**BOW LAKE**

**2015 SAMPLING HIGHLIGHTS**

**Station 1 Ledges**

Barrington and Northwood, NH

Water quality data displayed in Tables 1 and 2 are surface water measurements with the exception of the dissolved oxygen data that were collected near the lake bottom. Refer to the 2015 Bow Lake Annual Report for additional information.

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Blue = Excellent = Oligotrophic

Yellow = Fair = Mesotrophic

Red = Poor = Eutrophic

Gray = No Data

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**Figure 1. Bow Lake Water Quality (2015)**

**Table 1. 2015 Bow Lake Seasonal Averages and NH DES Aquatic Life Nutrient Criteria**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Oligotrophic “Excellent”</th>
<th>Mesotrophic “Fair”</th>
<th>Eutrophic “Poor”</th>
<th>Bow Lake – 1 Ledges Average (range)</th>
<th>Bow Lake – 1 Ledges Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Clarity (meters)</td>
<td>4.0 – 7.0</td>
<td>2.5 - 4.0</td>
<td>&lt; 2.5</td>
<td>7.5 meters (6.8 – 8.9)</td>
<td>Oligotrophic</td>
</tr>
<tr>
<td>Chlorophyll a (ppb)</td>
<td>&lt; 3.3</td>
<td>&gt; 3.3 – 5.0</td>
<td>&gt; 5.0 – 11.0</td>
<td>2.4 ppb (1.6 – 4.0)</td>
<td>Oligotrophic</td>
</tr>
<tr>
<td>Total Phosphorus (ppb)</td>
<td>&lt; 8.0</td>
<td>&gt; 8.0 – 12.0</td>
<td>&gt; 12.0 – 28.0</td>
<td>7.3 ppb (5.4 – 8.8)</td>
<td>Oligotrophic</td>
</tr>
<tr>
<td>Dissolved Oxygen (mg/L)</td>
<td>5.0 – 7.0</td>
<td>2.0 – 5.0</td>
<td>&lt;2.0</td>
<td>1.6 mg/L (1.1 – 2.5)</td>
<td>Eutrophic</td>
</tr>
</tbody>
</table>

* Dissolved oxygen concentrations were measured on September 25, 2015 between 10.5 and 19 meters, in the bottom water layer.

**Table 2. 2015 Bow Lake Seasonal Average Accessory Water Quality Measurements**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Assessment Criteria</th>
<th>Bow Lake – 1 Ledges Average (range)</th>
<th>Bow Lake – 1 Ledges Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color (color units)</td>
<td>&lt; 10 uncolored</td>
<td>14.8 color units (8.8 – 19.3)</td>
<td>Slightly colored</td>
</tr>
<tr>
<td>Alkalinity (mg/L)</td>
<td>&lt; 0.0 acidified</td>
<td>4.0 mg/L (3.5 – 4.3)</td>
<td>Moderately vulnerable</td>
</tr>
<tr>
<td>pH (std units)</td>
<td>&lt; 5.5 suboptimal for successful growth and reproduction</td>
<td>7.5 standard units (7.4 – 7.8)</td>
<td>Optimal range for fish growth and reproduction</td>
</tr>
<tr>
<td>Specific Conductivity (uS/cm)</td>
<td>&lt; 50 uS/cm Characteristic of minimally impacted lakes</td>
<td>56.1 uS/cm (56.1 – 56.1)</td>
<td>Lakes with some human influences</td>
</tr>
<tr>
<td></td>
<td>50-100 uS/cm Lakes with some human influence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 100 uS/cm Characteristic of lakes experiencing human disturbances</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Figure 2. Bow Lake - Site 1 Ledges (2015 Seasonal Data)**

Secchi Disk Transparency and Chlorophyll a Measurements

**Figure 3. Bow Lake - Site 1 Ledges (2015 Seasonal Data)**

Secchi Disk Transparency and Dissolved Color Measurements

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. Shallow water transparency measurements oftentimes correspond to increases in chlorophyll a and/or color concentrations.
LONG-TERM TRENDS

WATER CLARITY: The Bow Lake water clarity measurements, measured as Secchi Disk transparency, have oscillated among years but do not display a trend of increasing or decreasing water clarity over the thirty-one years of water quality monitoring conducted between 1984 and 2015 (Figure 4).

CHLOROPHYLL: The Bow Lake chlorophyll a concentrations, a measure of microscopic plant life within the lake, display a trend of increasing concentrations over thirty-one years of water quality monitoring conducted between 1984 and 2015 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Bow Lake total phosphorus concentrations display a trend of decreasing concentrations over twenty-six years of water quality monitoring conducted between 1984 and 2015 (Figure 5).

COLOR: The Bow Lake color data, the result of naturally occurring “tea” color substances from the breakdown of soils and plant materials, display a trend of increasing concentrations over twenty-seven years of water quality monitoring conducted between 1984 and 2015 (Figure 5).

### Table 3. Bow Lake Seasonal Average Water Quality Inter-site Comparison (2015)

<table>
<thead>
<tr>
<th>Site</th>
<th>Average Secchi Disk Transparency (meters)</th>
<th>Average Chlorophyll a (ppb)</th>
<th>Average Total Phosphorus (ppb)</th>
<th>Average Dissolved Oxygen (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ledges</td>
<td>7.5 (range: 6.8-8.9)</td>
<td>2.4 (range: 1.6-4.0)</td>
<td>7.3 (range: 5.4-8.8)</td>
<td>1.6 (range: 1.1 - 2.5)</td>
</tr>
<tr>
<td>3 Bennett</td>
<td>7.6 (range: 6.8-8.9)</td>
<td>2.3 (range: 1.4-3.1)</td>
<td>7.5 (range: 6.1-8.7)</td>
<td>1.1 (range: 0.7 - 1.5)</td>
</tr>
</tbody>
</table>

**Recommendations**


*Figures 4 and 5. Changes in the Bow Lake water clarity (Secchi Disk depth), chlorophyll a, dissolved color and total phosphorus concentrations measured between 1984 and 2015. 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. Bow Lake dissolved oxygen concentrations collected between June 26 and September 25, 2015. The vertical red line indicates the oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish. Notice the decreasing dissolved oxygen concentrations near the lake bottom between June and September.*
Figure 7. Bow Lake
Strafford & Northwood, NH
2015 Deep water sampling site locations with seasonal average water clarity

Average Depth = 21.1 feet
Maximum Depth = 69.3 feet
Surface Area = 1140 acres

1 Ledges
Secchi Disk Transparency = 24.6 feet

3 Bennett
Secchi Disk Transparency = 24.9 feet

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