

## Water Purification

You're out on the trail. It's hot. You and your hiking friends are thirsty. You've got the water filter feed hose dipped into the cool, clear looking stream. You're taking turns stroking away at the filter pump, but it seems to be going pretty slowly. Soon, there's a line of very thirsty, seemingly rabid people around, eyeing your water filter's dribblings. The thought crosses your mind "... the water looks pretty clean. Maybe it would be OK, (while they're not looking), to just, sort of, fill up the water bottles directly from the stream."

While this could save you time in the short run, and may work out well if the stream is pristine...chances are that it may turn out to have been bad choice about a week later, because of what lurks in the water, just waiting to make you ill. Most of us have taken drinks directly out of mountain streams and fast moving water, we've been swimming in lakes, and taken in river water during bumpy white water rides, with little or no ill effects. The reality is, if we didn't get sick, we were lucky. What can you get from drinking out of unprotected water sources in the backcountry? What will it do to you? How best can it be avoided?

Here's a short laundry list of the gremlins that live to make you miserable, just when you should be feeling your best.

### -- Protozoan Infections --

GIARDIA is caused by microscopic cysts that are frolicking in surface water. They are even in the clearest looking head waters waiting for a suitable host to come along. Giardiasis incubates in intestines for seven to twenty one days. It causes bloating, diarrhea, headache, vomiting, gas, cramping, fever and loss of appetite. Without treatment the infection can last for months and cause permanent scarring of the intestines.

CRYPTOSPORODIA PARVUM is a protozoa that causes illness such as cramps, diarrhea, nausea, vomiting and low-grade fever. Lasting for as much as three weeks in healthy adults, CRYPTO is very resistant to chemical treatments like chlorine and iodine. Because of this resistance to iodine the US Marines have ceased depending on iodine tablets for standard water treatment. Since there is no known treatment for Cryptosporidiosis, you must endure it once you've got it. Mountain waters tend to be less effected by CRYPTO than low-lying areas where there is a lot of animal life.

### -- Bacterial Infections --

Typically, these infections have the same or similar symptoms as protozoan infections but they come on faster, a few hours to a few days. CAMPYLOBACTER JEJUNI (CAMPY) is a bacteria found throughout the world. Bacterial infections play themselves out after making you uncomfortable and will often be gone a few days after their symptoms have manifested themselves. Most people who have had a bacterial infection will become somewhat immune from further infections from the same bacteria.

Bacterial Toxins, such as blue-green algae, also known as CYANO-BACTERIA are often found in low-lying, warm ponds. Removing the algae from the water will not eliminate the toxin from the water. Generally, high concentrations of bacterial toxins can be removed with activated carbon filters.

### -- Viruses --

Unfortunately, these viruses are spread via human waste. HEPATITIS 'A' (liver inflammation) can be spread by humans and by animals that are exposed to human waste. Since this virus easily crosses species, it can be carried from location to location and be found in animals that inhabit the backcountry. Viruses do not reproduce in water a water environment like bacteria. HEPATITIS A, which causes stomach pains, yellow skin, flu symptoms, and yellow eyes appears a few weeks after exposure and can take as much as a 6-month recovery period. Often, there can be long term liver damage. Hepatitis 'B' and 'C' are not spread through drinking water.

ROTAVIRUS has symptoms similar to bacterial infections but is a primary cause of dehydration in children. This water-borne virus is caused by contact with human waste.

-- Pesticides --

Even if you're out in the wilderness, it's possible that there has been selective spraying for insects or tree disease. Water contamination is caused by water run-off during early season rains.

Trail travelers and backpackers have found the most common water borne illnesses to be prepared for are

#### **CAMPYLOBACTER JEJUNI**

(Bacteria) and **GIARDIA** (protozoa). Viruses are more unpredictable. While viruses are still uncommon in the high country, they are undetectable to the naked eye, and worthy of caution.

How do you protect yourself? Some methods require a considerable amount of time and preparation, and, if you're thirsty now, they aren't very practical. The recommended methods for making drinking water safe are **BOILING**, **CHEMICAL TREATMENT**, and **FILTRATION**.

#### **BOILING**

This method kills, pretty much, everything. It won't remove metals or contaminants that are non-volatile. It won't make muddy water clear. Experts say to boil the water for at least a minute then let it cool. Realists say get it to a boil and then let it cool. If you're in a hurry, do the minimum. If it's nasty water... do the maximum and more than likely you'll be OK.

#### **IODINE**

This stuff tastes bad, but it will remove most waterborne pathogens. Typically, it's advisable to use iodine in conjunction with a filter since some protozoan cysts are resistant to iodine, and, because of their size, they will filter out. Iodine is also subject to lengthy contact time (depending on water temperature) and is not a quick way to make drinking water. There is a health risk when using iodine for people with conditions like hyperthyroid or pregnancy.

**IODINATED RESINS** (small black iodine beads) which sometimes are a filtration option, are effective if there is sufficient contact time with the liquid. If water is forced through this form of iodine it is not very effective since iodine requires soak time to kill the waterborne pathogens. **HINT:** To make iodinated water taste better, dissolve a vitamin C tablet or add a few drops of citric acid to make gulping easier.

#### **FILTRATION**

Here's where technology meets our craving for water, right now! Whether you decide to buy a paper, ceramic or carbon filter, (and learn to use it properly), you will decrease your chances of acquiring waterborne illnesses dramatically and have better tasting water. Each water filtration device has different specifications, varying degrees of filtration, pump design, filter life expectancy and pack weight, to name a few differences. Since they're mechanical, by nature, they're going to have mechanical difficulties and require repair or replacement, eventually. If you're interested in what experience others have had with filters, check our Website for consumer reviews. (In spite of what might be claimed by filter makers, no water filter is able to absolutely remove everything at all times from your drinking water. They just make your chances of getting ill dramatically lower.)

For your own safety, wellness, peace of mind, and enjoyment either **BOIL**, **TREAT** or **FILTER** your drinking water. You'll be glad you did.

To find **WATER FILTERS**, Water Carriers and Water Accessories from the best makers on our planet go to the following Web Site:

=> [http://www.mgear.com/mgear/dir\\_2.icl?SECID=4&SUBSECID=18](http://www.mgear.com/mgear/dir_2.icl?SECID=4&SUBSECID=18)