

LAKE WINNIPESAUKEE (MOULTONBOROUGH BAY)

2017 SAMPLING HIGHLIGHTS

Station Suissevalle

Moultonborough, NH



Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

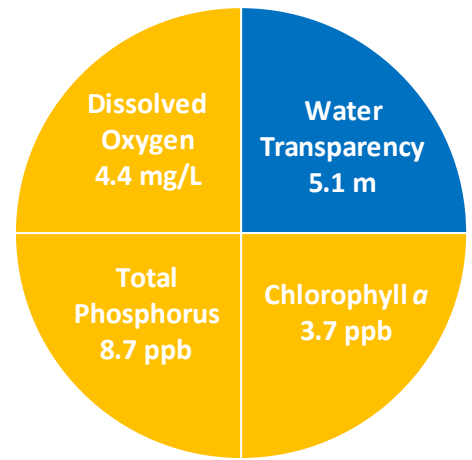


Figure 1. Moultonborough Water Quality (2017)

Station Suissevalle (Figure 7) was used as a reference point to represent the overall condition of the Moultonborough Bay water quality. Water quality data displayed in Tables 1, 2 and 3 were collected in the surface waters with the exception of dissolved oxygen data that were measured near the lake bottom.

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

Parameter	Oligotrophic "Excellent"	Mesotrophic "Fair"	Eutrophic "Poor"	Suissevalle Average (range)	Suissevalle Classification
Water Clarity (meters)	4.0 – 7.0	2.5 - 4.0	< 2.5	5.1 meters (4.2 – 6.1)	Oligotrophic
Chlorophyll <i>a</i> ¹ (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	3.7 ppb (2.1 – 5.7)	Mesotrophic
Total Phosphorus ¹ (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	8.7 ppb (6.0 – 12.2)	Mesotrophic
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	4.4 mg/L (3.2 – 6.1)	Mesotrophic

* Dissolved oxygen concentrations were measured on July 26, 2017 between 4.0 and 6.0 meters, in the layer of rapidly decreasing temperature.

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

Parameter	Assessment Criteria					Suissevalle Average (range)	Suissevalle Classification
Color (color units)	< 10 uncolored	10 – 20 slightly colored	20 – 40 lightly tea colored	40 – 80 tea colored	> 80 highly colored	36.9 color units (range: 29.9 – 47.6)	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	8.1 mg/L (range: 8.0 – 8.1)	Moderately Vulnerable
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			6.7 units (range: 6.7 – 6.7)	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		75.3 uS/cm (range: 74.9 – 75.9)	Characteristic of lakes with some human influence

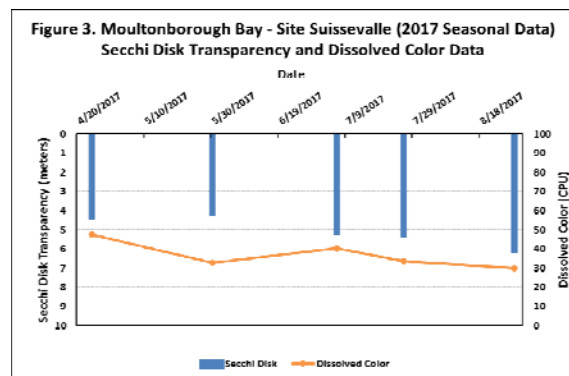
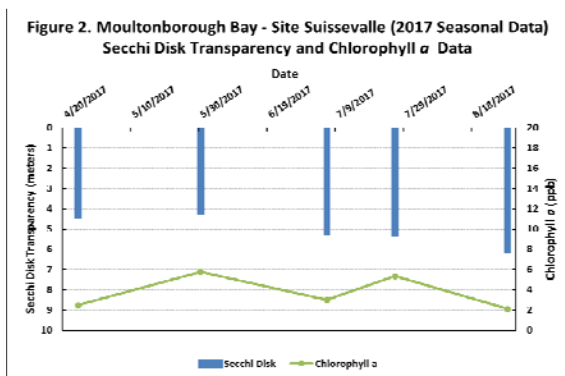


Figure 2 and 3. Seasonal Secchi Disk transparency, chlorophyll *a* and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll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

LONG-TERM TRENDS

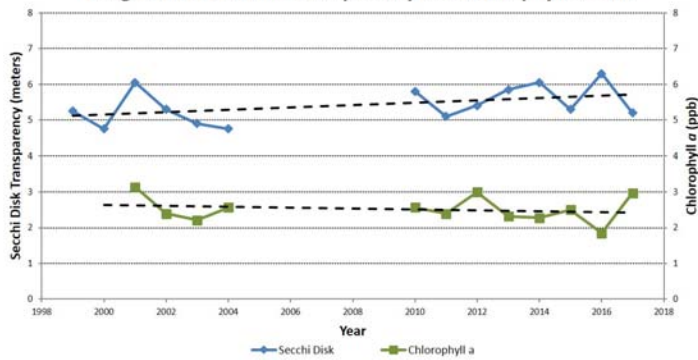
WATER CLARITY: The Suissevalle water clarity measurements, measured as Secchi Disk transparency, display a trend of increasing water clarity over the thirteen years of water quality monitoring conducted between 1999 and 2017 (Figure 4).

