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Lower Long Lake, Oakland County

September 11th, 2015

2015 Water Quality Summary

The goal of this testing protocol was to monitor various water quality parameters of the lake, compare results to historical data, and identify any potential risks to the health of Lower Long Lake. Water samples were taken at four different locations and tested for various parameters. The data in the below table are averages of the four sites for each parameter and date.

This report describes conditions at the times the samples were taken. The quality of the water was tested only to the parameters listed below. The following data provides an indication of the water quality throughout the summer. The full water quality report with all results, discussion, and historical comparisons will be delivered in the fall.

| Parameter | April 23rd | May 21st | June 22nd | July 23rd | August 17th | Target Range |
|---|----------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------|---|
| Temperature | 45.9 °F | 62.6 °F | 75.5 °F | 78.4 °F | 79.3 °F | Less Than 75 °F |
| Dissolved Oxygen | 9.9 mg/L | 8.8 mg/L | 7.4 mg/L | 7.2 mg/L | 7.5 mg/L | 4.0 – 12.0 mg/L |
| Total Phosphorus | 153 ppb | 68 ppb | 63 ppb | 63 ppb | 60 ppb | 0 – 100 ppb |
| Phosphate | 18 ppb | 25 ppb | 15 ppb | 33 ppb | 25 ppb | 0 – 100 ppb |
| Nitrate | 341 ppb | 209 ppb | 121 ppb | 209 ppb | 198 ppb | 0 – 1,000 ppb |
| Chlorophyll-a | 4.0 ppb | 4.8 ppb | 5.5 ppb | 5.9 ppb | 6.5 ppb | 0 – 7.3 ppb |
| Transparency | 17.3 feet | 23.1 feet | 22.3 feet | 15.6 feet | 16.3 feet | More than 6.55 feet |
| pH | 8.7 | 7.4 | 8.0 | 8.7 | 7.7 | 7.0 – 9.0 S.U. |
| Total Dissolved Solids | 430 ppm | 397 ppm | 386 ppm | 376 ppm | 377 ppm | 0 – 1,000 ppm |
| Conductivity | 845 µS | 796 µS | 773 µS | 752 µS | 754 µS | 0 – 1,500 ppm |
| Alkalinity | 144 ppm | 126 ppm | 131 ppm | 119 ppm | 123 ppm | 0 – 250 ppm |
| Sulfate | 13.4 ppm | 13.2 ppm | 12.2 ppm | 11.9 ppm | 11.9 ppm | 3 – 30 ppm |
| Fluoride | 0.08 ppm | 0.08 ppm | 0.08 ppm | 0.07 ppm | 0.08 ppm | 0.01 – 0.30 ppm |
| Chloride | 177 ppm | 171 ppm | 163 ppm | 160 ppm | 159 ppm | 0 – 230 ppm |
| Trophic State Index – Total Phosphorus | 76 | 65 | 64 | 63 | 63 | Oligotrophic: 0 - 40 Mesotrophic: 40 – 50 Eutrophic: 50 – 70 Hypereutrophic: 70+ |
| Trophic State Index – Chlorophyll-a | 44 | 46 | 47 | 48 | 49 | |
| Trophic State Index – Transparency | 36 | 32 | 32 | 38 | 37 | |
| <i>E. coli</i> | 0 CFU | 0 CFU | 0 CFU | 0 CFU | 25 CFU | 0 – 300 CFU |

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Temperature – increased each month to almost 80 degrees in August. Higher temperatures mean lower oxygen in the water.

Dissolved Oxygen – despite the higher temperatures later in the summer, the oxygen stayed at very healthy levels.

Total Phosphorus & Nitrates – These are the two main nutrients for plant growth. They started high in April, when spring rains flush them into the lake. Over summer, they decreased as they were consumed or flowed out of the lake.

Chlorophyll is a direct indicator of plant growth in the lake. It showed a steady increase throughout summer. More sunlight and warmer water lead to more plant production, so this wasn't a surprise. Even in August, the Chlorophyll was within the target range for a healthy lake.

All other parameters were within their target ranges and indicated Lower Long Lake has excellent water quality.

This summer, we started testing for *E. coli*. LakePro pulled samples from four sites near shore. The critical level of *E. coli* is 300 Colonies. *E. coli* were not present in April, May, June, or July.

In August, *E. coli* results were

- Site 1 – 0 Colonies
- Site 2 – 60 Colonies
- Site 3 – 20 Colonies
- Site 4 – 20 Colonies.

E. coli were present in the lake, but were well below the limit of 300 colonies, so there were no concerns about safety.

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