

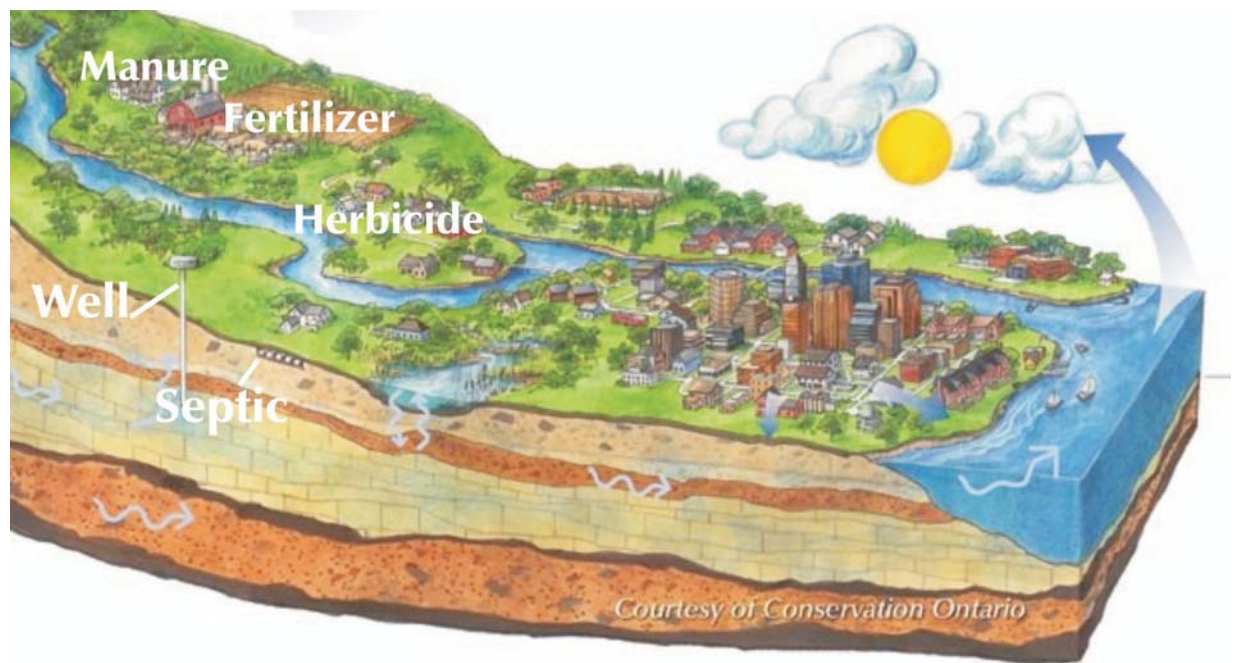
Chapter 5 – Policies for Regional Areas of Sensitive Groundwater

5.1 Overview

This chapter of the Source Protection Plan is dedicated to identifying actions that could be taken to help protect vulnerable regional groundwater sources from contamination, in particular where groundwater is used as a private source of drinking water (e.g., by individuals, businesses, institutions and community organizations).

The policies apply to all areas identified as either a highly vulnerable aquifer or a significant groundwater recharge area on **Schedule A**. The exception is where these sensitive regional groundwater areas overlap a wellhead protection area or an intake protection zone. In these situations the more restrictive policies that address the specific drinking water threat will apply.

Figure 5-1: Human Activities Affecting Source Water



Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

The landscape of the Cataraqui Source Protection Area is highly variable with a wide range of bedrock and soil types. The drainage patterns form over 200 lakes on the Frontenac Axis and many streams and rivers on the limestone plains to either side of this Precambrian rock feature. Two of the region's unifying characteristics are that the soil is very thin or completely absent in many locations, and the underlying bedrock has numerous gaps called fractures.

Highly vulnerable aquifers and significant groundwater recharge areas are the two types of sensi-

tive regional groundwater areas identified in the Cataraqui Source Protection Area, as required by the *Clean Water Act*. Vulnerable aquifers were previously identified in two regional groundwater studies (United Counties of Leeds and Grenville, 2001; Western Cataraqui, 2007).

