Chapter 4

Water for a Month

The Rule of Threes[1] says you can survive three days without water, but that's just a rule of thumb. In an extremely hot, dry environment in open sun your survival time may be measured in hours; in a cool environment, you may survive an extra day or two without water. But the essence of the Rule is correct. Water is critical. Without it you will die a very unpleasant death by dehydration, whether in a day or a week. Access to sufficient quantities of safe drinking water should be an extremely high priority in your prepping plans. There's no excuse not to store water, because storing a month's supply for you and your family can cost as little as ... nothing.

> WARNING: NEVER ration water. Drink until your thirst is satisfied, even if you're down to your last liter with no prospect of getting more. Dividing an inadequate supply and spacing its consumption over an arbitrary time period actually does more harm than good. Drink until you are no longer thirsty and just hope you can get more.

Because you can survive weeks without food but only days without water, it's a good idea to take care of water storage first. Our first-line water storage consists of fifteen cases of Costco-brand bottled water, at 40 half-liter bottles per case. That's 20 liters per case and 300 liters total, or 10 liters (about 2.5 gallons) per day. That's sufficient for one gallon per day for each of us and half a gallon per day for our dog. As we write this, Costco bottled water normally sells for $3.69/case, but can sometimes be found on sale for as little as $2.09/case. Even at the regular price, a month's minimal supply for both of us and our dog costs only about $55.

> The problem with commercial bottled water is that the containers are so full that if they freeze the bottles will burst. Other issues that concern some people are the labeled shelf life of bottled water and whether the water leaches harmful chemicals from the plastic bottles. Shelf life is essentially indefinite regardless of the labeled expiration date. We wouldn't hesitate to drink bottled water that had “expired” 10 or 20 years earlier. It's likely to taste flat, but that can be fixed by pouring the water back and forth from one container to another to aerate it. As to the plastic contaminating the water, there have been numerous scientific studies done to test that hypothesis. All have found that even after extended storage at elevated temperatures, the amounts of chemicals leached from the plastic are far below acceptable levels, which themselves are extremely conservative.

1 The Rule of Threes is a rule of thumb that says a person can survive for three minutes without air, three hours without shelter (in a severe environment), three days without water, and three weeks without food.

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You needn't spend any money at all to store a month's supply of water. At no cost, you can use 1- and 2-liter soft drink bottles from your own recycling bin and those of family, friends, and neighbors. Simply pre-rinse them with tap water, (optionally) give them a quick wash in a sink full of sudsy water, rinse with tap water, rinse again with a dilute chlorine bleach solution, drain the bleach, fill them with tap water, and cap them.

> Water expands when it freezes, and can burst a container that is filled too far. To avoid this, fill containers to 90% of their nominal capacity. For example, fill 1-liter soft drink bottles to 0.9 L, 2-liter bottles to 1.8 L, and 3-liter bottles to 2.7 L.

Some people store water bottles on their sides, a practice we do not recommend. The bottles—particularly the very thin bottles used for commercial bottled water—will sag and deform under the weight of the bottles above them, and may eventually leak. These bottles are designed to have much greater resistance to vertical forces than horizontal ones, so the proper way to store them is vertically, using sheets of cardboard to divide the layers. You can stack them vertically at least four or five layers high without damaging the bottom layer.

> One of our readers has a son in the Marine Corps, who recently rotated back from a tour in Iraq. His experience in Iraq was that each person used a 24 half-liter bottle case of water PER DAY for drinking, cooking, cleaning, brushing teeth, etc. That's about three gallons per day.
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> Water requirements are highly dependent on the person (weight, age), environment (temperature, humidity), and activity level. One gallon per day is marginally sufficient for most people in most environments at average to high activity levels, but only for drinking water requirements and limited cooking. We recommend three gallons (12 L) per person per day if at all possible, or 90 to 100 gallons per person-month.
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> In college, Robert worked summers on a road crew in the sun all day long. His foreman had a 5-gallon water container on the back of his pickup, which he often filled several times a day for the crew, which was typically four to six guys. The crew averaged drinking three gallons per day each.

Storing Water

As is true of any emergency prep, it's much better to have what you need stored and waiting rather than attempt to find or improvise it when you need it. Because water is so important to survival, it's worth storing as much of it as is realistically possible given your particular situation. If you live in an apartment, storing more than a few hundred liters may be problematic; if you live in a house, you can probably store 2,000 liters or more by using available space efficiently.

