# Table of Contents

**WATER CRISIS SURVIVAL SYSTEM** ......................................................................................................................... 3

**I. STORAGE** .................................................................................................................................................................. 3

**II. INDOOR WATER COLLECTION** ......................................................................................................................... 4
   - Last moment water crisis preparation .................................................................................................................. 4
   - Draw the water from your hot water heater tank ............................................................................................... 5
   - Draw the water from your toilet flush tanks: ....................................................................................................... 6

**III. OUTDOOR WATER COLLECTION** ....................................................................................................................... 6
   - Rain water ............................................................................................................................................................... 6
   - Dew ......................................................................................................................................................................... 7
   - Natural fresh water sources ................................................................................................................................. 7
   - To drink or not to drink? ...................................................................................................................................... 7

**IV. TREATING WATER** ............................................................................................................................................... 8
   - Filtering ................................................................................................................................................................. 8
     - Whole House Filters ...................................................................................................................................... 9
     - Under the Counter Water Filters and Faucet Mounted Filters ..................................................................... 10
     - Countertop Water Filters .............................................................................................................................. 10
     - Small portable filters ................................................................................................................................... 10
   - DIY Water Purification Methods .......................................................................................................................... 11
     - Boiling .............................................................................................................................................................. 11
     - Iodine treatment ............................................................................................................................................... 11
     - Bleaching .......................................................................................................................................................... 12
     - DIY Solar Disinfection .................................................................................................................................... 12
     - There are 3 methods of solar disinfection: ..................................................................................................... 13
Safe, potable, drinkable. They all mean pretty much the same thing: plain old water, with nothing else in it that will make you sick or kill you when you drink it. You have to have it, and, depending on the nature and the duration of the crisis that you face, you will need to have a continuing, reliable source for it.

If the crisis leaves you stranded—or safely secured—in your home, the first place you will look for water is your faucet. If it's still working, then unless you have reason to believe that the source of it has somehow been compromised (say, by a flood or a deliberate act of eco-terrorism), go ahead and drink it. You usually can't tell anything just by looking at it (though sometimes by smelling it you can), so if you're concerned, TREAT IT. (More on that below.) If you are on your own private well, it’s much more likely that your source will remain safe. If you do have your own well, but it’s powered by an electric pump and the electricity is out, there are hand pumps on the market that can be retro-fitted to the well head, so that you can have a continuing supply of safe water even in a blackout.

I. Storage

It’s best to have a stored supply of drinking water on hand. You can purchase 5 gallon containers of drinking water from Culligan or Sam’s Club. Properly contained, it never really goes bad. Expect that enough drinking water for more than short-term needs will take up a lot of space. A family of four, for instance, each of them drinking two liters per day, will require 60 gallons of drinking water for a month. That’s 12 five-gallon containers, each one weighing about 40 pounds. If they buy and store a supply of 12 ounce water bottles instead, the family will require over 200 of them in the first month. If there’s some soda pop mixed in there, they will require even more.

The easiest way to get water for long-term needs is to buy commercial jugs of water, like this Bluewave BPA Free 5 Gallon Reusable Water Bottle. If you are planning on preparing your own water, you have 2 options: buy specialty containers for water storage or use common household containers.

Using your household containers can actually be pretty tricky, but it’s well worth jumping through a few hoops to
ensure your family’s well-being. The best containers for water storage are plastic 2 liter bottles, like the ones that you buy soda pop in.

Here’s the step-by-step process to follow when storing your own water:

1. Clean the bottles thoroughly with dish soap and warm water.
2. Sanitize the bottles by adding 1 teaspoon of bleach per quart of water.
3. Shake the water/bleach solution to make sure that it comes in contact with every square inch of the walls inside the bottle.
4. Rinse the bottle thoroughly with clean water.
5. Fill the bottle with tap water.
6. Add two drops of chlorine bleach and let the bottle sit for a half an hour.
7. If after 30 minutes you don’t notice a faint chlorine smell, add two more drops of bleach and let the water sit again.
8. Close the lid tightly and label the bottle.

Ideally, water that has been treated and stored at home should be replaced every 6 months.

II. Indoor Water Collection

Even if you have water stored, you need to capitalize on all of the water resources that you’ll have on hand moments before or during the crisis.

Last moment water crisis preparation

First of all, if you somehow know that you are in the immediate danger of a water crisis, fill up whatever you have in the house with water: sinks, bathtubs, pots, pans and other containers. If you have time to clean your sinks and tubs, give them a quick once-over. Otherwise, you’ll benefit a lot more from having water, even if it is a little dirty, than from having clean sinks and bathtubs.
If your usual supply has been shut down, other less-obvious sources of safe water exist in the home, at least on a one-time basis.

