A Long-Term Survival Guide – How To Find Water:

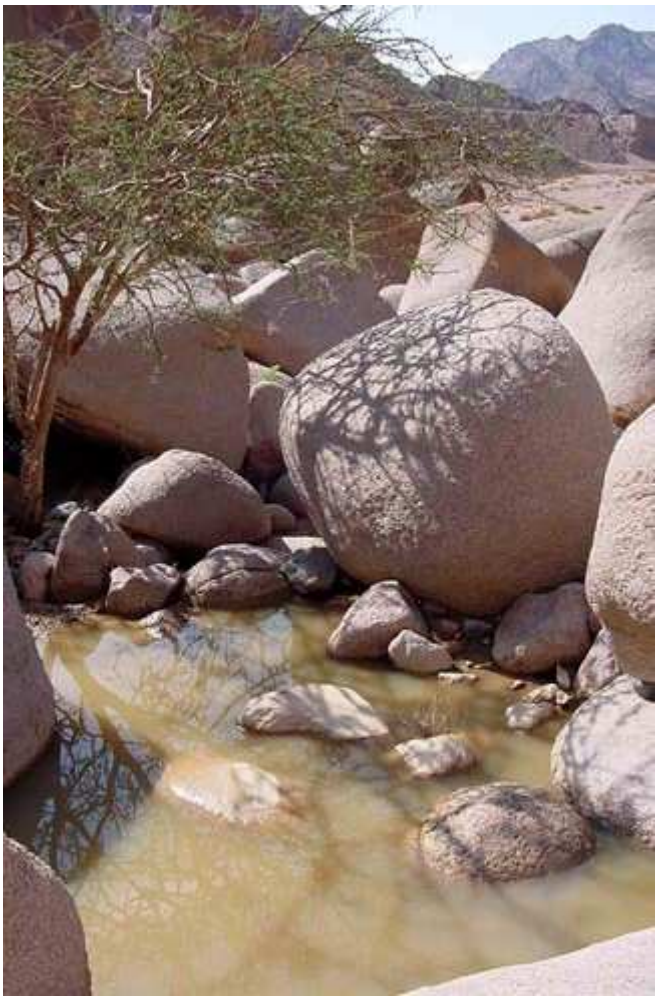
Natural Rain Caches:

Rocky canyons and watercourses often hide natural rain caches, like this one.

Rocky areas in the mountains and deserts sometimes have depressions or hollows that act as natural rain caches. They are most often found down in rocky canyons, or up on top of rocky mesas or hills. They can range in size from small puddles holding just a few gallons of water, to large ponds holding thousands of gallons. These caches may be the only available water in arid areas after extended dry spells, so knowing that they exist (and where to look for them) can save your life in a desert survival situation. They will also attract all the game in the area, so they are the best place for survival hunting and trapping. Always boil, filter, or treat water from caches before drinking, as they almost always contain dangerous germs and parasites.

A larger natural rain cache, like this one on top of a rocky mesa, can keep you supplied with water indefinitely.

Finding a small rain cache on a rocky outcrop, or in a canyon, will let you survive long enough to locate more.



Larger natural water caches are most likely to be found as pools, in the beds of seasonal streams and rivers. Dirty or muddy water is ok to drink after filtering and boiling, but avoid any bitter, alkali-tasting water; as it is poisonous.

Any area where you see a combination of exposed bedrock and green plants is a good pace to find water caches. Avoid bitter, poisonous alkali water, like the example on the right; it will kill you.

Green plants growing at the base of a cliff mean that there is a water seep coming from the cliff, at that spot.

Water seeps emerging from cliffs can range in size from tiny trickles, to large springs, or spring-fed pools.

Water that springs from a cliff in the desert can also disappear right back into the ground again, due to permeable soil and high evaporation rates, so you can't always find a stream leading away from such a desert water source.

Small seeps and springs almost always have live green plants around them, making them easier to find.

The green plants here really stand out from the rest of the desert, making this natural spring easy to spot.

Game trails in the desert will converge towards local water sources, so follow merging trails to find the water.

Sub-Surface Water: Both of these stream beds have water in them, but the water in the dry bed is hidden under the ground. Knowing that the water is there, and how to best access it, can save your life in a desert survival situation. Seasonal stream beds and dry river beds are still the lowest point of the local terrain, so any water in the area will continue to collect in the sand and soil of these beds, and will flow along underground, in these channels. Water can usually be found by digging on the deep side of the dry bed. In drier conditions, when there is not enough water underground to have a sub-surface flow, water can still be found in the lowest points of a dry river bed. This is just like a surface pool in a river that has stopped flowing, only it is covered by sand and soil. To find these buried pools, look for depressions in the river bed, and dig at the lowest points. Water may be close to the surface, or as deep as five or six feet down. An isolated area of green plants growing in the dry river bed is another good place to dig for water, as there may be a pool there, or an underground seep flowing into the river bed, hidden by the sand.

This bare strip of dirt is actually a dry river bed with sub-surface water, but where is the best place to dig for it?

If a stream bed is bone-dry, with no sub-surface water, follow it down-hill, looking for seeps and green plants. The green patch on this cliff indicates a water seep; look for surface water, and then dig in the sand, beneath it.

These green plants show that water is underground here; dig right in the middle of the green area to find it.

Sub-surface water in dry river beds may be five or six feet down, but it may also be the only water available.

Drinking holes, dug by thirsty animals, are a good indicator that sub-surface water lies below this spot.

Never camp down in dry stream beds or river beds, as a flash flood, from a storm miles away, could suddenly tear through without warning. When looking for water, always have an escape route in mind, so you can get out safely.

