



STAFF REPORT ACTION REQUIRED

Source Water Protection Plan for City of Toronto Water Treatment Plants – Supplementary Report

Date:	November 26, 2012
To:	City Council
From:	General Manager, Toronto Water
Wards:	All Wards
Reference Number:	P:\2012\Cluster B\TW\cc12016

SUMMARY

The purpose of this report is to advise Council of the need to notify all municipalities that operate water treatment plants along the north shore of Lake Ontario about threats to water quality at the intakes of these facilities, and about the policies contained in the Credit Valley, Toronto and Region, Central Ontario (CTC) Source Protection Plan aimed to protect against threats to Lake Ontario as a drinking water source.

The CTC Source Protection Plan was developed to address threats identified through computer simulation modelling of Lake Ontario, based on worst case scenarios of actual events that have occurred in Toronto and other jurisdictions and include threats from spills from fuel storage tanks, spills from pipeline failures, the release of tritium from nuclear power generating stations, the release of partially treated sewage due to disinfection process failures, and the release of raw sewage due to sanitary trunk sewer failures.

Due to the nature of the threats and the fact that pollution inputs once released to Lake Ontario do not respect municipal or Source Protection Region boundaries, it is appropriate for the Ontario Government to take responsibility for implementing the Lake Ontario policies contained in the CTC Source Protection Plan.

This report encourages municipalities that operate water treatment plants along the north shore of Lake Ontario to support the City of Toronto in calling upon the Ontario Minister of the Environment to reaffirm the Ministry of the Environment's overarching responsibility to protect and enhance near shore water quality in Lake Ontario; and that the Ministry of the Environment, rather than the City or other municipalities as assumed in the *Clean Water Act*, must accept lead

responsibility for implementation of the Lake Ontario policies contained in the CTC Source Protection Plan.

RECOMMENDATIONS

The General Manager, Toronto Water recommends that:

1. City Council forward a copy of this report to municipalities located along the north shore of Lake Ontario and which operate water treatment facilities and rely on Lake Ontario for their source water.
2. City Council request and encourage municipalities that have water treatment plant intakes located along the north shore of Lake Ontario to:
 - a) remind the Ontario Minister of the Environment that the Ministry of the Environment has a duty to protect and enhance the near shore water quality of Lake Ontario; and,
 - b) strongly urge the Ontario Minister of the Environment to accept responsibility and acknowledge the Ministry of the Environment as the "Implementing Body" for the purpose of Lake Ontario policies contained in the CTC Source Protection Plan.

Financial Impact

There is no financial impact associated with this report.

DECISION HISTORY

The Public Works and Infrastructure Committee, at its meeting of November 14, 2012, after consideration of the Report from the General Manager, Toronto Water, on Source Water Protection Plan for the City of Toronto Water Treatment Plants, requested the General Manager, Toronto Water, to submit a supplementary report to City Council on November 27, 2012, which:

- a. explains why the Ontario government is the appropriate Implementing Body for Lake Ontario-based Source Protection Policies;
- b. summarizes the critical importance of the near shore of Lake Ontario as the source of drinking water; and,
- c. contains recommendations that other north shore Lake Ontario municipalities should consider for adoption in support of the City of Toronto's position.

A copy of the Public Works and Infrastructure Committee Decision Document can be found at:
<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2012.PW19.6>

A copy of the Report from the General Manager, Toronto Water, on Source Water Protection Plan for the City of Toronto Water Treatment Plants can be found at:
<http://www.toronto.ca/legdocs/mmis/2012/pw/bgrd/backgroundfile-51737.pdf>

ISSUE BACKGROUND

Economic, Environmental, and Social Value of Lake Ontario

Every day, 6 million Ontario residents, representing almost half of the province's population, rely on Lake Ontario as a safe and abundant source of drinking water. For municipalities located along Lake Ontario, the lake and its shoreline provide a wide range of recreational opportunities, including swimming, fishing, boating, birding, cycling, and hiking. In order to sustain Ontario's economic, social, and environmental prosperity, it is imperative to protect and improve the water quality of Lake Ontario and its tributaries. This is ever more challenging, given that the shores of Lake Ontario are the most densely populated and industrialized area of the entire province and will continue to be so.

Ontario *Clean Water Act* (CWA) and Source Water Protection

In 2006, in recognition of the importance of protecting the sources of drinking water for all Ontarians, the Ontario government passed the [*Clean Water Act* \(2006\)](#) [S.O. 2006, Chapter 22]. The Act addresses recommendations made by Justice O'Connor in his judicial inquiry into the tainted water tragedy that occurred at Walkerton in 2001. A main conclusion made by Justice O'Connor was that protecting the sources of drinking water, before they are overused or polluted, is the best, most cost effective way of ensuring the safety and sustainability of drinking water into the future.

