunset Lake.*

Recommendations:

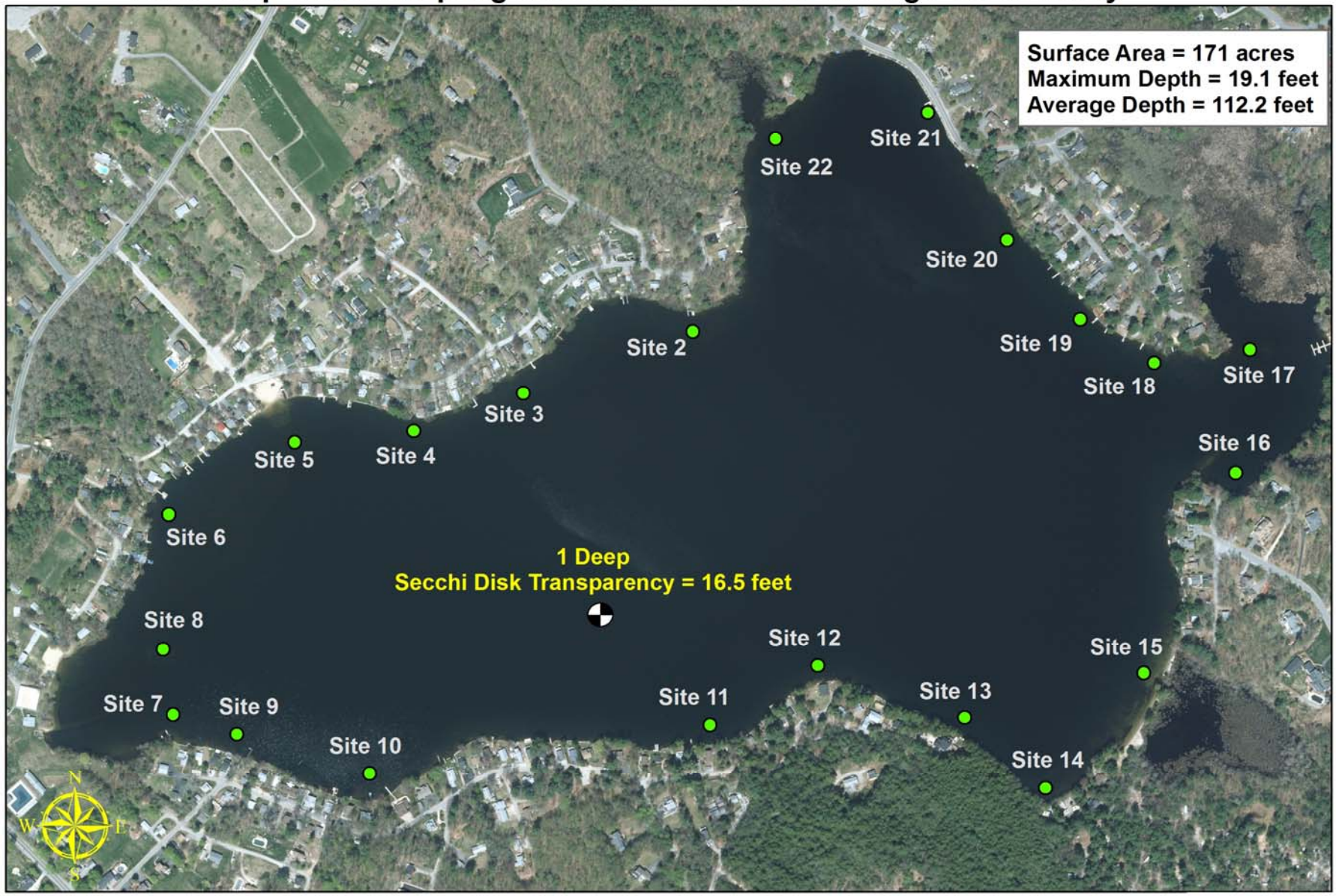
Implement Best Management Practices within the Sunset Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Sunset Lake. Refer to "Landscaping at the Water's Edge: An Ecological Approach" and "New Hampshire Homeowner's Guide to Stormwater Management: Do-It-Yourself Stormwater Solutions for Your Home" for more information on how to reduce nutrient loading caused by overland run-off.

- http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- http://soaknh.org/wp-content/uploads/2016/04/NH-Homeowner-Guide-2016.pdf

Figure 5. Sunset Lake

Hampstead, NH

2016 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

NH Extension

NEW HAMPSHIRE LAKES LAY MONITORING