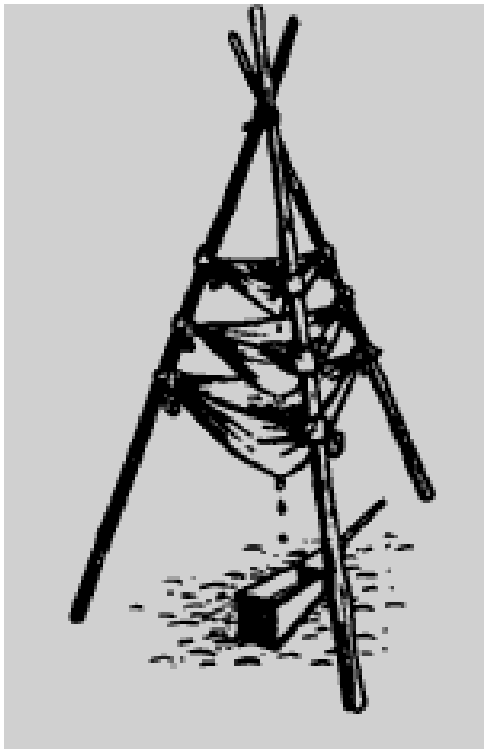
Caves: Desert caves seldom contain any water. Most are shallow and dry, but there are a few exceptions. But finding such a cave is still good news, as it can provide relief from the extreme heat, thus allowing you to live longer, giving you more time to find water, and making any water you find last longer. Any caves should be checked carefully, with weapon and torch in hand, as they are often a home for coyotes, mountain lions, rattle-snakes, scorpions, and / or tarantulas. They may even have a water seep, so you might as well look. One type of desert cave that sometimes has water is the lava tube caves that are found in far northern California, around Lava Beds National Monument. Lava is such a good insulator, that the deeper lava caves stay cold enough to have ice in the lower levels all year round, even in the heat of the desert summer. This ice is usually found as a dirty mixture of sand and ice on the floor of the lava tube, but it can be chopped up and hauled into the heat, and so melted to extract the water. Not all lava tube caves have ice, as some are too shallow, so shop around for best selection.

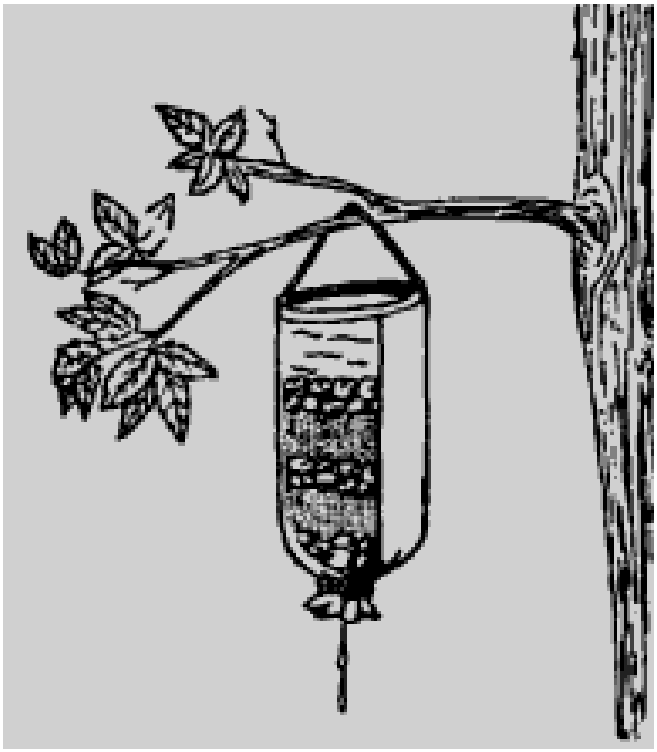
Old desert mines are very dangerous, and are best avoided. Unlike caves, mines are unstable. The critical roof supports, that the miners considered absolutely necessary for safety, may now be missing, or completely rotted through, so that the mine could cave in without warning. Old mines usually contain toxic wastes, heavy metals, and poisonous gas, so any water found in a mine will probably also be poisonous. Natural gas may also build up in mines, so trying to explore one with a torch could get you blown up and buried alive. It isn't worth the risk.

Here is an example of ice formed in a lava tube cave, in the far northern California desert.

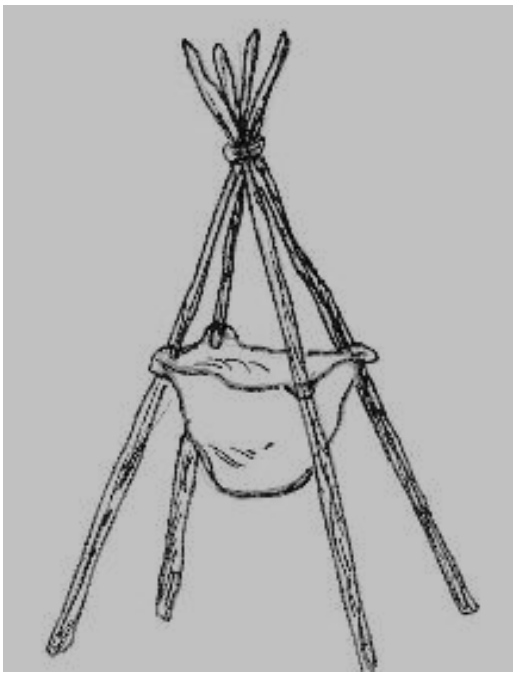
Ice in lava tubes usually forms on the floor, and could be broken up and melted for the water.

