

WATER & CLIMATE CHANGE

Context

Most climate models indicate warmer, rainier winters and hotter, drier summers in the future for southwestern British Columbia, including the Gulf Islands. Drier summers can result in slower groundwater recharge and greater heat will result in more water losses to evaporation, likely lowering water tables. Heavier rains in the winter may increase the amount of rainwater lost to run-off, escalating erosion damage to streams.

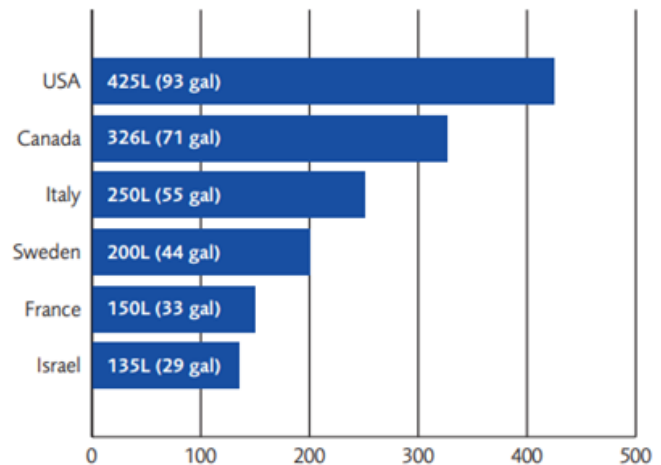
The predicted extremes in temperature and precipitation patterns due to climate changes will affect our groundwater resources. Many of the Gulf Islands, including Gabriola, have a limited ability to store surface and groundwater and lose up to 80% of rainwater as runoff to the ocean.

Water Consumption

The average Canadian uses around 330 litres of water daily (indoor and outdoor). Of that, ~10% is used for cooking and drinking and over 50% for flushing toilets and showering. Many water districts on the Gulf Islands report water use levels of 190-230 litres per person per day for full-time resident households. Rainwater-dependent users consume from 90-150 litres per person daily.

Most water consumed on Gabriola Island is drawn from the groundwater aquifer (water bearing rock fractures); rainwater is harvested for outdoor irrigation and is also used as a potable water source. The total groundwater withdrawal in summer is around three times higher than in the winter. A study of the water balance of the Gabriola Island aquifer indicates the local aquifer is under stress during the summer.

Average Daily Residential Water Use Per Person



Source: Islands Trust

Gabriola Wells



Image Sourced from iMapBC:
<http://maps.gov.bc.ca/ess/sv/imapbc>

Slide developed by Ministry of Forests, Lands and Natural Resource Operations, 2017

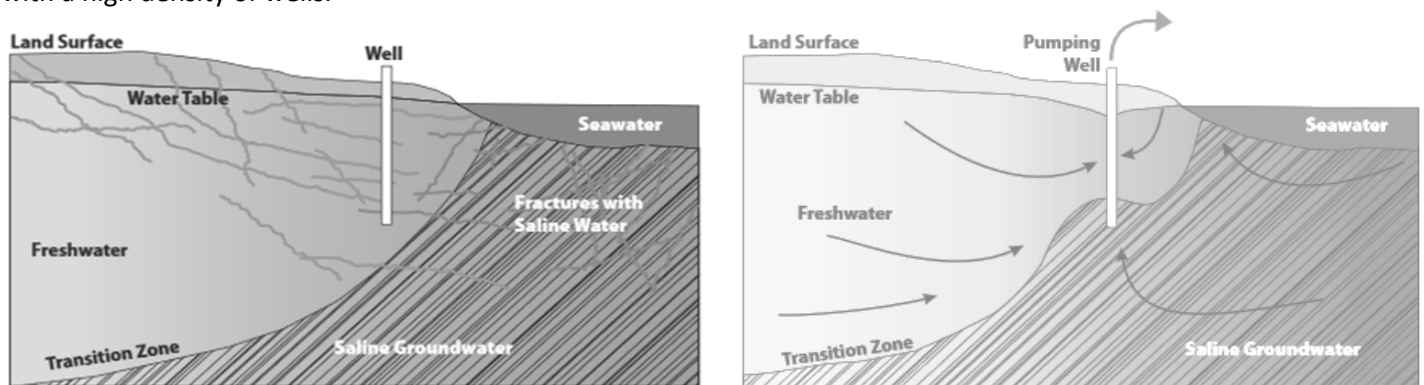
Gabriola Wells

Most islanders depend on well water for a sustained water supply. There are over 300 registered groundwater wells on Gabriola Island (Islands Trust, 2019). The mean depth is ~220 ft and the mean yield is ~8.5 USGPM (32 L/min). As the demand for groundwater increases, so do the well water quality challenges, including sulphur taste and odour, low yields, or saltwater intrusion.

There are 20 observation wells and 2 mapped aquifers, both are fractured bedrock.

Saltwater Intrusion

Saltwater intrusion occurs when seawater is drawn into a freshwater aquifer. Adjacent to the coast, groundwater consists of a freshwater aquifer that sits above the higher-density seawater with a transition zone (a mix of fresh and saltwater) in between. The risk of seawater intrusion into the freshwater aquifer is higher in areas close to the coast with a high density of wells.



The overuse of the aquifers on the Gulf Islands contributes to instances of saltwater intrusion, an increasing number of abandoned wells, and measurable declines in water quality over the summer months. For example, saltwater can find its way to the well via a single fracture in the bedrock. Once seawater intrusion occurs, changes in the aquifer may be irreversible or take many years to recover. Sea level rise will amplify the saltwater intrusion problem, although likely not for several decades. This area is not experiencing relative sea level rise currently because while the sea level is rising, the Earth's crust is also rising because of the melting of the glaciers that were here until about 12,000 years ago.

Rainwater Harvesting

Rainwater Harvesting can reduce climate change vulnerability and is used worldwide as an alternative for clean water sources during a drought. Rainwater can increase water availability and reduce demand on groundwater in areas where water is scarce. The benefits of rainwater harvesting systems go beyond home use, helping to reduce storm water runoff, slow down erosion, and mitigate urban flooding.

Rainwater harvesting refers to collecting and storing rainwater for reuse on-site, rather than allowing it to run off. It is suitable for areas with an annual average rainfall of more than 400 mm per year. (Gabriola's averages about 960 mm per year.) Modern rainwater harvesting systems – adequately managed and maintained – are safe and yield good-quality water.

Rainwater can be harvested for domestic, agricultural or commercial uses. The most common domestic uses of rainwater include non-potable uses such as toilet flushing, gardening and car washing, or potable uses such as drinking and cooking, dishwashing, and showering. Harvested rainwater properly treated provides a sustainable source of freshwater and helps alleviate water shortages and reduces reliance on water deliveries.

Resources and Rebates: Find more about [saltwater intrusion](#) from the BC Gov. factsheet
Learn more about [Freshwater Sustainability](#) from the Islands Trust website
Find your well in: [Groundwater Wells and Aquifers](#) directory
Access funding through [RDN Rainwater Harvesting Rebate program](#).
Well Water Testing Rebate <https://www.rdn.bc.ca/well-water-testing>.