

# GREAT LAKES CONSIDERATIONS

March 2015

Essex Region Source Protection Area

Updated Assessment Report

***APPROVED***

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## **5.0 Great Lakes Considerations**

The Essex Region Watershed drains into three major surface water bodies, namely, Lake St. Clair, the Detroit River and Lake Erie. Lake Erie is one of the Great Lakes and the Detroit River and Lake St. Clair are considered to be part of the “Lake Erie Basin” in the context of this section. All the municipal drinking water treatment systems in the Essex Region withdraw their source water from these surface water bodies.

### ***5.1. Consideration of Great Lakes Agreements***

The Clean Water Act (CWA, 2006) requires that the Source Protection Areas that flow into the Great Lakes or the St. Lawrence River must consider the following documents, during the preparation of an Assessment Report:

- Great Lakes Water Quality Agreement (GLWQA)
- Canada Ontario Agreement (COA) Respecting the Great Lakes Ecosystem
- Great Lakes Charter (GLC)
- Other agreements related to the Great Lakes Basin, to which the Government of Ontario or the Government of Canada is a party of, and
- Documents that are prescribed by the Regulations (currently there are no other documents prescribed by the Regulations)

The Technical Rules also further indicate that an Assessment Report must include a description of how these agreements were considered while conducting work related to the Assessment Report.

Following is a brief overview of the various Great Lakes-related Agreements and specific information sources, and how they were considered during the preparation of this Assessment Report.

## ***5.2. Great Lakes Water Quality Agreement***

Canada and United States signed the Great Lakes Water Quality Agreement in 1972 in order to express their commitment to restoring and maintaining the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem. Phosphorous over-enrichment was the main issue in the Great Lakes Basin at that time. The Agreement was further renewed in 1978 with special emphasis on complete elimination of persistent toxic substances such as PCB, mirex, DDT, mercury and dieldrin. The Agreement was later amended in 1987 as a protocol to include commitments to strengthen the programs, practices and technology that were described in the 1978 agreement. The 1987 protocol also included new annexes on non-point sources, contaminated sediments, airborne toxic substances, contaminated groundwater, and related research and development plans.

Lakewide Management Plans (LaMPs), Areas of Concern (AOCs), and Remedial Action Plans (RAPs) were also introduced in the amended 1987 protocol. The GLWQA states that Remedial Action Plans (RAPs) must be developed and implemented for each AOC. The provision on the development and implementation of RAPs is specifically relevant to this Assessment Report as two of the original 43 AOCs in the Great Lakes Basin are located in the Essex Region Source Protection Area. The Detroit River and Wheatley Harbour were designated as AOCs based on 14 impairments to beneficial uses as defined in the GLWQA. . The Essex Region Conservation Authority (ERCA) has been actively involved for many years in various aspects of the Detroit River Canadian Cleanup (DRCC), the Wheatley Harbour Remedial Action Plan, and the Lake Erie Lakewide Management Plan (LaMP). Staff members of ERCA, including Source Water Protection staff, are active members of the above mentioned programs, committees, and work groups.

## ***5.3. The Detroit River Area of Concern (AOC)***

The Detroit River was designated as an Area of Concern in 1987 by the International Joint Commission (IJC) because of the impairments of various beneficial uses of the Detroit River. The Detroit River Canadian Cleanup (DRCC) was established in 1998,

and is a community-based partnership between citizens, local industry, government, academics, businesses, and environmental organizations. The main goal of the DRCC is to implement the Remedial Action Plan (RAP) in order to restore the beneficial use impairments (BUIs) and remove the Detroit River from the list of Great Lakes AOCs.

The Stage 1 RAP Report for the Detroit River AOC identified eight of the fourteen beneficial use impairments (BUIs) as impaired (MDNR and OMOE, 1991). The major causes of these impairments were identified as loss of habitat, contaminated sediments, and point & non-point sources of pollution. The Detroit River Canadian Remedial Action Plan Stage 2 Report (2010) by the DRCC identified 9 of 14 BUIs as impaired, while 2 of the BUIs needed further assessment and the BUI on eutrophication or undesirable algae was considered unimpaired. The DRCC Remedial Action Plan (RAP) has been working on addressing specific impairments in the Detroit River, including restrictions on fish consumption and dredging activities (due to contaminated sediments), drinking water taste and odour problems, loss of fish and wildlife habitat, degraded aesthetics, benthos, plankton, and fish and wildlife populations, and beach closures. A multi-year work plan, currently being updated, identifies cleanup actions intended to correct these impaired beneficial uses and ultimately result in the delisting of the Detroit River as an AOC. These cleanup programs may also serve to improve water quality of source water for the Windsor WTP intake and the Amherstburg WTP intake, which are located in the Detroit River AOC.