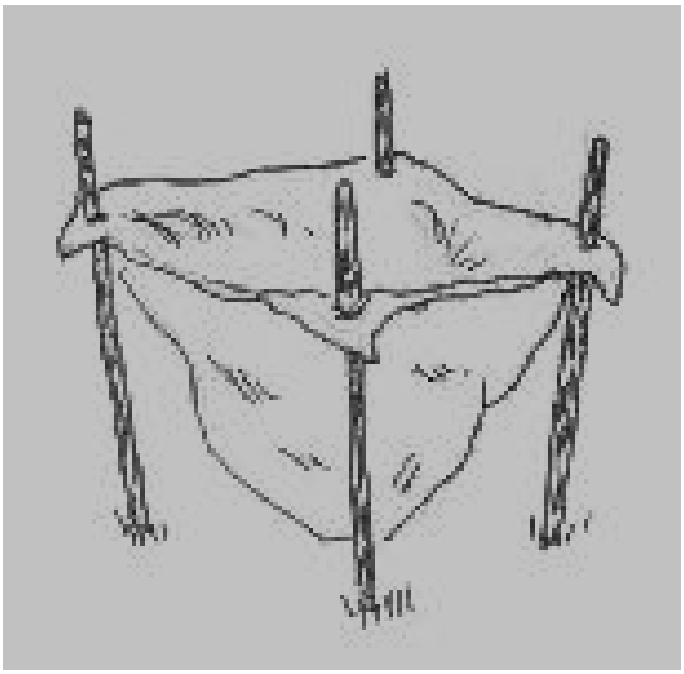
This green ice looks unappealing, but it is a form of desert survival water, available in a few rare areas. After melting the ice, boil all water to purify it, and filter through sand and charcoal, to clean it and improve the taste.

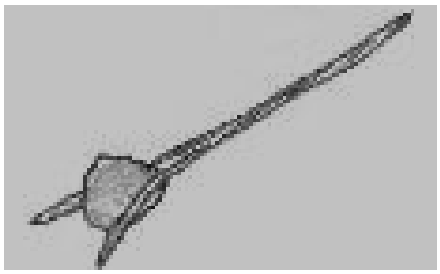




Here are two ways to make camp water filters, using cloth, sand, and charcoal from your campfires. The sand and charcoal are placed in layers in the cloths. The example on the right is improvised using a cutoff pant leg.







An animal hide can also be used to filter water, with sand and charcoal, by making a small hole in the bottom. You can even cook food in a hide container of this type (with no hole), by adding hot rocks until the stew boils.

How To Purify Water:

Water is the most crucial element for staying alive. It's more important than food. Everyone must have enough safe drinking water, which generally means one gallon per person per day. Needs will differ according to age, physical condition, lifestyle and climate.

This doesn't include water for cooking, bathing, washing dishes and clothes, and pets or other animals. Large dogs may need as much as a gallon a day, while cats can do well with just a pint a day. If you have other livestock your water needs obviously soar. But in that case, water taken directly from a river or stream, without purification, will probably be okay for the animals.

Untreated water straight from the tap should keep for six months when stored in clean, durable containers. However, it must be changed periodically. Bacteria-free water, which means treatment with bleach or other compounds, will keep up to several years. Heat, light, deterioration of the container and other factors can cut this figure substantially. Water should be stored as far as possible from paint and petroleum-based products, acids or anything with strong odors such as fertilizer or common household cleaning solutions. Lower-grade containers are permeable to certain gases and should be avoided whenever possible.

You'll need to locate at least one other water source, since even several hundred gallons of stored water won't last long. Assume any water not stored or purchased is contaminated, especially in perilous or unstable times. A mountain stream could look pristine, but still be polluted. If you can find only marginal water, first strain the debris through a t-shirt, paper towel, clean cloth, or coffee filter, then use one of the following methods:

Boiling: Without a high-quality water filter, this is the most reliable method for killing germs and parasites. Bring water to a rolling boil and keep it simmering for at least 10 minutes. Add one minute of boiling to the initial 10 minutes for every 1,000 feet above sea level. Cover the pot to shorten boiling time and conserve fuel.

Liquid Chlorine Bleach (unscented household bleach): Use 5.25 percent sodium hypochlorite that is free of soap or phosphates. To treat one gallon of water, add eight drops (1/8 teaspoon) of bleach to clear water and 16 drops (1/4 teaspoon) to cloudy water.

When purifying five gallons, add 32 drops (1/2 teaspoon) to clear water or 64 drops (one teaspoon) to cloudy water. By purifying a larger quantity of water, you will cut bleach usage 20 percent over the one gallon at a time method. After treating with chlorine, mix well and allow the water to stand for 30 minutes before using. An eye dropper can be used to measure the dosage. Bleach that is more than a year old loses approximately half its potency, so adjust the dosage accordingly.

Dry Chlorine Powder: Also known as calcium hypochlorite, it is used primarily in swimming pools. Since it is a powder, it has the significant benefit of extended shelf life. Dry chlorine may be stored for up to 10 years with minimal degradation if it is kept dry, cool and in an airtight container. This is a far better choice for quantity storage than liquid bleach. Dry chlorine is available at pool supply stores, hardware, and grocery stores.

For chlorinating water in large tanks, the recommended dosage is 1/4 ounce by weight per 264 gallons (or seven grams dry weight per 1000 Liters). Let the water stand for 24 hours before drinking. A 55 gallon drum of water thus requires approx. 1/20 ounce (one level teaspoon); a 5 gallon jug needs 1/200 ounce (a tiny pinch); and a one quart canteen needs 1/4000 ounce (just a few individual grains of the powder). So bearing in mind that it takes 24 hours before the water is drinkable, a small vial of chlorine powder should be part of every survival kit, as one ounce will treat 4000 canteens of water.

Iodine: If no instructions are provided on the bottle, use 12 drops per gallon of water. Increase the dosage if the water is of dubious quality. Mix well and allow the water to stand for 30 minutes before using. Iodine does have an unpleasant aftertaste.

Iodine Crystals: There is a water treatment product (called Polar Pure) that consists of a bottle containing iodine crystals. When water is added to the bottle, some of the crystals dissolve, and the liquid is then used to treat water, in the same way as regular iodine. The bottle can be refilled with water many times, before all the crystals are used up, so this product can treat several thousand gallons of water.

