



Calculating threat levels:

low, moderate or significant

There are many potential threats to drinking water in our urban and rural areas, but the level of risk they pose depends on the nature of the threat and its location. The *Clean Water Act* requires the elimination of the threats that pose the greatest risk. These are called **significant threats**.

To decide which threats are significant, the Ontario Ministry of the Environment has developed a formula to calculate a **risk score** based on:

- the hazard rating of the threat, on a 10-point scale
- the vulnerability of the water source, on a 10-point scale

How is the risk score calculated?

The risk score is calculated by multiplying the hazard rating by the vulnerability score. The result will be a number on a 100-point scale.

$$\text{risk score} = \text{hazard rating} \times \text{vulnerability score}$$

Based on the results of the calculation, threats are placed into one of three categories:

	Risk score
Significant threat	80 to 100
Moderate threat	60 to 79
Low threat	41 to 59

The Ontario Ministry of the Environment has developed tables showing the level of risk posed by hundreds of combinations of threats and vulnerability. These tables are available at www.ourwatershed.ca



How are possible threats identified?

Researchers working for conservation authorities or municipalities have used a variety of means to identify the possible location of potential threats. They have examined documents such as publicly available industrial databases. In some cases, they have obtained information directly from property owners. They also made some assumptions, such as that a rural home would have a septic system.

The location of properties containing potential significant threats will not be identified in the Assessment Report. The report will only identify the number and type of potential threats in the wellhead and intake protection areas. Individual property owners will be notified if it is believed their land is the site of a potential significant threat.

Examples of significant threats

Industrial or commercial

A solvent is stored in a tank close to a river intake. If the tank were to leak, the chemical could get to the intake in a short period of time. The chemical has a hazard rating of 9. The vulnerability score for the intake is 10. The risk score (hazard x vulnerability) would be 90, making it a significant threat.

Residential

A home located within 100 meters of a municipal well has a septic system. The area has a vulnerability score of 10 and the sewage has a hazard rating of 10. The result is a risk score of 100 making the septic system a significant threat.

Farm

A farmer spreads manure on his fields to fertilize them. There is a municipal well on the property next door. The vulnerability score for the farmer's land is 10. The hazard rating for manure is 8. The result is a risk score of 80, making it a significant threat.

What is

the South Georgian Bay-Lake Simcoe Source Protection Region?

This region covers four watersheds: Lake Simcoe, Nottawasaga Valley, Severn Sound and the Black-Severn River. A 22 person committee (plus chair) is responsible for developing Source Protection Plans for these watersheds. The plans will outline policies and programs to eliminate significant threats to the water supply as well as reduce the opportunity for low and moderate threats to become significant.

