

Decline of a primary weed nutrient in Cedarville Bay.

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Summary: The concentration of phosphorus dropped fivefold in Cedarville Bay between 2003 and 2011 (Fig 4.). This significant decline in phosphorus was observed at three sites of a transect used during studies in 2003 and in 2011. Decreased phosphorus availability reduces the density of weed growth and improves water ecology as well as the recreational quality of Cedarville Bay waters. These findings reinforce that long term efforts to reduce nutrient contamination from the Clark Township Sewer Treatment Plant (STP) have been effective.

Three factors most likely contributing to decreased phosphorus levels are: (1) Use of iron chloride to efficiently bind with phosphorus and remove it from lagoon water at the Clark Township (STP); (2) Continued STP process improvement and (3) a 2010 dredge operation whereby several hundred tons of phosphorus-laden sediment were removed from navigation channel and boat launch area (Smith 2011).

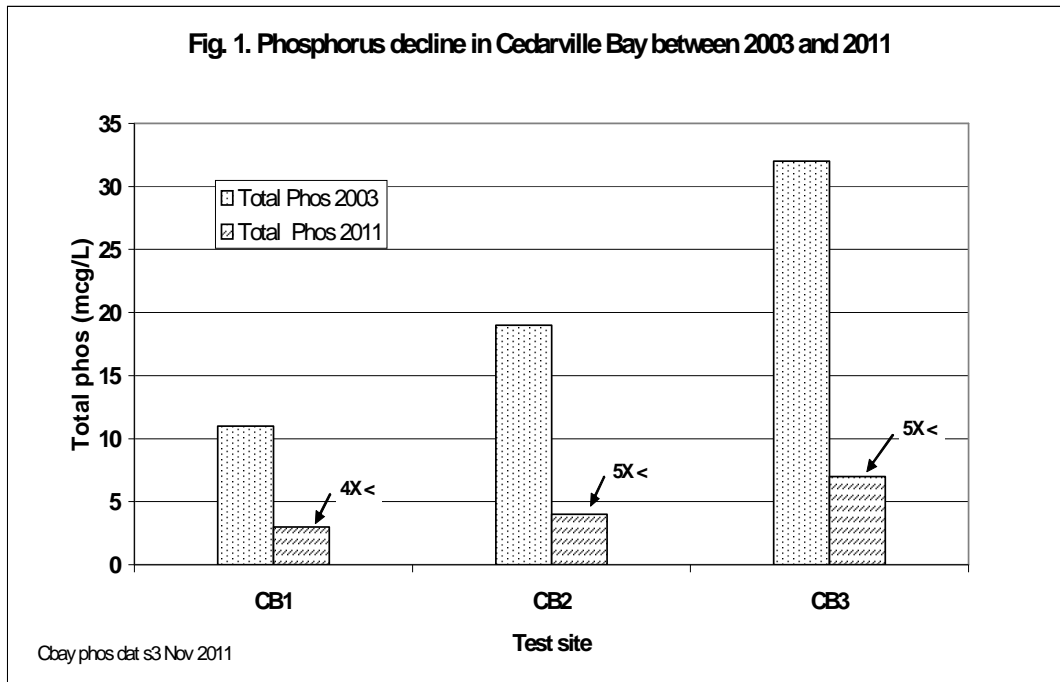
Although phosphorus concentrations have dropped in Cedarville Bay the level needs to be decreased at least tenfold more to bring the trophic status to a desirable range for improved ecology and recreational use.

Recommendation: Based on the significant phosphorus differences between 2003 and 2011 it is recommended the 2003 (Smith, 2003) transect study be repeated to confirm the apparent downward phosphorus shift. It is further recommended that an island-wide water chemistry study be updated to monitor any changes that might have occurred in overall Les Cheneaux water quality since completion of the 2001-2005 survey (Smith, 2006).

Background: Cedarville Bay is a primary focal point for activities within the Les Cheneaux Islands. As a resort community Les Cheneaux depends on high quality recreational waters to attract tourists each season. Les Cheneaux waters have traditionally been categorized as oligotrophic-to-mesotrophic, highly desirable for recreational use. Since the early 90s some areas of the channels have become more nutrient rich, or eutrophic. Upon completion of a five-year study Cedarville Bay was the most eutrophic area of ten sites monitored (Smith, 2006).

Cedarville Bay has characteristics more similar to an inland lake than a bay on the shores of northern Lake Huron. It is shallow with little water exchange with Lake Huron. As such, excess nutrients entering the bay are retained for long periods and contribute to both algal and vascular water plant growth. STP records show that lagoon discharges to Pearson Creek and, eventually to Cedarville Bay, since 1993 contained several tons of phosphorus. One result of excess phosphorus in Cedarville Bay has been luxuriant growth of both algae and water vascular plants (Smith 2003, 2004a, 2004b).

Methods: Samples were collected from a three-site transect and analyzed at the University of Michigan Biological Station as previously described (Smith, 2003).



Citations.

Smith, R.A. 2003. Phosphorus dynamics in Cedarville Bay.

Smith, R.A. 2004a. Adverse effect of lagoon water on Cedarville Bay.

Smith, R.A. 2004b. Use of formulated ferric chloride to reduce phosphorus content in Clark Township treatment plant lagoon effluent.

Smith, R.A. 2006. Trophic status of water from selected sites in the Les Cheneaux Islands. 2001-2005.

Smith, R.A. 2011. Impact of channel dredging on phosphorus concentrations in Cedarville Bay.