The only drawback is that the iodine crystals are very poisonous, if accidentally swallowed. The bottle has a screen designed to keep the crystals inside, but you should be very careful to check that no crystals get into the water being treated, where they could be swallowed while drinking. The best way to safeguard against this is probably to always cover the mouth of canteens and water bottles with a clean bandanna or t-shirt, before filling with treated water. This will filter out any crystals (or other particles) to protect the water in the containers that you will directly drink from.

Purification Tablets: They are either iodine or chlorine based. One or two tablets will purify a quart of water depending on the contamination level and length of time allowed for treated water to stand. Follow instructions on the package. These tablets are among the more convenient and affordable ways to purify water. Not every brand of purification products (especially iodine tablets) will kill giardia. Tablets have relatively short shelf lives, so they are not suitable for long-term storage.

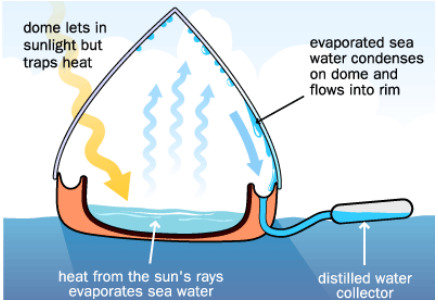
Stabilized Oxygen: People who have used this method generally prefer it to chlorine or iodine. Both treatments have shown some side effects if used for an extended period of time, and iodine and chlorine give water an off taste. Stabilized oxygen doesn't have side effects or add flavors to water, and it also offers health benefits.

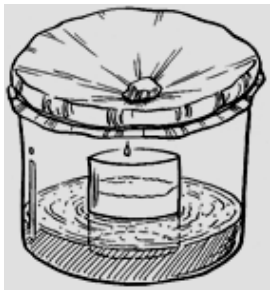
For long-term storage, treat one gallon of chlorinated water by adding 10 drops of stabilized oxygen. Add 20 drops if the water isn't chlorinated. Use five to 20 drops per eight-ounce cup of giardia-contaminated water.

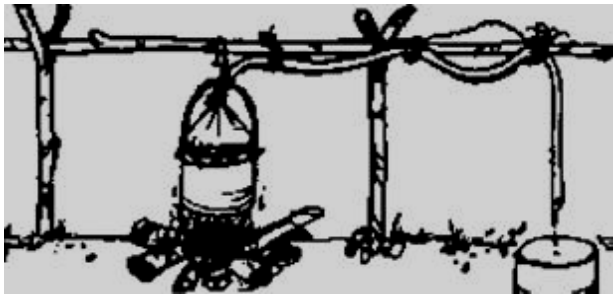
Stabilized oxygen is a relatively new form of water purification, so it isn't as widely known as other methods. Among the chlorine dioxide (a form of stabilized oxygen) products on the market are Aerox, Genesis 1000, Dynamo 2, Aerobic 07 and Aquagen.

Water Purifying Units: There are literally dozens of water filters on the market. Some are designed for campers, while others are made to be installed on household plumbing. If you plan to rely heavily on a water filter for purification during a crisis, choosing the right one will be a vital decision. Durability, dependability and a company's track record are important factors to consider. "Test drive" the unit to see how easy or strenuous it is to pump. Ease of use should be a high priority, for anyone with limited strength or physical ailments. What is the average water output? This is especially important for families or groups. Will this filter eliminate giardia and bacteria? Don't assume that the filter you choose will be 100 percent effective. Can the filter handle the really nasty stuff - stagnant, muddy water? How often should the filter be replaced?

There are also hand-pump powered sea-water filters, which remove salt by reverse osmosis, but they are expensive.



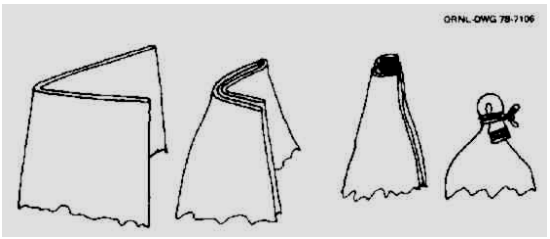




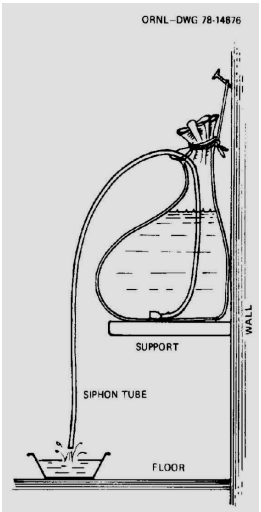
Distillation: Using a commercial or improvised still is the easiest way to turn salty sea water into drinkable fresh water. Stills either evaporate water by boiling over a fire, or by using solar energy. Plastic solar stills are standard issue for life-rafts, and everyone going onto the ocean should have several in their survival kits.

Make Your Own Improvised Water – Carrying Containers:

Carrying two plastic-lined bags of water, & how to tie them



Folding the inner trash bag liner



Siphoning from a bag

CARRYING WATER:

Most homes usually have few large containers that could be used for carrying water and storing it in adequate amounts for several weeks. Polyethylene trash bags make practical expedient water containers, when used as waterproof liners inside smaller fabric bags or pillowcases. (Plastic bags labeled as being treated with insecticides or odor-controlling chemicals should not be used.) This picture shows a teenage boy carrying over 10 gallons (more than 80 pounds) of water, well balanced front and back for efficient packing. Each of his two burlap bags is lined with two 20-gallon polyethylene trash bags, one inside the other. (To avoid possible pinhole leakage it is best to put one waterproof bag inside another.) To close a plastic bag of water, so that hardly any will leak out, first spread the top of the bag until the two inner sides of the opening are together. Then fold in the center so that the folded opening is 4 thicknesses, and smooth. Continue smoothly folding in the middle until the whole folded-up opening is only about 1-1/2 inches wide. Then fold the top of the bag over on itself so the folded-up opening points down. With a strip of cloth or a soft cord, bind and tie the folded-over part with a bow knot.

