

Chapter 9 – Key Findings

9.1 Key Findings in this Assessment Report

This *Assessment Report* represents the culmination of five years of research about sources of *drinking water* in the Cataraqui Source Protection Area (CSPA). The following are some of the key findings by Cataraqui Region Conservation Authority (CRCA) staff and consultants.

9.1.1 Water Quality

- The quality of *surface water* in the CSPA varies between the 12 major *watersheds*. As discussed in Chapter 2, some standards have been exceeded due to natural causes, while the presence of excess *nutrients* is mainly due to human *activities* on the landscape. There are limited data by which to assess groundwater quality. However, the available data suggest problems with bacteriological *contamination* from the surface. As discussed in Chapter 7, climate change may further degrade the quality of our water resources.
- The raw (source) water quality for the 12 municipal residential *drinking water systems* is generally good and only a limited number of *drinking water issues* were identified in Chapters 5 and 6.

9.1.2 Water Quantity

- As reported in Chapter 3, the Tier 1 Water Budget for the CSPA found that some *subwatersheds* may not always have enough available water for all users during the summer months. This information will be helpful for both government and non-government organizations that care for local *subwatersheds*.
- The Tier 2 Water Budget work at the municipal wells at Lansdowne found that while the water level in the wells appears to be falling, the pumps are not in danger of being exposed in the near future, and therefore the stress is low. Additional work in the future to consider the falling water levels is recommended (such as *monitoring* water levels), but the work will not continue on to Tier 3 at this time.
- The Tier 2 exercise for the upper Millhaven Creek *subwatershed* at Sydenham found that the existing and future demand could put significant stress on the water supply; however, it should be noted that the prescribed methods at Tier 2 did not allow consideration for the presence of Sydenham Lake (see Section 3.4.1 for more information). Further analyses that do include the lake and that are expected to lower the stress level will be completed through a Tier 3 exercise in summer 2010.
- As discussed in Chapter 7, climate change may reduce the quantity of water that is available to all users.

9.1.3 Groundwater Sources

- The Cataraqui area and adjacent parts of eastern Ontario are characterized by shallow soils and fractured *bedrock*. The movement of groundwater through this *geology* is

unpredictable and is governed by the number, size and orientation of the fractures in the rock. Unlike other parts of the province, it is difficult to identify distinct *aquifers* that are separate from their surroundings.

- Due to the *geology* noted above, a majority of the entire CSPA is considered as a *highly vulnerable aquifer* (see Chapter 5). Site specific investigations may confirm the presence of soil and *bedrock* conditions that reduce the vulnerability of the groundwater. Once groundwater is contaminated, it can be very difficult and expensive to clean up, and sometimes it can no longer be used as a source of potable water. For these reasons, the vulnerability of the groundwater in eastern Ontario is an important challenge that requires careful attention. We need to ensure that our groundwater resources can be used in the future.
- *Significant groundwater recharge areas* (SGRA) have been identified in Chapter 5 based on the relatively high rate of infiltration of surface water into the ground in those areas, per Technical Rule # 44(1). *Recharge* occurs in all parts of the Cataraqui area, through the fractures in the *bedrock* noted above. Further research will be required to confirm the extent of the significant areas.
- *Wellhead protection areas* (WHPA) have been identified around the three groundwater-based municipal residential *drinking water systems* in the CSPA, with an acceptable level of certainty (see Chapter 5). Further research (such as tests on *monitoring* wells) has been recommended to improve our understanding of the groundwater that supplies the Cana well supply, the community of Lansdowne and the Miller Manor Apartments. Further work on the Lansdowne wells to identify the source of *contamination*, and to improve the pumping wells to meet Reg. 903 is also recommended.
- Technical work in the adjacent Mississippi-Rideau Source Protection Area found that a small portion of the WHPA 'D' for the Westport Water Treatment Plant (WTP) extends into the CSPA.

9.1.4 Surface Water

- The movement of water in the eastern end of Lake Ontario and the upper part of the St. Lawrence River is affected both by the prevailing current towards the Atlantic Ocean and by wind conditions. This means that pollution in the lake and *river* could flow towards the west under some wind conditions. There is the potential for pollution to move through the water across the entire area within a few days.
- Research in the Quinte Source Protection Region found that *intake protection zone 3* (IPZ 3) for the Picton WTP extends into the CSPA. Owing to its sheltered location on the Bay of Quinte, this intake is not classified as a Great Lake intake. The IPZ 3 was therefore defined by the Quinte Source Protection Committee based on the total area that directly contributes water to the intake.

9.1.5 Other Key Findings

- Application of the three prescribed methods for defining a *drinking water threat* (see Chapter 4) resulted in relatively few existing *activities* and no *conditions* being identified (**Table 9-1**). A total of 40 parcels with significant *drinking water threats* were identified in the ten *intake protection zones* and four WHPAs. A review of the provincial Tables of Drinking Water Threats (MOE, 2009) found that other *drinking water threats* could emerge in the future. Some of these *activities* may be permitted by the current municipal official plans and zoning by-laws.

Table 9-1: Parcels with Drinking Water Threats Identified within the CSPA

System	Significant	Moderate	Low
Cana	14	7	2
Lansdowne	9	2	16
Miller Manor Apartments	13	2	3
Westport*	n/a	0	1
Brockville	1	99	8
James W. King (Gananoque)	3	115	12
Kingston Central	0	1	78
Point Pleasant (Kingston West)	0	1	4
Fairfield (Amherstview)	0	1	51
Bath	0	1	36
A.L. Dafoe (Napanee)	0	2	3
Sandhurst Shores	0	0	14
Picton**	n/a	13	32
Sydenham	0	133	6
Totals	40	377	267

* Applies to the Cataraqui portion of WHPA 'D' only

** Applies to the Cataraqui portion of IPZ 3b only

- The evaluation of available *source water* quality information identified naturally occurring *drinking water issues* such as *hardness* at all *drinking water systems*, but very few *issues* potentially related to human activities (**Table 9-2**).

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Table 9-2: Drinking Water Issues related to Human Activities

System	Drinking Water Issues with Possible Link to Human Activities
Cana	Chloride, sodium
Lansdowne	Total coliform, <i>Escherichia coli</i>
Miller Manor Apartments	Chloride, sodium, nitrate, total coliform, <i>Escherichia coli</i>
Westport*	--
Brockville	<i>Escherichia coli</i>
James W. King (Gananoque)	--
Kingston Central	--
Point Pleasant (Kingston West)	--
Fairfield (Amherstview)	Total coliform
Bath	Organic nitrogen, <i>Escherichia coli</i>
A.L. Dafoe (Napanee)	--
Sandhurst Shores	--
Picton**	--
Sydenham	Dissolved organic carbon

* Applies to the Cataraqui portion of WHPA 'D' only

** Applies to the Cataraqui portion of IPZ 3b only

Research for this *Assessment Report* was constrained by *data gaps* described in detail in **Appendix 'K-1'**. *Data gaps* exist where it was not possible to fulfil a requirement of the Technical Rules: Assessment Report (MOE, 2009) in this edition of the report. The primary solution for filling these gaps is additional field *monitoring*, both on a short-term project basis and on a longer-term program (network) basis. As outlined in **Appendix 'K-2'**, there are also opportunities for the broader improvement of the document through additional information gathering and analyses.