CHLOROPHYLL: The Suissevalle chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a stable trend of chlorophyll *a* concentrations over the twelve years of water quality monitoring conducted between 1999 and 2017 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Suissevalle total phosphorus data display a trend of decreasing total phosphorus concentrations over the ten years of water quality monitoring conducted between 2001 and 2017 (Figure 5).

COLOR: The Suissevalle color data, the result of naturally occurring “tea” colored substances from the breakdown of soils and plant materials, display a trend of increasing dissolved color concentrations over the twelve years of water quality monitoring conducted between 2001 and 2017 (Figure 5).

**Figure 4. Moultonborough Bay - Site Suissevalle (1999-2017)
Long-term Secchi Disk Transparency and Chlorophyll *a* Data**



**Figure 5. Moultonborough Bay - Site Suissevalle (2001-2017)
Long-term Total Phosphorus and Dissolved Color Data**

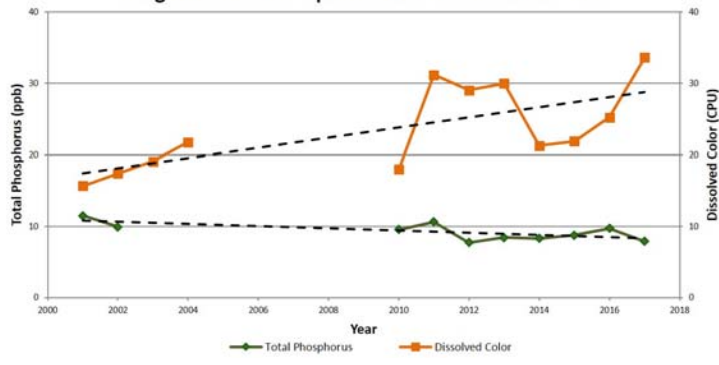


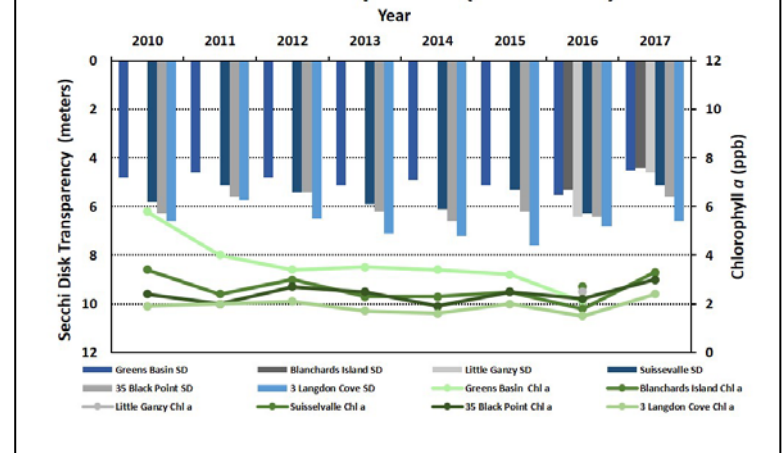
Table 3. 2017 Moultonborough Bay Seasonal Average (range) Water Quality Inter-site Comparison

Parameter	3 Langdon Cove Average (range)	35 Black Point Average (range)	Greens Basin Average (range)	Little Ganzy Average (range)	Blanchards Island Average (range)
Secchi Disk Transparency (m) Average (range)	6.6 (5.7 - 7.6)	5.6 (4.8 - 6.3)	4.5 (3.7 - 5.2)	4.6 (4.1 - 5.4)	4.4 (3.4 - 5.3)
Chlorophyll <i>a</i> (ppb) Average (range)	2.4 (2.1 - 2.7)	3.0 (1.8 - 4.3)	5.6 (3.1 - 9.6)	4.7 (2.5 - 6.7)	7.9 (5.5 - 10.2)
Total Phosphorus (ppb) Average (range)	6.8 (4.6 - 8.5)	8.6 (6.6 - 10.9)	12.7 (10.3 - 19.3)	11.2 (9.5 - 14.5)	12.5 (10.4 - 14.4)

Figures 4 and 5. Changes in the Moultonborough Bay – Suissevalle water clarity (Secchi Disk depth), chlorophyll *a*, dissolved color and total phosphorus concentrations measured between 1999 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. Moultonborough Bay inter-site comparison between Greens Basin, Blanchard Island, Little Ganzy, Black Point, Suissevalle, and Langdon Cove sites. Both the annual average Secchi Disk transparency and average annual chlorophyll *a* measurements are displayed between 2010 and 2017.