For long hikes, it is best to tie the water-holding plastic bags so that the openings 'are higher than the water levels inside. To transport this type of expedient water bag in a vehicle, tie a rope around the fabric outer bag near its opening, so that the rope also encircles and holds the plastic liner-bags just below their tied-shut openings. The other end of this rope should then be tied to some support, to keep the openings higher than the water level. To use two fabric bags or pillowcases to carry a heavy load of water contained in larger plastic liner-bags, connect the two fabric bags together. A small pebble or a similar object should be tied inside the opening of each bag before the two are tied together, to hold them securely. The bag that is to be carried in front should have the pebble tied about 4 inches further down from the edge of its opening than the pebble tied in the bag to be carried in back. This keeps the pebbles from being pressed against the carrier's shoulder by a heavy load.

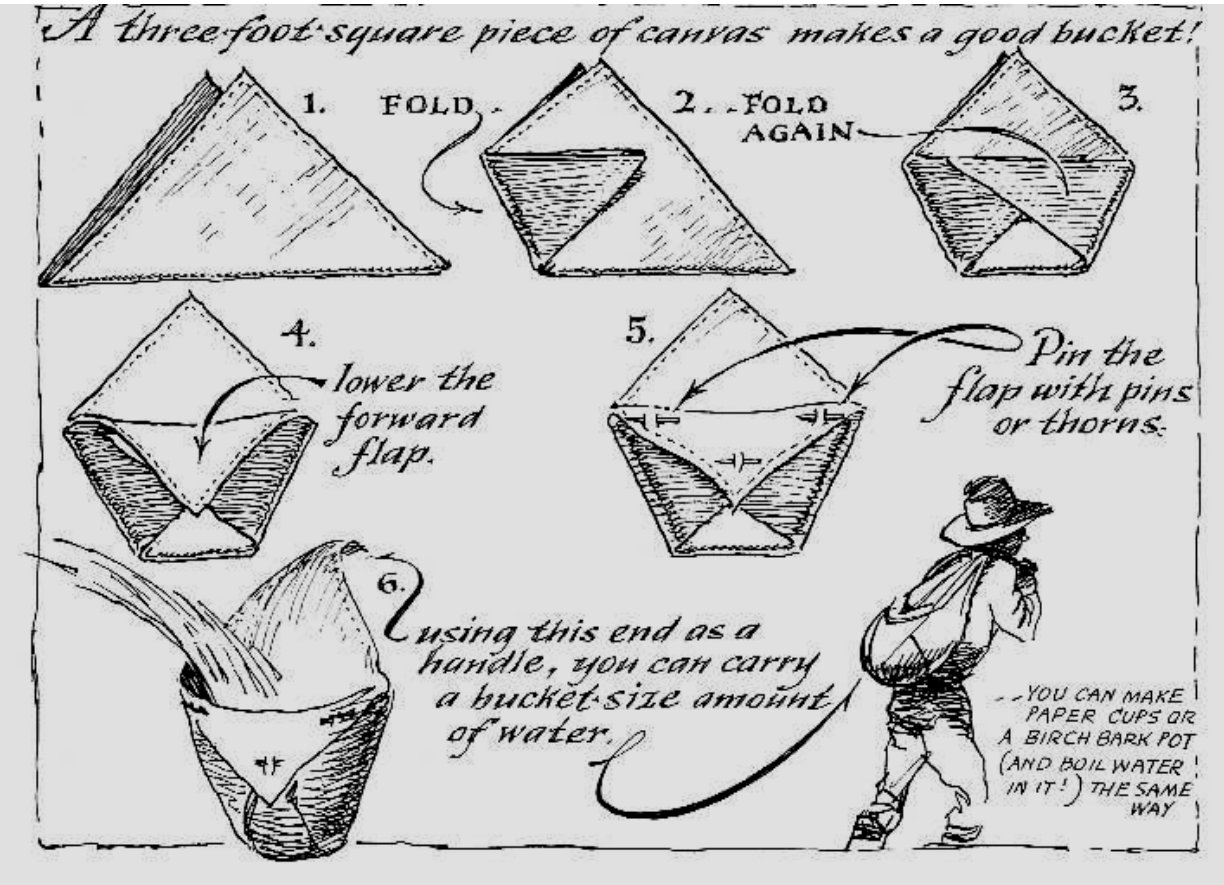
A pair of trousers with both legs tied shut at the bottoms can be used to carry a balanced load if pillowcases or other fabric bags are not at hand. Such a balanced load can be slung over the shoulder with the body erect and less strained than if the same weight were carried in a single bag-like pack on the back. However, trouser legs are quite narrow and do not provide room to carry more than a few gallons.

To prevent water from slowly leaking through the tied-shut openings of plastic bags, the water levels inside should be kept below the openings.

SIPHONING:

Pouring water out of a heavy water-storage bag is inconvenient and often results in spillage. Dipping it out can result in contamination. If a tube or piece of flexible garden hose is available, siphoning with the hose is the best way. To prevent the suction end of the tube from being obstructed by contact with the plastic liner of the bag, cut the tube at an angle. To start siphoning,' suck on the tube until water reaches your mouth. Next, fold over the tube near its end, to keep the tube full. Lower its closed end until it is near its position. Then release your hold on the tube, to start siphoning. To cut off the water, fold over the tube and secure it shut with a rubber band or string.

