

Sodium in Groundwater¹

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What is sodium?

Sodium is a highly soluble chemical element with the symbol “Na.” Sodium is often naturally found in groundwater.

In water, sodium has no smell but it can be tasted by most people at concentrations of 200 milligrams per litre (mg/L) or more. Within British Columbia the ambient concentration of sodium in groundwater ranges from a few mg/L to over 100 mg/L. High concentrations of sodium in groundwater occur naturally in some areas. For example, on the Gulf Islands sodium levels have been shown to range up to thousands of mg/L depending upon the location and depth of the well. An increase in sodium in groundwater above ambient or natural levels may indicate pollution from point or non-point sources or salt water intrusion. The Canadian drinking water quality objective for sodium is an Aesthetic Objective (AO) of 200 mg/L.

What are the known sources of sodium?

All groundwater contains some sodium because most rocks and soils contain sodium compounds from which sodium is easily dissolved. The most common sources of elevated sodium levels in groundwater are:

- Erosion of salt deposits and sodium bearing rock minerals
- Naturally occurring brackish water of some aquifers
- Salt water intrusion into wells in coastal areas
- Infiltration of surface water contaminated by road salt
- Irrigation and precipitation leaching through soils high in sodium
- Groundwater pollution by sewage effluent
- Infiltration of leachate from landfills or industrial sites.

What are the environmental health concerns?

Sodium is a principal chemical in bodily fluids, and it is not considered harmful at normal levels of intake from combined food and drinking water sources. However, increased intake of sodium in drinking water may be problematic for people with hypertension, heart disease or kidney problems that require them to follow a low sodium diet. Individuals on sodium restricted diets may want to discuss concerns related to sodium intake from drinking water with their doctor.

¹ Information in this fact sheet is generally intended for private wells. Please note that any water supply system or well serving anything other than one single family dwelling is defined as a water supply system under the *Drinking Water Protection Act* and Regulations and must be sampled according to the Act and Regulations. The person operating such a system is defined as a water supplier.

Other information sources:

Health Canada, Guidelines for Canadian Drinking Water Quality Supporting Documents. http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/index_e.html

Health Canada, *It's Your Health*. http://www.hc-sc.gc.ca/iyh-vsv/environ/index_e.html

B.C.'s Ground Water Protection Regulation: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/index.html

B.C. Ministry of Health, "Safe Water Supply Vital to Your Health." (1999) <http://www.healthservices.gov.bc.ca/protect/pdf/PHI052.pdf>

B.C. Ministry of Health, Health Files. <http://www.bchealthguide.org/healthfiles/index.stm>

Type "water" in the search section and look for various articles including:

- #45 "Should I Get My Well Water Tested?"

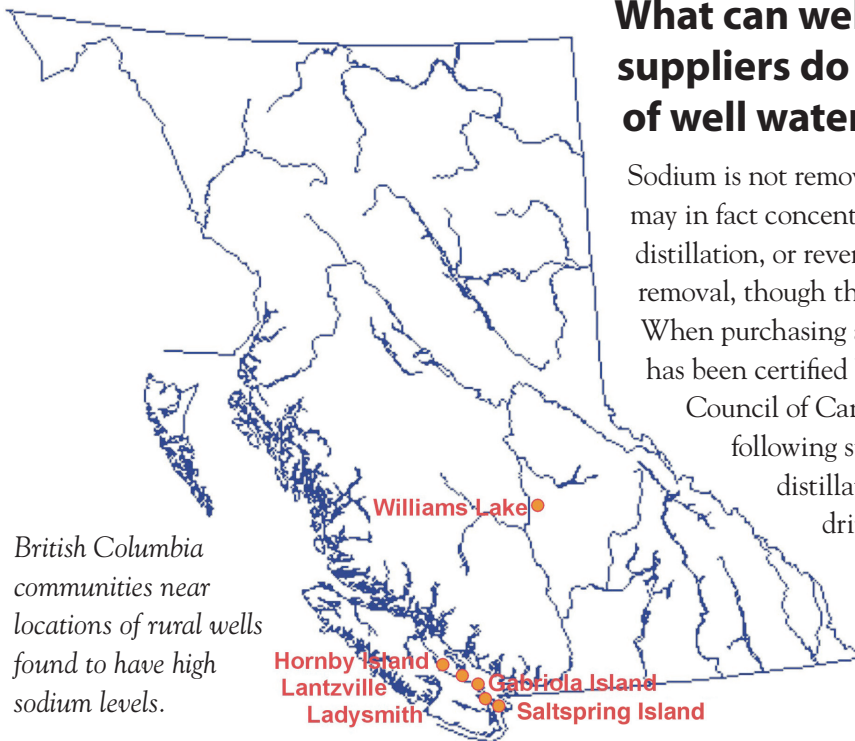


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Where have high sodium levels been found in B.C. well water?

The Ministry of Environment evaluated the results of groundwater samples obtained through the *Water Quality Check Program* carried out between 1977 and 1993. Over 2,100 samples were analysed for sodium concentration, of which 5% had sodium levels exceeding the drinking water aesthetic objective of 200 mg/L. Some rural wells near the communities of Gabriola Island, Hornby Island, Ladysmith, Lantzville, Saltspring Island and Williams Lake were found to have sodium concentrations above the Guidelines for Canadian Drinking Water Quality. Sodium levels above the drinking water guideline may also occur locally in other regions of the province.



British Columbia communities near locations of rural wells found to have high sodium levels.

What can well owners and water suppliers do about sodium contamination of well water?

Sodium is not removed by pitcher-type filtration units or boiling, which may in fact concentrate it further. Water treatment methods such as distillation, or reverse osmosis are the only effective methods of sodium removal, though these may be expensive for use in small water systems. When purchasing a treatment device, you should consider one that has been certified by an organization accredited by the Standards

Council of Canada (SCC). The treatment device should meet the following standards: NSF/ANSI Standard 62 on drinking water distillation systems, or Standard 58 on reverse osmosis drinking water treatment systems, or Standards 53

on drinking water treatment units — with specific designation for the water quality parameters you are trying to remove (e.g. sodium removal).

Certification assures that a device works as the manufacturer or distributor claims. Devices can be certified for treating a range of water quality

concerns, so make sure that the device you purchase is explicitly certified for iron and manganese removal. Find an up-to-date list of accredited organizations at www.scc.ca.

High sodium concentrations may be discovered more easily than other water quality concerns due to the taste of sodium chloride and sodium sulphate in water at levels above the drinking water guidelines. Proper well site selection and construction is critical to prevent contamination of wells with sodium from surface sources such as irrigation, or sewage discharges. Proper handling, storage and use of road salt will also minimize groundwater contamination. Water conservation measures, particularly in summer months when groundwater recharge is lowest, may reduce the risk of salt water intrusion in coastal areas.

Well water testing and source protection

Well owners are encouraged to test their water periodically to ensure the water is safe to drink. Consult Public Health at your local Health Authority for advice regarding the specific parameters to test for and how often testing should be done. For more information on protecting your well water source a *Well Protection Toolkit* is available from the Ministry of Environment on the internet: http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells/well_protection/wellprotect.html to help water suppliers and communities develop a well protection plan to minimize the threat of land use activities on groundwater quality.
