LAKE WINNIPESAUKEE
(MOULTONBOROUGH BAY)
2016 SAMPLING HIGHLIGHTS
Station Suissevalle
Moultonborough, NH

NH | Extension

Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

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.

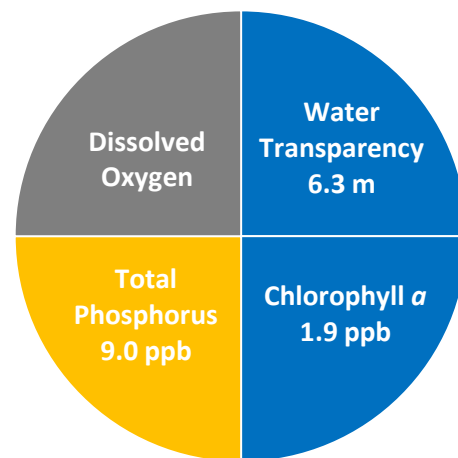| Dissolved Oxygen	Water Transparency 6.3 m
Total Phosphorus 9.0 ppb	Chlorophyll *a* 1.9 ppb

Figure 1. Moultonborough Water Quality (2016)

Table 1. 2016 Moultonborough Bay Seasonal Averages and NH DES Aquatic Life Nutrient Criteria[1]

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	**6.3** meters (5.6 – 6.8)	**Oligotrophic**
Chlorophyll *a* [1] (ppb)	< 3.3	> 3.3 – 5.0	> 5.0 – 11.0	**1.9** ppb (1.4 – 2.5)	**Oligotrophic**
Total Phosphorus [1] (ppb)	< 8.0	> 8.0 – 12.0	> 12.0 – 28.0	**9.0** ppb (3.1 – 13.6)	**Mesotrophic**
Dissolved Oxygen (mg/L)	5.0 – 7.0	2.0 – 5.0	<2.0	Not Assessed	Not Assessed

* Suissevalle did not develop a deep water layer that is the basis for the dissolved oxygen classification criteria.

Table 2. 2016 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	**24.3** color units (range: 16.2 – 30.6)	**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	**7.6** mg/L (single value)	**Moderately Vulnerable**
pH (std units)	< 5.5 suboptimal for successful growth and reproduction		6.5 – 9.0 optimal range for fish growth and reproduction			**7.2** units (range: 7.2 – 7.3)	**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		**71.7** *u*S/cm (range: 71.7 – 71.8)	**Characteristic of lakes with some human influence**
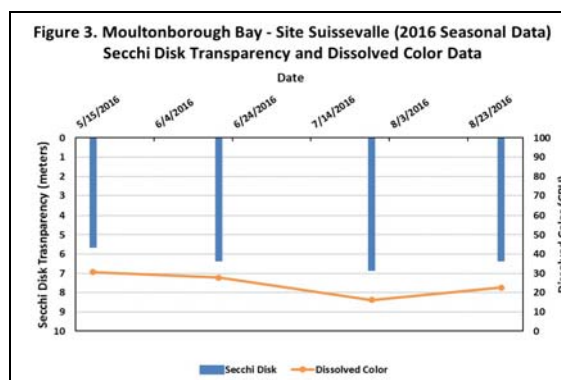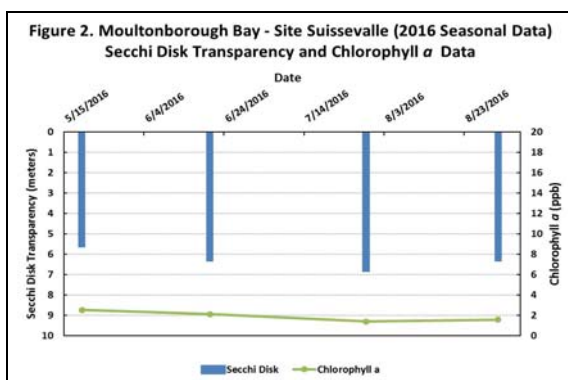
Figure 2 and 3. Seasonal Secchi Disk transparency, chlorophyll *a* and dissolved color concentrations. Figures 2 and 3 illustrate the interplay among Secchi Disk transparency, chlorophyll *a* and dissolved color. Shallower water transparency measurements oftentimes correspond to increases in chlorophyll *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 2016 (Figure 4).

CHLOROPHYLL: The Suissevalle chlorophyll *a* concentrations, a measure of microscopic plant life within the lake, display a trend of decreasing chlorophyll *a* concentrations over the thirteen years of water quality monitoring conducted between 1999 and 2016 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Suissevalle total phosphorus data have only been collected for nine sampling seasons between 2001 and 2016 (Figure 5). Due to the limited number of years sampled (less than ten) a trend analysis was not performed on the chlorophyll *a* data.

