

Understanding Why We Test Water and What the Results Mean

see also Merriam article on “Interpreting and Using Water Quality Results”

Excerpts of an E-mail from Patrick Larson at RVCA 1 June 2011

Interpreting water test results is a very complex business and, therefore, difficult to reduce to simple terms.

PHOSPHOROUS ACIDITY SCALE

A Total Phosphorous reading of pH – 6.5 to 8.5 is normal for freshwater lakes.

The total phosphorus (TP) scale of eutrophication is as follows:

- 0 to 10 micrograms per litre ($\mu\text{g/L}$) concentration is oligotrophic (clear, usually deep lakes with very low diversity of flora and fauna);
- 10 to 20 $\mu\text{g/L}$ is mesotrophic (lower clarity with a greater diversity of plants and creatures); and
- greater than 20 $\mu\text{g/L}$ is eutrophic (excessive plant growth of a dominant few species and low diversity of creatures).

Most of the lakes in the Rideau watershed fall within the mesotrophic range. That has meant some aquatic plant growth and occasional algae blooms. Unfortunately, over the last few years there have been increasing occurrences in frequency, duration and size of algae blooms with no increase in phosphorus concentrations. In many lakes the phosphorus concentrations have declined slightly.

NITROGEN

There used to be a guideline for nitrogen whereby a lake was considered to be in good shape if it had a concentration of 100 $\mu\text{g/L}$ to 500 $\mu\text{g/L}$ of total Kjeldahl nitrogen (TKN). That was withdrawn as further research made it unclear what concentration was correct. RVCA still uses 500 $\mu\text{g/L}$ as an indicator but we would certainly not use it on its own to characterize the condition of a lake.

E.Coli

E.Coli counts above 100 in a lake make that water unsafe for “body contact activities”. In the several years of Watershed Watch sampling, there have been very few sample results over that objective and none have been persistent.

WATER CLARITY

Guidelines for water clarity were devised related to the visibility of a Secchi disk at depths in a lake. Depth measurements of greater than 5 metres have been considered to indicate oligotrophic conditions, 2 to 5 metres indicates mesotrophic and less than 2 metres eutrophic.

THE BOTTOM LINE

The simplest way of looking at these variables is that a lake that meets the provincial objectives means that it is in reasonably good shape:

- TP at no greater than 20 $\mu\text{g/L}$ to limit plant growth (official MOE Provincial Water Quality Objectives [PWQO])
- E.Coli less than 100 counts for safe swimming (official MOE Provincial Water Quality Objectives [PWQO])
- TKN readings of less than 500 $\mu\text{g/L}$ (guideline)
- Secchi disk readings of greater than 2 metres depth for water clarity (guideline)
- NOTE: This may require acceptance of increased and more extensive algae blooms as being part of what mesotrophic now means, at least until further research can bring explanations.