



WaSH

WATER, SANITATION, AND HYGIENE
AFTER A MAJOR EARTHQUAKE

FOR DOWNLOADS RELATED TO THIS PRESENTATION
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(KAREN RH) **[SHARE screen & share audio. TURN ON THE RECORDING!]**

Hi Everyone. My name is Karen Ronning-Hall, your neighborhood preparedness evangelist. Tonight, we will be talking about “Water, Sanitation and Hygiene” (WaSH) after a Major Earthquake

This program tonight is brought to you by Cedar Hills Ready! Quake Up!

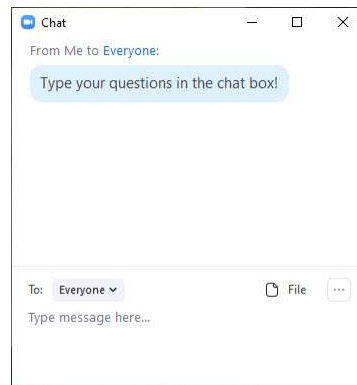
Our mission is to create caring, connected, and resilient neighborhoods.

We are committed to making sure every neighbor is prepared and has the best chance of survival in the event of a disaster.

- Welcome. We have invited people not only from my neighborhood, Cedar Hills, but also from across the Portland metro area.
- Because Cedar Hills Ready! isn’t just about my neighborhood, it’s about yours, too. It’s a movement to connect neighbors with each other; because there is strength (and fun) in numbers.
- We are making our content freely available to everyone. Feel free to share this information with all of your important people.
- If you happen to be from a neighborhood outside of Cedar Hills and you want to get prepared in your neighborhood, we’ll help you get connected to the right people.

Contribute to the Conversation via Chat

Click on Chat



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A few technical notes:

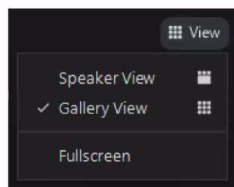
- We are recording this meeting so that we can make it available to others who could not make it tonight.
- We would like this to be an interactive meeting, but given the size, please stay on mute, unless you are called on.
- Anytime during the presentation, you can ask a question or contribute with your comments via the chat box.
- You'll find the Chat bubble at the bottom of your screen; that's where you can enter a comment in the Chat window.
- We have a person who will be monitoring that throughout the meeting.
- If we haven't answered during the presentation, we will answer the questions at the end during the Q&A session.

We Recommend Speaker View

Laptops and Desktops:

Hover your mouse over your screen to reveal **Speaker View** or **Gallery View** in the upper right-hand corner.

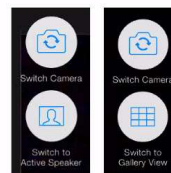
Click the button to toggle between the views.



Tablets:

Tap the screen to reveal **Speaker View** or **Gallery View** on the left.

Tap the icon to switch views.



Smartphones:

Swipe left and right to switch views.

For the best experience, we recommend watching this in speaker view or speaker: side-by-side.

Change views > top upper right corner of the screen



This program is part of an ongoing series.

Most of our meetings - Third Wednesday of the month at 7 PM on Zoom

Next month our focus will be on Go Bags.

Break in December.

Topics subject to change, depending on speaker availability.

Because you've signed up for this meeting, you'll be getting follow-up email notifications for upcoming meetings.

(You can cancel the newsletter email at anytime.)

Cedar Hills Ready! Quake Up! Team
Want to get involved? Contact Info.CedarHillsReady@gmail.com

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This presentation is a product of the efforts of your neighbors and community members and leaders. Before we get started, I wanted to thank a few members of the Cedar Hills Ready! QuakeUp! team who worked on creating this program.