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 eleven years of water quality monitoring conducted between 2001 and 2016 (Figure 5).

Figure 4. Moultonborough Bay - Site Suissevalle (1999-2016) Long-term Secchi Disk Transparency and Cholorphyll *a* Data

Table 3. 2016 Moultonborough Bay Seasonal Average (range) Water Quality Inter-site Comparison

Parameter	3 Langdon Cove	35 Black Point	Greens Basin	Little Ganzy	Blanchards Island
Secchi Disk Transparency (m) Average (range)	6.6 (5.5 - 7.2)	6.7 (6.2 - 7.3)	5.3 (3.9 - 6.3)	6.2 (5.8 - 6.5)	5.4 (5.1 - 5.8)
Chlorophyll *a* (ppb) Average (range)	1.7 (1.1 - 2.9)	1.9 (1.3 - 2.5)	2.2 (1.9 - 2.7)	2.2 (1.7 - 2.6)	2.7 (2.2 - 3.1)
Total Phosphorus (ppb) Average (range)	5.1 (2.9 - 6.4)	6.5 (3.5 - 12.1)	7.7 (4.4 - 12.4)	6.5 (4.2 - 8.2)	10.5 (6.6 - 15.4)

Figure 5. Moultonborough Bay - Site Suissevalle (2001-2016) Long-term Total Phosphorus and Dissolved Color Data

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 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. Moultonborough Bay inter-site comparision among Sites Blanchard Island, Greens Basin, Little Ganzy and Suissevalle. Both the Secchi Disk transparency and chlorophyll *a* measurements are displayed.
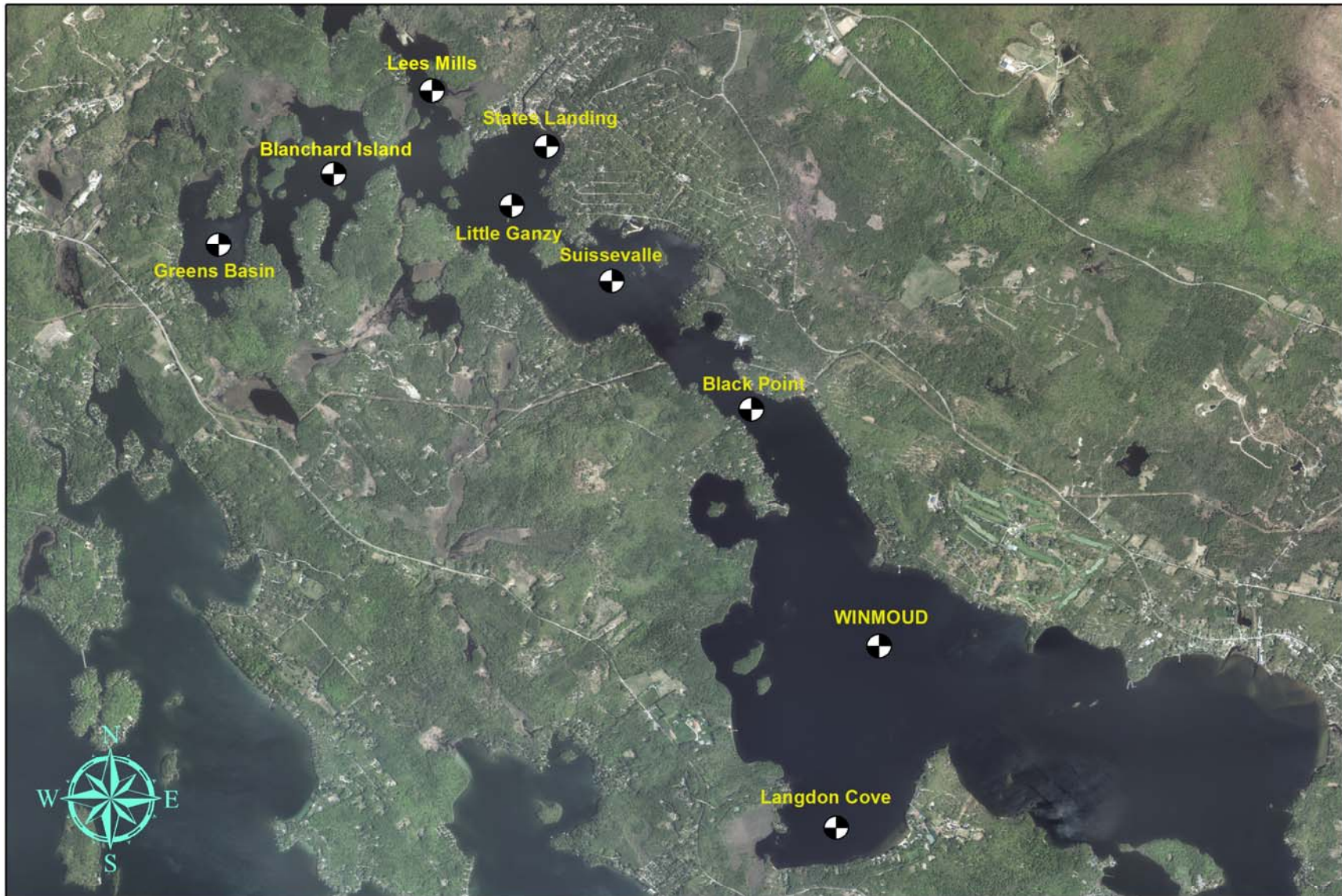

