

# Our Safe Water Supply



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### Threats to Island Groundwater:

#### Pesticides:

- Not all pesticides behave in the same manner. Many products, especially newer pesticide formulations, are unlikely to reach the water table.
- Studies have shown that under normal conditions pesticides are rarely detected in PEI's groundwater, and then only at a very low concentrations, well below the levels of health concerns.
- However, problems have occurred when large quantities of concentrated material have been released through leaks and spills. Two Island communities, Kensington and Tignish, have had significant portions of their groundwater rendered unusable due to such incidents.

#### Nitrates:

- Whenever there is agriculture, there is potential for elevated levels of nitrates in the groundwater. PEI is no exception!
- Studies conducted on PEI and elsewhere have shown a strong link between land use and nitrate levels in groundwater, with agricultural areas showing higher than average nitrate concentrations.
- One survey in an intensively cultivated watershed in PEI found that nearly 7% of well-water samples had nitrate concentrations higher than the recommended level in the Guidelines for Canada on Drinking Water Quality.
- Due to PEI's dependence on both groundwater and agriculture, a balance must be found between the interests of keeping our water clean and keeping our farms productive.

#### Manure:

- Manure on farms can also contaminate the groundwater. Bacteria and nitrate-laden water can wash off the fields and soak down into the groundwater or can leach from manure storage sites.
- Hog farmers use storage lagoons for liquid manure, if not built with an impermeable liner, or directly into fractured bedrock may cause some concern.
- Efforts are being made to educate farmers on proper construction techniques.

#### Petroleum Products:

- While not the most common problem, leaks and spills from petroleum storage tanks continue to be a serious threat to groundwater in PEI. The provincial government has strict regulations designed to prevent contamination from these sources.
- One well-known disaster happened in 1977 in Kensington where 31 wells were



contaminated by a leaking underground storage tank that was corroded. Since then, over 2,000 old steel storage tanks have been removed from the ground.

- Above-ground tanks are also a threat to PEI's groundwater. In 1994, the Environmental Emergency Response Team responded to 349 spills. The majority were from above-ground tanks for storing home heating fuel.
- A survey carried out in 1991 showed that most above-ground storage tanks were not installed properly. To help solve this problem, the Water Resources Branch organizes courses for tank installers on a regular basis.

#### Wastewater Treatment:

- Wastewater treatment can be problematic if septic tanks are improperly installed or faulty. Leaking sewage pipes can allow nitrates, chemicals, bacteria, and viruses to seep into groundwater supplies.
- The current system of assessing the suitability of soils for on-site sewage disposal will help address this issue.

#### Road Salt:

- Approximately 23,000 tonnes of salt is spread out over 500 kilometers of PEI roads every winter. Another 1,500 tonnes is spread on streets in Charlottetown and Summerside.
- Road salt is a compound made up of two elements, chloride and sodium. These compounds both occur naturally in all groundwater and provide important dietary health benefits. However, there can be too much of a good thing and. Occasionally, road salt use on highways is considered the cause of elevated chloride concentrations in well water.
- Because management of storage piles has been improved in recent years, cases of wells being contaminated by salt have been limited to area near high traffic roads and steep hills.

Groundwater has long been PEI's invisible resource. Its abundance and excellent quality has nourished the lives of all Islanders. As Islanders become more aware of the importance of groundwater and the potential threats to its quality, we must rise to the challenge of keeping this precious resource safe for all.

#### Freshwater Stream:

- PEI streams are small and shallow varying in width from 30 cm to 6 meters and in depth from 15 cm to 1 meter. Any PEI stream wider or deeper than this are actually estuaries. The streams are quite short and usually less than 16 km in length. They do not travel fast, rather they tend to meander and spread out.
- About 60-70% of the water in our streams comes from groundwater, the rest from rainwater or run-off from the land during rainfall or winter melting events. A typical stream begins from a spring, where groundwater has bubbled up to the surface and eventually it mixes with salt water to become an estuary.
- The high proportion of groundwater in the streams has a moderating effect on the



temperature of the stream water. The temperature of groundwater stays constant year round at about 8° Celsius, but temperatures can range for 0° - 4° Celsius in the winter and 12°-20° in the summer. This moderating influence is important for wild-life in streams, particularly in the winter.

- Groundwater also has a moderating effect on streamflow. The groundwater portion of stream water is often called “base flow”. Base flow in PEI streams is substantial and remains fairly constant throughout the year. Variations in the amount of streamflow from season to season are less on PEI than in many other places.
- For a large part of the year, base flow is the only water in our streams. This is because our watersheds are so small that rainfall can affect the streamflow for only about a day. Streamflow rises quickly after rain or a winter melt, but falls nearly to base levels shortly after.

#### Protecting the Quantity of Water in Island Streams:

- Most concerns about surface water are related to the quality of the water. But quantity is equally important.
- While PEI’s rainwater is plentiful, farmers sometimes need extra water for irrigating their crops. High capacity wells are used by some farmers for irrigation, but they must apply for a permit to construct such a well, and the use of this water is strictly regulated.
- The reason for these regulations is that as water is taken from groundwater supplies, less is available for discharge to the streams. In order to protect fish habitat, it is necessary to maintain a minimum amount of water flow in the streams at all times.
- Likewise, a person must obtain a Water Withdrawal Permit before they can take any water from an Island stream. Limited number of permits are granted each year, and the level of flow in the streams are monitored to make sure that it does not drop below normal levels.

#### Drinking Water Quality:

- We Islanders depend on groundwater for all of our drinking water. Because the water is naturally high quality, treatment for drinking purposes is not generally necessary.
- The need to protect our groundwater from contaminants has been recognized through the introduction of a number of regulations and guidelines.
- However, since water is both a solvent and a carrier, it may transport hazardous materials, in solution or suspension, and it can carry them down to our groundwater.
- The Round Table has examined three serious risks of groundwater contamination, namely pesticides, nitrates and improper manure storage. Other risks worth mentioning are petroleum leaks and spills, faulty wastewater treatment systems, domestic hazardous wastes and road salt.

## Our Safe Water Supply: Quiz

1. Which of the following is NOT a threat to ground water?
  - a, petroleum products
  - b, pesticides
  - c, nitrates
  - d, vitamin C
2. There is a link with nitrates in ground water and...
  - a, agriculture areas
  - b, nuclear areas
  - c, beaches
  - d, business areas
3. PEI streams that are larger then 30 centimeters to 6 meters in width, and 15 centimeters to 1 meter in depth are actually what?
  - a, ponds
  - b, oceans
  - c, estuaries
  - d, bathtubs
4. The temperature of groundwater year round is..
  - a, the same at 8 Degrees Celsius
  - b, fluctuates between 0-4 Degrees Celsius
  - c, goes through a 4 cycle change
  - d, changes a degree each month for the winter months
5. In winter we must be careful of..
  - a, flooding the groundwater
  - b, ice melting and contaminating the water
  - c, road salt contaminating groundwater
  - d, no extra concerns

Our Safe Water Supply Quiz Answers:

1. D

2. A

3. C

4. A

5. C