

Would You Like to Adopt a Lake?

The COLA Call

By Ed Mutsch

A lake is a living thing and, like all living things, grows old. Eutrophication, the fancy term for a lake's aging process, involves the fertilization, sedimentation, and acidification of a lake, causing it to progress through a variety of stages from a clean and pristine infancy (oligotrophic) to a young adult stage of reduced water clarity and oxygen concentration (mesotrophic), to middle age where water clarity and oxygen concentrations are further reduced and algal blooms and nuisance aquatic plants appear (eutrophic) and then further to a geriatric hypereutrophic stage where the lake has essentially no clarity but lots of dense algae. This process basically represents the transformation of a lake into a wetland. From a human recreational enjoyment perspective it represents the progression from an initial "heaven on earth" stage to an ultimate "totally useless for anything" stage. Left to its own devices, the eutrophication process is natural and inevitable, requiring hundreds of years to effect. Human beings, however, have an exceptional ability to catalyze and thereby greatly accelerate this transformation. They accomplish this remarkable acceleration by fertilizing the lakes with their agricultural, lawn fertilizer, and septic system runoffs, and by denuding shorelines or maintaining lush lawn-to-lake properties which greatly increase contaminating runoff, soil erosion, and sedimentation.

We routinely employ a variety of measurements, e.g., temperature,

blood pressure, blood chemistry, etc., to evaluate the health of a human being. We compare a given test result to what we know about the typical value of the larger population as well as to earlier measurements taken on the same individual. There are comparable tests and comparisons for assessing the health of a lake, three of which are Secchi depth and the concentrations of phosphorus and chlorophyll-a. Secchi depth is determined by use of a Secchi disc, an 8-inch circular white metal plate attached to a calibrated rope, which is slowly lowered into the water to the point at which it is no longer visible. Phosphorus and chlorophyll-a concentrations are determined by chemical analysis of a lake water sample. Secchi depth is a measure of water clarity. The chlorophyll-a level is a measure of current algal density. The phosphorus level is a measure of future algal load. High water clarity is good. High phosphorus and chlorophyll levels are bad. Phosphorus is food for plants and algae and causes algal blooms and decreased water clarity. One pound of phosphorus will ultimately lead to the production of 500 pounds of algae. The aforementioned progression of a lake from oligotrophic to mesotrophic to eutrophic involves a corresponding progression from a condition characterized by high water clarity and low phosphorus and low chlorophyll-a levels to ever lower water clarity and increasing phosphorus and chlorophyll levels, i.e., to ever more greenish, murky water and high plant and algae densities. The three measurements are mathematically combined into a composite number, the Trophic State Index (TSI) which can be taken as an overall measure of the nutrient enrichment of a lake; the lower the TSI, the "cleaner" the lake.

Forty four Hubbard County lakes recently completed 10 years of participation in a COLA-sponsored water quality monitoring program in which lake association volunteers periodically determine Secchi depths and collect water samples for phosphorus and chlorophyll-a determinations. The long, continuous set of data points on these lakes is important since the monthly data points, hence water quality, can vary considerably throughout a given season as well as season to season depending on temperature, weather patterns, and adjacent shoreland use practices. It is the trends in Secchi depth, phosphorus and chlorophyll levels, and TSI that are of particular importance and can offer early warnings of deteriorating water quality, offering a wakeup call to identify contamination source(s) and hopefully

eliminate them. The 10-year COLA lakes experience shows the TSI indices of the 44 lakes to range from 35.3 for Little Sand lake to 59.0 for Portage Lake. Eight of the 44 lakes can be classified as oligotrophic, seven as eutrophic, and the remainder as mesotrophic. However, twelve Hubbard County lakes have experienced declining water quality, in some cases alarming declines. The full 31-page report is available to all interested citizens and can be accessed at the RMB Environmental Laboratories web site by going to <http://www.rmbel.info/>, then clicking on 'Lakes Database' (top right of page), then on 'Publications' (left center of page), then on 'Hubbard County 10 year Water Quality Report'.

It would be highly desirable to have the corresponding data sets on all Hubbard County lakes. Unfortunately, such an undertaking is more than the resources of such public agencies as the DNR or the MPCA (Minnesota Pollution Control Agency) will permit. However, any concerned citizen who lives on or near a lake or who is a regular user of a particular lake, and is willing to give a small amount of time and energy to conduct simple water quality checks can become a part of the MPCA Citizen Lake Monitoring Program. Volunteers receive data sheets, a Secchi disc, a training video, and a t-shirt. One can obtain additional information at the MPCA web site; go to <http://www.pca.state.mn.us/>, click on 'Water' (on left of page), then click on 'Volunteer Surface Water Monitoring. Alternatively, one can phone the MPCA at 800-657-3864 or e-mail the agency at clmp@pca.state.mn.us. A substantial number of citizens, each devoting a small amount of time, could make a major contribution to monitoring, protecting, and improving the quality of our vitally important water resource.

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