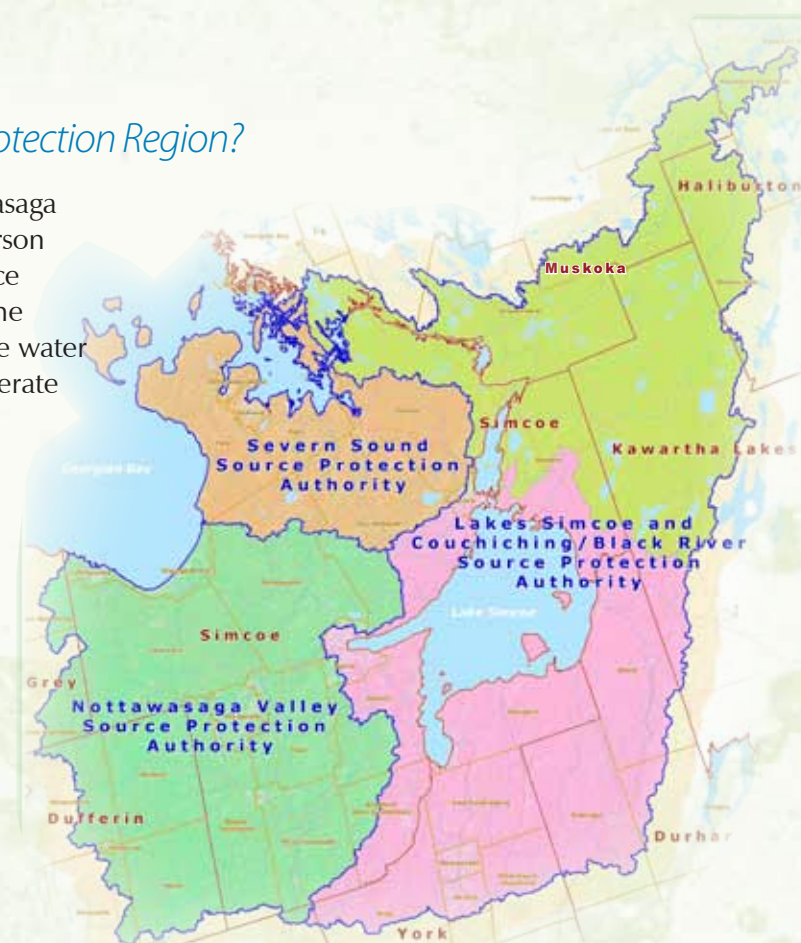
Who is

the South Georgian Bay-Lake Simcoe Source Protection Committee?

The Source Protection Committee is an independent group comprised of:

- Farmers
- Businesses
- Municipalities
- Residents
- First Nations

Source Protection Committees have been established in watersheds across Ontario to lead the development of Source Protection Plans.



Funding available for Landowners

The Ontario Drinking Water Stewardship Program provides grants to property owners to help them take action on their land to protect drinking water sources. Grants are available for a variety of projects to those eligible residents who own land near municipal wells and surface water intakes, including:

- replacing or upgrading old septic systems
- decommissioning old private wells, or upgrading wells still in use
- free and confidential Pollution Prevention Reviews for small and medium sized businesses to identify problems and develop solutions
- a range of agricultural best management practices to protect water quality

To learn more, go to www.ourwatershed.ca and look under stewardship funding or contact the stewardship coordinator at 1-800-465-0437.



Lake Simcoe Region Conservation Authority



Get involved!

Come to an open house and learn more about the assessment report. Check www.ourwatershed.ca for details.

Assessing Our Water Sources: Protecting Our Drinking Water



Calculating Threats to Drinking Water for the South Georgian Bay-Lake Simcoe Source Protection Region

The goal of the *Clean Water Act* is to protect the sources of municipal drinking water from pollution and overuse.

The *Clean Water Act* may affect you. Find out how.

Identifying the threats to our water supplies

The *Clean Water Act* was passed by the Ontario government in 2006 to protect sources of municipal drinking water from contamination or overuse. Studies are underway to identify the potential threats to municipal drinking water in four watersheds: Lake Simcoe, Nottawasaga Valley, Severn Sound and Black-Severn River. They make up the South Georgian Bay-Lake Simcoe Source Protection Region.

The studies are focused on vulnerable areas near municipal wells (Wellhead Protection Areas) and surface water intakes (Intake Protection Zones). These are areas where particular care must be taken in the use and storage of materials that could contaminate water. Activities on properties in these vulnerable areas are being evaluated and ranked according to rules developed by the Ontario government. Potential threats to water will be placed into one of three categories based on the level of risk: low, moderate or significant.

What is an Assessment Report?

In addition to a watershed characterization and water budget, information on vulnerable areas and potential threats is being compiled into Assessment Reports. There is one report for each watershed. They are publicly available at www.ourwatershed.ca. Public meetings are being held in each watershed to give people a chance to review the information and comment on it.

The Assessment Reports:

- give an overview of the watershed;
- provide a water budget;
- identify the vulnerable areas near wells and intakes;
- identify the types and number of significant threats to water quality near the wells and intakes;
- identify areas that could have low, moderate or significant threats.

As the Assessment Reports are being completed, work has already started on Source Protection Plans, the next phase of the process. These plans will outline what needs to be done to reduce the risk posed by significant threats and to prevent new ones from developing. They will be completed in 2012.