The groundwater in the Cataraqui Source Protection Area generally lacks the natural protection provided by overlying materials (e.g., soil) so it is easily impacted by sources of contamination (i.e., pollution) such as fuel spills or leaks and poorly functioning on-site sewage systems (e.g., septic systems). The relatively unprotected groundwater is called a highly vulnerable aquifer (HVA).

Significant groundwater recharge areas (SGRA) exist where water from the surface more easily infiltrates the ground (soaks in) to recharge the aquifers. Recharge is expected to occur at a low rate in the Cataraqui Source Protection Area, but to be widespread and diffused across a large area as water moves through complex fracture networks in the bedrock.

The reader is encouraged to read the Assessment Report for detailed information about the highly vulnerable aquifers and significant groundwater recharge areas, including how the areas were delineated.

The Source Protection Plan has a focus on regional groundwater because the Assessment Report identifies more than 90 per cent of the Cataraqui Source Protection Area as a highly vulnerable aquifer. Much of the CSPA covered by highly vulnerable aquifers is also a significant groundwater recharge area. As well, there are more than 20,000 private residential wells in this area (MOE, 2008), and documented cases of water quality problems throughout the area.



Thin soils and fractured bedrock throughout much of the Cataraqui Source Protection Area means that there are large areas of highly vulnerable aquifers.

Groundwater is not static. It moves under the ground carrying any contamination with it and could end up affecting a municipal or private drinking water source. Therefore the policies in this chapter should be applied, as appropriate, to areas where municipal water and sanitary servicing are present in the highly vulnerable aquifer or significant groundwater recharge area, particularly where the municipally-serviced land abuts properties served by private wells.

Outside of the municipally-serviced areas, municipalities may want to focus their efforts to areas with higher well densities (see Figure A6.1 in the *Watershed Characterization Report*). Many, but not all, of the policies for the highly vulnerable aquifers and significant groundwater recharge areas relate to research or best practices for drinking water wells and on-site sewage systems, and so by their nature are not applicable to the fully serviced areas.

In addition to the policies specified in this chapter, policies in Chapter 4 (Policies for All Vulnerable Areas) also apply to the highly vulnerable aquifers and significant groundwater recharge areas.

5.2 Education and Outreach Programs

Protecting Groundwater in Rural Settlement Areas

The primary source of drinking water in the Cataraqui Source Protection Area for individuals and communities that are not in close proximity to Lake Ontario or the St. Lawrence River is groundwater. Although three communities benefit from municipally supplied drinking water from groundwater, the balance of rural settlement areas (e.g., hamlets and villages) and countryside development depend on private drinking water wells.

The Cataraqui Source Protection Authority should provide municipalities with the information necessary for them to consider how to proactively protect the sources of drinking water for these areas, to consider protecting these sources for the long term where a municipal drinking water supply may be required in the future, and to manage activities that would pose a threat to the quality of the public groundwater sources.

The following policy was made under subsection 26(4) of Ontario Regulation 287/07 (General).

- 5.2.1-NB** a. The Cataraqui Source Protection Authority should share the following information with municipalities of rural settlement areas that are not currently serviced by municipal water supplies to help them consider how to proactively protect the sources of drinking water for these areas:
- i. the delineation of vulnerable areas as identified in the Assessment Report
 - ii. best management practices for the management of drinking water threats, including designating areas for the protection of drinking water sources in municipal planning documents.
- b. This policy should be implemented within one year of the Source Protection Plan taking effect.

Targeting Clusters of Water Contamination

The Health Units in the Cataraqui Source Protection Area encourage private home owners on private water wells to collect water samples and have them analysed for bacteriological contamination. The data from this sampling can be used to identify clusters of contamination and emerging water quality problems that may be associated with activities that are significant, moderate or low drinking water threats in the vulnerable areas. The Health Units, or other organizations, could then target these areas with appropriate education and outreach programs. The following policy was made under subsection 26(4) of Ontario Regulation 287/07 (General).

- 5.2.2-NB** a. The Cataraqui Source Protection Authority should encourage the Ontario Agency for Health Protection and Promotion, Kingston, Frontenac, Lennox and Addington (KFL&A) Public Health, and the Leeds, Grenville, Lanark and District Health Unit to develop a protocol to formalize sharing information with each other about the results of private well bacteriological sampling results within two years of the Source Protection Plan taking effect. The Source Protection Authority should also share information gathered for the preparation of the Assessment Report with

these agencies.