- Starting with me, Karen, the ringleader for Cedar Hills Ready!
- Bill Hall, my partner, is our speaker tonight. In addition to being a founder of CHR, he's a member of Beaverton CERT.
- Barbara Bracken will be tracking chat comments and leading Q&A session today. She is the Tualatin Ready! Program Manager. Tualatin Ready! Program provided the source materials for our "Get Prepared Now" Booklet.
- Stan Houseman, a founder of QuakeUp! and the Master of Disaster! He manages the website.
- Lincoln Thomas, is our Cedar Hills Neighborhood Ready! Coordinator; he also is our monthly newsletter editor
- Judy Janowitz – has been a Beaverton CERT for many years, and she coordinates the Waterhouse Neighborhood Ready! program.
- Former Beaverton City Councilwoman, Cate Arnold, is getting involved in Beaverton's Neighborhood Ready! efforts. She is our timer for the meeting.

We are always looking for new input, if you are interested in joining our efforts, please connect with us at Info.CedarHillsReady@gmail.com.



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Karen at 971-361-9348

Agenda

7:00 PM	Welcome & Introductions
7:05 PM	Water, Sanitation & Hygiene (WaSH) <i>Following a Cascadia Earthquake – Bill Hall</i>
7:10 PM	Water, Water, Everywhere <i>Except when it's not – How much do you need in a disaster?</i>
7:35 PM	Sanitation & Hygiene in a Disaster <i>Staying clean & healthy</i>
7:55 PM	Q & A <i>Lead by Barbara Bracken</i>
8:00 PM	Meeting Adjourns

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(KAREN RH) (**AGENDA SLIDE**) [0:30]

Last month we talked about basic safety preparation steps and focused on identifying and fixing home hazards.

Today, we are going to focus on Water, Sanitation, and Hygiene after an earthquake.

Making sure you have enough clean water is one of the most important things to consider in preparing for disasters.

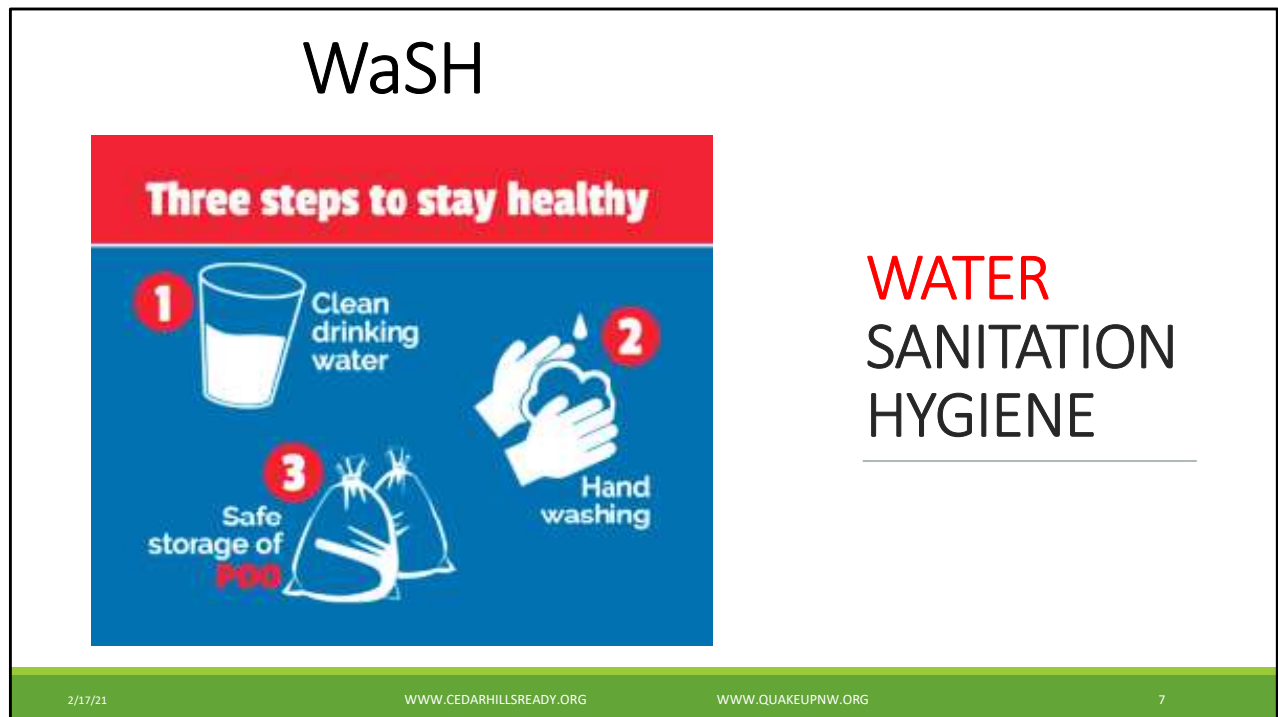
I'm going to turn this part of program over to my partner, Bill Hall, to guide us through these topics.