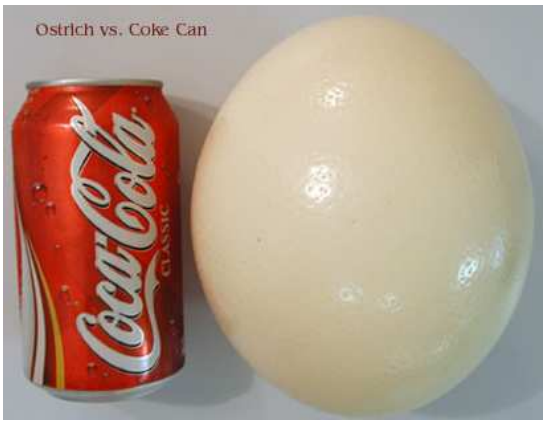
How to carry water in a Tarp:



How to carry water in an Inner Tube:

Although inner tubes aren't as common as they used to be, this is a simple way to convert one into a bucket. (You can also use this trick to carry water in a section of life raft, or rubber boat, or inflatable water toys.)

Make your own Improvised Canteens:



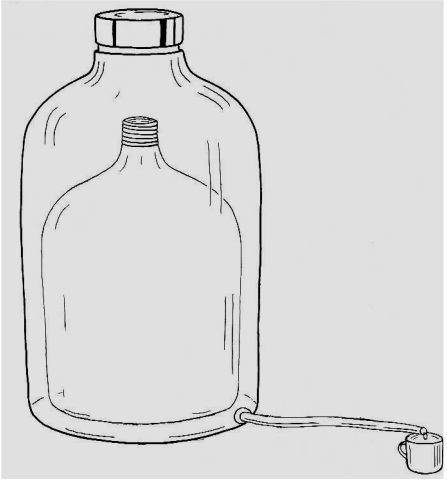
Ostrich eggs have been used for thousands of years as both improvised canteens, and improvised water storage containers. After cutting a hole in one end and removing and eating the egg, the shell is cleaned and washed out, then filled with water. The hole is sealed with a wax-coated wooden plug, or a cork, if available. Filled eggs are stored by burying them in dry sand, and will keep for decades. Native Americans, who didn't have ostrich eggs, stored water in coiled baskets sealed with pitch inside and out, then plugged with a wax-coated wooden stopper.

Ostrich eggs are very strong, as you can see from this picture. In dry areas, bushmen would suck up water from underground sources with hollow reeds, then fill the eggs for storage, like Amber is doing here. The recent popularity of ostrich and emu farming make it more likely that you could find eggs for canteen use. Emus in particular are very hardy, and many have escaped captivity or been turned loose, and are happily living in the wild.

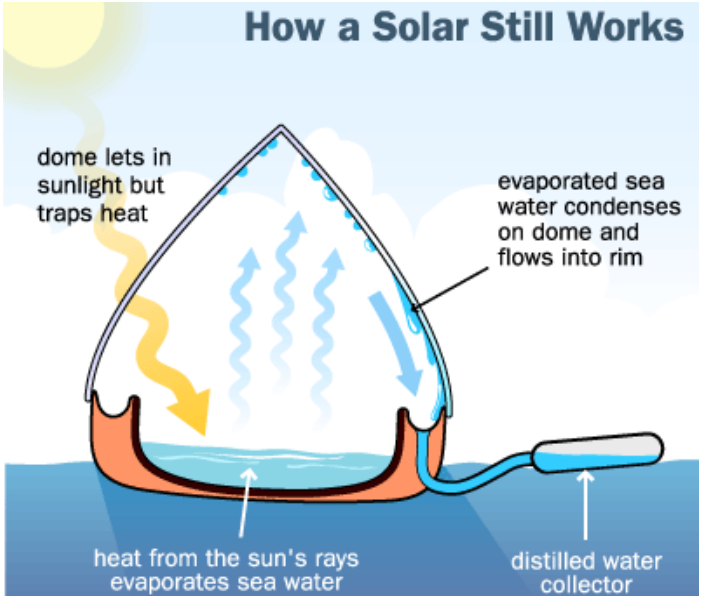
Gourds are another natural container suitable for making into improvised canteens and water storage jugs.

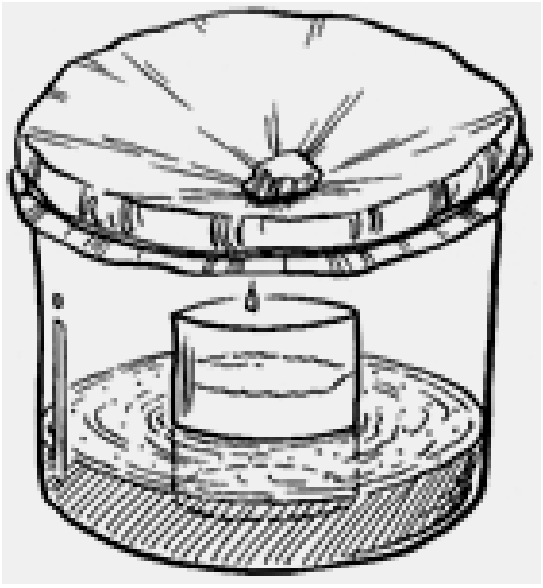
For a little more modern improvising, look in the trash at any Laundromat, and you will find a good selection of bleach and detergent bottles to make improvised canteens and water jugs out of. These are all very sturdy plastic, and since they only held bleach or soap, they wash up very clean with a little hot water. (You will also probably find lots of lint from the dryers in the Laundromat trash; this is an excellent fire starting material to scrounge.) Another good choice is empty 2 or 3 liter soda bottles, if you can find them. These are not nearly as tough as bleach of soap bottles, so it is best to keep them in some kind of protective bag. I like to improvise “canteen covers” for these bottles out of the nylon carrying bags that come with the nylon folding chairs that are so popular nowadays.

