
DATE: October 1, 2009

REPORT TITLE: **UPDATE ON SHORELINE ALGAE RESEARCH**

FROM: Dan Labrecque, Commissioner of Environment, Transportation
and Planning Services

OBJECTIVE

To inform Council on the status of shoreline algae research, the Region of Peel's contribution to the research with the Ontario Water Works Research Consortium and Peel's commitment to the water quality in Lake Ontario.

REPORT HIGHLIGHTS

- Excessive growth of attached algae, mainly *Cladophora*, occurred in the 1960's and 70's and returned in the late 1990's. These algae block water intakes, destroy fish habitat and foul beaches.
- The final report from the Ontario Water Works Research Consortium (OWWRC) has concluded that the increased growth of *Cladophora* is linked to the invasion of zebra and quagga mussels.
- The population of mussels along the shoreline filters out particles and increases light penetration – allowing growth of algae at greater depth. The mussels also have become the main local source of phosphorus through their excretions. The other major local source of phosphorus is stormwater runoff.
- Environment Canada has initiated a program to limit the amount of phosphorus in cleaning products to reduce the phosphorus loading to the lake.
- The Region of Peel's wastewater treatment plants produce effluent that is regulated through the Ministry of the Environment (MOE). Through negotiations with the MOE, steps have been taken to further limit phosphorus discharges.

DISCUSSION**1. Background**

The ecology of Lake Ontario has changed since the early 1990's when zebra mussels and then quagga mussels began to populate Lake Ontario. One result is the return of excessive growths of attached algae with the resulting increased odour complaints along the shoreline. The cause of the odour is the decomposition of *Cladophora* algae which detaches as the lake reaches its maximum summer temperature and drifts in to shore.

In 1999, Peel Region initiated the formation of the Ontario Water Works Research Consortium (OWWRC). In 2002, the OWWRC started working with the Ontario Clean Water Agency (OCWA) and the University of Waterloo to investigate the causes of the return of

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excessive growth of attached algae and the increasing odour complaints from residents related to fouled beaches.

2. Findings

Growth of the algae species *Cladophora* is limited by two factors: availability of phosphorus and availability of sunlight penetration to the lake bottom. As *Cladophora* dies, it drifts towards shore and begins to rot, resulting in offensive odours, a lack of usability of the shoreline by Peel residents and odour issues for people living close by. In the 1970's excessive *Cladophora* growth was successfully halted by phosphorus reductions in detergents and phosphorus limits at wastewater treatment plants. Although the Lake Ontario target for phosphorus is still being met there has been a resurgence of *Cladophora* starting in the late 1990's. The research to date has focused on determining the cause of this resurgence and possible solutions.

The main finding of the research was that the mussels have become a major source of phosphorus in the shoreline zone where the *Cladophora* is growing. The mussels excrete an available form of phosphorus in their feces. Mussels are also the cause of the increasing light penetration as they filter the water they increase clarity, this helps the *Cladophora* colonize the lake bottom to greater depths. After mussels, the largest contributor of phosphorus to the shoreline zone is stormwater runoff. The two other sources of phosphorus to Lake Ontario are rivers and streams that carry agricultural and urban/suburban contaminants and wastewater treatment plant effluent. There are no known methods for the removal of zebra mussels; therefore, the report recommends that solutions be researched and implemented with a range of partners to reduce all sources of phosphorus to Lake Ontario, starting with the most cost effective.

Concurrently, Environment Canada initiated a program to reduce the level of phosphorus in cleaning products. Environment Canada has stated that one of the main challenges facing manufacturers of the products is finding a substitute for phosphorus that does not adversely impact the environment. However, in expressing our due diligence, Peel Region and the Credit Valley Conservation Authority (CVCA) have sent written requests to Environment Canada asking that the limit be zero percent on all products containing phosphorus. The Minister of the Environment provided a written response stating they will continue to cooperate with their provincial counterparts and interested stakeholders to evaluate risk management options for protecting Canada's waterways. Lowering these concentrations represents one step to the overall lowering of phosphorus loadings to Lake Ontario.

The two wastewater treatment plants within Peel Region; G.E. Booth and Clarkson that discharge to Lake Ontario have taken action to reduce the phosphorus in their effluent. At both wastewater treatment plants detailed negotiations took place between the Region and the MOE to establish new and more stringent limits on phosphorus in the effluent. At the G.E. Booth Wastewater Treatment Plant, previous phosphorus limits were 1.0 mg/L and these have now been reduced to 0.8 mg/L. This is another step toward lowering overall loadings on Lake Ontario.

NEXT STEPS

The Region of Peel has worked closely with the MOE to establish wastewater plant effluent limits that result in the lowest practical phosphorus loading to the lake. The Region will continue to provide the public with information related to this issue through the website in the form of a Frequently Asked Question (FAQ) page, (as previously communicated to Regional Chair and Members of Regional Council from Commissioner Dan Labrecque dated July 29, 2009) daily

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reports and weekly photographs of the shoreline algal growth during the summer as well as pertinent findings from the OWWRC report. This report entitled "Research into the cause and possible control methods of increased growth of periphyton in the western basin of Lake Ontario is available in the Region of Peel Clerks Department.

The Region of Peel will continue to support research in this area which is anticipated to focus more on cost effective actions to reduce phosphorus loadings to Lake Ontario.




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Approved for Submission:



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