LAKE WENTWORTH

2017 SAMPLING HIGHLIGHTS
Station – 12 Governors
Wolfeboro, NH

This report provides a water quality overview for data collected in Lake Wentworth, Site 12 Governors, between 1987 and 2017. Water quality data displayed in Tables 1, 2 and 3 are surface water measurements with the exception of the dissolved oxygen data that summarize conditions near the lake bottom.

Blue = Excellent = Oligotrophic
Yellow = Fair = Mesotrophic
Red = Poor = Eutrophic
Gray = No Data

Table 1. 2017 Lake Wentworth 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>Lake Wentworth Site 12 Governors Average (range)</th>
<th>Site 12 Governors 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>5.4 meters (3.8 – 6.6)</td>
<td>Oligotrophic</td>
</tr>
<tr>
<td>Chlorophyll a (ppb) 1</td>
<td>&lt; 3.3</td>
<td>&gt; 3.3 – 5.0</td>
<td>&gt; 5.0 – 11.0</td>
<td>1.5 ppb (0.9 – 2.0)</td>
<td>Oligotrophic</td>
</tr>
<tr>
<td>Total Phosphorus (ppb) 1</td>
<td>&lt; 8.0</td>
<td>&gt; 8.0 – 12.0</td>
<td>&gt; 12.0 – 28.0</td>
<td>5.2 ppb (4.8 – 5.5)</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>2.6 mg/l (range: 2.2 – 3.0)</td>
<td>Mesotrophic</td>
</tr>
</tbody>
</table>

* Dissolved oxygen concentrations were measured on August 8, 2017 between 12.0 and 16.0 meters, in the bottom waters.

Table 2. 2017 Lake Wentworth Seasonal Average Accessory Water Quality Measurements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Assessment Criteria</th>
<th>Lake Wentworth Site 12 Governors Average (range)</th>
<th>Site 12 Governors Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color (color units)</td>
<td>&lt; 10 uncolored</td>
<td>16.1 color units (range: 12.4 – 20.9)</td>
<td>Slightly tea colored</td>
</tr>
<tr>
<td>Alkalinity (mg/L)</td>
<td>&gt; 0.0 acidified</td>
<td>6.4 mg/l (range: 5.5 – 7.5)</td>
<td>Moderately vulnerable</td>
</tr>
<tr>
<td>pH (std units)</td>
<td>&lt; 5.5 suboptimal for successful growth</td>
<td>7.2 standard units (range: 7.2 – 7.3)</td>
<td>Optimal range for fish growth and reproduction</td>
</tr>
<tr>
<td>Specific Conductivity (uS/cm)</td>
<td>Characteristic of minimally impacted NH lakes</td>
<td>67.5 uS/cm (range: 67.3 – 67.7)</td>
<td>Characteristic of lakes with some human influence</td>
</tr>
<tr>
<td>Chlorophyll a</td>
<td>&lt; 50 uS/cm</td>
<td>50-100 uS/cm Lakes with some human influence</td>
<td></td>
</tr>
<tr>
<td>Dissolved Oxygen Color</td>
<td>&gt; 100 uS/cm</td>
<td>&gt; 100 uS/cm Characteristic of lakes experiencing human disturbances</td>
<td></td>
</tr>
</tbody>
</table>

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 – SITE 12 GOVERNORS

WATER CLARITY: The Lake Wentworth water clarity measurements, measured as Secchi Disk transparency, display a trend of decreasing water transparency between 1987 and 2017 (Figure 4).

CHLOROPHYLL: The Lake Wentworth chlorophyll a concentrations, a measure of microscopic plant life within the lake, display a trend of decreasing concentrations between 1987 and 2017 (Figure 4).

TOTAL PHOSPHORUS: Phosphorus is the nutrient most responsible for microscopic plant growth. The Lake Wentworth total phosphorus concentrations display a trend of decreasing concentrations between 1987 and 2017 (Figure 5).

COLOR: The Lake Wentworth color data, the result of naturally occurring “tea” color substances from the breakdown of soils and plant materials, display a relatively stable trend between 1987 and 2017 (Figure 5).

Table 3. Lake Wentworth and Crescent Lake, Site 6 Center, Seasonal Average Water Quality Inter-site Comparison (2017)

<table>
<thead>
<tr>
<th>Sampling Station</th>
<th>Average (range) Secchi Disk Depth (meters)</th>
<th>Average (range) Total Phosphorus (ppb)</th>
<th>Average (range) Chlorophyll a (ppb)</th>
<th>Average (range) Dissolved Color (CPU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crescent Lake</td>
<td>* 4.7 m (3.5 – 5.6)</td>
<td>6.7 ppb (single value)</td>
<td>2.1 ppb (1.3 – 4.0)</td>
<td>24.9 CPU (15.1 – 33.7)</td>
</tr>
<tr>
<td>1 Fuller</td>
<td>6.2 m (4.3 – 8.1)</td>
<td>6.8 ppb (4.4 – 8.8)</td>
<td>1.5 ppb (1.1 – 2.8)</td>
<td>16.2 CPU (7.9 – 24.7)</td>
</tr>
<tr>
<td>2 Triggs</td>
<td>6.4 m (5.5 – 7.0)</td>
<td>6.1 ppb (single value)</td>
<td>1.4 ppb (0.7 – 2.0)</td>
<td>15.5 CPU (11.3 – 18.5)</td>
</tr>
<tr>
<td>12 Governors</td>
<td>5.4 m (3.8 – 6.6)</td>
<td>5.2 ppb (4.8 – 5.5)</td>
<td>1.5 ppb (0.9 – 2.0)</td>
<td>16.1 CPU (12.4 – 20.9)</td>
</tr>
</tbody>
</table>

* indicates the Secchi disk occasionally reached the lake bottom before disappearing from view.

Figures 4 and 5. Changes in the Lake Wentworth water clarity (Secchi Disk depth), chlorophyll a, dissolved color and total phosphorus concentrations measured between 1987 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. Lake Wentworth dissolved oxygen profile collected on August 8, 2017. The vertical red line indicates the dissolved oxygen concentration commonly considered the threshold for successful growth and reproduction of cold water fish such as trout and salmon. Notice the decreasing dissolved oxygen concentrations near the lake bottom.

Recommendations


Figure 7. Lake Wentworth and Crescent Lake
Wolfeboro, NH
2017 Deep water sampling site locations with seasonal average water clarity

Lake Wentworth
Average Depth = 21.0 feet
Maximum Depth = 83.0 feet
Surface Area = 3016 acres

Crescent Lake
Average Depth = 9.9 feet
Maximum Depth = 21.0 feet
Surface Area = 147 acres

2 Triggs
Secchi Disk Transparency = 21.0 feet

1 Fullers
Secchi Disk Transparency = 20.3 feet

6 Center
Secchi Disk Transparency = 15.4 feet

12 Governors
Secchi Disk Transparency = 17.7 feet

Site location GPS coordinates were collected by the UNH Center for Freshwater Biology
Aerial Orthophoto Source: 2015 Statewide High Resolution Aerial Photography, NH GRANIT