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Drinking Water In The Great Canadian Outdoors

Is the water safe to drink?

Waters in the great Canadian outdoors are generally of excellent quality, but to ensure an enjoyable experience, be prepared to boil or disinfect all drinking water. Filtration prior to disinfection will provide additional protection.

No surface water can be considered safe for human consumption without treatment. Even the cleanest looking spring water could be polluted. Untreated water may be contaminated with bacteria, viruses and protozoa.

How do I choose my drinking water source?

Choose your water source carefully to reduce the risk of exposure to disease-causing organisms and to increase the effectiveness of your water treatment. On short trips, use water from home or another safe source.

Generally, the chances of finding safe drinking water in the mountains increase as you gain altitude. Intense sunlight at high altitudes kills undesirable bacteria and viruses but harmful cysts are unaffected.

Runoff water from streams below glaciers is often cloudy with silt and should be filtered.

Well water, fast-moving rivers and the deepest parts of lakes are the best locations to obtain water. Avoid stagnant water, shoreline water, and water close to human habitations and campsites.

During the winter, it is best to use an open water source or obtain water through a hole in the ice. Check the safety of the ice first! Melting ice and snow consumes fuel and takes extra time. Eating snow or ice directly can lead to chilling and hypothermia and could also cause stomach cramps and headaches. Beware of coloured snow - it indicates the presence of algae that could cause diarrhea if ingested. Even in winter, all water should be purified.

How can I purify my water?

Each method of water treatment has its advantages and disadvantages. Choose a treatment method that suits your camping style and follow the directions carefully. Use only treated or boiled water for drinking, brushing teeth, or washing fruits and vegetables that will be eaten raw.

Boiling

Heat is the oldest, safest and most effective method of purifying water. Bring the water to a boil for at least one minute (adding one more minute for each 300 m (1000 ft.) above sea level. If the water is cloudy, filter it before boiling.

Boiling will give your water a flat taste that can be remedied by pouring the water quickly back and forth from one clean container to another, by letting the water cool, or by adding a pinch of salt per litre of water.

Chemical Purification

When boiling is not practical because of time and lack of a heat source, disinfection with chlorine or iodine compounds may be effective.

Use two water containers: one for treating water and the other for carrying purified water. After disinfection, shake the container vigorously. Wait five minutes. Shake it again with the lid loose so some water leaks out to cleanse the mouth of the container.

Disinfection alone may not kill some protozoa. Pass the water first through a filter with a pore size of 0.5 micron (absolute) or less to remove protozoa then disinfect it to kill viruses and bacteria.

Disinfection will give the water a peculiar taste. If you find it unpleasant, try using flavoured drink crystals or concentrated citrus juice to mask the taste of the disinfectant. Add drink powders or juice only after the treatment time has elapsed.

Table 1: Summary of Water Purification Methods

E=effective
M=may be effective (see text)
N=not effective

	Boiling	***Chlorine***	***Iodine***	***Filters***
Bacteria	E	E	E	M
Viruses	E	E	E	N
Protozoa	E	M	M	M
Chemicals	M	N	N	N

Chlorine

Under most conditions, chlorine is a suitable disinfectant for raw water. However, it may not be as effective under certain conditions such as water that is extremely cold, alkaline or full of organic matter.

Chlorine loses its effectiveness with age, exposure to air and extreme heat. If the odour of chlorine (swimming pool smell) is not noticeable in the water, increase the dosage. Chlorine and iodine are effective against most protozoa, with exception of *Cryptosporidium*.

Chlorine bleach

Household bleach (4 or 5% sodium hypochlorite) is effective. Carry the bleach in a small bottle sealed inside a plastic bag to guard against leaks. For maximum effectiveness, use a new vial of bleach every few months.

Add two drops (0.1 mL) of household bleach to 1L of water, shake with the cap loose, and allow the mixture to stand for 30 minutes. Double the amount of bleach and the time if the water is cold, cloudy or odourous.

Chlorine tablets

Chlorine tablets are inexpensive and readily available in stores. After adding the chlorine tablets, let the water stand for 30 minutes before use. Consider dosages listed on the instruction sheet as the minimum recommended. For maximum effectiveness, store the tablets as directed and replace them every few months.

Iodine

With the proper iodine concentration and a 30-minute contact time in moderately turbid water that is maintained at 20^0C or higher, all harmful bacteria and most viruses will be destroyed. In cold or cloudy water (5 to 15ºC), the contact time should be increased up to several hours before drinking. In very cold, cloudy water, iodine will be more effective if you warm the water first.

Follow these contact times with all the methods listed below.

Because of potential health concerns (thyroid problems or iodine sensitivity), iodine use is recommended for no more than three weeks per season. Caution must be exercised with the use of crystalline iodine, which is readily available at outdoor equipment shops.

Both the iodine crystals and the iodine solution are toxic and should be kept out of the reach of children. Children and pregnant women are particularly sensitive to iodine so they should avoid it.

Tincture of iodine

Six drops (0.3 ml) of 2% tincture of iodine, the kind commonly sold at pharmacies, will purify 1 L of clear untreated water. Let stand for at least 30 minutes before drinking. For cloudy or cold water add 10 drops iodine per litre of water and increase the contact time up to several hours before drinking.

Iodine tablets

One iodine tablet will purify 1L of water. Let stand for at least 15 minutes before drinking. For cold or cloudy water use two tablets per litre of water and let stand for 20 minutes. A bottle of tablets should be discarded every few months after being opened.

Iodine crystals

To use this method, place 4 to 8 g of iodine crystals in a 35 mL glass bottle with a leak-proof cap. Add 30 mL of water and shake for one minute to produce a saturated solution. Allow the remaining crystals to settle. From the saturated iodine solution, use 15 ml/L of untreated water and let stand for 15-20 minutes.

For cloudy or cold water add 20 ml/L of water and let stand for 20 minutes. Because the iodine crystals are toxic, **do not** allow the solid crystal iodine remaining in the bottom of the bottle to be transferred to your drinking container.

The crystals remaining in the bottle can be re-used. Top up the 35mL bottle with water, shake and use it again as described earlier. As long as crystals are still visible at the bottom of the bottle, there will be enough iodine to act as a disinfectant. Keep the bottle warm, at body temperature, to ensure optimum effectiveness of the iodine.

Filtration

Water filters for use in the wilderness are available but be wary when making your choice. Avoid filters that allow particles larger than 0.5 microns to pass.

Filters with a pore size of 0.1 to 0.3 micron can remove protozoa and bacteria, but may not remove viruses. Filtration alone is insufficient to purify water; hence it should be combined with disinfection to remove viruses. Follow the operating and maintenance instructions carefully.

Filter units that effectively remove suspended materials and associated contaminants employ a hand pump and special filter. The pump forces water through the filter leaving an array of debris trapped behind. One litre of water can be produced in about 90 seconds.

One type of purifier has a replaceable glass fibre filter that should be changed frequently if it is used in heavily contaminated water. Another type has a ceramic cartridge that is cleaned with a brush. If the ceramic filter cracks, the unit should not be used until the ceramic filter is replaced.

What should I do if I feel sick?

Some water-borne diseases are difficult to diagnose. If you are not feeling well and have recently drunk water from a source in the wild, inform your doctor that you may have consumed untreated water.

How can I minimize my impact on the environment?

With more people using the back country every year, it is everyone's responsibility to minimize their impact on the environment and to help preserve the quality of waters in the outdoors. Many parks and protected areas have regulations regarding wilderness practices.

Need more information?

For more information, contact Health Canada:

Last Updated: 2004-06-09

Important Notices