

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

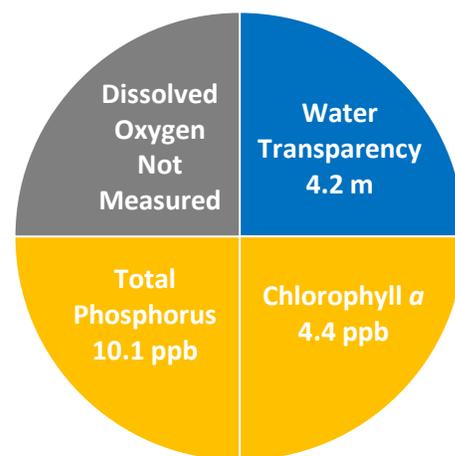


Figure 1. Swains Lake Water Quality (2016)

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

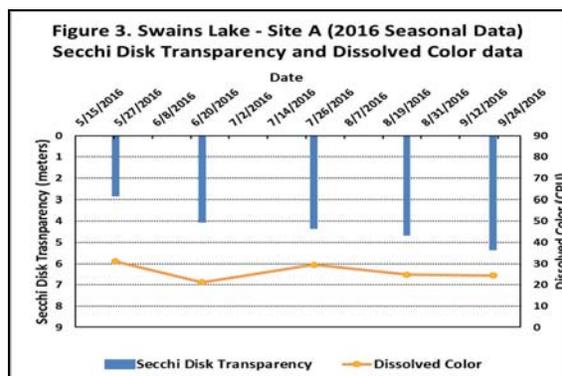
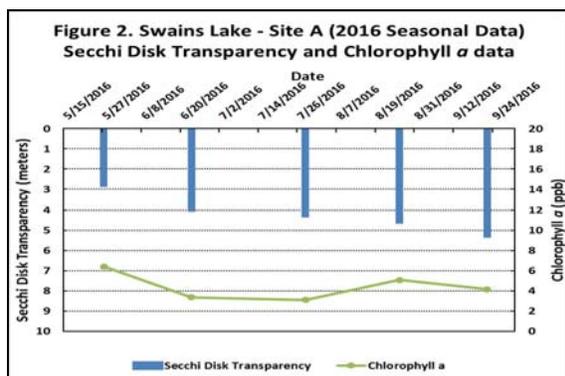


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* changes and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in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

