

# Choosing A Clean Water System



Having access to clean water and a hydration plan are imperative to a successful camping or backpacking trip.

When on the go outdoors, we require substantial amounts of water (minimum two liters a day) to stay healthy. Unfortunately, water sources are often impacted in ways that can make drinking from them a bad idea. Whether it is an outhouse located too close to a water source, contamination by livestock or wild animals, or poor sanitation in a developing country, non-potable water is reality.

Lugging your own water is not an option for trips of more than a day or two, so you'll need to treat water found in the backcountry so it's safe for consumption. Even if the water looks clean and clear, it may be teeming with microscopic foes.

## **THE ENEMY**

The most obvious use of a water treatment system is to deal with the stuff you see—debris and sediment floating around in water. This is often most necessary when you're drawing from standing water, which may have silt or other large particles suspended in it.



But even if your water source is a clear-looking running stream, you can't be sure it's OK to drink. To be certain your water is safe to drink, you want to eliminate the "Big Three"—protozoa, bacteria and viruses. They're the culprits behind many backcountry trips ending in a gastrointestinal nightmare. But I'll spare you a detailed picture of what they do; instead I'll focus on what they are and how to manage each.

- **Protozoa:** Protozoa are microscopic parasitic organisms about 5-500 microns in diameter. The most commonly known protozoa are Cryptosporidium and Giardia.
- **Bacteria:** Bacteria are microscopic organisms about 0.2 – 2.0 microns in diameter. The most commonly known bacteria are Salmonella and E. coli.
- **Viruses:** Viruses are infectious microbes about 0.004 – 0.1 microns in diameter. They are much smaller than protozoa and bacteria, making them harder to eliminate from water. Filters simply aren't fine enough to be able to trap them.

## TYPES OF SYSTEMS

When choosing a system for making your water safe to drink, you'll generally be choosing between water filters and water purifiers.

### Water Filters

Water filters not only remove sediment and debris, but they are fine enough to block protozoa and bacteria from passing through. Some water filters (such as the MSR MiniWorks Ex Water Filter) have a charcoal element in their filter

cartridges to remove certain odors or taste as well. However, viruses are small enough to pass through the pores of most filters, so that method is insufficient if you believe viruses are present in your water source.

- Pros: Remove sediment, protozoa, bacteria; can improve taste. Ideal for standing water.
- Cons: Do not remove viruses

Filters come in several general types:

### **Pump filters**



Pump filters and purifiers offer a human-powered method for filtering and purifying water. This means no batteries or fuel consumption, just good old-fashioned elbow grease. While these are popular, they do have some drawbacks: the number of moving parts can increase the likelihood of equipment failure, and filter tubes or parts can actually freeze if you are treating extremely cold water. Also, be aware that putting a pump back into a pack can result in the contents of the pack getting wet, so ensure that it's totally empty before inserting into your pack, or bring along a dry bag to stash it in just in case.

- Pros: Quick, easy to use, effective.
- Cons: May break, require regular cleaning/maintenance

## Gravity filters



Gravity-fed filters and purifiers offer a “set it and forget it” option to water treatment. Once the water bag is filled from your water source, the system is hung on a pole, tree or tall object and gravity forces the water from the dirty bag through the filter/purifier on to a separate bag containing clean, treated water. Just note that gravity filters require some attention—you need to keep track of which bag is the “dirty” (untreated) bag and which is the treated bag. The results of accidentally swapping bags could be very uncomfortable.

- Pros: Simple, best option for large groups
- Cons: Must keep track of ‘clean’ and ‘dirty’ containers; filter will require occasional cleaning

## Bottles with filtering straws or lids



Some bottles come with a filter built into the bottle that is either a part of the lid or incorporated as a straw. The user fills up the bottle with water and as water is consumed it passes through a filter. Overall, this is a fast, painless option that simply requires filling the bottle with water. However, it’s obviously not an option for large groups, and you won’t be able to filter large amounts of water in one go. Water sources will need to be readily available during your trek.

- Pros: Simple, inexpensive
- Cons: Single-user solution, will only clean one bottle's worth at a time

## Shopping Tips

When you're looking at filtration systems, some criteria you might want to evaluate, based on your needs, include:

- Capacity or output (how quickly it can filter a liter, for example)
- Cartridge life (how many liters/gallons it will clean before the filter cartridge needs replacing)
- Weight and size of the system

## Water Purifiers

When it comes to water that needs to be treated for viruses as well as protozoa and bacteria, you'll need a water purifier; filters will not eliminate viruses because they are so small they slip through the filter's pores. Water purifiers use chemicals or UV light to destroy all the pathogens (protozoa, bacteria and viruses) that are found in the water. Some water purifiers also include a filter for removing sediment or debris from the water.

On the downside, chemical options can leave a taste or odor to the water and also require a period of waiting time before the water can be safely consumed. SteriPens and other electronic options require batteries which can get expensive over the life of the product. Water may require pre-filtering if you're drawing from a stagnant source; if you're drawing from running water, go for it.

- Pros: Do a great job of cleansing the water of all pathogens, including viruses. Compact, convenient, relatively easy to use.
- Cons: Depending on system, may be slow and not as sustainable as filters (tablets run out or eventually expire, batteries are depleted).

## Chemical Treatment Drops or Tablets



Tablets and chemical drops are a great choice for weight-conscious or ultralight backpackers. Tablets take up less space in your pack and weight little, both big benefits. Many people love having tablets or drops as a backup system and they are also a good idea to include in an emergency kit. If you are using these means, however, be sure to budget the time for them to fully disinfect your water.

- Pros: Most reliable, simplest solution
- Cons: Amount of time required for the water to sit with the chemicals; taste that some (not all) chemical treatments leave behind; finite (when you're out, you're out).

## UV Light Purifiers

Popular with international travelers or the ultralight crowd, SteriPen UV light purifiers emit a stream of UV light into the water. This high-intensity light disrupts the DNA within the bacteria, protozoa, and viruses that may be lurking the water, rendering them unable to reproduce and, therefore, harmless.



The major shortcoming of UV light purifiers is that they tend to run through batteries quickly. They're also only effective in clear water, so if you're using a source with a lot of sediment, it should probably be filtered first to clarify it. There is also a chance your bulb could burn out or break in transit, so it's wise to carry tablets as backup. (I learned this the hard way in Nicaragua when the lamp of my SteriPen shattered in my baggage and I had to rely on a friend's water treatment system).

- Pros: Effective, highly portable
- Cons: Power & bulb requirement, water needs to be relatively clear. Carrying a backup option a good idea.

## **Boiling your Water**

Finally, you can always boil water to purify it. This age-old solution has a few drawbacks, in that it can't really be done on the go, and it requires a good amount of fuel (which you must also pack and carry) and time waiting for water to boil. This can be problematic at elevation, where boiling cold or frozen water will require extra time and fuel.



- Pros: Highly effective
- Cons: Slow, fuel-intensive, not practical on the go

## A WORD OF WARNING

Having the right water treatment plan and equipment is crucial to a successful trip. Whichever water treatment option fits your needs best, always read the directions and take time to thoroughly familiarize yourself with the treatment system you've selected. This includes use, cleaning and storage, and repair of your unit. Taking the time to care and regularly clean your system will ensure longevity and provide you with safe drinking water, and depending on what system you're using, it never hurts to have a backup plan.