

WINNIPESAUKEE

2017 SAMPLING HIGHLIGHTS

Station 25 Alton

Alton, NH



Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

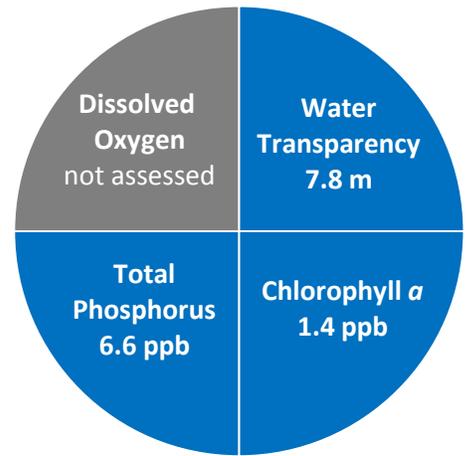


Figure 1. Alton Bay Water Quality (2017)

Station 25 Alton (Figure 7) was used as a reference point to represent the overall condition of Alton Bay. Water quality data displayed in Tables 1 and 2 are surface water measurements with the exception of the dissolved oxygen data that are collected near the lake bottom.

Table 1. 2017 Alton Bay Seasonal Averages and NH DES Aquatic Life Nutrient Criteria¹

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Alton Bay Average (range)	Alton Bay Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	7.8 meters (6.5 – 9.3)	Oligotrophic
Chlorophyll <i>a</i> ¹ (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	1.4 ppb (0.8 – 2.0)	Oligotrophic
Total Phosphorus ¹ (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	6.6 ppb (4.9 – 8.7)	Oligotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	Not measured *	Not Assessed *

* Site 25 has not historically developed a deep water layer that is the basis for the dissolved oxygen classification criteria.

Table 2. 2017 Alton Bay Seasonal Average Accessory Water Quality Measurements

Parameter	Assessment Criteria					Alton Bay Average (range)	Alton Bay 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	9.5 color units (6.1 – 14.9)	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	Not Measured	-----
pH (standard units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			Not Measured	-----
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		Not Measured	-----

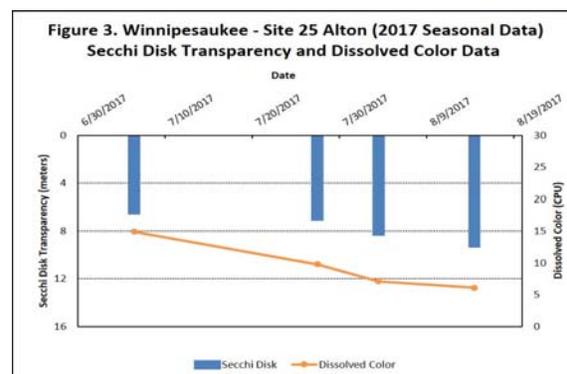
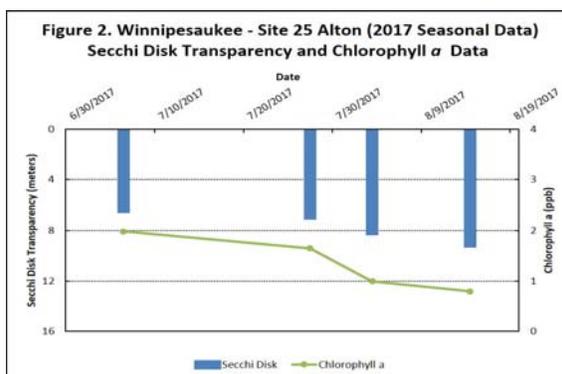


Figure 2 and 3. Seasonal Secchi disk transparency, chlorophyll *a* concentrations and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases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

