CHAPTER 2

Water

New here? Ready, Set, Ready is a 10-minute starting point: an honest assessment, one gap closed for real, then a map for using the rest of this site. Once something's actually happened, Surviving picks up where this chapter leaves off, organized by chronology instead of category. Curious how Tier, Stage, and Phase relate? See the Glossary.

Why This Category Comes Second

Community relationships come first in this manual because they cost nothing and compound over time. Water is where hands-on preparedness itself begins, and it has the shortest failure clock of any category here: a healthy adult can become severely, dangerously dehydrated in as little as three days without it, faster in heat or under physical exertion. Every other category in this manual, including the Food chapter that follows, assumes the people executing those plans are hydrated and thinking clearly. This chapter is deliberately one of the most detailed in the manual for that reason.

The chapter is organized into four tiers of increasing duration and self-sufficiency. Each tier builds on the one before it: Tier 1 gear does not become obsolete in Tier 2, and Tier 2 skills remain essential in Tier 3. Read each tier as “what we add,” not “what replaces the last section.”

Stored vs. Produced

Underneath the four tiers is a simpler shift worth naming directly: stored versus produced. Tier 1 is Stored: living entirely off water that’s already stored, nothing new is produced or generated. Tier 3 is Produced: stored and purchased water is gone, and the household shifts to managing a renewable water source instead. Tier 2 sits between the two, a transition where filtration extends what’s available, but filter elements and treatment chemicals are still finite; nothing in Tier 2 renews itself the way a well or catchment system does. Tier 4 is Produced at community scale. Knowing whether a given piece of gear or a given skill is stored or produced is the difference between a plan that runs out and one that doesn’t.

Tier 1: Short-to-Medium Term (Hours – 14 Days)

Goal: Stored: using what's already stored. Immediate survival using stored buffers. Aligns with the Be Ready Utah 2-week household recommendation.

Tier 1 assumes normal supply chains, utilities, or safe outside movement are disrupted, but help or recovery is coming within roughly two weeks. Nothing in this tier requires producing anything new: it is entirely about correctly using and rationing the water that is already stored in the home. The two-week target gives margin beyond most utility outages, regional storms, and short-notice evacuations, and matches the state of Utah's own household guidance.

Skills to Build

- **Rationing:** Plan around roughly 1 gallon of water per person per day (more for children, nursing mothers, larger adults, and anyone doing physical labor in the response). Practice doing this math on paper before you need it. Under stress, simple arithmetic gets harder, not easier.
- **Emergency Water Treatment:** If stored water is compromised or you're using a backup source, know the dosing: for 6% unscented household bleach, use 8 drops (about 1/8 tsp) per gallon of clear water; for 8.25% (the more common strength on shelves today), use 6 drops per gallon. Check the label every time; concentration varies by brand and changes over a bottle's shelf life. Stir and let stand 30 minutes; double the dose for cloudy water. Chlorine dioxide tablets are a simpler, more shelf-stable alternative; follow the package ratio.

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The **Water Addendum** builds these into real, tested competency.

For the hands-on how-to:

Water Purification | Storing Water Correctly | Measuring Your Water Intake | Sourcing & Hauling Water | Legal Rainwater Harvesting in Utah | Building a Biosand Water Filter | Collecting Water From Snow, Dew & Condensation | Water Testing: Strips, Labs & Field Methods

Tech & Equipment

- **Water Containers:** Food-grade 55-gallon barrels for whole-household storage, or stackable 5–7 gallon jugs for portability and easier rotation. Mix formats: barrels for bulk, smaller jugs for grab-and-go.

- **Dispensing Hardware:** Barrel spigots or a siphon pump: a full 55-gallon barrel weighs over 450 lbs and cannot be tipped to pour.

Materials & Supplies

Item	Quantity / Spec	Notes
Drinking & sanitation water	14 gal / person	1 gal/person/day × 14 days. Store in food-grade containers only.
Water treatment	Bleach or ClO_2 tablets	Unscented 6% bleach or chlorine dioxide tablets, for backup/compromised sources.