After the presentation, we will have a question and answer session. As I mentioned before, feel free to add your questions to the chat at any time during the presentation.

Some of this information may not be new to you; if it isn't, hopefully, it will give you something to share with people you care about who aren't as knowledgeable.

Let's have some fun and learn something!

Bill?



(BILL)

Thank you, Karen.

If you attended our discussion last month, you will remember that we did a visualization exercise. In an 8-9 point Cascadia earthquake, first steps are to protect yourself, take care of your family, then turn off your utilities. Shut off your Gas if necessary, because of fire danger, and then shut off your WATER main at the house.

Today, we want to talk about the whys of WATER. I'm going to split up our discussion into three parts, defined by the CDC and the World Health Organization as WaSH – Water, Sanitation and Hygiene . Basically, it is all about water

First, I want to talk about why this matters, and then break the discussion down into some hints about what you can do in each area to get ready for the Big One .

80-100 Gallons Every Day



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But first, WHY you should get ready:

The United States Geological Survey says Americans use 80-100 gallons per day per person. According to the National Environmental Education Foundation, the average Oregon resident uses 113 gallons of water per day.

No, seriously. Look at your water and sewer bill if you don't believe this. Most of that 100 gallons is heavy use of the toilet and showers & baths, according to our utility companies. We take it for granted. We use it, without thinking much about where it's coming from, or where it goes after we use it.

What would 100 gallons look like if you put it all in one place? This picture shows about 35 gallons visible in the garage. Multiply by three. Just for one day!

But, we don't put it in the garage, do we? We run it through the faucet and through the toilet, as we need it, without thinking much about it.

CASCADIA SUBDUCTION ZONE QUAKE

Critical Service	Zone	Estimated Time to Restore
Electricity	Valley	1 to 3 months
Electricity	Coast	3 to 6 months
Police and Fire Stations	Valley	2 to 4 months
Drinking Water and Sewer	Valley	1 month to 1 year
Drinking Water and Sewer	Coast	1 to 3 years
Top-priority highways (partial restoration)	Valley	6 to 12 months
Healthcare facilities	Valley	18 months
Healthcare facilities	Coast	3 years