Look for otherwise-unused space for storing water. For example, you can probably fit 150 liters or more of bottled water under each of your beds, where it can remain out of the way and unseen until it's needed. Similarly, you may have otherwise unused storage space in the back of the cabinets under your kitchen counters, in the backs of closets, or even behind rows of books on your bookshelves. The space you use for storing water doesn't have to be easily accessible because bottled water is a store-and-forget item.

Amount

Store an absolute minimum of one gallon (3.8 L) of water per person per day. In one sense, that's grossly inadequate. In normal circumstances, the average American uses about 100

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gallons of water per day. In another sense, the one gallon/day recommendation may be generous. In a short term emergency, you may be able to get by on as little as one liter per day for drinking, cooking, and minimal sanitation, but that depends heavily on environmental temperature, humidity, and physical activity level. If it's hot and dry, particularly if you're working hard and the sweat is running off you, you may need a gallon or more per day just for drinking. We consider 30 gallons (120 liters) per person to be an absolute minimum for a one-month supply, but more is always better. We actually store about three gallons per person per day.

> Don't forget your pets. For dogs, cats, and other mammals store one ounce per day per pound of body weight (65 mL/kilogram). For example, for our 5-year-old 68-pound Border Collie, we store 16 gallons (62 liters) as a one-month supply.

Water that has been stored properly doesn't go bad. After months or years it may taste flat from a lack of dissolved air, but that can be remedied simply by exposing the stored water to air overnight or by using an aerating mixing pitcher. Many people rotate their stored water periodically, but that's really not necessary.

> Water is the cheapest emergency preparation you can make. Don't count on municipal water, which may fail in an emergency. Store as much water as you can. If in doubt, store more. Not just for drinking and cooking. Store extra for sanitation, flushing toilets, washing clothes, fighting fires, and so on. Also, keep in mind that during any emergency that lasts more than a few days, you may well be taking in family, friends, and neighbors. What looked like a good supply for your family of four will be totally inadequate if you find yourself providing refuge for a dozen or more people. The only limit on your water storage should be the number of containers you have and the space you have available to store them.

Containers

The only critical consideration for water containers is that they be food-grade. Of course, very few containers are labeled to indicate their food-grade status. For all practical purposes, you can consider any container made of one of the following plastics to be potentially usable for storing water or food. (The number is the recycling code, displayed within a triangle somewhere on the container.)

> The plastic polymers used in food-grade containers are also used in containers that are not certified food-grade because they are made using curing agents and other additives that are not officially approved as food-safe. In practical terms, we wouldn't be too concerned about this. As long as the container has been washed thoroughly and allowed to air out, such chemical contamination is likely to be present only a very low level, if that.

#1 – PET (or PETE) polyethylene terephthalate
#2 – HDPE (or PE-HD) high-density polyethylene
#4 – LDPE (or PE-LD) low-density polyethylene
#5 – PP polypropylene

> New containers such as jerry cans that are intended for storing water are normally made of light blue plastic, which is about the only indication of a food-safe container you're likely to see.

Obviously you'll need to exercise judgment in choosing used containers. All of these plastics are also used for bottles that contain household cleaners, pesticides, and other toxic materials.

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Make sure that any bottle you use for water storage has never been used to store anything other than food or water. The one exception we make to that rule is that empty jugs that contained generic chlorine bleach (the cheap stuff with no additives) are excellent for water storage. Just rinse them well, fill them with tap water and cap them.

> WARNING: Never store water in containers that originally held milk, cream, or another dairy product. Even thorough washing can't remove the last traces of proteins and fats present in milk products, and those traces provide a fertile environment for bacterial growth.

One excellent, inexpensive way to store a lot of water, assuming you have a basement or garage floor available, is an inflatable kiddie pool. For example, one Intex model[2] that sells for about $40 is about 10x6x2 feet when inflated, and can hold more than 250 gallons of water. Uninflated, these pools need little storage space, are easy to inflate, and if needed can be set up in a few minutes and filled with the garden hose. (At typical residential flow rates, it takes a couple of hours to fill one of these with the hose.) At three gallons per day per person, 250 gallons is sufficient to supply three people for just under a month. If the emergency passes and it turns out you don't need all that water, you can simply drain the pool, allow it to dry completely, and repack it for later use.