Make your own Solar Water Purification Stills:



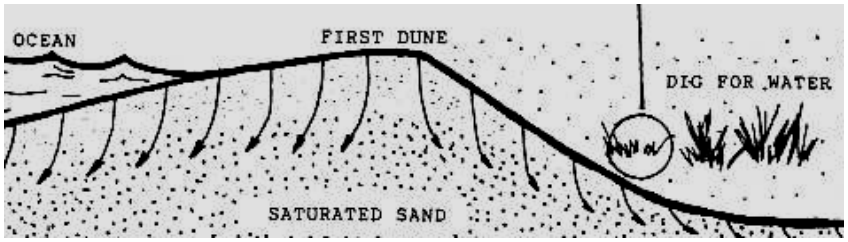
A simple solar still, made from two plastic jugs, with a collection tube added to the outer container. A collapsible, soft plastic jug was placed inside a larger plastic jug in this example, but it is easier to use a large-mouth jug for the outer container. Check out the plastic screw-top storage canisters at your local dollar store. Many kinds of Tupperware-style containers can be made into good solar water distillers. When placed in the sun, dirty water in the inner jug evaporates, then condenses on the walls of the outer jug, and runs down to the collection tube. An even cheaper version can be made by placing a container of dirty water in a trash bag (clear bags work best), inflating the bag, and tying the bag's opening around a collection tube. A few small rocks placed in the bag help keep it from blowing around, and this setup should be placed on a slight slant, with the collection tube at the low point, so water builds up there. You can even use glass jars, but if you want to have the collection tube, you have to drill the hole with a carbide drill bit, to cut through glass, or run it out the top of the jar, and seal the jar with plastic, or cut a hole in the lid for the tube, and seal around it. Glue the tube in place with some silicone caulking, or you can improvise with wax, clay, or chewing gum. Keep the collection tube folded and tied, until you are ready to collect water.





Cutaway view of a commercial sea water solar still, and another type of simple solar still. In this second version, the dirty water is in the outer container, and evaporated water collects on the plastic cover, then drips into the inner container. Even a plastic trash can will work for this type of still, when the top is covered by plastic, with a small weight, to make it into an inverted cone. A collection tube is not shown here, but using one allows you to get water without taking your still apart. The tube should be tied in place, so that it stays in the clean inner jug, to avoid accidentally drinking the suspect water. If you don't have any good tubing, improvise with garden hose, plastic pipe, a hollow bamboo rod, reed, or even a hollow quill from a large feather. Use what you have, & make it work.

How to Make Beach Wells:

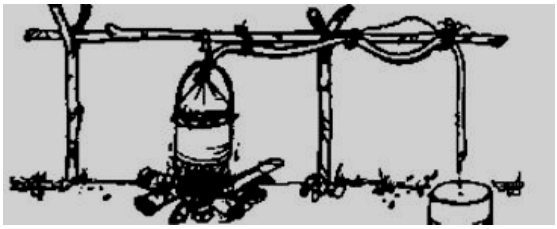


If you find yourself on a beach or island with no fresh water streams, springs, or other sources, you can still get drinkable water, by making beach wells. A beach well is just a hole, dug behind the very first sand dune in from the ocean. It should be three to five feet deep, and will have to be shored up with driftwood, to keep the sand from collapsing. Dig down until you hit water, then keep digging until you get to three to five feet. Shore up the well, and then let the water stand and settle in the well for several hours. Fresh ground water seeping towards the ocean will accumulate in the well, and float on top of the salty sea water. Skim off the top inch or so of water in the well with a canteen cup or shell, and it should be drinkable. You can make the wells as large as you like, and make as many as needed to supply yourself with fresh water. This is an important technique to know, for when you don't have any plastic to make solar stills, or when no coconuts are available, as they only grow in tropical areas.

Water wells can also be dug in low spots of dry stream beds and river beds, to find sub-surface water. Often when a stream or river bed appears dry, water is still flowing under the sand and gravel of the stream bed. If you dig a well at a low spot, or at any muddy or damp-looking area, water may seep into the well, making collection easy.

If nothing else is available, you can collect fresh water by tying rags or t-shirts to your ankles, and walking through the grass in the morning, when the dew is on the leaves. Wring the rags out into a container when wet, and repeat. You can get a surprising amount of fresh water this way. (Think of how soaked pant legs get when hiking in grass.)

How to Distill Sea Water, using Primitive Methods:

