

## What is source water?

Source water is untreated water taken from rivers, lakes or underground aquifers for drinking (Another term for untreated water is 'raw' water.)

There are two types of source water: surface water and groundwater. Surface water is water on the Earth's surface such as lakes, rivers and streams. It is drawn into a drinking water system through a pipe, known as the intake pipe. Groundwater is the water beneath the Earth's surface found in the cracks and spaces between soil, sand and rock particles. It is drawn into a drinking water system through a well. Surface water and groundwater are interconnected and water flows from one to the other.

## What is source water protection?

Source water protection is protecting our drinking water sources from overuse and contamination. This helps to protect public health. In Ontario, source water protection is carried out under the [Clean Water Act, 2006](#). The goal of source water protection is to ensure we have enough clean drinking water for generations to come.

Source water protection is considered the "first barrier" of a multi-barrier approach to providing safe drinking water. Other barriers are effective water treatment, proper distribution and adequate water testing.

Source water protection also protects against overuse by determining how much water is available compared to how much is needed.

## Why does Ontario need the clean water act and how will it protect Ontario's drinking water?

Everyone has a right to clean water and need clean drinking water to survive. Unfortunately, history has shown us that if a community is not careful, contaminants can enter a drinking water supply, or the supply can be exhausted. Every community has a responsibility to make sure its children and their children are left with enough clean drinking water to survive. We must be able to trust our water sources.

[The Clean Water Act](#) helps to reduce risks to municipal drinking water sources by addressing threats to drinking water quality and quantity. It establishes a locally driven, science-based, multi-stakeholder process to protect drinking water sources and promotes the notion of stewardship – the shared responsibility of all stakeholders to protect the integrity of local sources of public drinking water.

## Why protect source water?

Protecting water sources safeguards public health and our future water needs.

Other good reasons to protect water sources:

- It is important to prevent source water from becoming contaminated because water testing and treatment procedures are not perfect.
- Source water protection is cost effective. It is more cost effective to keep our water clean and protected rather than to have to pay to clean it up.
- Not all forms of contamination can be removed or treated (i.e. many chemical compounds).

- Many people in Ontario, especially in rural areas, are not connected to municipal water. These people supply their own drinking water from a private well or surface water intake. For these people, protecting source water from contamination may be the only barrier they have against contaminated drinking water.
- Protected, abundant sources of water will allow our communities to plan properly for future development.
- Protecting our water sources also means we will have clean abundant water for other uses like recreation.

## How can we protect source water?

Everyone can help protect water at its source. Ways to protect drinking water range from individual actions, such as taking household hazardous wastes to proper disposal sites, to collective efforts by everyone working together to implement and follow the policies of the watershed-based source protection plans.

Developing a source protection plan for a watershed is an excellent way to identify steps that should be taken to protect local sources of drinking water. Source protection plans help municipalities and people within a watershed protect their local sources of drinking water. These plans aim to keep source water clean and encourage wise water use.

Source protection plans are based on sound science and are developed by a local Source Protection Committee with input from municipalities, stakeholders and the public.

## Why are conservation authorities involved?

For over 50 years, Conservation Authorities have been protecting, restoring and managing Ontario's water and land resources on a watershed basis.

A watershed is the area of land that drains into a common river or stream. Water in its natural state (solid, liquid, gas, etc.) is vulnerable to contamination or depletion, depending on activities within its watershed.

Quinte Conservation and other Conservation Authorities have the technical scientific, communications and administrative expertise required for source protection planning. The Ontario Ministry of Environment, Conservation and Parks recognized this expertise and are funding Conservation Authorities to coordinate source water protection at the watershed level. Quinte Conservation supports the work of the local Source Protection Committee who worked with municipalities and stakeholders to develop the science-based source protection plan. Quinte Conservation now helps to facilitate the implementation of the approved Quinte Region Source Protection Plan.

## What are potential threats to source water?

Over the past few decades, people have come to realize that their actions and how they use their land and water can contaminate the environment. A number of these contaminants can get into surface and groundwater that people use for drinking water. Contaminants may include:

- Industrial emissions, spills and leaks,
- municipal sewage treatment discharges,
- landfill leachate,
- wastes from mining sites,
- on-site septic systems;

- leaking storage tanks (i.e. fuel oil and gas),
- urban runoff containing sediment, nutrients, bacteria, oil, metals, chemicals, pesticides, herbicides, fertilizer, road salts, pet droppings and litter,
- agricultural runoff containing oil, grease, fertilizers, pesticides, bacteria, nutrients and manure, and
- bacteria and petroleum products from recreational boating.