Commercial Bottled Water

Commercial bottled water is an excellent source of drinking water packaged for easy portability. A typical shrink-wrapped pack of bottled water contains 40 half-liter bottles (just over 5 gallons), weighs about 45 pounds, and is easily manageable as a unit if you ever need to load it into your vehicle. The bottles, although thinner and more fragile than soft drink bottles, are sufficiently robust that cases of bottled water can be stacked at least four or five high. Don't pay a premium for name brands. The store-brand bottled water sold by Costco or Sam's Club is just as good as the name brands and much cheaper. Look for bottled water on sale, and stock up. The last time we bought water at Costco, it was on sale for $2.09/case, or less than six cents a bottle.

> Our Costco also sells their Kirkland brand bottled water in gallon six-pack cases (about 22.7 liters) at the same price as the 20-liter cases of half-liter bottles. We now buy water in the gallon bottles, which when empty are also excellent for storing bulk dry staples like sugar and flour.

You needn't worry about shelf life. As is usually true of packaged food and drinks, the expiration date on bottled water is completely imaginary. Bottled water is good indefinitely. We would not hesitate to drink bottled water that had “expired” 20 or 30 years previously. (In fact, we have.)

Soda Bottles

One- and two-liter soda bottles are an excellent source of free food-grade water storage containers. Even if you don't drink soft drinks, your friends and neighbors will probably be happy to save their empty (uncrushed) soda bottles for you in trash bags, so you can probably accumulate hundreds of them in very short order.

Preparing bottles for reuse is easy, if a bit time-consuming. All you'll need is the kitchen sink, some chlorine laundry bleach, a funnel, and some sticky labels or a permanent marker. Proceed as follows:

1. Remove the label and rinse the bottle well with warm tap water to remove any residual soft drink. You can use sudsy water if you wish, but we've never had a problem just rinsing with

2 http://smile.amazon.com/Intex-Swim-Center-Family-Inflatable/dp/B000058TJ3

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warm water.

2. Make up a solution of two tablespoons (1 fluid ounce or 30 mL) of standard 5.25% to 8.5% chlorine laundry bleach in two liters of water in a 2-liter soda bottle. Use cheap generic bleach from the supermarket rather than name-brand bleach. The last thing you want is the scents, whiteners, and other gubbage present in name-brand bleach. Rinse the inside of each bottle and cap with the dilute bleach solution. You needn't fill the bottle; a cup or so (8 fluid ounces or 250 mL) suffices. Add the bleach solution to the bottle, cap it, and invert it several times to make sure the bleach solution contacts the entire inner surface of the bottle and cap for 30 seconds or so.
3. You needn't use new bleach solution for each bottle. Once you've rinsed a bottle with the bleach solution, simply pour that solution into the next bottle to be treated. Invert the treated bottle to allow most of the remaining bleach solution to drain into the sink, fill the bottle with tap water, and recap it. You can use each original cup of diluted bleach to treat at least two or three dozen bottles before losses and dilution require replacing it with a fresh cup of diluted bleach.
4. Once you've filled all your bottles, label each of them as “Drinking Water” and date them. In reality, water treated and stored this way remains good indefinitely, but most sources recommend replacing water stored this way every six months to a year, and many people are more comfortable doing so.

> If you are storing water from a well, spring, or other untreated source, it's a good idea to chlorinate the raw water before you bottle it and stick it on the shelf for months or years. Per CDC recommendations, add about one-eighth of a teaspoon (~ 0.75 mL) of 5.25% to 8.5% plain chlorine bleach (without brighteners or other adulterants) per gallon of raw water, or twice that to cloudy water. Allow the water to sit for 30 minutes or more before drinking.
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> Note that the concentration of bleach used to sanitize water itself is much lower than the concentration used to sanitize containers, which is concentrated enough to be toxic if consumed. At this lower concentration, chlorine kills most but not all pathogenic microorganisms. Giardia and cryptosporidium, for example, are both resistant to chlorine at levels that are safe for human consumption. If your well or spring has been tested safe and not later contaminated, you should be fine.

Standard 1- and 2-liter soft drink bottles are physically robust, particularly when filled. You can stack them at least five or six high, using cardboard dividers between layers. Always stack bottles vertically rather than on their sides. These bottles are engineered to be much more resistant to compressive forces vertically than horizontally. If you stack them on their sides, you'll find that they deform under the weight of the bottles above them.