Northern Utah Note

Unheated garages and sheds along the Wasatch Front regularly drop below freezing in winter. Water expands roughly 9% when it freezes; rigid barrels stored outside the conditioned envelope of the house can crack. Store water in a heated space, or leave 10% headspace in every container and expect a freeze/thaw cycle.

Portability

This tier is written for staying home: 55-gallon barrels and bulk cases aren't something you carry. If evacuation is plausible for your household, keep a dedicated, portable subset (the 5–7 gallon jugs) packed and ready to grab, distinct from the bulk stay-home stock. See the Go-Bags & 72-Hour Kits skill guide for what belongs in that portable kit beyond water.

What 1 Gallon/Day Actually Covers

This is a survival floor, not a comfort target, and it assumes no laundry and no toilet flushing (this manual's own sanitation approach uses a no-flush bucket system for exactly that reason). Humanitarian relief standards (WHO/Sphere) put the fuller operating figure at 7.5-15 liters/person/day, roughly 2-4 gallons, once drinking, hygiene, and cooking are all counted properly, up to four times this tier's number. Fourteen gallons/person is still the right Tier 1 floor; a household with anyone pregnant, nursing, sick, or doing hard physical work, or planning past the first couple weeks, should build Tier 2 bulk storage toward the higher figure rather than just multiplying this one by more days. See the Storing Water Correctly skill guide for the full breakdown.

Quick Checklist

- [ ] Water: 14 gal/person, food-grade containers, dated
- [ ] Backup water treatment (bleach or tablets) on hand and dosing known
- [ ] Water stored where it won't freeze, or headspace left for expansion
- [ ] Portable grab-and-go water subset packed, separate from bulk stock
- [ ] Practiced: used only Tier 1 stored water for drinking for a full day

Tier 2: Extended (2 Weeks – 3 Months)

Goal: *The stored-to-produced transition, still finite but beginning to build renewable capability. Active resource management when municipal water service is offline.*

Tier 2 begins where the stored buffer runs out. The household shifts from consuming pre-packaged supplies to actively purifying water from outside sources. This tier requires equipment that Tier 1 doesn't: filtration capable of processing untreated water indefinitely.

Skills to Build

- **Water Purification:** Learn to operate a gravity filter, run a rolling boil (1 minute at altitudes below 6,500 ft, 3 minutes above), and correctly dose chemical treatments for larger batches than a single gallon. Most gravity filters (including Berkey- and Sawyer-style) are rated for bacteria and protozoa but not all remove viruses; check the manufacturer's rating, and for any surface water with possible sewage contamination, follow filtering with a chemical or UV step rather than filtering alone. Practice all three methods before you need them. Filter cartridges and pump technique both have a learning curve. See the Water Purification skill guide for the full method breakdown.
- **Source Identification:** Know, in advance, where the nearest streams, irrigation canals, ponds, or rain-catchment points are relative to your home, and understand that all of them require treatment before use. See the Collecting Water From Snow, Dew & Condensation skill guide for real, honestly-rated options when none of those exist nearby.

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Tech & Equipment

- **Gravity Water Filters:** High-volume systems (e.g., Berkey-, Sawyer-style) with spare filter elements. These are the workhorse of Tier 2: buy the largest capacity your budget allows and keep at least one full spare element set. The cartridge itself is a finite, stored resource, though; Tier 3 covers a sand-and-gravel alternative that doesn't wear out the same way.
- **Water Testing Kits:** Test strips for pH, chlorine residual, and bacteria presence, to confirm treated water is actually safe before drinking it at scale. See the Water Testing skill guide: strip tests, lab panels, and field bacteria tests don't work the same way or tell you the same thing.

Materials & Supplies

Item	Quantity / Spec	Notes
Bulk water storage	55-gal food-grade drums	Filled, or clean and ready to fill from a treated source.
Treatment chemicals (bulk)	ClO_2 tablets / calcium hypochlorite / bleach	Calcium hypochlorite ("pool shock") is a compact way to store large-volume treatment capacity; store separately from food, well-labeled.

Northern Utah Note

Spring snowmelt (roughly March–May) makes Wasatch Front streams and canals highly turbid: cloudy water clogs gravity filter elements fast. Let turbid water settle overnight or pre-filter through cloth before running it through your primary filter.

