



The State of the Lake

A critique of recent reports on phosphorus loading and lake chemistry

July 2007

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The purpose of this document is to provide a brief critique of the reported phosphorus loading to Lake Simcoe and the reported chemical analyses of phosphorus levels in the lake and dissolved oxygen in the deep water. These are the data on which claims that the state of the lake is improving have been made. In addition conclusions have been drawn that evidence shows that lake trout are beginning to reproduce naturally once again. This conclusion also is challenged.

Phosphorus Loading

In regard to phosphorus loading the relevant documents are: Scott et al 2001 Imp. A4, and Scott Winter and Girard 2006 Imp. A6.

These two documents report total phosphorus loading for the years 1990-98 and 1998-2004 respectively.

- 1) A very large unexplained difference exists between the two sets of data. Data in 1990-98 range between 85.4 tonnes (total load) and 156.5 tonnes whereas data in 1998-2004 are much more consistent, ranging from 53 to 72 tonnes. In the absence of a persuasive explanation it remains possible that the difference relates to sampling or method changes.
- 2) Different components are included in the two sets of data. Holland Marsh contributions were measured. Polders were estimated. Urban run-off is estimated using varying calculations of urban area determined by different photographic techniques over the entire period.
- 3) Only part of the watershed (about 42.5%) was measured (i.e. monitored and gauged for phosphorus levels and flow) the data were translated to estimates for the entire watershed. Some of the watershed was monitored and not gauged; some was gauged and not monitored. The large unmeasured area (57.5%) for which only estimates are available makes for uncertainty concerning reliability.

4) Additional problems attributable to data being missing, in some cases for up to two years, add to concerns about reliability.

5) No reasonable explanation has been offered for the wide variability in the data on the atmospheric component - from a high of 73.4 tonnes (1994-5) to 16 tonnes (2001-2). The early data are generally much higher than the later period. In the absence of an explanation, sampling and methodology must be suspect.

Taken as a whole, these observations demand caution in interpretation and conclusions. We agree with the decision of Scott, Winter and Girard in Report A6 to report their findings in detail but to not comment on whether their results justify a conclusion as to whether or not phosphorus loading has decreased in the period 1998-2004 compared to 1990-98.

Measured Lake Phosphorus

LSEMS Implementation Report 2005 (B20) examines the phosphorus levels in Lake Simcoe at four open lake and three Cook's Bay and one Atherley stations over a 23 year period, (1980-2003). They used all the data points, examining the record for statistical significance. Using a probability value of $P < 0.05$, they concluded that no significant change could be shown in the phosphorus levels for any of the four open lake and Kempenfelt Bay stations during the 23 year period. Significant reduction was demonstrated at the three Cook's Bay and one Atherley stations.

The report also shows data on end-of-summer dissolved oxygen in the deep water zone. Except for two years out of 23 (1980-2003), the record shows dissolved oxygen below the LSEMS targeted objective of 5mg./l., itself well below the optimum level of about 7 mg./l. These data are not encouraging and are incompatible with conclusions that the lake's ability to sustain naturally reproducing cold water fish is improving.

It has been reported by the Ministry of Natural Resources that a very small number of young lake trout have been recovered from the lake each year since 2001. This suggests the possibility that some reproduction may have occurred. The significance of this observation remains unclear. At best it appears to be an anomaly given the low levels of dissolved oxygen.

The above findings cast doubt on the claim that the lake's health is improving. Lower phosphorus levels in Cook's Bay are compatible with lower loading and may be the best evidence that this may be occurring. However continuing low levels of dissolved oxygen and lack of evidence of phosphorus reduction in the main lake where fish reproduction should occur are hard to reconcile with claims that the state of the lake is improving.

JBM July 26/07