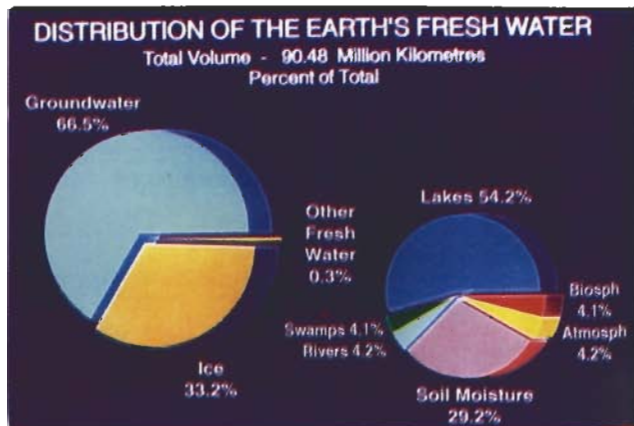


WHERE DOES GROUNDWATER COME FROM?

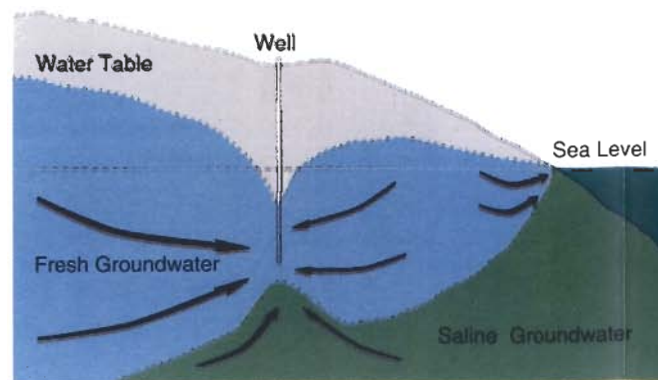
Groundwater lies beneath all of us and is found in the spaces between particles of rock and soil, and in bedrock fractures. Two thirds of the world's freshwater is found underground. It is an integral part of the hydrologic cycle. Rain that trickles down through the soil reaches the **water table** which is the level below which all these spaces are filled with water. Groundwater moves slowly through the ground until it reaches river banks, lakes, or oceans. Much of a river's flow during periods of drought is actually groundwater which is slowly discharging along its banks and river bottom. Groundwater discharging onto a land surface is called a **spring**. Springs are usually found near the ocean and along the sides of cliffs and river valleys. An underground formation of permeable rock or loose material capable of transmitting useful quantities of water to a well is called an **aquifer**.



HOW ARE GROUNDWATER RESOURCES USED IN NEWFOUNDLAND AND LABRADOR?

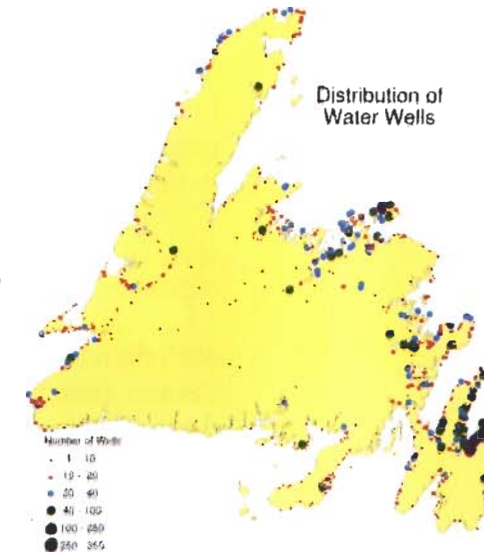
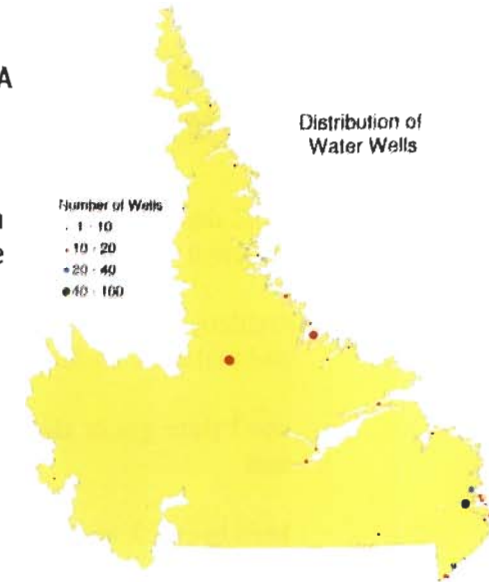
Groundwater is a renewable resource used as a potable source of drinking water by approximately 29% of the province's population. A larger percentage of the rural population are dependent on groundwater due to the spread out nature of small communities where constructing a central water system would be too expensive. Groundwater supplies are always less expensive to install than surface water systems, especially where clusters of houses can be serviced by a local well. Disease free and relatively the same temperature year round means cool and clean water is readily available during the summer months when other water supplies have boil orders in effect or are experiencing water shortages. Dependability is one of the major benefits of using groundwater.