Figure 6. Moultonborough Bay Inter-site Comparison (2010-2017)



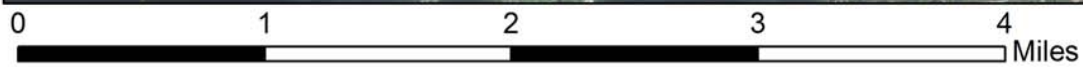
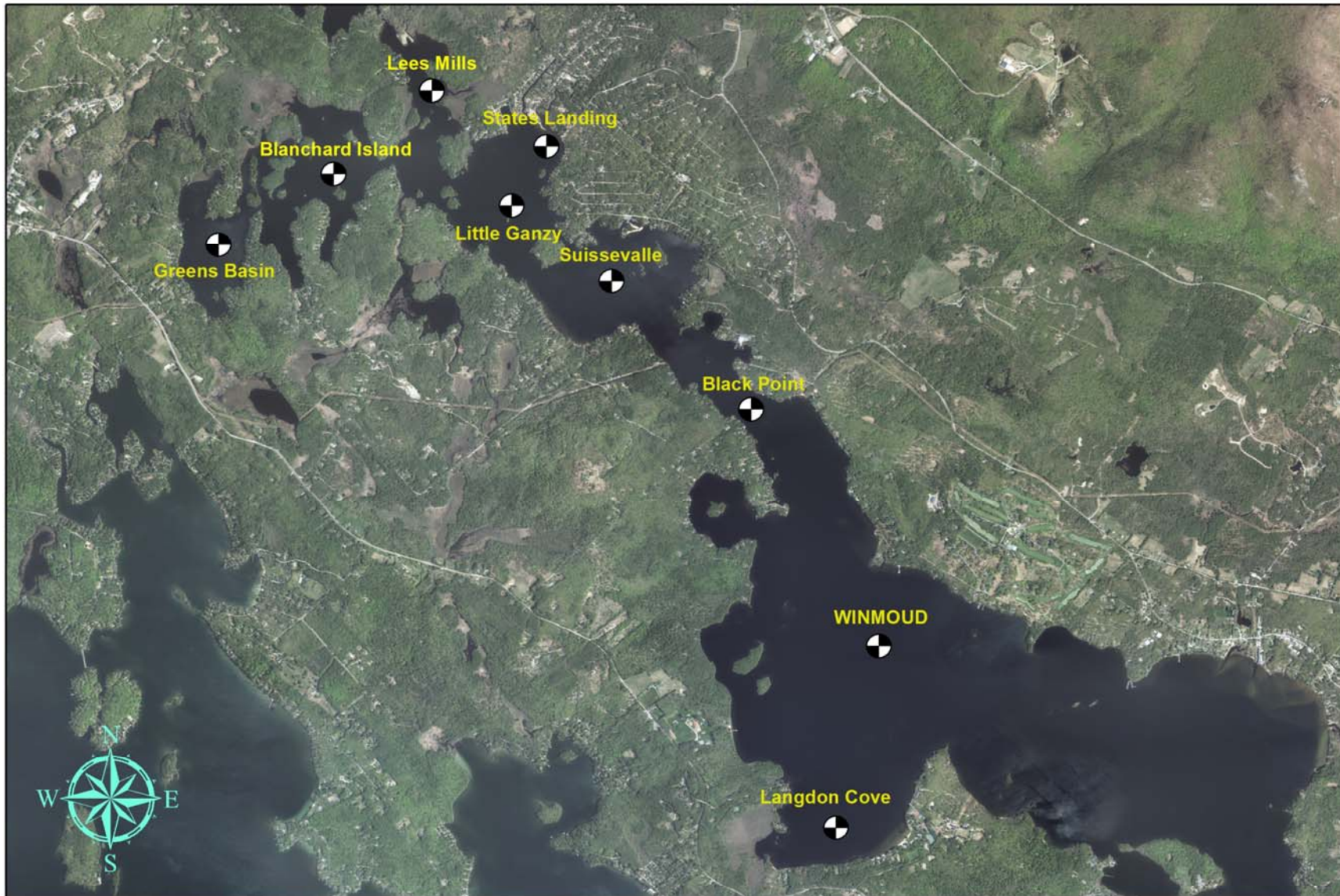
Recommendations

Implement Best Management Practices within the Lake Winnepesaukee watershed to minimize the adverse impacts of polluted runoff and erosion on Lake Winnepesaukee. 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. Lake Winnepesaukee - Moultonborough Bay

Moultonborough, NH
Water quality sampling locations



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



Extension