**Draw the water from your hot water heater tank**

If you live in a single-family residence, you have a hot water heater of some kind. It heats water for your home in a tank that is typically 40 or 50 gallons in capacity, and when operating, is always full of fresh (albeit hot) drinkable tap water. (If your home is equipped with a modern, tank-less, on-demand-type water heater you are out of luck and you may as well skip down to the next section on getting water from your toilet tanks.)

1. **Turn the power off.** The typical hot water heater has two water lines that run in at the top of it, one for cold water to come in, and the other for hot water to come out. Leave these pipes alone. It also has a pressure relief valve near the top of the tank. Leave that alone as well. It also has a gas or electric line that provides power to it. Turn that off (there is usually a single knob that is also used to set the temperature for the water, and will show an “off” position).

2. **Let the water cool.** Give the water a couple of hours to cool down after you have turned off the power to the tank.

3. **Find the spigot.** Now look for the spigot, or faucet, near the bottom of the tank. If you maintain your hot water heater properly, you already know that this is where you drain some water out of the bottom of the tank once or twice a year to flush out sediment. It can also be used to drain just about every drop of water out of that tank. Because the outside water supply to your home is off (that’s why you are doing this), you will be drawing water out of the tank at low pressure, assisted only by gravity, so the only good way to do it is to stick a bucket under the spigot, open it, and draw off the water one container at a time. The first gallon or so may be rust-colored or heavily “sedimented”, so be prepared to make use of that for purposes other than drinking or cooking. Use caution if the water is still hot.
Draw the water from your toilet flush tanks:

1. First, strictly for the uninitiated: Do not flush the toilet, or the water in the flush tank will empty down the toilet before you can draw it off. Inside the flush tank is fresh, drinkable water that has not yet had contact with the toilet itself.

2. To remove water from the toilet flush tank, take the lid off, dip a water container into the water and allow it to fill. Once again, you have to do it one container at a time.

3. As the water level lowers to near the bottom of the toilet flush tank, you can use a clean, absorbent cloth or sponge to remove the remaining water.

After that, it’s time to go outside.

III. Outdoor water collection

Before moving ahead, though, a few rules for dealing with water that comes from natural sources and sources other than your own tap:

1. If you are concerned about the purity of the water for drinking purposes, TREAT IT.

2. If you are the slightest bit suspicious of it, TREAT IT.

3. If you are anything less than absolutely, completely confident, and you have the necessary equipment and the opportunity to do so, TREAT IT.

Rain water

Rain water is the best natural source, in an emergency, for potable water. Provided the skies haven't been blackened by whatever is going on around you, it's your safest bet, whether you are stranded in the wilderness or on your cul-de-sac. Taken right from the sky and caught in your open mouth, it is safe to swallow. Any clean, empty containers placed outside during a downpour (blow up the kiddies' pool before it starts raining) will also work, and what you gather requires no treatment. It can be gathered in the crease of a pitched tarp, or even soaked into and wrung out of a cotton blanket or towel spread out on the sidewalk or driveway, and it requires no treatment. Most home and garden centers sell rain barrels that can be placed at the
end of your gutter downspouts to catch all that water, such as RTS Home Accents 50-Gallon Rain Water Collection Barrel. You can also find any number of sources online for making your own. If the top of it is not screened (the commercially available ones usually are), you may need to strain the water first to get out any roof sediment or little critters that may have gone along for the ride, but it is otherwise safe to drink.

**Dew**

Provided you don’t chemically treat your lawn, dew is also safe to drink. Go out in the early morning, wipe it off the grass and plants with a clean cloth, and squeeze it into a bucket. You’ll be surprised at how much you can gather in a short time and without much effort. Again, you’ll probably want to at least strain it before drinking it. Plants themselves are another potential source for safe drinking water. They usually don’t produce any great volume of it, however, and unless you really know your botany, messing around with drippy green things in the woods can just as likely harm you as hydrate you.

**Natural fresh water sources**

This leaves the remaining natural fresh water sources: lakes, rivers, and streams. Unfortunately, none of them anywhere in North America can be completely trusted. For whatever reason, whether the fault of man or beast, today every one of them, from Alaska to Mexico and beyond, presents the potential danger of waterborne pathogens or chemical pollutants that can make you very sick or kill you. All of the water from these sources should be treated prior to consumption.

There are two exceptions. Water from a natural spring, whether flowing from the side of a rock or bubbling out of the ground, if tapped right at its source, is probably safe. In an area with a high water table—high enough so that a shallow hole dug in the ground soon fills up with water—that water is probably safe (though it’ll be muddy, so you’ll need to let it settle out, and then at least strain it).