The Province of Ontario has identified 22 [drinking water threats](#).

It is far more expensive to treat contaminated source water than it is to protect it from contamination. It costs much more to remediate contaminated groundwater than to protect it from contamination. We need to use water wisely to ensure that we have enough clean water now and in the future.

### What is a surface water intake protection zone?

A surface water intake is the pipe through which surface water (water from lakes and rivers) is drawn into a water treatment system for drinking water. The surface water intake protection zone is the area of land and water surrounding the intake pipes that may be vulnerable to contamination. The [Intake Protection Zones](#) factsheet further explains how and why intake protection zones are created.

### What is a wellhead protection area?

A wellhead protection area is the area above and below ground, surrounding a municipal well that supplies a municipal drinking water system. It is the area through which contaminants may move toward and reach the water well. The [Wellhead Protection Areas](#) factsheet further explains how and why wellhead protection areas are created.

### What is the difference between the water table and an aquifer?

The water table is the top of the aquifer. An aquifer is an underground source of water. It is an underground area saturated with water. A common misconception is that our underground sources of water are underground lakes and rivers. In actuality, the water in an aquifer fills the spaces between the soil particles and rocks.

### What is vulnerability?

Vulnerability refers to how easily a well (or aquifer) or surface water intake can become polluted with a dangerous material. Researchers studied each municipal well and intake to determine how vulnerable they are. There are [eleven systems](#) in the Quinte Region: seven municipal surface water intakes and four municipal wells.

### What is a vulnerable aquifer?

A vulnerable aquifer is an underground source of water that may be contaminated or is easily susceptible to contamination from human and/or natural sources. An aquifer is considered highly vulnerable based on a number of factors, including how deep the aquifer is underground, what sort of soil or rock is covering it and the features of the soil or rock surrounding it. A vulnerable aquifer is often not protected by overlying layers of soil serving to slow the rate of water movement from the ground surface. Soil or rock that has many large cracks and spaces, and is looser rather than more compact, allows for water to quickly flow into an aquifer. The faster water flows through the ground to an aquifer, the more vulnerable it is to contamination.

## How is surface water vulnerability measured?

To determine the vulnerability score for surface water intakes, researchers study how water moves in the area around each intake. For a river intake, they look at how quickly water gets to the intake during high and low flows. For a lake intake they study how the movement of water is affected by currents and winds. For both types of intakes they identify streams, municipal storm sewers and rural drains that enter near the river or lake near the intake.

Intake protection zones (IPZs) are then drawn around the intakes and assigned vulnerability scores on a 10 point scale with 10 being the most vulnerable.

The intake protection zones are established for up to three contributing areas divided into times of travel zones.

- IPZ 1 is the area immediately upstream or adjacent to the intake (no more than 1 km away)
- IPZ 2 is the contributing area where contamination could reach the intake before an operator could respond (this is a minimum of 2 hours)
- IPZ 3 is the larger contributing area around the intake

## How is groundwater vulnerability determined?

To determine the vulnerability scores for the area surrounding a well, researchers have to answer two questions:

- How quickly does water move horizontally through the aquifer to the well?
- How quickly does water move vertically from the surface of the ground down to the aquifer? This is called the intrinsic vulnerability.

This information is used to draw a wellhead protection area or 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 and 25 years. Times of travel refer to how long it may take a contaminant to reach to well.

Researchers look at information like: the geology and porosity of the underlying rock and; well records that show the direction of groundwater flow to help them answer the questions.

The answers to the two questions are combined to come up with a vulnerability score on a 10 point scale for all the land within the WHPA for each well.

## What is a groundwater recharge area?

A groundwater recharge area is an area where precipitation seeps into the ground and drains to the water table and underlying aquifers. Typically, these are isolated areas of significant deposits of sand and gravel, found throughout the Quinte Region, where high volumes of water can move easily into the ground thereby recharging the groundwater.

## **Does the clean water act pose a threat to the privacy rights of rural property owners?**

Under the Clean Water Act, municipalities, conservation authorities, landowners, industry, businesses, farmers, community groups and the public have collaborated to develop a fair, effective plan to address local risks to drinking water.

Conservation Authorities already collect data, carry out studies, map resources and monitor the state of our watersheds daily. Conservation Authorities have a long history of working with landowners, farmers and municipalities in a mutually acceptable and respectful way and that is not going to change. We all need to work together to protect our water.

Conservation Authorities already have the authority to enter onto private property under Section 28 of the Conservation Authorities Act. Conservation Authority staff members seek permission of property owners prior to entering onto private property to monitor, assess, map, etc. Power of entry on private property is used only when absolutely needed.