Source Protection Timeline

	2005	2006	2007	2008	2009	2010	2011	2012
Watershed Studies	█							
Technical Studies		█						
Terms of Reference			█					
Assessment Report				█				
Source Protection Plans					█			
Implementation								█

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Who could be affected by Source Protection Planning?

The source protection planning process could affect industries, farmers, businesses, rural residents and others who own property in the protection zones around municipal wells and surface water intakes. It's of particular importance to property owners who use or store materials that could pose a risk to municipal drinking water sources. These include chemicals, fertilizers, manure, human waste found in septic systems, and other materials.

What if there is a 'significant threat' on your property?

The Assessment Report will list the number and type of significant threats near municipal water sources. However, individual properties will not be identified. Property owners will receive individual notification if an activity on their land has been flagged as a potential significant threat. They will then have the opportunity to provide additional information about the nature of the activity and anything they have done to reduce the impact on water sources.

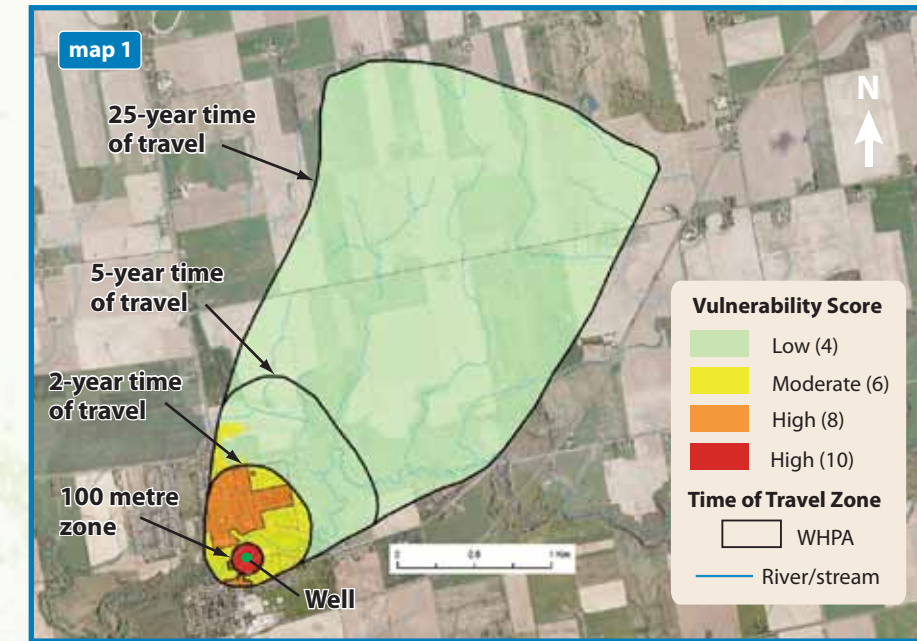
How will significant threats be dealt with?

Source Protection Plans will outline the steps that must be taken in a watershed to reduce the risk posed by significant threats. They could propose a variety of approaches such as incentive programs, monitoring activities, risk management plans, changes to municipal land use policies and others.

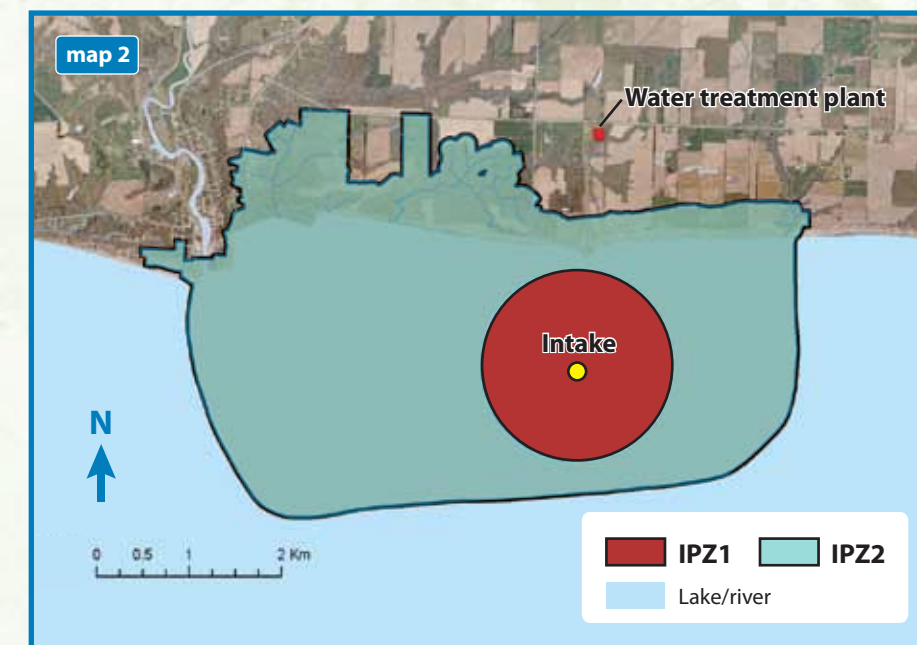
However, there are actions that property owners can take now to decrease the risk that an activity on their lands could pollute a drinking water source. For more information on Early Actions grants for landowners, see page 6.