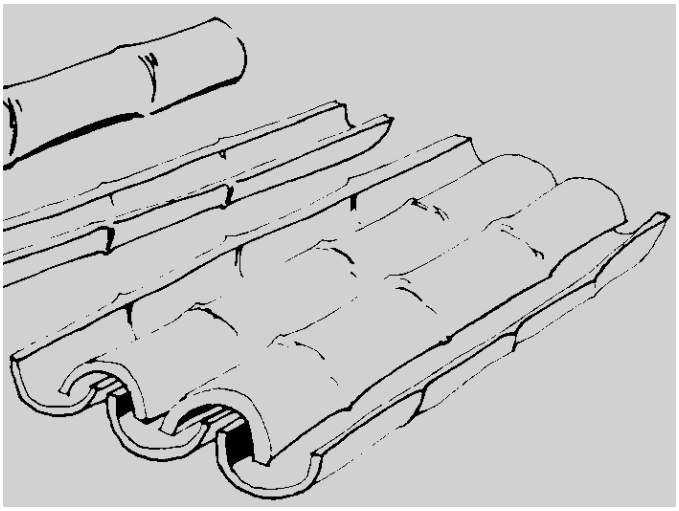


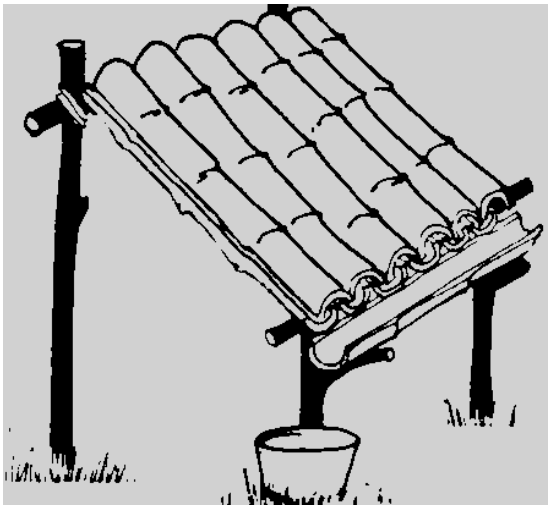
If you have fire and a pot (or if you can make an improvised container from a large clam shell, or a mud-coated pot made from bark, or a coconut, or a section of bamboo) you can get fresh water by distilling sea water.
Heat sea water in a pot or improvised container, until the sea water is steaming. Tie some large leaves above the pot, positioned at a slant so that the steam collects on them, and then drips into a collection container (such as a length of bamboo split in half). The condensed steam will be fresh, drinkable water. Steam condenses best on objects which conduct heat rapidly, like panes of glass (or empty bottles), or sheet metal, but it will collect on and drip from anything placed in its path, such as bamboo sticks or leaves. This method works best in an area that is sheltered from wind, such as over the inside fire of a survival teepee, so that the wind doesn't blow the steam away.

A similar method of collecting steam from a pot of sea water is to place a rag, t-shirt, towel, or sponge over the steaming pot, and it will get wet from the steam. You will need to lay some sticks in a lattice over the pot, to keep the rags from falling in, or tie them to sticks that you can lay across the pot. Once the cloth is saturated, you have to wring it out into another container, so this method is more labor-intensive. This technique works best once the cloth has become cool and damp. If you have two cloths to alternate over the pot, it works even better.

Another similar method is to cover the steaming pot of sea water with an improvised lid, which has a long bamboo pipe attached to it, so that the bamboo slopes downwards from the pot. A reasonably long pipe will lose enough heat that most of the steam will condense as it travels through the pipe, and fresh water will drip out the end. The bamboo can be sealed to the lid with a coating of mud or clay, which can also be used to seal any joints in the pipe. If possible, filter the water from all of these methods through a cloth, to strain out any dirt or other impurities.

Make a Bamboo Rain Catch:





Split bamboo poles can be arranged so that they overlap, like Spanish tiles, to form a waterproof roof. This same design can be used to make a simple rain catch, to collect rainwater into storage containers, or improvised cisterns.

Water from green bamboo: Green bamboo can supply you with fresh water, even when everything else is dry, at the height of the tropical dry season. To collect water from small bamboo stalks, bend a green stalk over, and tie it securely in place, for safety. Cut off the top, and water will start to drip out of the cut (the flow may be better at night). Collect the water in a container; it is safe to drink as is, without any treatment.

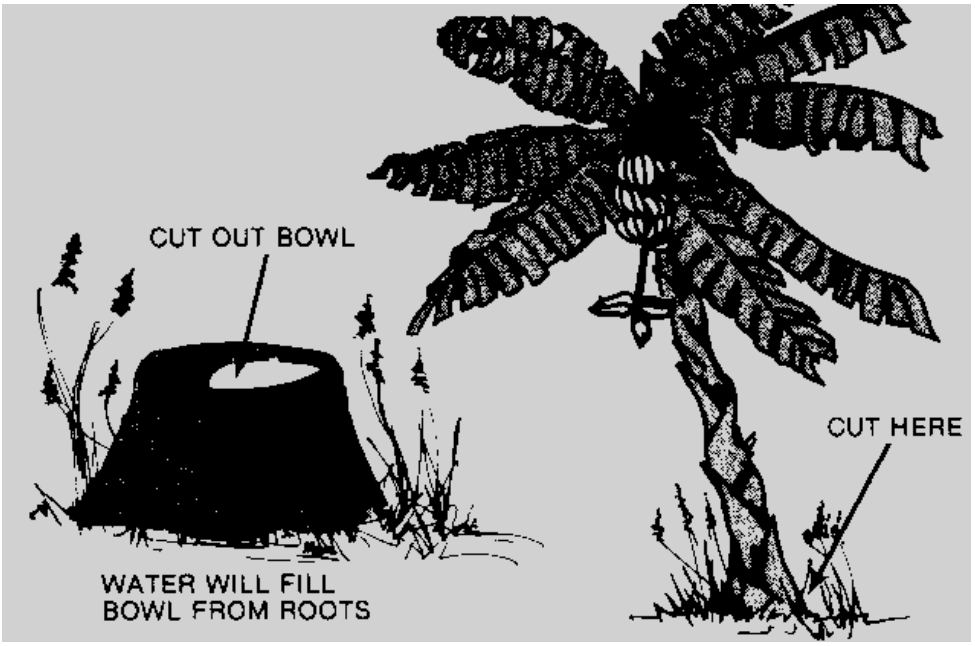
Note: Water from any green bamboo is safe to drink, but water from old, yellow bamboo must be purified first.

Green bamboo usually has fresh, drinkable water inside. You can use a knife to cut into each joint, to collect it.

Medium size bamboo stalks can be cut down, and each of the sections will have water inside. Chop or drill a small hole in each section, then hold the bamboo with the hole facing down, and collect the water which drains out into a container.

Larger bamboos can have a lot of water inside. Some vines also provide water, but bamboo is easier to identify.

Very large green bamboo stalks can contain several gallons of fresh water. The easiest way to collect water from large stalks is to leave them standing, and cut into each of the sections near their bottoms, and collect the water as it pours out. You can also cut a hole near the top of a large section, then insert a bamboo straw (or some plastic tubing), and drink the water straight out of the plant.



Water from banana plants: When you find a banana tree in the tropics, you can get water from it. Banana trees are easy to identify, even if they don't have any bananas on them (some people call them plantains). To get water from a banana plant, cut the tree (which is a pretty soft plant) off at the base, leaving about one foot of stump projecting from the ground. Now carve out the center of the stump, and it will start to fill up with water from the root base. The first few fillings will be bitter, and should be dumped out, but after this the rest of the seeping water will taste better. A banana stump like this will continue to fill with water for three or four days. you should keep it covered, to keep bugs, rodents, or animals from contaminating the water with local tropical disease germs.