The DRCC RAP Stage 1 and Stage 2 reports were considered in the development of this Assessment Report. During the preparation of technical studies that are components of this AR, data and reports made available through the DRCC RAP were reviewed, including:

- An inventory of potential sources of contamination in the DR AOC (Stage 1 Report (1991) and Draft Stage 2 Report (2009))
- Report Cards on Various BUIs by the Public Advisory Council of the DRCC
- Modeling and Management Framework Interpretive Report (prepared by the GLIER for the DRCC, 2003)

- Detroit River and Ecorse River E. coli monitoring to support TMDL Development. Report for US EPA Region V and MDEQ Water Bureau by Environmental Consulting Technology, Inc. (ECT) (2007).
- The presence of PCBs, PAHs and toxic metals in the sediments in the Lake St. Clair, the Detroit River and Lake Erie corridor identified through various monitoring programs (e.g. Lake Erie Tributary Mouth Monitoring program, the Great Lakes Index Stations, etc).

Data obtained through these programs were reviewed and used in the identification of environmental problems in the Watershed Characterization section of this AR, as well as during the preliminary identification or screening of conditions and issues in the Region, for this AR. Stantec Consulting used various data sources from the DRCC during the vulnerability assessment of the municipal water intakes in the Detroit River watershed.

In addition to above mentioned reports and data sources, Source Water Protection staff have also consulted with representatives of the DRCC during preparation of various components of this Assessment Report. ERCA staff, including some Source Water Protection staff, are familiar with the information available from DRCC through their past and ongoing involvement (see **Table 5.1**).

#### ***5.4. Wheatley Harbour Area of Concern (AOC)***

Wheatley Harbour was identified as an Area of Concern in 1985 because of water quality issues, including dissolved oxygen depletion elevated bacterial levels, and nutrient enrichments, as well as elevated concentrations of PCBs in sediments. The PCB contamination of sediments appears to be the primary environmental concern (Wheatley Harbor RAP Report, 1997). The main goal of the Wheatley Harbor RAP was to restore impaired beneficial uses and attain the publicly defined water use goals. Over the years, the RAP implemented major restoration programs in the AOC (e.g. wastewater treatment upgrades at the local industry and at a sewage treatment plant servicing part of the AOC, upgrading faulty septic systems in the AOC, etc.). The Wheatley Harbor was delisted in April, 2010 based on the improved environmental conditions related to various beneficial

uses impairments of the area. ERCA staff were very involved in the delisting process (see **Table 5.1**).

The environmental database for the Wheatley Harbour is extensive. These data were used in the Watershed Characterization section of this Assessment Report. The information was also used by Stantec Consulting Ltd. in determining vulnerability scores for the Intake Protection Zones (IPZs) of the Wheatley Water Treatment Plant.

### ***5.5. Lake Erie Lakewide Management Plan (LaMP)***

As described earlier in this chapter, in 1987 the governments of Canada and the United States made a commitment, as part of the Great Lakes Water Quality Agreement (GLWQA), to develop a Lakewide Management Plan for the Great Lakes. The Lakewide Management Plan (LaMP) for Lake Erie is coordinated by federal, state and provincial government agencies in the two countries. Under the guidance of these agencies, the LaMP unites a network of stakeholders in actions to restore and protect the Lake Erie ecosystem. Lake Erie is naturally divided into three basins namely, the western basin, the central basin, and the eastern basin. The lake provides drinking water for about eleven million inhabitants of the Lake Erie Basin. The lake receives chemically enriched runoff and sediment from agricultural lands within the basin. As well, it surpasses all other Great Lakes in the amount of effluent (discharged wastewater) it receives from sewage treatment plants (Dolan, 1993). The Lake Erie LaMP is very relevant and important for the ER Source Protection Area, as 4 of the 9 municipal drinking water systems withdraw their source water from the Western Basin of Lake Erie. The 2009 Report on Lake Erie Binational Nutrient Management Strategy identified nutrient enrichment as a serious water quality issue in the Lake Erie basin. Cyanobacterial toxins (harmful algal blooms) are identified as an emerging threat in the Lake Erie Basin (The Lake Erie Nutrient Science Task Group, 2008). The report also recommends nutrient targets (total phosphorus) for offshore, nearshore and coastal wetlands in the Lake Erie basin. In order to focus actions on Lake St. Clair specifically, the Lake St. Clair Coordination Council is finalizing a Management Plan, and will be developing work plans in the near future.