- b. Any resulting determination of clusters of water quality problems identified by the Health Units should be considered for targeted education and outreach initiatives to inform well owners of best management practices to protect their sources of drinking water.

Groundwater Protection Information Sessions

The Ministry of Municipal Affairs and Housing provides municipalities with guidance on a wide variety of matters. The Ministry is ideally positioned to disseminate information about groundwater protection to the municipalities in the Cataraqui Source Protection Area. The Ministry of the Environment and non-profit organizations, such as Well Aware and the Ontario Groundwater Association, have valuable knowledge and insight into the type of groundwater information that would benefit municipalities. The following education and outreach policy was made under section 22(7) of the *Clean Water Act*. It supports all of the policies in the Plan that address threats to groundwater sources.

- 5.2.3-NB**
- a. The Ministry of Municipal Affairs and Housing, in consultation with the Ministry of the Environment and groundwater focused organizations, should coordinate the delivery of information sessions targeted to municipal councils and staff that would address the importance of protecting groundwater, and provide practical ideas for implementation through land use planning and development.
 - b. The information sessions should be offered to all municipalities within the Cataraqui Source Protection Area, and delivered within five years of the Source Protection Plan taking effect.

5.3 Research and Monitoring Initiatives

The Cataraqui Source Protection Authority is encouraged to collaborate with other partners on research and monitoring policies that were prepared under subsection 26(5) of Ontario Regulation 287/07 (General), that aim to:

- capitalize on existing information to provide a more comprehensive picture of regional groundwater
- improve reliable, long-term background groundwater data.

The following two research and monitoring policies are proposed to improve information sharing and availability as well as to inform development requirements intended to protect groundwater.

Organization of Groundwater Data

During preparation of the Assessment Report, it became evident that there is a need for more and better groundwater information in the Cataraqui Source Protection Area for source protection assessment and planning purposes (see **Appendix K-2** of the Assessment Report). This was echoed by municipalities and local agencies during pre-consultation on the draft source protection policies.

- 5.3.1-NB a.** The Cataraqui Source Protection Authority, in cooperation with the Ministry of the Environment, Ministry of Natural Resources, KFL&A Public Health, the Leeds, Grenville, Lanark and District Health Unit, local municipalities, and other groups, should coordinate the collection and management of groundwater data in order to be prepared to better gauge the impact of climate change on sources of drinking water within the Cataraqui Source Protection Area.
- b.** Such a program should:
- i.** establish a means by which databases may be collated, and data shared and
 - ii.** facilitate the identification of gaps in current groundwater monitoring programs.
- c.** These bodies should work to establish this program within one year of the Source Protection Plan taking effect.

Groundwater Monitoring Network

The Cataraqui Region Conservation Authority, in cooperation with the Ministry of the Environment, operates a groundwater monitoring network within its jurisdiction. The main purpose of the network is to collect ambient water level and quality data from representative aquifer types.

The high quality data from the six existing monitoring wells is instrumental to understanding the quantity and quality of groundwater and is used in part to determine how different aquifers react to climatic conditions. There are at least three geographically extensive aquifer types that are not currently included in the network.



Collecting data from a groundwater monitoring well.

