

CHAPTER 6: Summary, Conclusions, and Next Steps

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6.0 SUMMARY, CONCLUSIONS, AND NEXT STEPS

6.1 SUMMARY AND CONCLUSIONS

The *Clean Water Act (2006)* and regulations aim to protect drinking water supplies in Ontario. The Act requires that we assess risks to all drinking water sources by completing an Assessment Report. The next step is to develop a Source Protection Plan to protect these sources.

This Assessment Report describes the physical features and water resources within the Central Lake Ontario Source Protection Area (CLOSPA) jurisdiction. Using approved provincial methodologies; it delineates vulnerable areas and assesses specific activities on the landscape within these vulnerable areas as potential drinking water threats. The various chapters in the Assessment Report have been completed to meet provincial requirements in the determination of any potential risk to drinking water supplies. Based on these discussions, we can determine the status and sustainability of drinking water, as required under the *Clean Water Act (2006)*. The identified vulnerable areas and risks will be the focus of the Source Protection Plan policies.

It should be noted that all municipal drinking water supplies for the CLOSPA jurisdiction come from Lake Ontario. The *Lake Ontario Collaborative Intakes Protection Zone Studies, 2009*, provided us with raw water quality data from the municipal intakes in Lake Ontario that serve as the drinking water source for all municipal supplies in CLOSPA. In general, the Lake Ontario source water for the CLOSPA water treatment plants was of high quality. The operators reported the source as excellent, relatively predictable, and easy to work with, and that raw water quality fluctuations were the result of seasonal, weather-driven events.

The analyses of the **Watershed Characterization** component of this Assessment Report revealed some increasing trends in levels of contaminants in shallow groundwater supplies that support private wells in the study area. Levels are compared to the Ontario Drinking Water Standards, as private well owners use groundwater as a source of drinking water. Shallow wells are naturally vulnerable to impact from land-use activities; for example, increases in sodium and chloride were observed and are thought to be associated with the application of road salt. Water well construction guidelines under Ontario Regulation 903 (Water Wells) should be strictly adhered to. Surface water quality in the streams discharging into Lake Ontario shows some elevated levels of chlorides, phosphorus, copper and nitrates as compared against ecosystem and aquatic life standards (Canadian Water Quality Guidelines). These contaminants are thought to be associated with the impact of urbanization and agricultural activities. With the exception of chlorides which are still below the provincial standards, the other parameters showed decreasing or no trend. The surface water in these streams is not used as a drinking water supply.

The **Water Budget** analysis in this Assessment Report assessed potential water quantity stress in both surface water (not including Lake Ontario) and groundwater. Groundwater supplies in CLOSPA are used as a source of drinking water for private wells (5% of the population in the study area) and to support ecosystem functions. The surface water in streams in the study area is important for supporting the ecosystem and is also used for irrigation and other non-drinking water purposes. Lynde and Darlington Creek watersheds were found to have moderate groundwater stress levels, and the Lynde, Goodman, Oshawa, Darlington, and Soper Creek watersheds have significant surface water stress levels during summer months. All other catchments in the study area have low stress levels for both groundwater and surface water. Given that these stresses are not associated with municipal drinking water supplies,

which are the focus of the *CWA (2006)*, additional investigation and management will take place under the Conservation Authority watershed protection programs. Since the Technical Rules exclude consideration of the Great Lakes in water budget stress assessments, Lake Ontario was not included in the water budget studies.

Vulnerability was assessed and scored in all vulnerable areas in CLOSPA (Intake Protection Zones (IPZs), Highly Vulnerable Aquifers (HVAs), and Significant Groundwater Recharge Areas (SGRAs)). The Intake Protection Zones for the study area (IPZ-1s and IPZ-2s) were all ranked as having low vulnerability. The results of the CLOSPA HVA and SGRA vulnerability analyses reflect the presence of many shallow aquifers that are naturally vulnerable.

Vulnerability is considered together with provincial hazard scores outlined in the [Provincial Tables of Circumstances](#) (Nov 2009) for the various activities and their associated chemicals and pathogens to determine a risk score. Using both the natural vulnerability and hazard scores, potential drinking water **threats** are ranked as Significant, Moderate, or Low in each one of the vulnerable areas (IPZs, HVAs, and SGRAs). Significant threats **must** be addressed in the Source Protection Plan.

Provincial methodology outlined in the Technical Rules directs what types of activities can be considered potential threats. The [Provincial Tables of Circumstances](#) (Nov 2009) assigns the level of drinking water threat to a specific circumstance. The circumstance includes the specific characteristic of the prescribed drinking water threat activity, the type of vulnerable area, and its vulnerability score. A threat is defined as an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water, and includes an activity or condition that is prescribed by the *Technical Rules*. There is no consideration in the threats assessment as to whether there is an actual threat or whether the activity is being properly managed or controlled by existing requirements. Such consideration is part of the development of the Source Protection Plan policies and implementation.

In addition to identifying potential drinking water threat activities, existing water quality problems or increasing trends that suggest a future water quality problem are issues that must be evaluated. According to Technical Rule 114.1 (a & b), issues may exist only in vulnerable areas associated with a municipal drinking water system. Issues can therefore be identified in the IPZs only for this study area.