Quick Checklist

- [ ] Gravity filter (virus rating checked) + full spare element set
- [ ] Water testing strips on hand

- [ ] Local untreated water sources identified in advance
- [ ] Bulk water treatment chemical on hand, stored away from food
- [ ] Practiced: purified and used water from an outside source for a full day using only Tier 2 gear

Tier 3: Permanent (Indefinite)

Goal: *Produced: managing a renewable water source rather than relying on stored or purchased supplies.*

Tier 3 assumes stored and purchased water is exhausted or unavailable for the foreseeable future. The household shifts from consuming reserves to managing a renewable water source on an ongoing basis. This is a skill-intensive tier: the equipment matters far less than whether the skills were practiced before they were needed.

Skills to Build

- **Non-Commercial Water Filtration:** A biosand filter, built from sand, gravel, and a durable housing to a specific tested design, treats water indefinitely without a replaceable cartridge, the Tier 2 gravity filter's real limitation. It only works if built to spec: correct sand grain size, a slow enough flow rate, and 2–4 weeks for a biological layer to mature before it's actually effective. CAWST, the Centre for Affordable Water and Sanitation Technology, publishes the free, illustrated Biosand Filter Construction Manual this design traces back to, with the exact dimensions and specifications a real build needs. See the Building a Biosand Water Filter skill guide for the full design and why the fast-flow bucket version common online isn't the same, tested thing.

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Tech & Equipment

- **Irrigation & Catchment Systems:** Drip lines, a solar-powered pump, and rain-catchment diverters. As of this writing, Utah permits collecting rooftop rainwater without a water right up to 200 gallons (two containers, 100 gal max each) with no registration required, or up to 2,500 gallons in an above-ground container or cistern with free registration through the Utah Division of Water Rights. Register before exceeding 200 gallons, and verify current limits with the Division before installing. This is state law, not local practice, and it does change.

Materials & Supplies

Item	Quantity / Spec	Notes
Biosand filter materials	Sand, gravel, durable housing (a 55-gal drum or a built structure)	See the Building a Biosand Water Filter skill guide for correct grain size and layering.

WARNING

A Well Is Only as Useful as What Lifts the Water Out of It

A conventional well pump runs on grid power and stops the moment the grid does. A well you're counting on past a short outage needs its own solar- or generator-backed power plan, sized specifically to that pump's draw, not assumed to come along with the rest of your backup power setup. See the Energy & Heat chapter for sizing a system to a specific load rather than guessing.

Northern Utah Note

Wasatch Front municipal water is largely snowpack-fed surface water and groundwater. Know where your area's water actually comes from and what could plausibly contaminate or disrupt it; this shapes which of the options above are realistic for your specific property. Own and know how to use at least two independent water treatment methods (a quality filter plus chemical disinfection is a common pairing) so a single point of failure doesn't leave you without safe water.

Quick Checklist

- [ ] Biosand filter built, ripened for 2+ weeks, and flow rate tested against expected output

- [ ] Irrigation/rain-catchment system installed within legal storage limits
- [ ] Rain-catchment system registered with Utah Division of Water Rights if over 200 gal
- [ ] Well pump backup power (if applicable) sized specifically to its draw, not assumed
- [ ] At least two independent water treatment methods owned and practiced
- [ ] Practiced: used the biosand filter (or an equivalent produced source) as primary drinking water for a full day

Tier 4: Sustainable Community

Goal: *Produced, at community scale. Decide, deliberately, what water security actually looks like for your own neighborhood: move from single-household self-sufficiency to a resilient local system with redundancy, shared infrastructure, and knowledge transfer that outlast any one household.*

In Tier 3, all of this household's water self-sufficiency lives in whatever one household built and maintains: a single lost well or forgotten rule can leave a household without safe water. Tier 4 spreads that capability, and its rules, across a neighborhood. The organizing and teaching skills this takes are the same ones covered in the Community chapter; this section covers what's water-specific about applying them here.

