

SWAINS LAKE

2016 SAMPLING HIGHLIGHTS

Station A

Barrington, NH



Refer to the Swains Lake Annual Report (2016) for additional information.

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

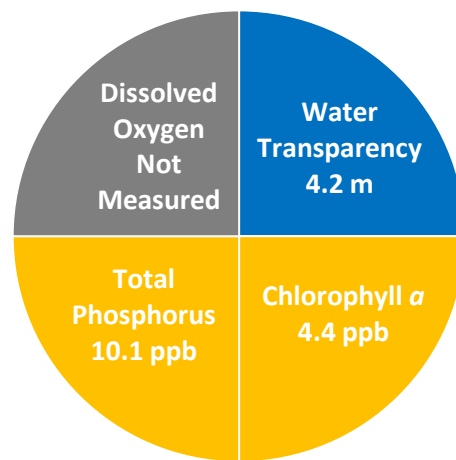


Figure 1. Swains Lake Water Quality (2016)

Table 1. 2016 Swains Lake (Site A) Seasonal Averages and NH DES Trophic Level Classification Criteria

| Parameter | Oligotrophic "Excellent" | Mesotrophic "Fair" | Eutrophic "Poor" | Swains Lake Average (range) | Swains Lake Classification |
|----------------------------|--------------------------|--------------------|------------------|-----------------------------|----------------------------|
| Water Clarity (meters) | 4.0 – 7.0 | 2.5 - 4.0 | < 2.5 | 4.2 meters (2.8 – 5.3) | Oligotrophic |
| Chlorophyll <i>a</i> (ppb) | < 3.3 | > 3.3 – 5.0 | > 5.0 – 11.0 | 4.4 ppb (3.1 – 6.4) | Mesotrophic |
| Total Phosphorus (ppb) | < 8.0 | > 8.0 – 12.0 | > 12.0 – 28.0 | 10.1 ppb (9.1 – 11.3) | Mesotrophic |
| Dissolved Oxygen (mg/L) | 5.0 – 7.0 | 2.0 – 5.0 | <2.0 | Not Measured | ----- |

Table 2. 2016 Swains Lake (Site A) Seasonal Average Accessory Water Quality Measurements

| Parameter | Assessment Criteria | | | | | Swains Lake Average (range) | Swains 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 | 26.2 color units (21.2 – 31.0) | 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 | 2.7 mg/L (2.0 – 3.1) | Moderately vulnerable |
| pH (std units) | < 5.5 suboptimal for successful growth and reproduction | | 6.5 – 9.0 optimal range for fish growth and reproduction | | | 6.8 standard units (6.5 – 7.3) | 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 | | 118.4 uS/cm (114.8 – 120.5) | Characteristic of lakes experiencing human disturbances |

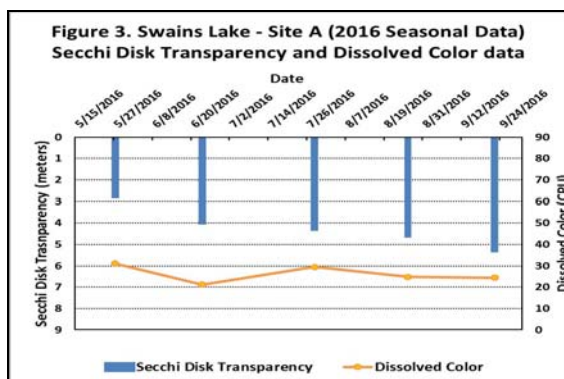
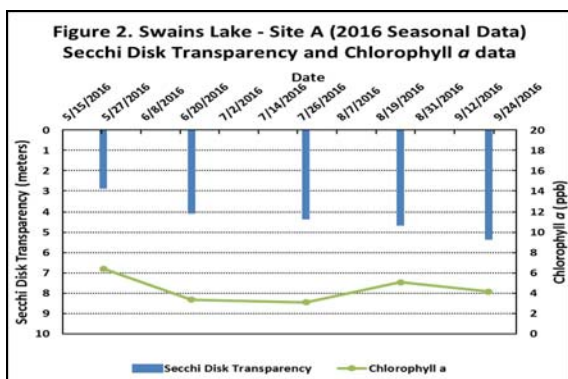


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in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