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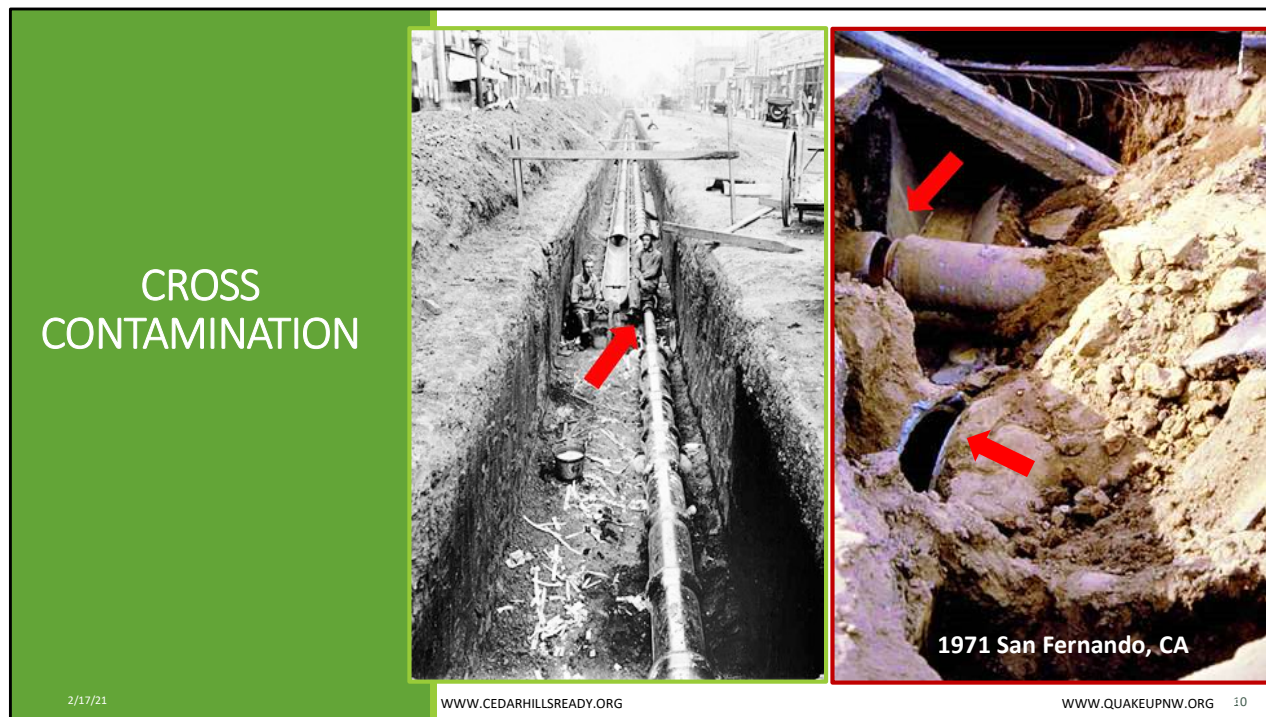
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So, here's the deal:

- This slide comes from a joint study of our emergency response agencies, and shows the estimated time to restore basic services after the expected big Cascadia quake.
- That earthquake is likely to be an 8-9 level seismic event which will last anywhere from 3 to 5 minutes, shaking and rolling the level ground, splitting roads, collapsing buildings and violently smashing and breaking apart utility supply systems. Obviously, there are going to be problems in all areas, but today, let's just focus on the impact on water supply, because a big quake is very likely to disrupt and shut down the automatic systems that you and I take for granted every day. Toilets and faucets.
- According to FEMA and both State and local emergency planning agencies, we are likely to be without our water and sewer infrastructure for weeks or months after the Big One. So, thinking about the water usage I just showed you, now consider the estimated time to restore water and sewer in Beaverton .
- Imagine – no toilets or faucets for 1 to 12 months. I think I'll use 3 months as a basic planning number, just for this discussion.