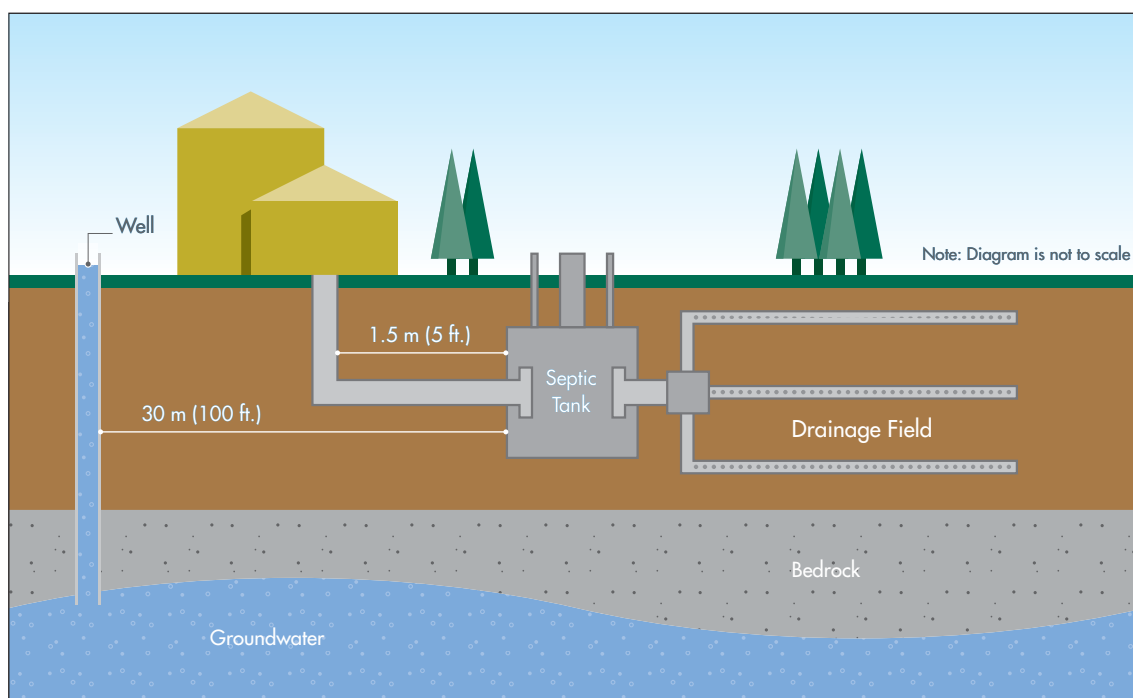
- 5.3.2-NB a.** The Cataraqui Region Conservation Authority, in cooperation with the Ministry of the Environment, should expand the existing Provincial Groundwater Monitoring Network within the jurisdiction of the Cataraqui Region Conservation Authority to ensure that data on fluctuating water levels for all main bedrock aquifer units in the Cataraqui Source Protection Area is gathered on an on-going basis to assess the impact of climate change in the highly vulnerable aquifers and significant groundwater recharge areas.
- b.** The network should be expanded to include monitoring wells in the following bedrock units and municipalities, as originally included in the monitoring network plan (Cataraqui Region Conservation Authority, 2002):
- i.** Gull River Formation: Member D in the City of Kingston
 - ii.** March Formation in the Township of Front of Yonge

- iii. Precambrian Shield (coarse-grained) in the Township of Leeds and the Thousand Islands
- c. The Cataraqui Region Conservation Authority and the Ministry of the Environment should work to expand the network within two years of the Source Protection Plan taking effect.

5.4 On-site Sewage System Maintenance

The Ontario Building Code requires on-going maintenance of every on-site sewage system (e.g., septic system) and the remediation of unsafe or failing systems. It is the responsibility of Principal Authorities (e.g., municipalities or health units) to enforce the Building Code. Owners/operators are responsible for septic system maintenance.

5-2: Example of Septic System



Source: Pollution Probe, *The Source Water Protection Primer*, June 2006

In addition, the *Building Code Act, 1992* and the Building Code require mandatory maintenance inspections in vulnerable areas where these systems are identified as significant threats to a source of drinking water (e.g., wellhead protection areas A and B). The purpose of the mandatory inspection program is to confirm that on-site sewage systems are functioning properly and to require the remediation of failed and improperly functioning systems so that they do not release untreated or poorly treated sewage to groundwater and surface water. The Act and Code contain provisions that allow the Principal Authority to establish maintenance inspection programs in other parts of the municipality.

This Plan encourages municipalities to establish on-site sewage system maintenance inspection

programs, and to support these programs with targeted education and outreach initiatives. Such a program would normally be organized and/or delivered by a municipality's principal authority for Part 8 of the Ontario Building Code. The principal authorities in the CSPA are KFL&A Public Health and the Leeds, Grenville, Lanark and District Health Unit, except in the Township of Rideau Lakes.

Subsection 26(ii) and (v) of Ontario Regulation 287/07 (General) provide authority to include the following policy.