Water expands when it freezes, so if there is even the slightest chance that the bottles will ever be exposed to freezing temperatures, under-fill them to allow room for the ice to expand without breaking the bottle. Water expands just under 10% when it freezes and the volume of soft drink bottles is actually larger than their nominal capacity, so filling a 1-liter bottle to 900 mL (~ 30 fluid ounces) or a 2-liter bottle to 1.8 L (~ 60 fluid ounces) is sufficient to prevent freezing damage.

> How safe is water stored this way? Extremely so, assuming the original water was properly treated to be potable. Robert recently tested the contents of a 3-liter bottle of tap water that had been stored this way 14 years previously. Using the standard coliform culturing test used by municipal water systems to ensure water safety, he found that this antique stored water was as safe as the day it came out of the tap. The water also tasted fine. It was a bit flat, but that's easily addressed

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by pouring the water back and forth between two containers to aerate it, using a commercial aeration mixing pitcher, or simply allowing the water to sit for a few hours in a pot, pan, or other open container to accomplish the same thing.

If you have a standalone freezer, fill unused space with bottles of water. Not only is the freezer just one more place to store more water, but that stored frozen water will extend the time the contents of your freezer will remain frozen during a power outage. It's a good idea in general to keep your freezer packed as full as possible. As you remove food from the freezer, replace it with water bottles. When you do a Costco run and return home with lots of frozen foods, remove enough of the water bottles to make room for the food and just set them on the floor near the freezer. As you remove food, replace it with those bottles.

Food Storage Bags

Although they're clumsy to store in quantity when filled with water, gallon food storage bags cost only 10 or 15 cents each in quantity, are made of food-safe polyethylene, and are a convenient way to store water in one-gallon increments. We buy them in bulk packs at Costco. Buy Ziplok or Glad name-brand bags. We've tried store-brand bags, which aren't all that much cheaper than name brands and are much more prone to leak.

The only real drawback of food storage bags for water storage is that they can't be stacked without risking leaks from the lower layers. They do store well in otherwise-unused flat areas, such as under beds or other furniture. You can easily fit 100 gallons or more of water under a typical bed. To minimize the chance of leaks, keep the seal on top of the bag. You can seal the bags with an impulse sealer[3] or even a clothes iron. Seal them above the zip closure. That way, you can cut off the seal above the slider and still re-use the bag.

Pails

Another option for water storage is 5- or 6-gallon pails. You can buy food-grade pails locally or on-line, but you probably won't need to pay for them. Restaurants, bakeries, nursing homes and other commercial food-service businesses purchase food in these pails. Many food service businesses have stacks of them in the back room, waiting to be picked up for disposal, and many will be happy to give you as many as you're willing to carry away. Because empty pails stack compactly, you can fit dozens of them in the back seat and trunk of a car, and hundreds in the back of a pickup truck.

Grab as many empty 5- or 6-gallon pails as you can get your hands on. Besides storing food or water, they can also be re-purposed for many things, such as water filters, large gardening pots, and so on.

For water storage, wash the pails thoroughly with sudsy water, rinse, and treat them with dilute bleach solution before filling them with tap water. Some foods give the pails a persistent odor, so you may want to reserve those for purposes other than food or water storage.

Don't forget to get the free lids with your free buckets. Standard pail lids are not designed for ease of putting on or taking off. The first time the lid is installed, the plastic seal strip must be torn off before the lid can be popped off. The best tool for that job is a bucket lid opener[4]. Once removed, that lid can be used again to seal the pail by hammering it onto the pail rim with a rubber mallet, although with multiple uses the sealing gasket will eventually degrade until it no longer provides a tight seal. That's not usually an issue, because you wouldn't ordinarily be sealing and then re-opening a 5- or 6-gallon pail very often.

3 such as http://smile.amazon.com/12-Impulse-Sealer-Cellophane-sealer/dp/B000UYC55O
4 such as, http://www.augasonfarms.com/Pail--Bucket-Lid-Opener-Green-Each-upc-078716203008

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If for some reason you need a pail that's easy to open and reseal, you can buy screw-top lids[5], although they're not cheap. These lids have two parts. The pail adapter part attaches permanently to the rim of the pail and is threaded to receive the separate screw-top lid, which simply screws on and off and is rated for hundreds of on/off cycles. We keep a few of these on hand just in case we need them, but for water storage they're really not necessary.

