

# WESSERUNSETT LAKE WATER QUALITY REPORT - 2016

The Volunteer Lake Monitoring Program (VLMP) water quality sampling program for Wesserunsett continued for the 35th consecutive year in 2016. John Bonsall took over the sampling program and did the monitoring along with Bob McLaughlin and Jay Conway. Will Reid continued to chair the LWA Water Quality Committee. Bob, Jay and Will are also members of the LWA Road Committee which was created to address water quality problems caused by roads and is chaired by Mark Doty.

**Program Purpose:** The primary purpose of this sampling program is to monitor selected biological and physical parameters over both the short- and the long-term in order to detect any changes and trends. Climate change is affecting lakes in a number of ways. According to a journal article by L. Borre, L., R. L. Smyth & E. A. Howe (2016. At the Forefront of Shoreline Management. Lakeline, NALMS, Summer 2016: 8-13), global lake water surface temperatures are warming, duration of winter ice cover is declining, and more rain is in the form of heavy downpour events. For example, Maine and other northeastern states have had a 71% increase in the amount of precipitation falling in very heavy events from 1958 to 2012. This means more surface runoff and erosion which results in more nutrient pollution and sedimentation. Climate is becoming more extreme. Despite an increase in the amount and intensity of precipitation, an increase in consecutive days without rain is projected. A warming climate and increased development both can accelerate the lake eutrophication process. However, if monitoring results indicate existing or potential problems, there's a chance that actions may possibly be taken in time to prevent or at least reduce increases in nutrient loading or to reverse unwanted changes.

**Sampling:** Readings were taken by one or more of the three monitors (John, Jay, & Bob) once or twice a month from May through October. They collected data regarding Secchi Disk depth (water clarity), Temperature, Color, Dissolved Oxygen, Total Phosphorus (TP) and *Gloeotrichia* density. John sent Will the sampling results and mailed the monitoring reports to VLMP on its data forms. Will measured rainfall, recorded Ice-In/Ice-Out dates, and calculated open water duration. John and Will prepared monthly summaries of results for LWA and this 2016 final report.

**Secchi Disk:** Water clarity readings taken on nine trips from May through October averaged 21.5 ft deep, with two readings being on the bottom. The annual mean readings for Wesserunsett during the period of 1982-2016 have ranged from a low of 16.4 ft in 1984 to a high of 22.3 ft in 1988. According to VLMP online records, the long-term average of means for Wesserunsett from 1982-2014 is 19.4 ft. The 2016 average Secchi Disk depth was therefore greater than the long-term average, which is good (i.e., the water was clearer). The mean Secchi Disk depth for Maine lakes as reported by the VLMP in 2013 is 15.8 ft.

**Water Temperatures:** Surface temperatures ranged from 68.0°F on May 20 to 77.5°F on September 10. Bottom temperatures ranged from 73.6°F to 75.0°F during July and August.

**Color:** Levels measured with the LWA Hach Color Test Kit (Model CO-1), ranged from 15 to 26 Platinum-Cobalt units, and averaged 21.6 SPU. This was higher than in 2015, but not high enough to affect Secchi Disk readings. The average for Wesserunsett according to VLMP in 2013 is 19.

**Dissolved Oxygen:** Levels were measured from the surface to the bottom once a month in May, July, and September and twice in August with the LWA YSI 550A meter. Four of the five DO surface readings were less than VLMP tabular saturated DO values, suggesting that the meter still tends to read low. Levels were therefore likely sufficient to support all species of fish present in the lake at all depths.

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**Total Phosphorus (TP):** Surface grab samples were taken once each month in May, July and September and sent to the State's Health & Environmental Testing Laboratory (HETL) in Augusta for analysis. The levels ranged from 7-8 parts per billion (ppb), with an average of 7.7 ppb. These levels are higher than in 2015, which were very low. The annual means for Wesserunsett TP for 13 years of sampling during 2003-2015 range from 5.7 to 9.5 ppb, with the average being 6.8 ppb. In 2014, levels ranged from 7 to 12 ppb, with an average of 9.5 ppb, the highest ever in our data base. As excess phosphorus can result in unwanted algae blooms, the increased levels measured in 2014 were high enough to warrant concern. The Wesserunsett TP levels in 2015 and 2016 were at the low end of the category of medium productivity (4.5 – 20 ppb TP) for Maine lakes according to the VLMP, which is very good news. The total rainfall during the 2015 sampling period was less than in 2014, and even lower in 2016 with the individual rain events being less intense. This likely resulted in less erosion and transport of sediment that would carry phosphorus to the lake.

**Gloeotrichia:** Density estimates ranged from 0 to 1+ on a scale of 0 to 6 in the 10 estimates that were made. These are low densities, as in 2014 and 2015. This is encouraging because *Gloeotrichia echinulata* is a cyanobacteria with a complex lifecycle that can affect eutrophication and produce toxins that can harm waterfowl, fish, pets and humans.

**Rainfall:** Totaled rainfall was 17.30" from Ice-Out on April 3 to the last sampling on October 1. In comparison, the rainfall total from Ice-Out to the last sampling date for 2015 was 19.14" and 24.24" for 2014. However, as the time period during which rainfall was measured in those years was 34 and 39 days shorter respectively than for this sampling season, 2016 was actually much drier than the simple differences between those totals might suggest.

**Open Water Season:** Ice-Out in 2016 was on Apr. 3 and Ice-In was on Dec. 11, resulting in an open water season of 252 days (69% of the calendar year). For the 31 years from 1986 through 2016, the average duration of open water has been 236 days (about 65% of the calendar year). The shortest open water season was 212 days (58% of year) in 1989. The longest open water season was 270 days (72% of the year) in 2006. Length of the open water season can affect lake productivity and is influenced by climate change, so it is important to continue to track it over the long-term.

**Conclusions:** The results in 2016 and 2015 are encouraging, in contrast to those for 2014. As the article by L. Borre et al. indicates, it is very important to continue the monitoring program and to retain all data for analysis so that any long-term trends may be identified. Controlling runoff, improving shoreline buffers and reducing erosion and sedimentation from such sources as camp roads and driveways are some of the key measures to take to reduce phosphorus input and help combat the effects of climate change. Wesserunsett does not thermally stratify and has a high flushing rate, both of which help in maintaining or enhancing water quality. However, it is essential that each of us takes a personal role in protecting the lake by educating ourselves about water quality and doing the right thing in order to improve the chances of keeping the lake in good condition.

Please let us know if you have any comments, questions, see any errors, etc. Thanks.

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