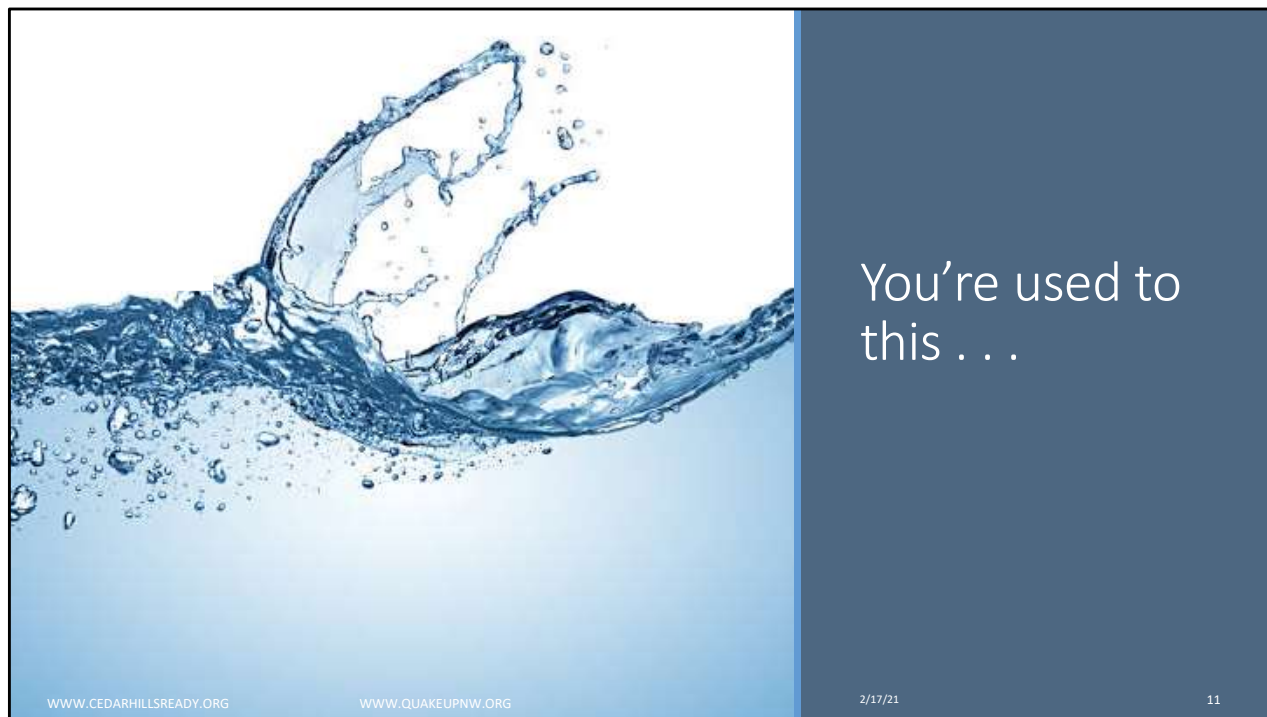


Why the dire prediction by our government?

It's hard to visualize, but these pictures show, on the left, installation of our infrastructure, showing that water and sewer lines were often buried under the street in the same tunnels; on the right, the kinds of ruptures that occur – this one in 1971 in a San Francisco earthquake smaller than the one we are expecting. This can be the cause of cross-contamination between water and sewer lines, if you don't shut off the water main in your home very soon after an earthquake.

In addition, if there is an extended period of interrupted water service, you actually have several gallons of water in the pipes in your house that, if not contaminated or draining back into the street, are good to drink.

That's pretty important, because for some time – say, three months, you are going to be wholly dependent on yourself to provide your family with the necessary water in order to stay healthy. Without toilets, or faucets.



You're used to this

You don't want this . . .



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You don't want this.

Euu!


HOW MUCH WATER


. . .to live, and stay healthy?

For One Person Every Day





8 cups per person for drinking






4 cups per person for washing





4 cups per person for cooking



One Gallon per Person

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First, lets look at how much water you REALLY NEED to live, not what you are using in our society today.

Scientists tell us that people need a minimum of one gallon of water per person per day to stay healthy. About half of that is for drinking, in one form or another; the rest is for washing and cooking, both vital for good health. That's a lot less than 100 gallons, but it's a bare minimum for staying healthy. A gallon per day per person

- For purposes of readiness in case of an emergency, FEMA and our local Emergency Response agencies say: Everyone should have a 2 week supply of potable – drinkable – water on hand for emergencies. That means at least 14 gallons of stored water – per person.
- For a family of four, that's 56 gallons to store, for two weeks' use. For reference, that's almost twice what I showed you in the picture of jugs in the garage earlier. Just for an extended urban camping trip at home – no faucets, no toilets, for two weeks.