Wells & Intakes

Wellhead Protection Area



Intake Protection Zone



What is vulnerability?

The word **vulnerability** describes how easily a well or intake can become polluted with a dangerous material. Researchers have studied each municipal well and intake in the four watersheds of the South Georgian Bay Lake-Simcoe Region to determine how vulnerable they are. There are approximately 290 wells and 15 surface water intakes.

Wellhead Protection Areas

Wells draw water from underground areas called aquifers where water fills cracks in bedrock or spaces between grains of sand, gravel or soil.

Aquifers are replenished when water from rain and melting snow soaks into the ground. Sometimes, the water also carries pollutants. It can take years, or even decades, for water to reach a well. The speed depends on the characteristics of the soil and bedrock in the area.

Measuring groundwater vulnerability

To determine the vulnerability score for a well, the researchers had to answer two questions:

- How quickly does water move **horizontally** through the aquifer to the well? The information was used to draw Wellhead Protection Areas (WHPA) around each well. WHPAs are divided into rings called Time of Travel Zones. The innermost zone is a 100-metre circle. The other zones are set at times of travel of 2 years, 5 years (or 10 years) and 25 years.
- How quickly does water move **vertically** from the surface down to the aquifer? This is called "intrinsic vulnerability."

The answers to the two questions were combined to come up with **vulnerability scores** on a 10-point scale for all the land within Wellhead Protection Areas for each well.

- An area of **high vulnerability** has a score of 8 or 10.
- An area of **moderate vulnerability** has a score of 6.
- An area of **low vulnerability** has a score of 4.

A note about the maps:

These maps are representations of two types of vulnerable areas. These are examples only and should not be taken to provide information for real wells and intakes.



Communities rely on wells (groundwater) or intakes (surface water) for their water supply. Both can be vulnerable to pollution.

Intake Protection Zones

River and lake intakes can be contaminated when dangerous materials are spilled into the water or on nearby land. **Intake Protection Zones (IPZ)** are areas where dangerous materials may get to an intake so quickly, the operators of the municipal water treatment plant may not have enough time to shut down the intake before the pollutant reaches it.

Measuring surface water vulnerability

Researchers studied how water moves in the area around each intake. For a **surface water intake**, they studied how the movement of water is affected by currents and winds. For intakes, they identified streams, municipal storm sewers and rural drains that enter the river or lake near the intake.

Intake Protection Zones were drawn around the intakes and assigned vulnerability scores on a 10-point scale:

- **IPZ1:** For a surface water intake, a one-kilometre circle around the intake the vulnerability can score up to 10.
- **IPZ2:** The area where water can reach the intake in a specified time (minimum of two hours). For a surface water intake, scores can be as high as 9.
- **IPZ3:** Areas where there are activities further away from the intake which could have an impact on water quality. Vulnerability scores are less than in the IPZ2.

Threats to Wells & Intakes

What are threats?

Researchers have studied the areas around municipal wells and intakes to identify the human activities that could threaten municipal water supplies.

