



Lake & Watershed Resource Management Associates
P O Box 65; Turner, ME 207-336-2980
LWRMA @megalink.net

Report on the Health of Thompson Lake

2008

In stark contrast to 2007, Thompson Lake experienced an exceptionally good year in 2008. Conditions were considerably above average for Thompson last summer, whereas in 2007, water quality was considerably below average. It is somewhat unusual for a lake to experience such extreme variation from one year to the next. But that is not the case for Thomson, where we have documented a number of dramatic swings over the years in what are considered to be the four prime indicators of lake health: the distance that one can see down into the water (aka water clarity or transparency), the concentration of phosphorus in the lake, the concentration of algae (measured as chlorophyll-a), and the amount of oxygen that is dissolved in the water from the surface to the bottom of the lake during the late summer.

In all respects, Thompson Lake experienced a very good year in 2008. The average water clarity for the lake during the five month (May-September) monitoring period in 2008 was 10.0 meters (about 33 feet), compared to the 2007 average of 8.2 meters (about 27 feet). The historical average for the lake is 9.0 meters, which is considerably higher (better) than the “average” water clarity for all Maine lakes, which in 2008 was 5.3 meters (based on the annual average of more than 400 lakes).

The average concentration of phosphorus in the lake during the five month monitoring period was 4 parts per billion (ppb), compared to the historical average of 5 ppb, and the average concentration of chlorophyll-a was 2.2 ppb. Both the phosphorus and CHL concentrations were low (good), indicating low concentrations of algae in the water, and relatively little phosphorus to feed the algae. In 2007 the algae level in the lake was measurably higher than in 2008.

Another critical indicator of lake health is the amount of oxygen in the deepest area of the lake during the late summer (August and September). 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. This characteristic of exceptional water quality is the primary factor that allows coldwater fish to thrive in the lake. Dissolved oxygen levels measured

throughout the monitoring period in 2008 remained high, and were consistent with levels that have been documented historically.

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.

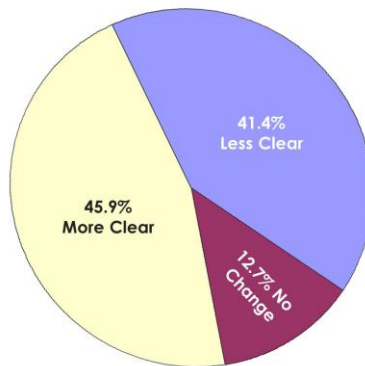
Additional water quality indicators, including pH, water color, and total alkalinity were monitored throughout the season. All were within the normal range of historical values for the lake.

We are also monitoring the presence of Gleotrichia in the lake. This blue-green algae often appears in Thompson during mid to late summer. It floats near the surface, and has the appearance of tiny, fuzzy, off-white dots. Gleotrichia is sometimes described as looking like “tapioca in the water”. It is a normal component of lake algal communities, and it appears in Maine lakes having a wide range of water quality, including several similar in size, depth and quality to Thompson. But this tiny plant has also been associated with water quality concerns in a few lakes, and, for reasons not fully understood, it may be on the increase. At this time, Gleotrichia concentrations in Thompson are very low. We will continue to carefully monitor it’s presence in the lake.

Statewide Perspective on 2008 Lake Water Clarity:

To put into perspective the significance of the 2008 water clarity findings for Thompson Lake, consider that out of 418 Maine lakes that were assessed last year, about 46% were clearer than their historical averages, and about 41 % were less clear than their average. *This represents a significant change from 2007, when a much higher percentage of Maine lakes were clearer than they had been historically.*

Comparison of 2008 water clarity of 418 Maine lakes to their long term clarity.



