Federation of Ontario Cottagers´ Associations

Protecting the water quality of Ontario's inland lakes: A closer look at the impacts of shoreline development on water quality

Lakeshore Capacity Assessment (LCA) was developed as a tool by the Ministries of the Environment (MOE), Natural Resources and Municipal Affairs and Housing in response to the growing need for informed decision-making regarding development along lake shorelines. LCA and its associated predictive model (LCM), was first developed in the mid-1970s and has recently been formalized in the "Lakeshore Capacity Assessment Handbook- Protecting Water Quality in Inland Lakes on Ontario's Precambrian Shield."

The basis of Ontario's LCA approach is a conceptual model linking hydrology, lake morphometry, and natural (e.g., inputs from the watershed and the airshed) and anthropogenic (e.g., human-derived inputs from development and changes to land-use) phosphorus sources into a phosphorus budget for a lake. The model incorporates key input parameters such as lake surface area, catchment area, mean depth, percent forest and wetland, and the number and types of shoreline residential developments. The model is based on a number of coefficients that have been calibrated for lakes in south-central Ontario. These coefficients are periodically updated and revised as our understanding of the science improves.

The model predicts the phosphorus concentrations in lakes, as it is the nutrient most often limiting primary production in Canadian Shield lakes. In other words, the growth of algae in these lakes is highly dependent on the concentration of TP in the water column. When present in excess amounts, phosphorus can cause eutrophication and the development of problematic, and potentially toxic, algal blooms. Thus, nutrient enrichment is a primary concern for lake users in Ontario's cottage country.

One of the key goals of the LCM is to determine the maximum allowable TP concentration that would protect lake water quality. The MOE defines this TP objective as the modeled background TP (i.e., TP of a lake with an undeveloped watershed) plus 50 percent. Thus, a lake with a modeled background TP of 10 µg/L would have a water quality objective of 15 µg/L (i.e., 10 µg/L + 50%). Shoreline development surrounding the study lake (and all upstream lakes) should be maintained at a level where the water quality objective is not exceeded.

In recreational lakes that do not have a large point source of phosphorus (e.g., sewage treatment plant), domestic waste from septic systems is the largest human source of phosphorus. The concentrations of phosphorus in septic wastewaters are roughly 200-300 times higher than the concentrations needed to stimulate significant algal growth in lakes! Therefore, as cottage owners, we have a shared responsibility to maintain the health of our lakes by limiting the inputs of phosphorus. Below are some ways that you can help reduce the effects of shoreline development on water quality:

1) Maintain a properly functioning septic system. Have your septic system pumped every 3-5 years to remove the build-up of solids and scum, and take this opportunity to have the system checked for any required maintenance. If you are converting a cottage into a permanent dwelling be sure to check the capacity of your septic system. Exceeding the capacity of your septic could result in the remobilization of phosphorus in the soil.
2) Reduce your water use at the cottage. Excessive water use is the most common cause of septic failure. Cut down on the amount of water entering your septic by installing low flow toilets and showerheads, and taking laundry home to wash.
3) Implement mandatory septic inspections. Have your local cottage association arrange for an inspector to come to your lake.
4) Naturalize your shorelines (e.g., vegetated buffer strips, wetlands) to help control soil erosion and the runoff of nutrients to the lake and nearby rivers and streams.
5) Limit the amount of impervious surfaces, including roofs, parking areas, and patios, to reduce runoff to nearby waterbodies.
6) Adopt strong stewardship programs to educate other lake users on ways to promote good water quality (e.g., promote the use of phosphorus free products).
7) Encourage enhanced septic system setback limits. The current minimum setback requirement in the Ontario Building Code (OBC) is 15 metres. The MOE recommends a minimum clearance of 30 metres between septic system and the water's edge.

Adopting these Best Management Practices can help reduce the input of phosphorus to our lakes. Do your part to minimize the footprint of your waterfront property.

Further information is available in the *Lakeshore Capacity Assessment Handbook: Protecting Water Quality in Inland Lakes on Ontario's Precambrian Shield* online at http://www.ene.gov.on.ca/publications/7642e.pdf. A link is also available from the FOCA website Lake Partner pages.

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