There are two categories of threats – chemicals and pathogens:

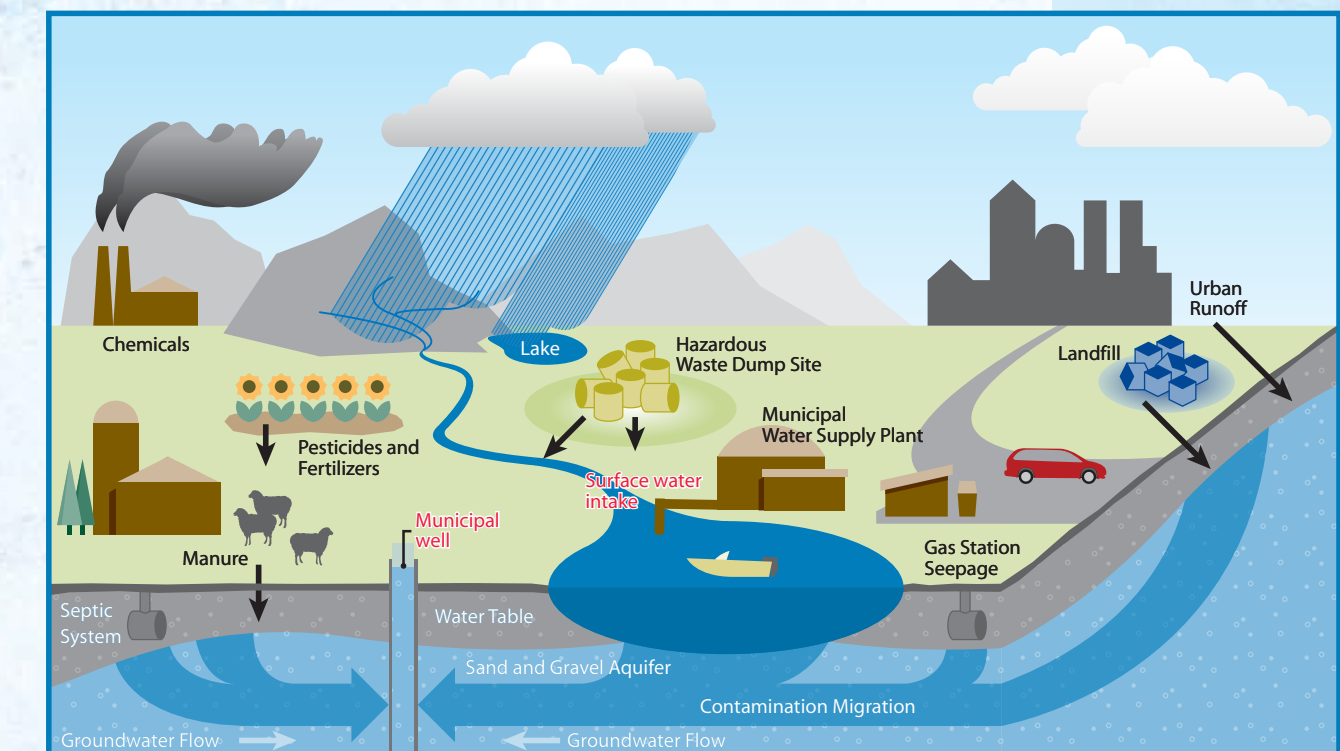
- **Chemical threats** include things like solvents, fuels, fertilizers, pesticides and other similar products. They can be found in factories, storage depots, gasoline stations, farms or other places.
- A **pathogen** is a dangerous bacteria or virus found in human or animal waste. Human pathogens can be found in septic systems, and animal pathogens can be found in manure.

Hazard ratings

Not all threats are equal. The danger posed by particular chemicals or pathogens depends on several factors including the amount, its toxicity and how it behaves in the environment.

The Ontario Ministry of the Environment has identified many materials that could contaminate water. It has assigned a **hazard rating** to each using a 10-point scale based on the nature of the material and how it is used or stored.

To learn how threat levels are calculated and how threats are identified, see page 5.



Based on graphic from The Groundwater Foundation: www.groundwater.org/gi/sourcesofgwcontam.html



There are many types of potential threats to water in rural and urban areas.