Figure 6. Moultonborough Bay Inter-site Comparison (2010-2016)
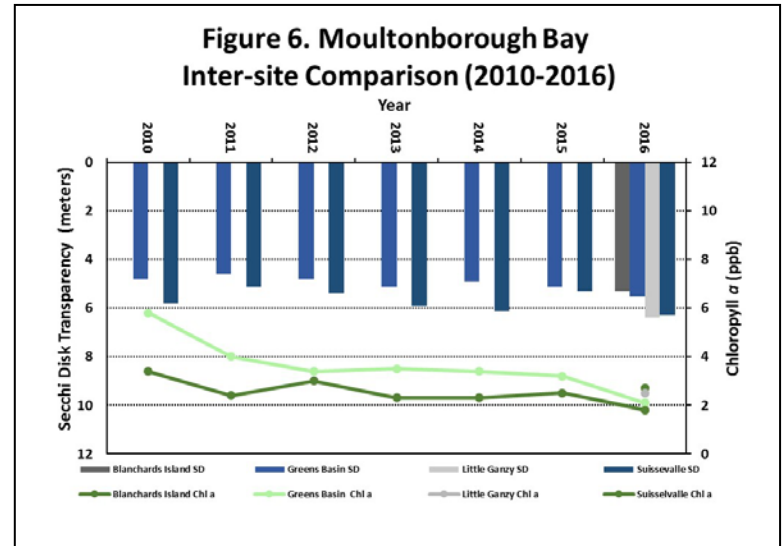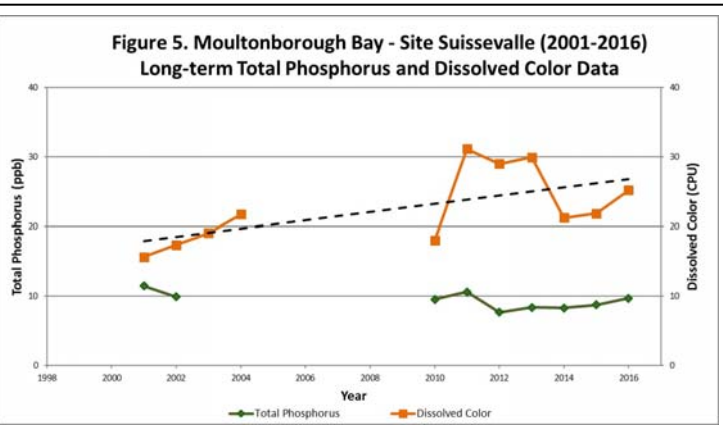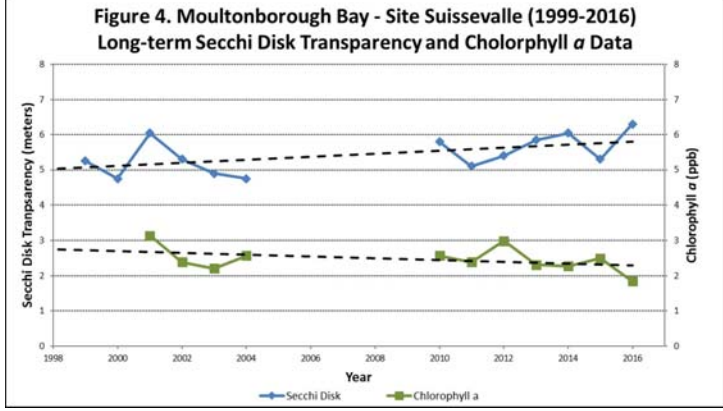
Recommendations

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

Moultonborough, NH
Water quality sampling locations

Lees Mills

States Landing

Blanchard Island

Little Ganzy

Suissevalle

Greens Basin

Black Point

WINMOUD

Langdon Cove

N
W   E
S

0   1   2   3   4
Miles

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

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