**To drink or not to drink?**

Sometimes you are left with the only decision: drink the questionable water untreated, or face dehydration. In that situation, drink it. If you have to drink directly from a lake, the middle of it, near the surface, is safer than along the shoreline or down deep. If the lake is fed from a marsh or a wetlands (unmistakable for their vegetation), the water right at the outflow from it—though it may look and taste
funky—is generally going to be safer; all those cattails and bulrushes are nature’s filtering devices. If you must drink from a river, first check upstream for things like beaver dens, human activity, or dead animal carcasses, then draw from the clearest, coldest, fastest moving water that you can find. If the shoreline is sandy and relatively clean, a hole dug several feet from the water’s edge will eventually fill up with water that has at least been filtered through the sand.

Yes, it is a gamble. But hydrated, you’re simply rolling the dice. Not hydrated, you have three very lousy days ahead of you to regret your decision.

Finally, the “P” question: Can you drink it? Stranded in the desert or on a rooftop with no fresh water, should you drink your own urine? The authoritative answer seems to be, even in the most extreme of circumstances, a resounding, “NO!” True, urine is mostly water, but it’s also loaded with all kinds of toxins, excess minerals, and other waste products that the body works hard to get rid of. It flushes them out of the system by using up energy and, especially, lots of water. Put that bad stuff back into your system and it has to work that much harder, using up that much more water, to get rid of it all over again. The net result, system-wise, is harmful. Hydration-wise it’s actually a negative. Related question: Sea water. There’s a reason why God put it in the oceans and not in your faucets. Same problem as above, except that if you drink it, first you will go crazy and then you will die.

IV. Treating Water

FILTERING

The first step to treating water is removing solids from the water, such as heavy metals and other chemical impurities. To do that, the water must be filtered. The second step is purification. However, a good filter will, for drinking purposes, filter and purify the water, effectively removing both the organics and the solids.

The design of the filtering device, including the type and effectiveness of the filter that it employs, is critical to choosing the best one for you. Here’s what you should look for:

1. Determine first how easy it is to work and, equally important, how easy it is to disassemble and fix when it stops working.

2. There are many different types of filtering materials employed in these devices. Check the flow rate, and how many gallons it will filter.

3. Check whether the filter itself can be cleaned, or if it has to be replaced?
4. Check how finely it filters, and what percentage of which impurities it removes.

Filtering systems can be classified based on their size and type. Size wise, you can choose among the following options:

- Small portable filters
- Countertop filters
- Under the counter filters
- Whole house filters.

**Whole House Filters**

A plumbing-mounted whole house filtering system will take care of your water quality issues if the water is still running. Generally, whole house filters are categorized according to the levels of filtering that they provide. Some filter manufacturers include more than one of the following layers of filtering:

1. Mesh Filters (or sediment filters). These filters remove larger particles, like dirt, sand and rust from the water. They are easy to take care of, as you can simply rinse them clean and it’s unlikely that you’ll ever have to replace them.

2. Carbon Filters. There are two types of carbon water filters: activated granulated carbon and carbon block. These filters remove various contaminants, such as pesticides and herbicides, chemicals, tastes and odors. They work by attracting these chemicals to the carbon particles. Carbon filters need to be cleaned after a certain volume of water passes through and need to be replaced periodically.

3. Ultraviolet (UV) Filters. Ultraviolet filters are more advanced in a sense that they kill viruses, bacteria, yeast, algae and other scary organic contaminants.

4. Reverse Osmosis Filters. These filters are elaborate and work very slowly. They were first developed to desalinate sea water. Reverse osmosis uses pressure to force the water through membranes, which filter the water, keeping the contaminants on one side of the membrane and the clean water on the other side.
Under the Counter Water Filters and Faucet Mounted Filters

If you do not have a whole house filter and cannot afford to install one, you have an option of installing an under the counter filter or attaching one directly to your faucet. These usually go in the kitchen.

Under the counter water filters vary from sediment only to elaborate, multiple-step filters that include sediment filter, carbon filter and reverse osmosis filter. One of the best-selling filters of this kind is Watts Premier 531130 Filter-Pure UF-3 3-Stage Water Filtration System.

The faucet attachments, such as Brita filters, are simple 2 stage filters, primarily aimed at trapping sediment and reducing the amount of chlorine and lead. While they are a nice, inexpensive option when your water treatment plant is working, they are practically useless if your tap water is not safe and will have to be used in combination with other filtering and disinfecting devices to achieve optimum drinking quality.

Countertop Water Filters

If the water is not running, self-filtering pitchers and water containers can take care of questionable water that you get from other sources. Carafe filters, like this Brita Everyday 10 Cup Water Filter Pitcher are most common, but don’t always remove organics.

As with whole house filters, different types of countertop filters are available: sediment, carbon, reverse osmosis and UV filters. Keep in mind that these filters have limited capacities and will only filter so many gallons effectively. An energy-free, gravity-fed filtering device that can sit on a counter top, is long lasting, and will produce up to a gallon of drinkable water per hour (it looks like two stacked 4-gallon plastic buckets, which it actually is, with a ceramic cone filter in between) is a wise choice. Several versions of it, or do-it yourself instructions for assembling your own, can be found online.