- 5.4.1-NB a.** Municipalities, in consultation with their respective principal authorities under Part 8 of the Ontario Building Code, should consider establishing on-site sewage system maintenance inspection programs consistent with the Ontario Building Code and the inspection guidelines under the Code in areas that are subject to increased risk of groundwater contamination from on-site sewage systems (i.e., septic systems and holding tanks) within the highly vulnerable aquifers and significant groundwater recharge areas where they are low drinking water threats, as prioritized to reflect local circumstances.
- b.** Consideration for establishment of the program described in **a.** should be done by October 6, 2016 (i.e., five years following the approval of the Assessment Report).
- c.** Any resulting program should provide information to landowners about the proper operation and maintenance of their on-site sewage systems, and the benefits of a well maintained system.
- d.** If the foregoing is implemented, the Cataraqui Source Protection Authority should be provided notice of any on-site sewage system maintenance inspection program, including the applicable area, rationale, and a summary of inspection results, by February 15 of the year following program implementation.

5.5 Land Use Planning and Development

Municipal Approvals

Municipalities regulate development through their powers under the *Planning Act* and the *Condominium Act*. The *Clean Water Act* requires that decisions on planning matters must have regard to the moderate and low threat policies in the Source Protection Plan on the date the Plan takes effect. Municipalities are encouraged to amend their official plans to reflect the intent of the following Source Protection Plan policy no later than at the next five year review required under section 26 of the *Planning Act*, in order to ensure that their decisions have regard to these policies.

Most municipalities in the CSPA have official plan policies about groundwater protection, however, their applicability varies. For example, most of the policies address the impact of on-site sewage systems, while only a few suggest that other uses with the potential to contaminate groundwater sources should be discouraged or managed. The intent of the following policy is to strengthen these existing policies by protecting sensitive regional groundwater sources from

contamination that could result from the establishment of specific activities associated with land uses if appropriate risk management measures are not put in place.

The activities below reflect those identified as significant threats to the wellhead protection areas in Chapter 6, since they can also impact the highly vulnerable aquifers and significant groundwater recharge areas, which are also groundwater sources.

Karst formations are sinkholes, caves and underground tunnels that form when rock is dissolved by water. Karst is most notably present in the Bobcaygeon and Gull River limestone bedrock formations in the Cataraqui Source Protection Area in the Town of Greater Napanee, Loyalist Township, the City of Kingston, the Township of South Frontenac, and the Township of Frontenac Islands. They can also be present in Precambrian marble (e.g., on the Canadian Shield). These formations create a direct link, or short cut, from the surface to the underlying aquifer such that any contamination on the surface can quickly reach the groundwater leaving no time to clean up a spill or for the contaminant to break down. They should be identified, assessed and addressed as appropriate.



Karst formations such as this sinkhole provide a direct pathway for contaminants on the surface to reach groundwater.

5.5.1-HR a. Municipalities reviewing proposals under the *Planning Act* or *Condominium Act* for new development and for expansions to existing development located in a highly vulnerable aquifer or significant groundwater recharge area, and involving one or more of the activities listed below, should incorporate measures/management practices to adequately manage the risk to groundwater quality associated with those activities. This policy contains examples of land uses associated with these activities, which are low drinking water threats, and is not considered to be an exhaustive list.

- i. the handling and storage of more than 25 litres of dense non-aqueous-phase liquids (DNAPLs) and/or organic solvents (e.g., metal manufacturing, electroplating and fabrication indus-

Municipalities can meet the intent of this policy in a number of ways:

- requiring up-front disclosure of activities
- site plan control
- development agreements
- conditional zoning (when available).

