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Report on the Health of Thompson Lake 2011

This report is based on a reduced sampling period for 2011. The summary information should therefore be compared cautiously to historical water quality information which has, for many years, been based on a full 5-6 month sampling period. Monitoring in 2011 was limited to the months of May, July and September.

Compared to the historical averages for indicators of lake water quality, Thompson Lake experienced a somewhat *below average* year in 2011. During the course of the monitoring season, the distance that one could see down into the water from the lake surface ranged from a low reading of 6.95 meters (~22.5 feet) on both May 5 and June 7, to a high reading of 9.9 meters (~32 feet) on July 2 (compared to a high reading of 10.6 meters in 2010). The May and early June readings were relatively poor for Thompson, compared to historical minimum readings for the lake, but were still well above the average for Maine lakes. Relatively few Maine lakes experience water clarity readings as high (good) as Thompson Lake! *The average for the 2011 season was 8.4 meters (~27feet), compared to 8.9 meters in 2010, and the historical average for Thompson lake of 9.0 meters.* Please note that the 2011 water clarity average for the lake was based on a reduced number of readings, compared to recent years. *However, thanks to certified volunteer lake monitor, Bob Tracy, the combined readings for the year included the full May through September monitoring period.*

Thompson Lake has significant variability over the years in the four prime indicators of lake health: water clarity (aka Secchi transparency), the concentration of total phosphorus in the lake, the concentration of algae (measured as chlorophyll-a). The concentration of oxygen that is dissolved in the water from the surface to the bottom of the lake during the late summer has varied to a lesser degree.

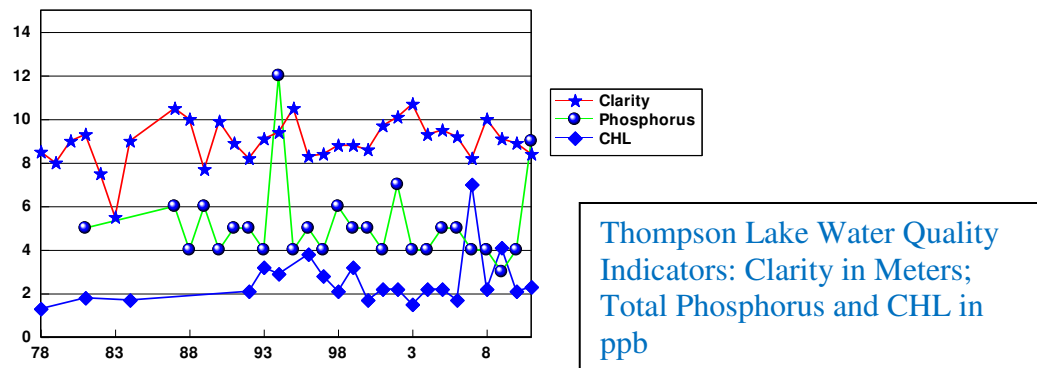
The average concentration of phosphorus in the lake in 2011 was 9 parts per billion, compared to 4 parts per billion in 2010, 3 ppb in 2009, 4 ppb in 2008, and the historical average of 5 ppb. This very high concentration for Thompson Lake is the result of two factors: 1) Heavy, persistent rain during the early summer resulted in a great deal of stormwater runoff flowing into the lake from the watershed during the period, and 2) the reduced sampling period very likely skewed the 2011 data toward the highest readings

during the summer monitoring period. Based on the 2011 spring and summer weather, and the reduced water clarity in the lake, one might anticipate phosphorus levels to be higher – but probably not as high as the limited season average of 9 ppb. This high average for the season will likely also raise historical average calculation for the lake.

The average concentration of chlorophyll-a (CHL) was 2.3 ppb, compared to 2.1 ppb in 2010, 4.1 ppb in 2009, 2.2 ppb in 2008, and the historical level of 2.6 ppb. While the average concentration of phosphorus in the lake was high in 2011, the concentration of chlorophyll-a, a more accurate indicator of the concentration of algae in the water, was slightly lower than it was in 2010, and approximately half of what it was in 2009, and was actually lower than the historical level for the lake.