The Act established Source Water Protection Regions with responsibility for developing Source Water Protection Plans to address activities and land uses around municipal wells (groundwater sources) and drinking water treatment plant intakes (surface water sources – including Lake Ontario) to protect existing and future sources of drinking water.

In total, five Source Protection Regions were established around the north shore of Lake Ontario, from the Town of Grimsby to the west, to the Town of Picton in the east, extending across 19 water treatment plant intakes, as shown in Figure 1. Source Protection Committees were established for each of these Regions.

COMMENTS

Lake Ontario Collaborative and the Assessment Report

In support of the development of Source Protection Plans for the above-noted five Source Protection Regions, the Lake Ontario Collaborative (LOC) was formed in 2006. The LOC comprised representatives of all municipalities from Niagara to Prince Edward County that have Lake Ontario-based water treatment plants, as well as from each of the corresponding Conservation Authorities, the Ontario Ministry of the Environment, and Environment Canada. Establishment of the LOC acknowledged that pollution inputs to Lake Ontario do not respect municipal boundaries. Once contaminants enter the lake, they are dispersed and can be transported far from the point of entry.

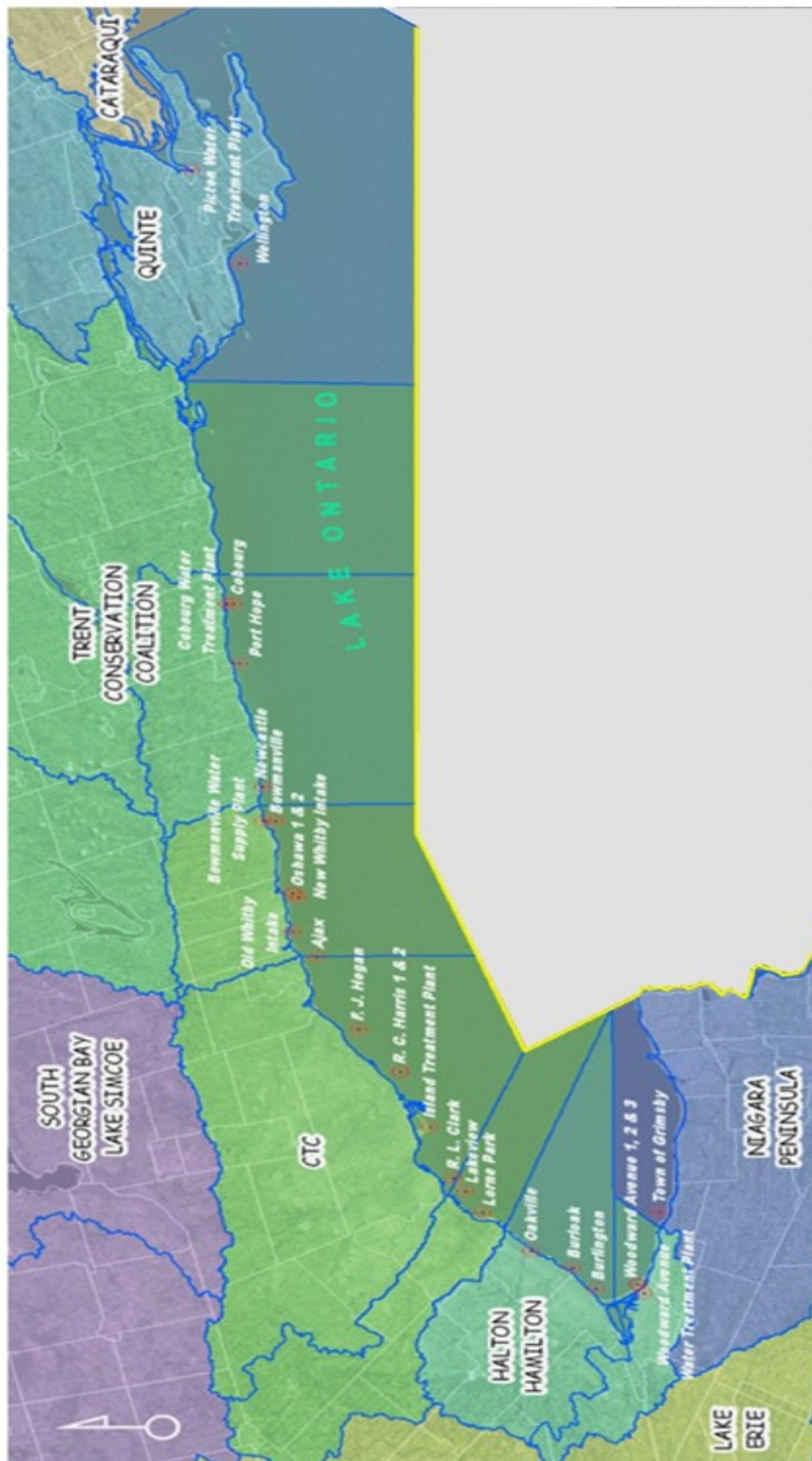


Figure 1. Map showing water treatment plants along the Lake Ontario north shore.