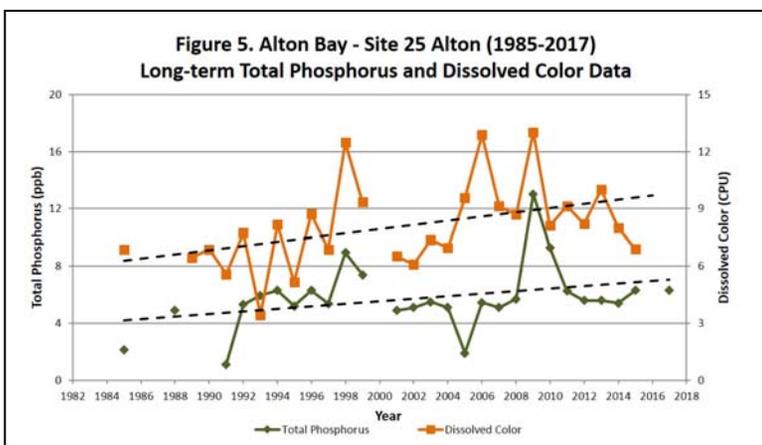
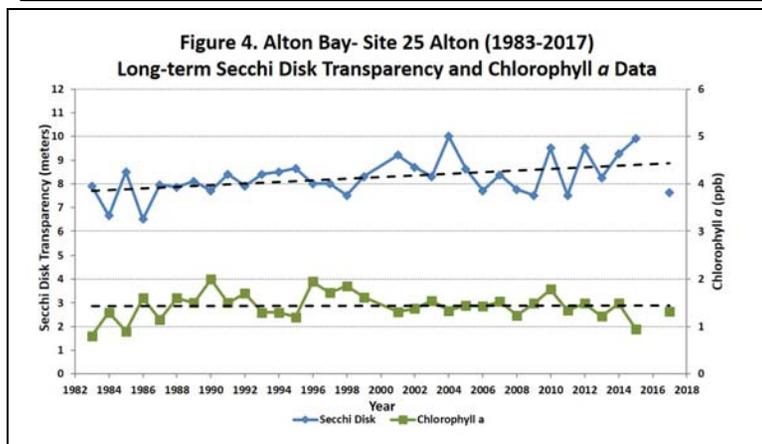
LONG-TERM TRENDS

WATER CLARITY: The Alton Bay (Site 25 Alton) water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity between 1983 and 2017 (Figure 4).

CHLOROPHYLL: The Alton Bay (Site 25 Alton) chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, have oscillated among years but have been relatively stable between 1983 and 2017 (Figure 4).

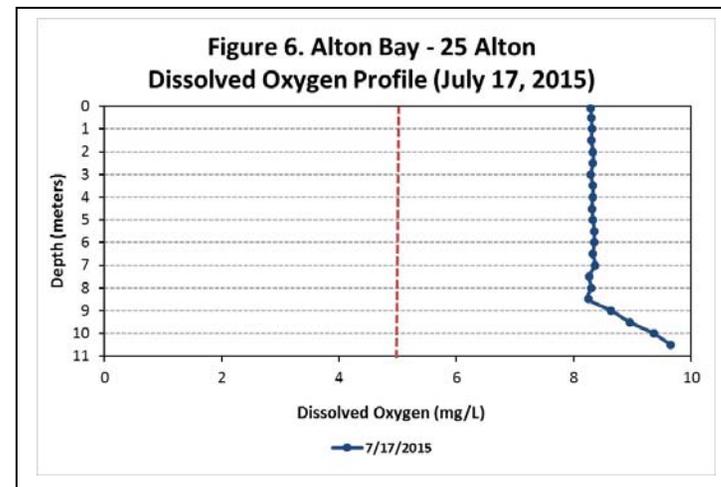
TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Alton Bay (Site 25 Alton) total phosphorus measurements display a trend of increasing total phosphorus concentrations between 1984 and 2017 (Figure 5).

COLOR: The Alton Bay (Site 25 Alton) color data, the result of naturally occurring “tea” colored substances from the breakdown of soils and plant materials, display a trend of increasing color concentrations between 1985 and 2017 (Figure 5).



Figures 4 and 5. Changes in the Alton Bay water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1983 and 2017. 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. July 17, 2015 Alton Bay (Site 25 Alton) dissolved oxygen profile. The vertical red line indicates the oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish. Note, the July 17, 2015 measurements are the most recent Lake Winnepesaukee, Site 25 Alton, dissolved oxygen measurements.



Recommendations

Implement Best Management Practices within the Lake Winnepesaukee watershed to minimize the adverse impacts of polluted runoff and erosion into Lake Winnepesaukee (Alton Bay). 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 information on how to reduce nutrient loading caused by overland run-off.

- http://extension.unh.edu/resources/files/Resource004159_Rep5940.pdf
- <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-11-11.pdf>

Figure 7. Lake Winnepesaukee - Alton Bay Alton, NH

Historical sampling sites and 2017 seasonal average water clarity



0 0.5 1 1.5 2 Miles

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



Extension