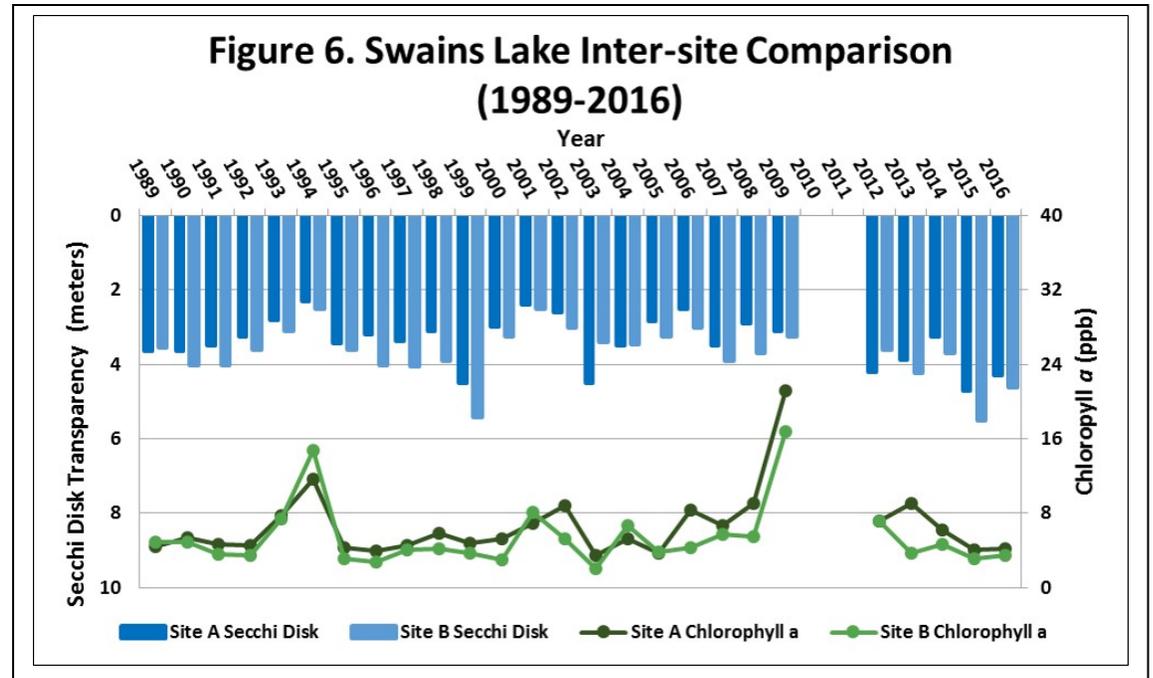
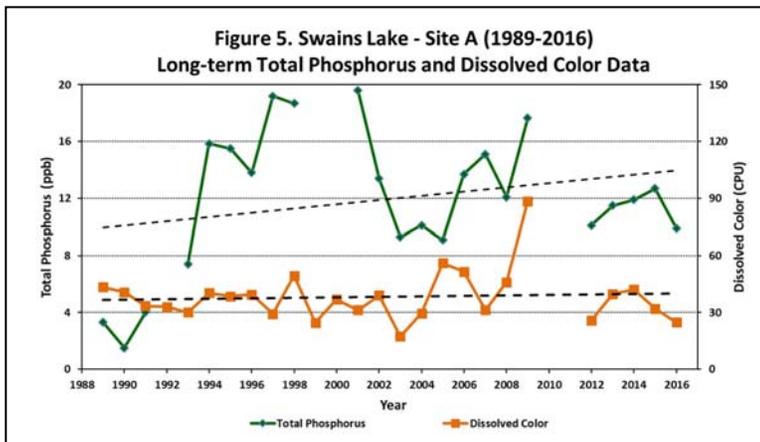
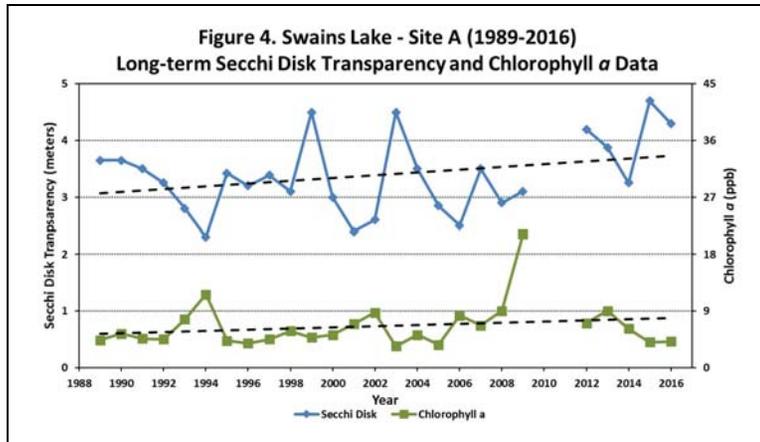
LONG-TERM TRENDS