The LOC determined that a whole lake-based approach was prudent and necessary to fully assess threats to drinking water. Furthermore, the adoption of a common methodology avoided duplication of effort and ensured consistency of approach and analysis for all Lake Ontario-based Source Protection Regions.

The 19 water quality threats prescribed by the Ontario government were examined and two of these threats were deemed to be of sufficient concern to warrant further investigation: sewage threats (disinfection failures at wastewater treatment plants and raw sewage spills resulting from sanitary trunk sewer failures) and bulk fuel storage spills (containing benzene). Two additional threats applicable to the Lake Ontario Source Protection Regions were also evaluated: the release of tritium from a nuclear generating station, and spills of petroleum products containing benzene from a pipeline.

The assessment of these potential threats used a lake-wide three-dimensional water quality and circulation model providing coverage across all affected water treatment plant intakes and incorporated pollution source inputs derived from information provided by affected municipalities and Conservation Authorities along the north shore of Lake Ontario.

CTC Assessment Report – Understanding Threats to Lake Ontario Water Quality near Water Treatment Plant Intakes

A scenario approach was used to evaluate whether spills of contaminants (defined in the CWA Regulations) from specific sources could represent a significant threat to lake-based intakes. Model inputs for the threat evaluation were based on actual or anticipated spill occurrences. The focus of the evaluation was on the near shore zone, which receives flows and pollutant loadings from various pollution sources along the shoreline, including the tributaries that flow into Lake Ontario, municipal wastewater treatment plant effluents, industrial discharges, and discharges from sewer outfalls.

The scenarios that the LOC examined were based on worst case scenarios of real events that have occurred in the past and included threats from releases of:

- gasoline from a bulk petroleum fuel storage and handling facilities;
- gasoline/refined petroleum product due to failures of large pipelines located under major Lake Ontario tributaries;
- tritium from nuclear power generating stations at Pickering or Darlington;
- partially treated sewage due to disinfection process failures at each municipal wastewater treatment plant located along the north shore of Lake Ontario; and
- raw sewage due to sanitary trunk sewer failures within watercourses.

The computer simulation modelling results completed by the LOC showed that significant threats could affect all Lake Ontario-based water treatment plants assessed to date. It is worth noting that the results of the LOC assessment indicated combined sewer overflows did not represent a significant threat to water treatment plant intakes.

The LOC studies provided the foundation for the Assessment Reports for each Source Protection Region, and ultimately the policies contained in Source Protection Plans. A copy of the Assessment Report pertaining to intakes for water treatment plants in Peel Region, the City of

Toronto, and Durham Region can be found at: <http://www.ctcswp.ca/Assessment-Report/assessment-report.html>

CTC Source Protection Plan Policies to Address Threats to Lake Ontario Water Treatment Plants

Based on the LOC evaluations, the CTC Source Protection Committee developed a Source Protection Plan that presents 15 policies intended to specifically address current and future potential threats to Lake Ontario-based water treatment plant intakes. These policies are grouped into five categories and summarized in Table 1, and can be found at:

http://www.ctcswp.ca/files/CTCProposedSourceProtectionPlan_LowRezFINAL.pdf.

Table 1. Summary of CTC Source Protection Plan - Lake Ontario Policies

CTC SPP Policy Category	Identifier	SPP Chapter 10 Page Reference	Overview Description
General	LO-G	pp. 116 – 119	Applicable to all threats and relating to improved spills notification protocols, the installation of instrumentation to assess real time lake circulation and water chemistry, the further development and application of Lake Ontario circulation and water quality modelling, and public education and outreach, particularly with other agencies including United States government agencies.
Nuclear Generating Stations	LO-NGS	p. 121	Pertaining to improved spills notification protocols.
Sewers	LO-SEW	pp. 123 – 125	Directed at wastewater treatment plant by-pass flows and potential disinfection failures, the failure of sanitary trunk sewers, spills from properties which could enter the municipal storm sewer system, and the need for pathogen risk assessments at water treatment plants.
Pipelines	LO-PIPE	pp. 127 – 128	In regards to reducing the risk and/or impact of petroleum pipeline breaks.
Petroleum Tank Farm Storage	LO-FUEL	pp. 129 – 130	Dealing with the adequacy of existing spills prevention/contingency plans.

While these policies have been developed by the CTC, they are directly applicable to all water treatment plants located along the north shore of Lake Ontario and will be of interest to all local and regional municipalities that rely on Lake Ontario as the source for drinking water.