There are **no significant** drinking water **quantity** threats related to municipal drinking water supplies and **no significant** drinking water **quality** threats, conditions, or issues identified in this Assessment Report in any of the delineated vulnerable areas (IPZs, HVAs, or SGRAs). All municipal drinking water supplies in CLOSPA come from Lake Ontario. Additional work underway in the Lake Ontario IPZ-3 analyses may identify some significant drinking water threats for the study area.

The *Technical Rules* require only a reference to what circumstances would be moderate and low potential threats. There is no requirement to count or locate where these circumstances exist or are planned. A link to a list of potential moderate- and low-level threats based on the provincial matrices has been included in this report per the requirements in the *Technical Rules* ([Provincial Tables of Circumstances](#): Tables 17 and 18: HVAs and SGRA, Provincial Threat Tables 41, 44, 69, and 73: IPZs). If and where these activities exist, they may constitute a moderate or low risk to drinking water supplies.

6.2 DATA GAPS AND UNCERTAINTY

Overall, the information available at the time of writing was sufficient to characterize, delineate, and analyze vulnerability and threats. The only gaps in data essential to completing a preliminary assessment of vulnerability and threats are associated with the IPZ work (delineation and evaluation of IPZ-3s) and the identification of “transport pathways” in the assessment of vulnerability. These pathways are features or structures that may serve to increase the natural vulnerability of an area. These data are not available at this time and will be captured in an updated Assessment Report prior to the completion of the Source Protection Plan (see **Table 6.1**)

Identified Data and Knowledge Gaps			
Vulnerable Areas with Scoring			
Component	Data Set Name or Source	Data Gap Problem	Comment
AVI—Transport Pathways	Site-specific records to confirm that the feature is a pathway	Site-specific data required	HVAs/SGRAs to be updated to include confirmed pathways at a later date
IPZ-3 Delineation and Scoring	Lake-based assimilation study(s)	In progress	Lake Ontario IPZ collaborative study initiative
Knowledge Gaps			
<ul style="list-style-type: none"> ▪ Need to develop methodology and tools to provide analysis of spills response, which will involve all pathways, including overland flow, stream travel, and groundwater flow, including the unsaturated zone transport ▪ Need more detailed consideration of potential transport pathways ▪ Need more detailed scrutiny of significant recharge areas as they relate to drinking water systems ▪ Need more detailed scrutiny of highly vulnerable aquifers, specifically shallow aquifer deposits 			
Threats, Conditions, and Issues			
Component	Data Set Name or Source	Data Gap Problem	Comment
IPZ-2 and IPZ-3 Threats	Lake-based assimilation study(s)	In progress	Lake Ontario Collaborative Study Phase 3
Knowledge Gaps			
<ul style="list-style-type: none"> ▪ Need land classification 2008 update ▪ Need management land update ▪ Uncertainty regarding the number of animals and types of animals that a farm unit may hold 			

Table 6.1: Assessment Data and Knowledge Gaps

The *Technical Rules* require a discussion of uncertainty associated with all technical components of the Assessment Report. In this Assessment Report, the uncertainty level for the characterization assessment is low. For delineation, vulnerability, and scoring of the three vulnerable areas, the uncertainty level is moderate to high due to the limited data needed to calibrate the model suites. Ongoing studies and continuous improvement built in to water management programs serve to improve analyses and reduce uncertainty. Future editions of the CLOSPA Assessment Report will reflect such improvements. Because of the combined uncertainties of delineation, vulnerability, and scoring and the lack of land-use data, the uncertainty level for potential threats in the CLOSPA jurisdiction is moderate to high.

6.3 NEXT STEPS

Based on this Assessment Report, we will develop a Source Protection Plan for the study area. Per the requirements of Section 19 (1) of the *CWA (2006)*, that updates be included prior to the completion of the Source Protection Plan, this report will be updated with the IPZ-3 analysis governing the Lake Ontario intakes that provide all the municipal drinking supplies for the CLOSPA area; and to consider whether the presence of transport pathways requires that vulnerability scores be increased for portions of SGRAs or if additional areas are identified as HVAs.

There are **no significant** drinking water **quantity** threats and **no significant** drinking water **quality** threats, conditions, or issues identified in this Assessment Report requiring management and/or mitigation in the study area. A Source Protection Committee may develop policies to address moderate- and low-level threats in their Source Protection Plan. Such policies must be considered by those responsible for implementing them, but adherence to such policies is not mandatory.

Any significant drinking water quality threats that might be identified through the Lake Ontario Collaborative studies Phase 3 (IPZ-3) will require policies in the source protection plan to be developed, as well as implementation actions such as management and/or mitigation for this study area.

The Source Protection Authority is required to prepare an annual public report that is submitted to the Minister of the Environment reporting on the implementation of the Source Protection Plan policies.

Additionally, per Section 36 (1) of the *CWA (2006)*, the Minister will set the timeline for the revision of the Source Protection Plan. The Assessment Reports serve as background documents for the plans, and therefore must be updated to reflect new or revised data and knowledge as part of the revision process.