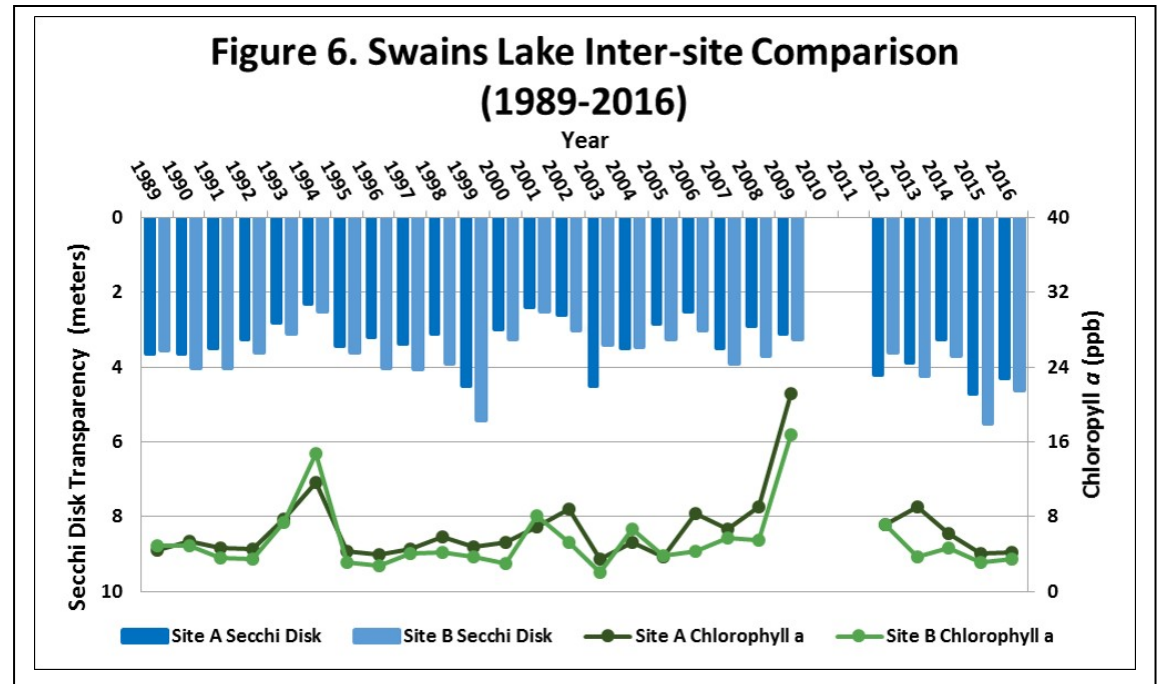
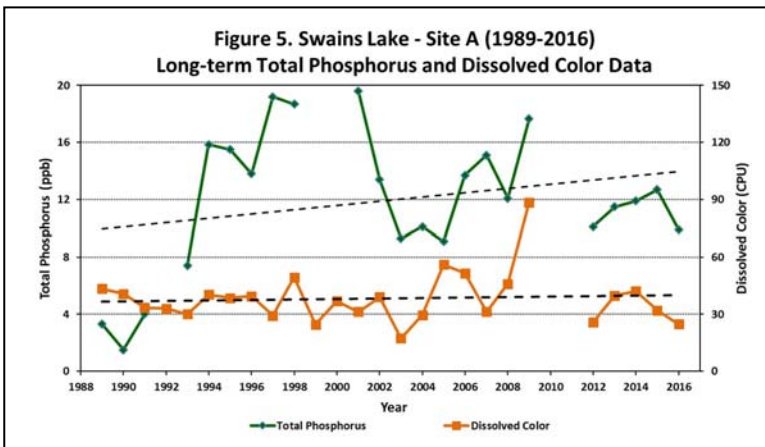
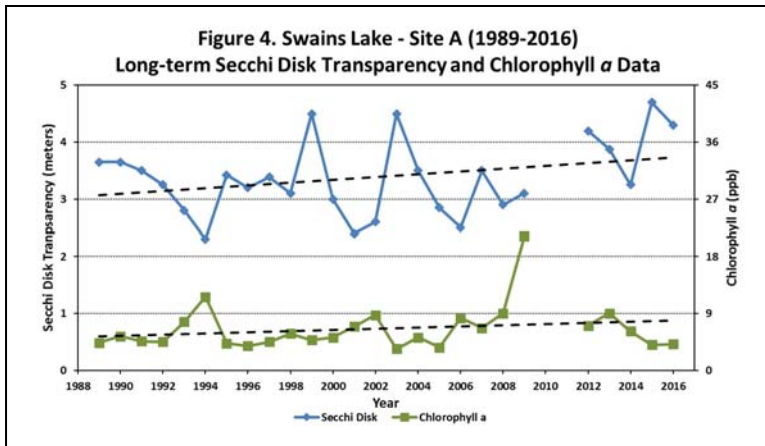
LONG-TERM TRENDS

WATER CLARITY: The Swains Lake water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity (Figure 4).

CHLOROPHYLL: The Swains Lake chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of increasing microscopic plant growth (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Swains Lake total phosphorus concentrations display a trend of increasing concentrations (Figure 5).

COLOR: The Swains Lake color data, the result of naturally occurring “tea” color substances from the breakdown of soils and plant materials, have oscillated among years while the long-term trend is stable (Figure 5).