These reports and other data sources from the Lake Erie LaMP were used in assessing nearshore water quality conditions in the Essex Region SPA as part of the Watershed Characterization. The water quality conditions were also considered by Stantec Consulting Ltd. in determining vulnerability scores for the IPZs of the Harrow-Colchester WTP, the Union WTP, the Wheatley Harbour WTP and the Pelee Island West Shore WTP. The ERCA staff have been and continue to be very involved, with these initiatives (see **Table 5.1**).

### ***5.6. Canada-Ontario Agreement (COA) Respecting the Great Lakes Ecosystem***

The Canada-Ontario Agreement Respecting the Great Lakes Ecosystem is an agreement between the governments of Canada and the Province of Ontario that supports the restoration and protection of the Great Lakes Basin Ecosystem. It outlines how the two governments will cooperate and coordinate their efforts to restore, protect, and conserve the Great Lakes basin ecosystem, and it contributes to meeting Canada’s obligations under the Great Lakes Water Quality Agreement (Environment Canada, 2004b). Although this agreement is geared towards the protection of water quality, it does not contain any specific technical information that was applicable to the preparation of this Assessment Report.

### ***5.7. Great Lakes Charter***

The Great Lakes Charter is a series of agreements between the Provinces of Ontario, Quebec, and the eight Great Lakes States that set out broad principles for the joint management of the Great Lakes (Environment Canada, 2005). The original Charter was developed in 1985 in response to the growing use of water and proposals to divert large quantities of water out of the Great Lakes Basin (Ministry of Natural Resources, 2005). The purposes of the Charter are “to conserve the levels and flows of the Great Lakes and their tributary and connecting waters; to protect and conserve the environmental balance of the Great Lakes Basin ecosystem; to provide for cooperative programs and management of the water resources of the Great Lakes Basin by the signatory States and

Provinces; to make secure and protect present developments within the region; and to provide a secure foundation for future investment and development within the region” (Council of Great Lakes Governors, 1985).

The Great Lakes Charter was supplemented in 2001 by the Great Lakes Charter Annex, which reaffirmed the principles of the Charter and committed the Governors and Premiers of the Great Lakes States and Provinces to “developing an enhanced water management system that...protects, conserves, restores, and improves the Waters and Water-Dependent Natural Resources of the Great Lakes Basin” (Council of Great Lakes Governors, 2001). The Great Lakes Charter Annex implementing agreements, including the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement, attempt to provide this water management system (Environment Canada, 2005).

Although this Charter is geared towards the protection of water quality and quantity, it does not contain any specific technical information that was applicable to the preparation of this Assessment Report.

### ***5.8. Great Lakes Targets***

The Clean Water Act allows for the Minister of the Environment to establish targets under the Clean Water Act relating to the use of the Great Lakes as a source of drinking water for any of the Source Protection Areas that contribute water to the Great Lakes. Targets and recommendations have not yet been developed in this regard. However, it is felt that there would be benefit in pursuing this, and further work will be carried out for this purpose in the near future.

Initial discussions among the Project Managers, Chairs and technical staff from various Source Protection Areas in the Lake Erie basin (including Lake St. Clair, the Detroit River and St. Clair River Corridor) resulted in the discussion of the concept of formation of a collaborative group to assist in further developing some common targets across the western basin.

In the Fall of 2009, representatives of the Source Protection Regions and Areas draining into the Lake Erie Basin (including Lake St. Clair, the Detroit River and St. Clair River)

held an initial meeting to discuss and address common issues, share knowledge and to engage in broader discussion on Great Lakes issues from a drinking water source protection perspective. Common water quality concerns identified included turbidity, nutrients and algae. These are also common water quality problems across the Lake Erie basin. It was agreed at the meeting that there is a value in this group continuing to discuss common issues, to share information and possibly work towards Great Lakes water quality concerns and targets in terms of Source Water Protection.

In 2014, both the Essex Region SPC and Thames-Sydenham Region SPC identified microcystin-LR as a drinking water issue at Lake Erie intakes (Harrow-Colchester, Union, Pelee Island West Shore and Wheatley WTPs) because concentrations of microcystin-LR had exceeded half the maximum allowable concentration on multiple occasions in the raw water of these intakes. Microcystin-LR is a neurotoxin produced by cyanobacteria (blue-green algae) and is released when the cell walls of the algae break down. Each summer the western basin of Lake Erie experiences algal blooms that result in high levels of total microcystins and microcystin-LR. Drinking water plant operators are required to alter their operations during a bloom at a significantly increased cost over regular operations. There is evidence that microcystin-producing algal blooms are also occurring with increasing frequency and severity in the central basin of Lake Erie, as well as in Lake St. Clair. Given that this drinking water issue is so extensive, the Essex Region SPC suggests that the Minister of the Environment consider establishing a Great Lakes target under the Clean Water Act for microcystin-LR.