Start with the real failure mode, not a vague sense that "more water security" is good: a neighborhood on one municipal system is exposed to a different risk (a single treatment-plant or pipe failure taking out everyone at once) than one where every household already has its own well (a shared regional drought or aquifer decline). Measure what a candidate well, spring, stream, or pond actually yields before planning around it; a well that looks fine at one household's normal draw can fail outright once several households pull from it, and a pond fed only by runoff isn't a reliable year-round source no matter how large it looks today. Multiply the real headcount this would serve by a real daily-use figure (this chapter's 14–56 gal/person range) to get total demand, and compare that honestly against what the source actually yields. Some neighborhoods genuinely can't produce enough locally; for them, the honest output of this section is a shared hauling-and-storage plan, not a built system.

Choosing an Approach

Three real models exist, and they fit different circumstances. Pick based on the assessment above, not on which sounds most impressive.

Approach	What it is	Fits when
Informal mutual-aid agreement	No new infrastructure: a written plan for whose stored water, filters, or well capacity gets shared, and how, if one household's supply fails	Reliable municipal utility, low risk of an extended area-wide outage, or genuinely poor local water production
Small shared well or system	One well or filtration system, under 15 connections and 25 people, serving a known group of neighbors under a private agreement	Decent local hydrology, households close enough to share pipe runs affordably, trust already established
Formal community water system	A planned system deliberately built to serve 15+ connections or 25+ people, crossing into regulated “public water system” territory	A genuinely planned, permanent development with committed long-term management, not an emergency-driven decision

WARNING

Crossing 15 Connections or 25 People Changes Everything

The federal Safe Drinking Water Act’s threshold for a “public water system” is 15 service connections or 25 people served for 60+ days a year, and states enforce it. A shared well that quietly grows from 4 households to 16 can cross that line without anyone deciding to, triggering real testing, reporting, and operator-certification obligations the group never planned for. Treat 15 connections as a hard planning ceiling unless the formal system route is the actual intent.

Skills to Build

- **Shared Infrastructure Stewardship:** Maintaining a shared well, spring, or filtration system that serves more than one household means putting the agreement in writing and recording it, naming a custodian who maintains the system and logs usage, agreeing on cost-sharing before a repair is needed, and writing a real dispute process into the same agreement, using the Community chapter’s governance guidance rather than inventing one from scratch. Revisit the agreement at least yearly, since household count and system condition both drift. An unrecorded handshake agreement is a common, well-documented source of neighbor conflict specifically because nothing was written down.

- **Becoming a Water System Operator:** Most states certify water system operators through a state environmental or health agency — in Utah, through the Utah Division of Drinking Water —

typically requiring a real exam covering math, operations, pumps, chemical feed, and safety rules. Difficulty: High. Training: certification required, a real state exam. Cost: $$–$$$$ (course and exam fees, varies by state). Pursuing it is appropriate only if the formal community water system path is the real plan, but some states require at least entry-level certification for any shared well over a certain size, so it's worth knowing the pathway exists even for a smaller shared system.

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Tech & Equipment

- **Expanded Water Infrastructure:** A shared well, developed spring, or larger-capacity filtration system sized for a cluster of households, with an agreed maintenance and access plan.

Materials & Supplies

Item	Quantity / Spec	Notes
Shared water infrastructure reserve	Bulk treatment chemical, spare filter elements, spare parts for shared systems	Sized for the neighborhood, not one household; access rules agreed in advance.

Quick Checklist

- [ ] Shared water infrastructure (if any) has an agreed maintenance plan, in writing, with a named custodian
- [ ] Headcount and real demand checked against a measured source yield, not assumed
- [ ] At least one household member aware of the water system operator certification pathway, if a community-scale system is the real plan

- [ ] Practiced: participated in a shared water-infrastructure maintenance day or drill with neighbors

At a Glance: Water Across All Tiers

A single-page reference for planning purposes. This does not replace the detailed guidance above; use it to see how the plan scales, not as a standalone checklist.

Tier	Mode	Duration	Water Plan
Tier 1	Stored	Hours – 14 days	Stored water, 14 gal/person
Tier 2	Transition	2 weeks – 3 months	Filtered/treated outside sources
Tier 3	Produced	Indefinite	Managed irrigation/catchment, redundant treatment
Tier 4	Produced	Sustainable community	Shared/community infrastructure