Even though the three primary indicators of lake water quality (water clarity, total phosphorus and CHL) are sampled at the same time during sample visits, and the three generally correlate relatively strongly during the course of a typical annual monitoring season, there is often a time lag between the three. During the course of a full monitoring season, the lag would be accounted for through a full 5 months of data. However, with limited sampling in 2011, the three indicators did not correlate as well, because samples were not taken every month.

The chart below illustrates annual averages for each of three indicators of lake water quality that have been monitored since 1977.



Dissolved Oxygen:

The amount of oxygen that is dissolved in the water in the deepest area of the lake during the late summer (August and September) is a critical indicator of overall lake health. Thompson Lake has maintained high levels of dissolved oxygen through the summer/fall period for as long as data have been collected for the lake – even in the deepest spot in the basin near Hayes Point. This characteristic of exceptional water quality is the primary factor that allows coldwater fish to thrive in the lake. Water temperature and dissolved oxygen profiles measured during the limited monitoring period in 2011 indicated that concentrations of oxygen in the deepest area of the lake remained high, and were consistent with levels that have been documented historically. The critical oxygen level for cold water fish species (Trout and Salmon) is ~5.0 parts per million. Few lakes in the region are able to sustain such healthy levels of DO through the summer months.

Additional water quality indicators, including pH, water color, and total alkalinity were monitored throughout the season. All were within the normal range of historical values for the lake. The natural color of the water in the lake was relatively low, averaging 9 Standard Platinum-Cobalt Units (SPU), compared to the historical concentration of 9 SPU. Thompson is considered to be a low color lake.

All of the data described above were collected at the deepest known location in the lake, which is situated northwest of Hayes Point in the Town of Oxford.

Gloeotrichia:

We continued to monitor the presence of *Gloeotrichia* in the lake in 2011. This blue-green algae often appears in Thompson during mid to late summer. It is suspended near the surface, and has the appearance of tiny, fuzzy, off-white dots. *Gloeotrichia* is sometimes described as having the appearance of “tapioca in the water”. It is found in many lake algal communities throughout Maine. It has been associated with water quality problems in a small number of Maine lakes. For reasons not fully understood, it may be on the increase. The concentration of *Gloeotrichia* in Thompson was measured on September 17, following reports from TLEA members of unusually high levels of this algae, especially in areas where wind and wave action caused the colonies to accumulate along the shoreline. The most reliable method for determining the average concentration of this alga in Thompson is by estimating the level at the deep monitoring station off Hayes Point. *On September 17, the concentration of Gloeotrichia was approximately double what has been observed historically in the lake.* Reports of similar increases in other nearby lakes in 2011 suggest that an external factor – possibly weather-related – may have been driving this phenomenon. We will continue to closely monitor the concentration of this alga in the lake in 2012.

Summary:

The 2011 lake monitoring season will be remembered for the unusually cool, wet weather during the spring and early summer. Moderate winter snowfall, combined with intense spring rain, resulted in heavy stormwater runoff from the Thompson Lake watershed, which is undoubtedly why the phosphorus concentration in the lake was so high during the early summer. *Water clarity was lower than it has been for most years for more than two decades, and the phosphorus concentration in the lake was very high for Thompson. However, because the sampling frequency was reduced in 2011, it is not possible to know whether these findings reflected the overall condition of the lake during the spring, summer and early fall.*

Comparative lake monitoring results from all lakes sampled throughout Maine in 2011 were not available at the time that this report was prepared (March 11, 2012). However, preliminary data from a group of lakes in the Thompson Lake region suggest that many lakes may have experienced below average conditions in 2011. Statewide summary information will be prepared supplemental to this report, and will be submitted as an addendum in a few weeks time.

TLEA has an outstanding history of stewardship for the lake, focusing on public education in the watershed communities, a strong history of monitoring water quality, watershed assessment, and proactive watershed conservation and protection. Thompson Lake has been the fortunate beneficiary of TLEA's vision for more than four decades.

Prepared by Scott Williams, Aquatic Biologist