Trash cans

New plastic trash cans from RubberMaid and other manufacturers are a good option for bulk water storage. They can store from 20 to 32 or more gallons each, have tight-fitting lids that prevent contamination, and are readily available at Home Depot and similar big-box stores. You can store them empty stacked in relatively little space, and fill them when the need arises. They're not technically food-safe, but we wouldn't hesitate to drink water that had been stored in one, as long as it had been washed, aired, and treated with dilute bleach solution before being filled.

The main problem with using trash cans to store water is their weight when full. Water weighs about 8.3 pounds per gallon. Even a 20-gallon trash can weighs about 170 pounds when full, and a 32-gallon model weighs about 270 pounds. And, although better models are rigid enough to hold their shapes when full of water, cheaper models may require a framework of boards to support their sides and prevent deformation.

We know more than a few people who decided to “go big” when it comes to water storage. Their primary storage is in drums or barrels, usually 55-gallon, 100-gallon, or even larger. Although food-grade drums are made in various sizes from 5-gallon to 500-gallon or more, we think they're a poor choice for water storage for most people.

The first problem, at least if you buy new drums, is the cost. Plastic drums are available in open-top and closed-top varieties. The former has a separate lid and the latter is of one-piece construction with one or more bung holes in the lid. A typical closed-top 55-gallon drum costs around $50 direct from the manufacturer or a wholesaler, and open-top models usually run $10 or $15 more[6]. That doesn't include shipping costs. Larger sizes of drums ship motor freight, which typically costs $50 to $75 per drum. And you'll pay that shipping cost whether you have a drum delivered directly to you or buy one at a big-box home center. Overall, you can expect to pay $2 or more per gallon for drum storage. Obviously, that compares very poorly with $0.50 per gallon for plastic trash cans, let alone $0 per gallon for recycled soft drink bottles or food-grade 5-gallon pails.

And, as with trash cans, the big issue is weight. A 55-gallon drum of water weighs about 500 pounds, and 500-gallon drum weighs more than two tons. Portability is an obvious issue, and depending on where you plan to store the drums you may have to reinforce the structure of the floor.

Bathtubs

Bathtubs are excellent containers for water storage, assuming you have sufficient notice to clean and fill them. A standard bathtub holds 42 gallons of water when filled to the overflow drain, and many custom and spa tubs hold much more.

5 such as, http://www.homedepot.com/p/Leaktite-5-gal-Screw-Top-Lid-5GAMMA6/203205720
6 such as, http://www.lexingtoncontainercompany.com/New-Drums.html

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To prepare a bathtub for water storage, scrub it with cleanser to remove all dirt, soap scum, and other contaminants. Rinse the entire inner surface thoroughly with the same dilute bleach solution you'd use to sanitize bottles, allow it to drain, and then fill the tub with cold tap water. If possible, cover the tub with a clean shower curtain or sheet to prevent airborne contamination from getting into the water. Water stored in this manner can be drunk without further treatment, although it does no harm to add a couple tablespoons of chlorine laundry bleach to the tub before filling it.

> WARNING: Many modern tubs use a lever actuator to plug the drain, and those are notorious for leaking slowly. They're intended to keep the water in the tub while you bathe, not to keep water in the tub for days on end. You can test your own tub by filling it to the overflow drain and then keeping an eye on the water level for a few days. If the level drops noticeably, block the main drain with duct tape pressed tightly into place against the dry tub surface before you use the tub to store water.
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> Most tubs that use a rubber stopper to plug the drain do not leak, but it's still worth testing if you have one of these tubs. If yours does leak, the problem is usually that the drain plug has hardened with age and no longer provides a tight seal. Simply replace the plug with a new, soft plug.

> Don't bother to buy the tub-liner reservoirs made by WaterBob, EPI, and others. These products typically sell for $25 to $50, and are essentially a large plastic bag with a filler tube that connects to the tub faucet and a siphon or pump that allows you to draw water from the reservoir. Most are intended for one-time use, and the pump or siphon is often fragile. Using one is no safer or easier than simply storing water in a clean bathtub.