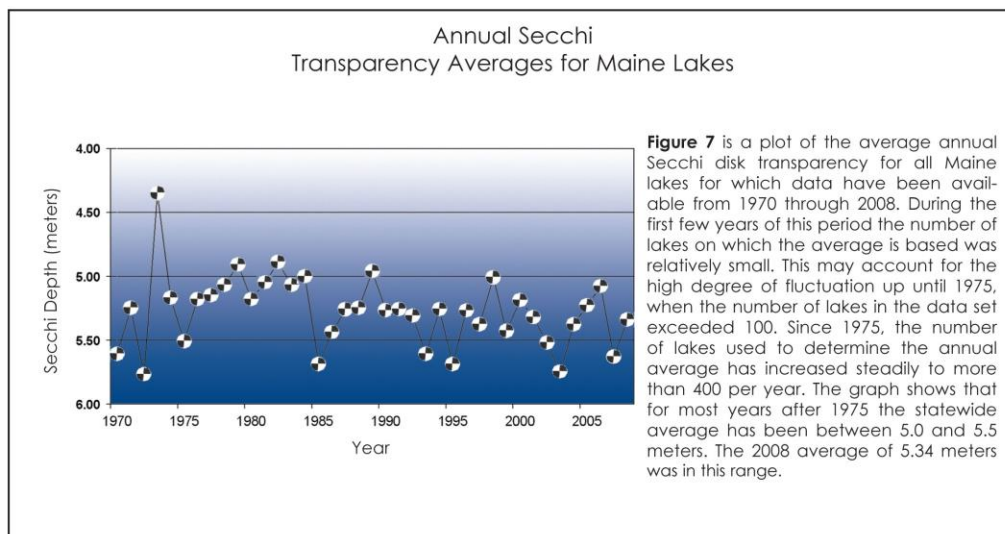
Note: Consideration was not given to whether or not some Secchi disk readings hit bottom, or whether 2008 was the first year for which data were gathered on a small number of lakes.

Percentage of Maine Lakes that were clearer, less clear, and the same as their Historical Average in 2008
(Source: Maine Volunteer Lake Monitoring Program 2008 Maine Lakes Report)

It is likely that the reduction in the number of lakes that were clearer than average in 2008 was the result of heavy snow and runoff in the spring and moderate to severe rain throughout much of Maine during the mid to late summer period. Spring runoff from melting snow and rain typically carries a high percentage of the annual phosphorus load to lakes from their watersheds. Information obtained from the National Weather service indicated that Portland, Maine experienced the wettest summer period in 138 years.

Water clarity is one of three primary indicators of the overall biological productivity of lake ecosystems, in addition to the nutrient phosphorus (TP) and chlorophyll *a* (CHL), a pigment that is used to measure the concentration of algae in lake water. The three indicators, along with dissolved oxygen, are considered to be key measures of the water quality, and overall health of Maine lakes.

The chart below shows the extent to which water clarity (Secchi transparency) has varied for Maine lakes over time. The chart shows the average water clarity for all Maine lakes monitored in a given year. Note that this average has, for most years since this information has been tracked, fallen between 5.0-5.5 meters. Variation from one year to the next is influenced by many factors, not the least of which is weather. Maine lakes may be relatively clearer during dry years because stormwater runoff from rainfall carries phosphorus and other pollutants from the watershed to the lake.



Source: Maine Volunteer Lake Monitoring Program 2008 Maine Lakes Report

The illustration above shows that for the period from 2004-2006, the “average” clarity of Maine lakes dropped substantially. This may have been due to the fact that much of the state experienced above average precipitation during the period. In 2007, Maine lakes as a whole were significantly clearer, most probably due to reduced precipitation during the winter, spring and early summer months, when a high percentage of watershed phosphorus loading typically occurs for lakes. But in 2008, along with a lower percentage

of lakes being as clear as they were in 2007, the overall water clarity for Maine lakes dropped to 5.35 meters, as the graph above illustrates.

The graph shows that a number of similar changes have occurred historically. Some of the “clearest” years have been those during which drought has recently occurred, such as 1985 and 2002 and 2003, which followed the severe statewide drought of 2001.

Each lake and pond responds in a unique way to the influences of weather, changes in land use in the watershed, and other forces upon the ecosystem. That is because of the wide range of physical, chemical and biological characteristics of each lake basin and its watershed. Most lakes and ponds experience moderate levels of natural annual variability.

Water clarity (Secchi transparency) is one of four primary indicators of the biological productivity of lake ecosystems, in addition to the nutrient phosphorus (TP), chlorophyll a (CHL), a plant pigment used to measure of the concentration of algae in lake water, and the concentration of dissolved oxygen in deep areas of the lake during the summer months.

Clearly (pun intended), Thompson Lake does not necessarily follow statewide trends. But there is no question that this lake continues to be one of Maine’s clearest and cleanest. The dramatic swings in water quality that have been documented for Thompson Lake over the years may be an indication that, despite indicators of very good health, the lake is sensitive to pressures from its developing watershed. To date, the lake has always rebounded from years when conditions have been below average. But we should not assume that this will always be the case. TLEA’s proactive effort to protect the lake through wise watershed stewardship is Thompson Lake’s best hope for continued good health.

Prepared by Scott Williams, Aquatic Biologist