

Groundwater is an important source of freshwater for many communities. In Canada, groundwater represents 30.3% of domestic freshwater sources. Prince Edward Island, for example, relies completely on groundwater since there are no major lakes or rivers to provide adequate supplies.

Groundwater is stored in geological formations known as aquifers, which are accessed by means of wells. Just like rivers, groundwater flows underground from one region to another and sometimes ends up in a lake or riverbed. In coastal regions, such as the Maritimes or Atlantic shores of the United States, freshwater aquifers are close to the seabed which contains salty water.

Freshwater naturally flows towards a saltwater aquifer under the sea, and usually there is a barrier (interface) that prevents mixing between fresh and salty water. For many years, freshwater aquifers in coastal regions have been used to provide potable drinking water. However, with increasing demand on freshwater and increased freshwater pumping, natural groundwater flow was disturbed and caused saltwater to intrude into freshwater aquifers.

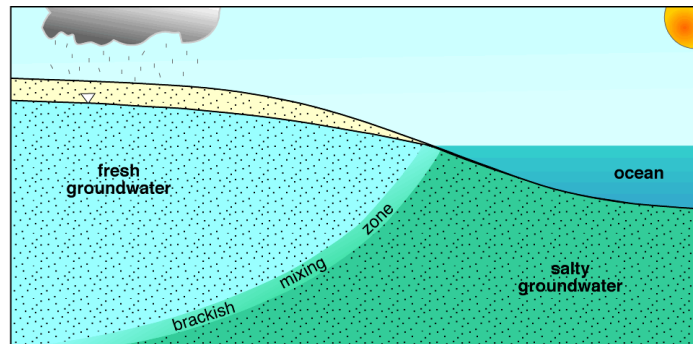
Saltwater intrusion has become a major issue in some cases such that potable pumping wells have been completely abandoned. Since 1940, there have been more than 120 supply drinking water wells in Cape May County, New Jersey that have been abandoned due to saltwater intrusion. Other communities have utilized saltwater aquifers in creative ways. In Prince Edward Island for example, saltwater wells are used as a convenient supply for Shellfish farms.

Water authorities are taking various measures to deal with saltwater intrusion. One of the interesting engineering solutions to the problem is injecting Reverse Osmosis quality water back into the aquifer to reduce aquifer salinity and “dilute” the aquifer.

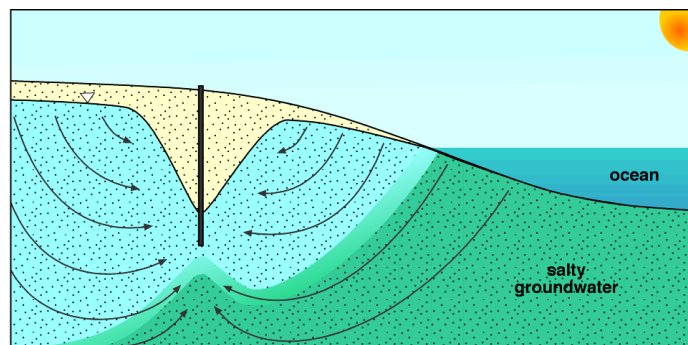
The Terminal Island Sewage Treatment Plant in Los Angeles implemented a creative system that treats sewage water to RO quality and injects it into the seawater barrier to control saltwater intrusion in the North Long Beach area.

Another growing technology is desalination, which directly treats pumped saltwater into potable water, similar to RO systems. The North Reverse Osmosis Water Plant in Dare County, North Carolina is

one of the largest brackish water treatment systems in the United States, which produces 850,000 gallons of potable water per day.



Naturally, fresh groundwater flows into salty aquifers under the ocean bed. In coastal regions there is a mixing zone that separates fresh water from salty water.



When too much freshwater is pumped from coastal wells, it disturbs the natural barrier and causes saltwater to flow into freshwater aquifers and increasing its salinity.