The Lake Ontario policies proposed by the CTC Source Protection Committee continue the work begun by the LOC. The individual policies are intended to facilitate future activities aimed at reviewing and updating the modelling scenarios, and refining the impact assessments by, for example, making provision for the implementation of appropriate contingency measures. The Ontario Ministry of the Environment is named as the "implementing body" for all the Lake Ontario policies proposed by the CTC Source Protection Committee.

The CTC Source Protection Plan was filed for final approval with the Minister of the Environment on October 22, 2012. Prior to submission of the Plan, the CTC Source Protection Committee contacted the Ministry of the Environment with a request for assistance regarding formulation of policies to address the intake protection zones in Lake Ontario.

Guidance was sought in respect of proposed policies related to future efforts to assess the impacts of other threats in Lake Ontario, future support for assessing the risks associated with specific waterborne pathogens, future development of an inventory of pipe facilities that cross tributaries draining into Lake Ontario, and consideration of a broader range of policies and measures to protect the Great Lakes. In response, the Director of Source Protection Programs at the Ministry advised the CTC Source Protection Committee that the proposed policies were “out of scope” because they did not fit the defined general policy categories described at Section 22(7) of the Clean Water Act¹. The Director’s response did note that this did “not mean that the policies are not worth considering”.

Notwithstanding the response from the Ministry, the CTC Source Protection Committee carried forward the above-noted policy recommendations to the Source Protection Plan.

Ontario Government is Appropriate Implementing Body for Lake Ontario Policies

The *Clean Water Act* addresses implementation of Source Protection Plans and introduces risk management as a policy approach to mitigating threats to drinking water sources.

Specifically, the *Clean Water Act* names municipalities as the authorities responsible for implementing Source Protection Plan policies through municipality appointed risk management officials and inspectors. The underlying assumption is that the presence and scope of threats to drinking water sources can be contained within municipal boundaries. The result is that the Act effectively downloads to municipalities the responsibility for actively identifying and preventing threats to drinking water sources. This approach may make sense for municipalities that rely on groundwater sources, where threats are largely land use based and enforcement can be conducted on a property by property basis with a view to protecting municipal well heads and surrounding areas. For groundwater sources, reliance on risk management officials and inspectors may be appropriate, because the risk can be contained at the property level.

It is, however, the conclusion of the CTC Source Protection Committee that the Ontario Government is the appropriate “Implementing Body” (i.e., the authority responsible to ensure the policy is implemented) for all Lake Ontario Source Protection Plan policies, and not the individual municipalities where a given threat may be located (e.g., pipeline, nuclear power plant, fuel storage facility, etc.). Downloading the responsibility for enforcing policies that address threats to Lake Ontario drinking water intakes to municipalities would be inappropriate for the following reasons:

1. Many of the threats identified by the Lake Ontario Collaborative originate with activities and/or operations that are regulated by other, more senior levels of governments. For example:
 - Petroleum operations are regulated by the Ontario Government;
 - Nuclear power generation is regulated by the Canadian Nuclear Safety Commission and the Ontario Energy Board; and,
 - Fuel storage is regulated by the Ontario Technical Standard and Safety Authority.

¹ Letter dated July 20, 2012, from Mary Anne Covelli, Director, Source Protection Programs Branch, Ministry of the Environment, to Ms. Susan Self, Chair, CTC Source Protection Committee.

2. Pollutants entering Lake Ontario do not respect municipal boundaries. Without an ability to take inter-jurisdictional enforcement actions, individual municipalities cannot effectively mitigate threats originating beyond their borders, thus negating the efficacy of the risk management approach outlined in the *Clean Water Act*.
3. The Ontario Government already has in place effective emergency response infrastructure, in the form of the Ministry of the Environment's Spills Action Centre, which proactively prevents, mitigates, and prepares for potential emergencies related to spills and drinking water hazards.

For these reasons, the CTC Source Protection Committee contends, and the City of Toronto agrees, that enforcement of policies directed at Lake Ontario intake protection zones must be led and managed by the Ontario Government, which is already responsible for matters affecting Lake Ontario.

Use of Ministry of the Environment Expertise and Infrastructure to Guide Contingency Planning

Furthermore, the CTC Source Protection Committee maintains that, based on the work completed to date, there is a strong need for the provision of real time "in-lake" monitoring data to track lake circulation and water quality characteristics. These data would be useful in guiding the implementation of contingency plans to mitigate the impact of a spill that reaches the near shore of Lake Ontario. As well, there is an ongoing need to further develop Lake Ontario circulation and water quality simulation models, so that the model/s and the necessary expertise are available in the event a spill occurs and guidance can be provided with respect to the implementation of contingency plans. Furthermore, it would be prudent to assess threats that could not be modelled and evaluated through the Source Protection Plan development process due to time and financial constraints. The Ontario Ministry of the Environment already maintains the expertise and the equipment necessary to perform the noted monitoring and computer simulation modelling functions advocated in the Source Protection Plan policies.

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