Water Heater

Other than the minuscule percentage of homes that use on-demand water heaters, every home has a hot water heater that stores anything from 30 gallons to 75 gallons or more. Most homes use enough hot water to empty and refill the tank several times a day, so the water in the tank is always fresh. On the downside, if you drain the water from the tank to use as an emergency drinking supply, you'll probably find that at least the first few gallons are contaminated with scale and sediment. That's easy enough to deal with; simply drain water into a pail until it runs clear. Any remaining water should be free of sediment and other contamination, and is safe to drink. For that matter, you can simply filter out the sediment or allow it to settle. The water is safe to drink regardless. Instructions for draining the water heater are normally posted on the heater itself near the drain tap at the bottom of the tank, but it's worth checking beforehand to make sure you know how to do it if you need that water.

> We heard from one reader who replaced his water heater because it was no longer heating very well. He installed the new heater in series with the old one, connecting the output of the old heater to the input of the new one and simply unplugging the old heater and plugging in the new one. We're not sure if this meets code, but even if it does it's a bad idea. A water heater that's no longer heating is likely to begin leaking sooner rather than later. There are easier and cheaper ways to store water.

Toilet Tanks

As disgusting as it sounds, toilet tanks (NOT bowls) are a reasonable last-resort source of emergency water, as long as they don't have one of those cleaner/disinfectant hangers that turns the water blue. Yes, most toilet tanks have accumulated scale and rust stains that makes

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them look unappealing, but the water itself is cycled through a typical tank so often that it's essentially just tap water. Even so, we admit that we'd either microfilter that water or treat it with chlorine bleach before we drank it.

Swimming Pools

A swimming pool may or may not be a good source of emergency drinking water, depending on what treatments have been used. If the pool water has been treated with algaecides, fungicides, or other poisons, it is chemically contaminated, not safe to drink, and cannot easily be made so, although it can be used for washing clothes, flushing toilets, and other non-potable purposes. If the pool water has been treated ONLY with chlorination chemicals and pH adjustment chemicals, it can be used for drinking and cooking, but only after you treat it to remove any biological contamination present.

> Typical pool water is maintained at a much higher chlorine concentration than is used by municipal utilities for water treatment, and a higher level than the recommended maximum for drinking water. You can drive off excess chlorine by bringing pool water to a full boil, and allowing it to boil for several minutes.

Water Sources

If you exhaust your supply of stored water, you'll need a ready source of additional water. Unless you have a spring or a well and the means to power your well pump, you'll need to collect water from natural sources and treat it to make it safe to drink. In this section, we'll cover only the basics. For more information about gathering and treating water, see Chapter ???, ???.

Rainwater

If you live in an area with regular rainfall, you can capture a large amount of water from your downspouts in buckets, plastic bins, clean plastic garbage cans, or other containers. Even a quarter inch of rainfall on a 2,000 square foot roof totals more than 40 cubic feet of water, which is more than 300 gallons.

Unless you have had a new roof installed recently or large fires have put huge amounts of smoke and particulates into the air, rainwater can be considered chemically safe. It is, however, biologically suspect, because it will inevitably be contaminated by bird and squirrel droppings, bacteria, dead bugs, and and other contaminants present on your roof. You must treat it as you would any other biologically-suspect source by using chemical treatment or micro-filtration before using the water for anything that requires potable water.

Surface Water

Water from a lake, pond, or stream should be your last resort for drinking water. Water from lakes and ponds is very likely to be chemically contaminated with fertilizers, pesticides, and other toxic materials, which are almost impossible to remove with practical home water purification methods other than distillation. Even streams may be chemically contaminated, although such contamination is less likely than if your source is a pond or lake. Even so, you should consider any surface water as chemically suspect, and use it only as a last resort. Distillation is possible, of course, but is extremely time- and fuel-intensive.

Also, do not overlook the amount of effort involved in hauling water even from a nearby surface source. A gallon of water weighs more than 8 pounds, so a five-gallon bucket weighs more than 40 pounds. Hauling water any distance gets old quickly and will make you wish you'd stored a lot more when you had the chance.

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Purifying Water

Any water you obtain from rainfall or a surface source must be treated before it's safe to consume.

The first step to treat any found water is to pre-filter the water to remove gross contaminants. Pre-filtering doesn't make the water safe to drink, but it does make subsequent purification easier and more reliable. We stock coffee filters, which are ideal for this purpose. If you don't have coffee filters, pre-filter the water through an old t-shirt, a paper towel, or whatever else you have available that will remove gross contamination. If you don't have a funnel, you can have one person hold the t-shirt or whatever and a second person carefully pour the source water through the pre-filter. The top portion of a 2-liter soda bottle makes an excellent field-expedient pre-filtering funnel.

