

Keeping Tabs on the Health of Our Lakes

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If one is going to monitor something, there are certain questions that pertain: “What?”, “Why?”, “When?”, “How?”, and “So What?”.

Looking for a moment at the What and How questions:

If you wanted to check for the general health of someone’s kidneys, you might start with an examination of a urine sample; you would not start with a kidney biopsy.

If you wanted to check for the general health of someone’s heart, you might start with a check of the person’s pulse; you would not start with angiography of the coronary arteries.

My point is that the method(s) used to follow and document conditions are different from those employed to address questions that arise due to signs that are observed or symptoms that are reported.

Although the examples above relate to human health, I believe the concept embodied also aptly applies to other fields, such as the health of our environment and, in particular, one of my areas of particular interest, the water quality of our beloved regional lakes and streams.

Turning, then, to the Why question, for example, for a lake:

Just as it is with the evaluation of human health, there are parameters that have stood the test of time as INDICATORS of good or impaired water quality. These parameters, tracked over time, provide evidence of historical conditions. And any substantial change for improvement or deterioration is a useful tip-off of some stimulus that may merit a more targeted evaluation.

Which brings us to the When question:

Water clarity in a lake, as demonstrated with Secchi Disk depth monitoring, has been shown to be a simple and reliable means to quickly detect changes when conducted weekly during the growing season. A developing algae bloom, for instance, would cause the water clarity to diminish and would serve as a cue to look for the condition(s) provoking the change.

Chlorophyll a measurements are more laborious but also very useful for detecting an increase in the water content of plankton, potentially due to an increase in phosphorus delivery to the lake water; and once a month during the growing season has long been established as a reasonable compromise between the difficulty of performing the test procedure and the value of the information.

Total phosphorus, phosphorus being the rate-limiting nutrient for plant and algal growth, is another parameter that is highly valuable for assessing the water quality of lakes. Measurements are routinely taken in the early spring when lake water is fully mixed from top to bottom and in the late summer when lake water is fully stratified due to the development of a thermocline (sharp temperature difference in the water column).

Dissolved oxygen, at levels adequate to support the life of fish, is another frequently-used indicator of water quality. Monitoring by The Three Lakes association (TLA) has documented over many years that the dissolved oxygen levels in Torch Lake from surface all the way to 200 feet below the surface, remain

well adequate to support fish, both when the lake is mixed and when it is stratified. While this parameter is not part of the current TLA monitoring, historical data give no reason for concern and it is highly likely that the other parameters being tracked would also show undesirable changes if the dissolved oxygen were falling off.

So What:

If routine monitoring with Secchi disk, Chlorophyll a, and spring and summer phosphorus is showing continued good results, is there something else we should do? Could be. This type of monitoring is routinely performed over the deep basins of lakes and is useful to detect major changes.

Important changes to water quality may still be occurring elsewhere, in particular in the shallow near-shore reaches where more rapid effects due to activities on land will show up long before there are detectable changes over the deep basins far from shore.

Periodic assessments of shoreline conditions have been used to fill this gap. And these labor-intensive assessments are typically done by volunteers in kayaks looking for large patches of stringy green macroalgae like Cladophora. I am not aware, however, of any standard, routine, monitoring programs that focus on nutrient dynamics in the shallows.

It was the growing presence of near-shore lake floor Golden Brown Algae, not of Cladophora, that stimulated TLA to begin a study of near-shore nutrient dynamics, something that is currently ongoing; a study that will, hopefully, provide us with better understanding of this phenomenon and point the way to its mitigation.