Figures 4 and 5. Changes in the Swains Lake water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1989 and 2016. **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.**

Figure 6. Inter-site comparison of the annual Swains Lake Site A (dark shading) and Site B (light shading) water clarity and chlorophyll *a* concentrations. The inter-site comparison data provide a general sense of the variability between the two long-term Swains Lake sampling locations.

Recommendations

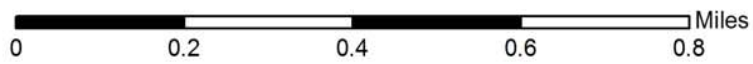
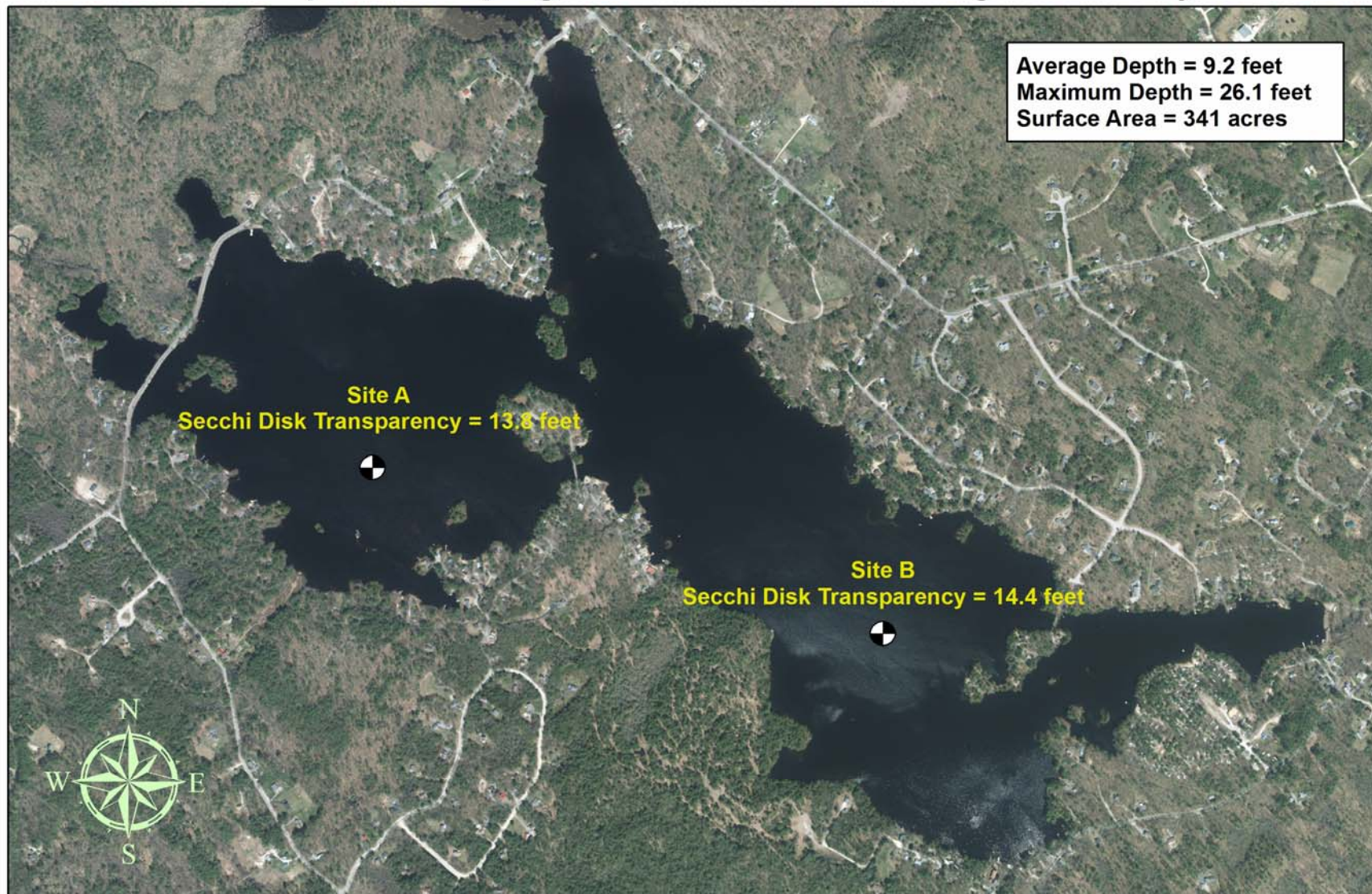
Implement Best Management Practices within the Swains Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Swains Lake. Refer to “Landscaping at the Water’s Edge: An Ecological Approach” and “New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself Stormwater 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 7. Swains Lake

Barrington, NH

2016 deep water sampling stations and seasonal average water clarity



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



Extension