Once the water is prefiltered, the next step is to treat it to kill any biological contaminants present. The cheapest and most readily-available means of doing that is to use ordinary generic unscented chlorine bleach. Add one quarter teaspoon of the bleach to each gallon of raw water, and slosh the water around to make sure it comes into contact with the entire surface of the container and cap. If the temperature is near 68 ºF (20 ºC), allow the treated water to sit for 30 minutes to give the bleach time to do its work. At 50 ºF (10 ºC), allow one full hour. If the raw water is close to freezing, allow at least two full hours before consuming the treated water.

Alternatively, if you don't have bleach or another means of chemical treatment available but you do have some means of heating the water, boiling is even more effective at killing biological contaminants than chemical treatment is. Simply bring the raw water to a full boil, and then allow it to cool. Unless the raw water is also chemically contaminated, it's actually safer to drink than utility water is. We list boiling as our second choice, because it consumes a lot of fuel, which may be in short supply.

Turning Off the Water

If you have municipal water, there are two situations in which you might need to turn off the water at the main valve. First, if your local authorities advise you to do so. Second, if an emergency makes it impossible for you to heat your entire house during sub-freezing weather. In that situation, water may freeze in your home's pipes. As that water expands, it may split the pipes or joints. The way to avoid that is to turn off the water and drain your home's pipes.

There are actually two main water shut-off valves, one located inside your home and the second located on your side of the water meter, which is probably buried near the street with a removable access cover. Shutting off either will work.

The valve inside your house is probably a simple in-line gate valve in the main water supply line. If the handle is parallel to the pipe, the valve is open; to close it, turn the valve handle perpendicular to the supply pipe. You should be able to close it with your fingers, but if it's stuck, use pliers (GENTLY!) to turn it to the off position.

The buried shut-off valve out near the street requires a long-handle wrench, called a curb key[7]. You can pick one of these up at a hardware store or home center for under $10.

To drain your home water pipes, take the following steps:

1. Turn off the main water valve.
2. Locate the lowest faucet in the house, usually at the bottom of your water heater or an

7 such as, http://www.homedepot.com/p/28-in-Steel-Curb-Key-53246/100113731

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outside hose connection. If the faucet is indoors, place a large pail or similar container under that faucet, or connect an ordinary yard hose and run it outdoors. Open the faucet, and allow water to drain. You home pipes and water heater contain a significant amount of water, so watch the level in the container and turn off the faucet when it's full. Empty the container and repeat the draining procedure until the tap runs dry.

> Unless you've been notified otherwise, the water in your pipes should be safe to drink. Capture it in a clean pail, bin, or other container. If you want to save the water in your water heater, drain it into clean container. The first few gallons may be ugly because of rust and sediment from the tank. You needn't discard those first few gallons; simply allow the sediment to settle or filter it out. The clear water remaining is perfectly safe for human consumption.

3. Open each of the faucets, indoors and out, turn on each shower head, and turn on the dishwasher and clothes washer.
4. After all of the water outlets have finished draining, turn each of them off, including the water heater drain.
5. When utility water service is restored, open the main shutoff valve and then open all of the faucets in the house. Allow them to run for several minutes to purge air and sediment from the pipes.

To-Do List

1. Assume that there will be no potable water available in an emergency other than what you've stored. Decide how much you need to store to meet your family's needs for 30 days, and set that as your target. Decide what mix of containers—soda bottles, pails, bottled water, etc.—you intend to use and begin accumulating those containers.
2. Put bottled water at the top of your shopping list every week. Pick up at least one case on every trip to the supermarket, Costco, Sam's Club, etc., and two or more cases if possible. When there's a sale, pick up as many extra cases as you can haul. Store this bottled water wherever you can fit it, but making sure that it cannot freeze.
3. Begin saving empty soda bottles and similar containers. After you accumulate a batch, clean them and fill them with water. Stick them somewhere out of the way.
4. When you think you have more water stored than you'll ever need, keep going until you've doubled that amount. Store as much water as possible not just for your own immediate family, but for extended family, friends, and neighbors.
5. Just in case you run out of stored water, keep a bottle of generic unscented chlorine bleach to treat found water.
6. You may need to turn off utility water if the authorities recommend it or to prevent your pipes from freezing. Find out where the water cutoff is, and store any tool needed near the cutoff. Learn how to drain your home's water pipes to prevent freezing.

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