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

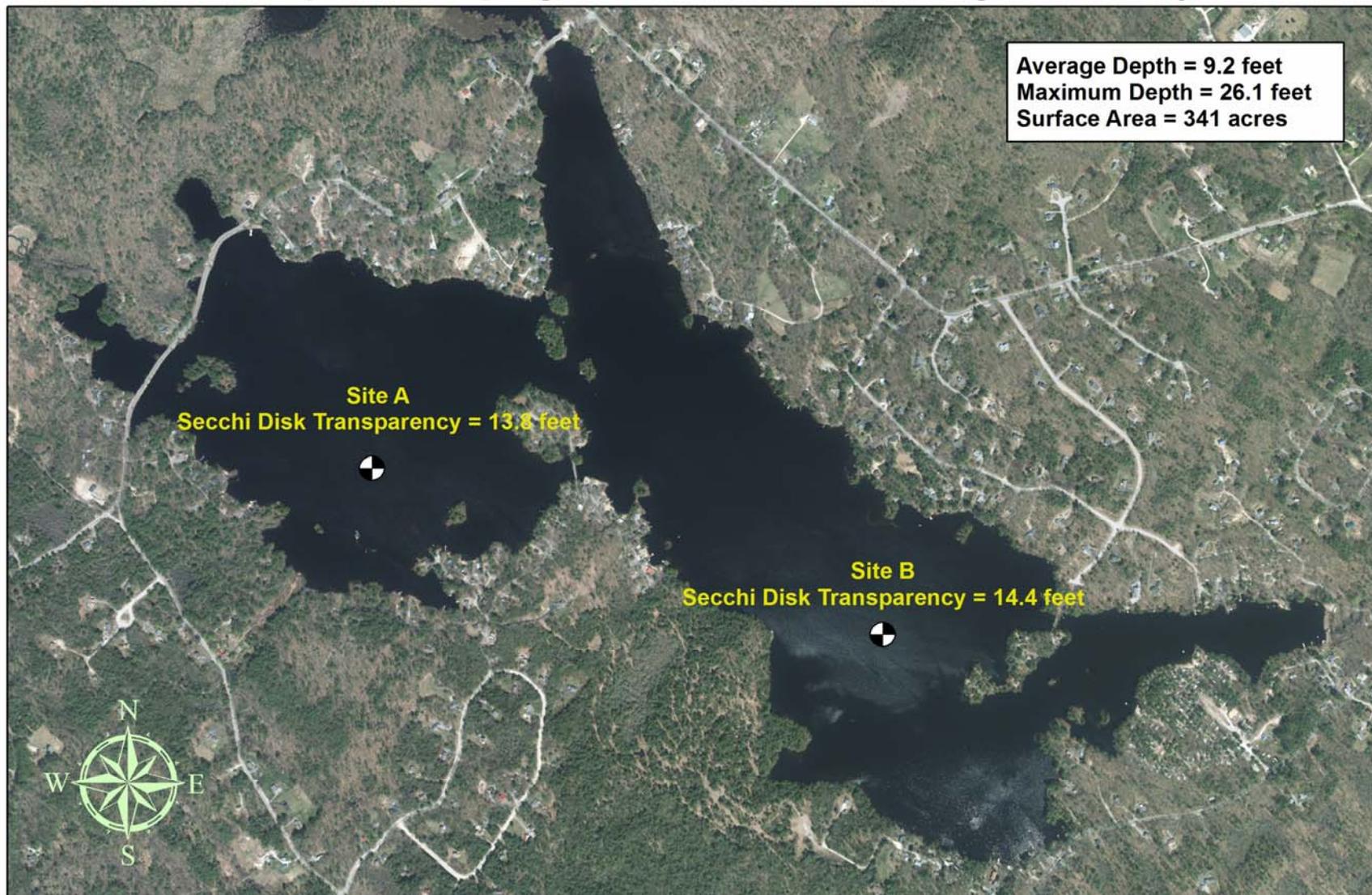
Implement Best Management Practices within the Swains Lake watershed to minimize the adverse impacts of polluted runoff and erosion on Swains Lake. Refer to “Landscaping at the Water’s Edge: An Ecological Approach” and “New Hampshire Homeowner’s Guide to Stormwater Management: Do-It-Yourself Stormwater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



0 0.2 0.4 0.6 0.8 Miles

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



Extension