Groundwater is also being used in this province for aquaculture, water bottling, and as a source of heating using ground sourced heat pumps. The majority of farms use



Salt water contamination of a well

groundwater, as do many schools and businesses. A number of larger towns in the province depend on wells to obtain their water. These are Happy Valley-Goose Bay, St. Alban's, Badger, Stephenville Crossing, Bell Island, and Eastport. There are many more smaller communities and local service districts who utilize groundwater. Information on groundwater resources is constantly being gathered by government to properly manage this resource. There are approximately 13,000 drilled wells and an estimated 35,000 dug wells in the province.



Point Sources

- hydrocarbon contamination from leaking underground fuel storage tanks, domestic furnace oil tanks, and from accidental spills
- high bacteria counts due to on-site septic tank runoff
- contaminated surface or groundwater entering improperly constructed wells
- leachate from municipal landfills

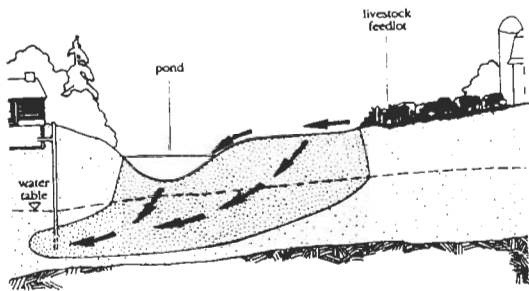
Non-Point Sources

- runoff from salt storage facilities
- road salt deicing applications on highways
- salt water intrusion near coastal areas
- fertilizers and pesticide applications
- farm waste runoff
- mine tailings




HOW DOES GROUNDWATER BECOME CONTAMINATED?

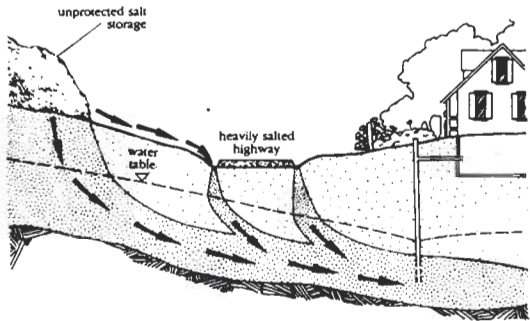
The major sources of groundwater contamination are:

Groundwater quality is also affected during it's movement by contact with naturally occurring minerals. Excess iron and manganese are the most common naturally occurring contaminants.






A poorly designed livestock facility can cause nitrate contamination.

-  indicates uncontaminated area
-  indicates contaminated area
-  indicates direction of contaminant movement



Heavily salted roadways or unprotected salt storage sites can lead to groundwater contamination.

-  indicates uncontaminated area
-  indicates contaminated area
-  indicates direction of contaminant movement

Generally groundwater is not as easily contaminated as surface water, however, once it is contaminated it is much more difficult to clean up because of its relative inaccessibility. Most drilled wells in Newfoundland obtain water from fracture flow in the bedrock. Because of relatively thin soils in many locations, there is little filtering action to purify water as it seeps downward on it's way to the water table. Prevention is the key to reducing groundwater contamination.

HOW CAN YOU PREVENT GROUNDWATER CONTAMINATION

- don't dump waste oil on the ground – recycle it
- regularly inspect your furnace oil tank and fuel lines for leaks
- don't store gas or cleaning fluids near a well
- keep livestock away from a well
- make sure wells and septic tanks are located at the required distance (16m) from each other – the septic field should be down grade of the well and constructed according to Department of Health regulations
- apply pesticides and fertilizers only in the recommended dosages
- don't flush large amounts of household cleaners down the drain which may kill the bacteria in your septic tank
- all wells should have a secure cover, especially larger diameter dug wells
- properly seal all abandoned wells according to Department of Environment guidelines
- wells situated near the coast should only be drilled to a depth where freshwater is first encountered and used conservatively to prevent saltwater intrusion.

For more information on our groundwater resources, please contact:

**Groundwater Section
Water Resources Management Division
Department of Environment
P.O. Box 8700
St. John's, NF
A1B 4J6
(709) 729-2539
FAX (709) 729-0320**



CANADA - NEWFOUNDLAND
AGREEMENT Respecting Water
Resources Management



Department of
Environment



Environment
Canada

Environnement
Canada