Risk management measures like siting of storage facilities, spill containment and storm-water management can be implemented through site plan control or development agreements.

tries, automotive or equipment repair shops, furniture refinishing shops, dry cleaning establishments)

- ii. the handling and storage of more than 2,500 kilograms or litres of commercial fertilizer and/or more than 250 kilograms or litres of pesticide where it is sold or used for application at other sites, except where it is manufactured or processed (e.g., lawn and garden centres, farm supply stores, yard maintenance contractors, golf courses)
 - iii. the handling and storage of more than 2,500 litres of liquid fuel (e.g., gas stations)
 - iv. the handling and storage of more than 500 tonnes of road salt (e.g., public or private maintenance yards)
 - v. at or above-grade snow storage that is more than 1 hectare in size (e.g., public or private maintenance yards, snow dumps)
 - vi. the storage of mine tailings (e.g., mineral extraction sites)
 - vii. the storage of PCBs (e.g., waste transfer stations)
- b. If there is any evidence of surface karst formations (e.g., disappearing streams, sinkholes, caves, vertical fissures) on the property, the municipality should require the developer to have a karst assessment completed by a karst specialist to determine what, if any, additional risk management measures may be required.
- c. This requirement could be waived if the proponent can demonstrate through a site specific investigation that a property does not exhibit characteristics of a highly vulnerable aquifer and/or significant groundwater recharge area.

- 5.5.2-NB a.** In order to monitor the implementation of policy **5.5.1-HR**, municipalities should provide the Cataraqui Source Protection Authority with a copy of any approvals under the *Planning Act* or *Condominium Act* for applications for properties in the highly vulnerable aquifers and significant groundwater recharge areas that relate to the activities listed in **5.5.1-HR**, when the Notice of Decision is issued.

Provincial Approvals

Provincial ministries have an important role to play in protecting the highly vulnerable aquifers and significant groundwater recharge areas by:

- integrating considerations for source water protection into their decision-making frameworks for environmental compliance approvals, certificates of approval, licenses and permits
- providing guidance to municipalities about practical groundwater protection
- optimizing the usefulness of collected data.

-
- 5.5.3-HR** The Ministry of the Environment, when reviewing applications for the establishment of new waste disposal sites, should incorporate available source protection information in its decision-making process, and require the incorporation of appropriate risk management measures to protect the source of drinking water as part of any environmental compliance approval. Waste disposal sites would be moderate or low drinking water threats in the highly vulnerable aquifers and significant groundwater recharge areas.
- 5.5.4-NB**
- a.** The Ministry of the Environment should prioritize the preparation and implementation of closure plans for waste disposal sites in the highly vulnerable aquifers and significant groundwater recharge areas where they are moderate or low drinking water threats.
 - b.** The Ministry of the Environment should include information about this policy in an annual summary of actions taken to achieve outcomes of source protection policies and make it available to the Cataraqui Source Protection Authority.
- 5.5.5-HR**
- a.** The Ministry of the Environment, when reviewing applications for the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage should incorporate available source protection information in its decision-making process, and require the incorporation of appropriate risk management measures to protect the source of drinking water as part of any environmental compliance approval.
 - b.** The action identified in **a.** applies to the following types of sewage works where they would be low drinking water threats in the highly vulnerable aquifers and significant groundwater recharge areas:
 - i.** discharge of stormwater from a stormwater retention pond
 - ii.** sanitary sewers and related pipes
 - iii.** septic systems or holding tanks
 - iv.** sewage treatment plant effluent discharges (including lagoons)
 - v.** storage of sewage (e.g., treatment plant tanks)
 - c.** Items to consider include enhanced level of quality control for stormwater, strict monitoring requirements and annual reporting.
- 5.5.6-NB**
- a.** In order to monitor the implementation of policies **5.5.3-HR** and **5.5.5-HR** the Ministry of the Environment should publish information to demonstrate implementation in a timely manner and in a location that is readily accessible to the Cataraqui Source Protection Authority.

5.5.7-HR a. The Ministry of Natural Resources, through its review of site plans included in applications for licences and permits for new or expanding aggregate extraction, should require terms and conditions be included to reduce the risk of groundwater contamination from a spill or leak associated with the handling and storage of liquid fuel at the site, where this activity would be a low drinking water threat.

5.5.8-NB a. The Ministry of Natural Resources should include information about policy **5.5.7-HR** in an annual summary of actions taken to achieve outcomes of source protection policies and make it available to the Cataraqui Source Protection Authority.

Sand and gravel pits (aggregate extraction sites) are generally located in hydrogeologically sensitive areas because they contain highly permeable sand and gravel deposits.

They can be considered transport pathways for contaminants since the protective soil layer is removed to extract the sand and gravel.

It's important to have risk management measures in place at these sites to reduce groundwater contamination.