Small portable filters

While countertop filters are portable, they are too awkward to pack in a bugout bag or use in the wilderness. If you expect to be on the go at any time, a hand-pumped or gravity-fed portable filter, such as those carried by backpackers and other outdoors people, is a must.

There are lots of great options available at outdoor goods stores or on Amazon, and you can even find
portable filters and water purification tablets at Wal-Mart. One of the popular choices is the compact LifeStraw personal water filter. You can use it to sip water directly from lakes and rivers.

All in all, when it comes to filters, the latest silver-impregnated ceramic-charcoal combination filters, like this Filter Kit by Emergency H2O seem to be the best of the currently available options. The hand-pump portable models are about the size of your forearm, weigh a little over a pound, will filter up to a liter per minute (with some effort), and are good for some 50,000 liters of purified water before the filter has to be replaced. Once again, you have to do your homework and then decide for yourself. Having more than one choice available to you is the best choice of all.

**DIY WATER PURIFICATION METHODS**

If you have to purify and disinfect the water yourself, there are several DIY methods that you can use.

**Boiling**

The easiest way to purify questionable water for drinking purposes is to boil it. All you need is water, a pan, and a flame. At sea level, you need only bring it to a rolling boil, or 212ºF, for just a minute. At higher elevations, where water begins boiling at lower temperatures, a rule of thumb is one additional minute of boiling for every 1,000 feet of elevation above sea level. Boiling kills the organic nasties in the water.

**Iodine treatment**

Iodine dissolved in the water, in the form of either several drops of liquid tincture or one commercially sold iodine tablet per liter, will do the same thing as boiling the water. Many commercially sold water treatment tablet kits, such as this Potable Aqua Water Purification Tablets with PA Plus Kit now consist of 2 tablets: 1 iodine tablet to treat the water and the other tablet to remove the taste and odor associated with iodine use. The issue with drinking iodine-treated water long term is that it will have a negative effect on your health.
**Bleaching**

Bleaching kills the bacteria, viruses and algae in the water and is an effective method to use if you don’t have access to safe drinking water. You need to use regular bleach, free of perfumes and dyes. Look at the list of ingredients. If you see anything besides sodium hypochlorite, you have a problem.

1. Prior to bleaching, be sure to remove the sediment by filtering.

2. Using a dropper of some sort, add 8 drops of liquid bleach to one gallon of water (adjust the proportions accordingly if you have a different size container.)

3. Mix the solution well and let it stand for 30 minutes.

4. Smell the water. Does it have a faint chlorine smell? If so, it is safe to drink. If not, repeat the process.

5. If after bleaching the water twice you cannot smell chlorine, you need to look for a different water source.

**DIY Solar Disinfection**

Solar disinfection was first studied in the 70-s, when the world community was looking for ways to help the rural residents of Third World countries to find accessible water treatment solutions. The experiments have proven worthwhile, showing the effectiveness of sunlight exposure when treating contaminated water. The UV rays from the sun destroy the pathogens in the water. An important note to keep in mind is that solar disinfection does not remove heavy metals and toxins from the contaminated water, it only destroys organic pathogens.
There are 3 methods of solar disinfection:

- Thermal
- Electric
- Ultraviolet

The cheapest, most accessible and most common method of household solar disinfection application is SODIS. Here’s how it works:

1. Obtain clear, colorless plastic PET bottles (like water or pop bottles) and remove labels. Note: they do have to be classified as PET bottles for this method to work.

2. Filter the water if it is cloudy prior to treating it.

3. Wash the bottles and fill them with contaminated water. Note: WHO recommends filling the bottle ½ to ¾ of the way and shaking it prior to filling it completely. This improves the oxygen saturation.

4. Place the bottles in the direct sunlight. If it is sunny out, the water will be treated within approximately 6 hours. If it is cloudy, it takes up to 2 full days. If rainfall is present, opt for collecting fresh rain water rather than trying to treat questionable water.

The trick with using solar disinfection is that the rate of effectiveness varies from region to region and different timetables apply at different latitudes. Please take the responsibility to educate yourself about applying SODIS methods in your particular region. There is a lot of material available online that addresses SODIS.

The newer, battery-powered, rechargeable ultraviolet pens, like the Watts 270154 8-GPM 3/4-Inch 110-Volt UV Disinfection System are another great way to purify questionable water. They are quick and convenient, and purify water without the greater energy use required with boiling or the taste and health issues associated with iodine. They are expensive, however, and they do seem to have some persisting problems with reliability, so read up and choose carefully before deciding to invest in one.

When using DIY water purification and treatment methods, remember that the products you use to treat the water, such as iodine and bleach, have a shelf life. Their effectiveness drops dramatically as time goes by. Restock your emergency bleach and iodine supplies frequently.