STORING WATER for a family of four



5 Gallon Storage Jug



For two weeks:

Family of Four needs **56** gallons

12 jugs or 20 cases of bottles

For three months:

Family of Four needs **348** gallons

72 jugs or 100 cases of bottles

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How do we store water? In refillable containers, or in pre-bottled water containers. The picture on the upper left shows a standard five gallon food grade water jug, available at most grocery stores for around 10 dollars. There are other sizes and styles, but I'll just use this one for illustration.

- You should wash and sanitize containers using tap water with bleach, and replace tap water in this kind of storage container every six months.
- Avoid using milk jugs and other containers that might not be completely cleanable; some of the plastic is semi-permeable, and they can create an environment for bacterial growth. I advise getting new food-grade jugs like this.

Commercially bottled water, like on the bottom photo, should be kept in its original container until you need to use it. It should last indefinitely – at least the 3 months, or year we are talking about. Store water in a cool, dark location. I have taken the one gallon per person per day requirement and put together a TWO WEEK plan for a family of four.

- For a family of four: two weeks' supply will take 12 of these jugs, or 20 cases of bottled water.
- And if we use the FEMA and Emergency Planner estimate of recovery time for our public water systems – say, 3 months to come back on line: That means 72 jugs or 100 cases of bottled water to store 348 gallons of water for the family for 3 months.
- You can do it . . .



But . . . that's a lot of water!

Lotsa space needed for storing water! Think of your garage , under your bed, the back of cupboards or closets . . .!

Reminds me of a Fish story: You know what the fish said when it swam smack into a wall? Dam!

How many of you are likely to store this much water for emergencies? 100 cases of bottled water. 348 gallons



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You might be thinking of water lines you may have seen on television in other disasters. I remember the run on toilet paper when the COVID pandemic hit. And then, we know how well the government's vaccination distribution plans are going . . .

- You might be able to spend a LOT of time doing this, IF FEMA and local governments get their act together some time in the first month or two after the Big Quake, and let you know where they are delivering water. When might that happen? Well, that is unclear. At some point the Military is likely to be deployed to do this. They may have what is called a CPOD – Community Point of Distribution model, but current actual emergency plans are very unclear for our community.
- We have checked with all the agencies we depend on, and while all of them seem to be in the process of planning for backup systems in case our infrastructure is interrupted, but, it's a huge task; the likelihood of broken roads and bridges making transportation unpredictable; plus, the multiple levels of National, State, Local and Utility ownership responsibilities are keeping those plans at a high level, and we have been unable to discover any comprehensive neighborhood-level water distribution strategies showing where you can actually acquire drinking water if the faucets are shut off. In the meantime, the best advice I have been able to get from these agencies is: have your

own personal plan ready for when the BIG ONE hits.

- So, let's think about some workable alternatives for acquiring water for survival. What are your thoughts? Let's spend a minute thinking about where you might find water, after you run out of stored water, and before the government can respond. Write down some of your ideas in the CHAT feature, and Barbara will capture them and share ideas with the rest of the group. – let's give this a few minutes thought.
- **CHAT:** (Give it 15 seconds)

Okay, Barbara, what have people suggested?

READ QUESTIONS, IDEAS

Good work everyone. This is a question we should be thinking about, because we are likely to face it at some point when the Big one hits.

(NOTE: You might hear one or more of these: Cedar Mill Creek; Johnson creek; Bethany Pond; Commonwealth Lake, Hagg lake, Beaverton Creek, Rock Creek, Ash Creek, Ball Creek, Chicken Creek, Finger Creek, Fanno Creek, Fern Creek, Golf Creek, Hall Creek, Hedges Creek)

(NOTE: Some of these, especially Hagg Lake, are expected to fail and become floodwater – not good for use.)

(NOTE: Fire hydrants are likely to be turned off and not available for water supply.)

OTHER SOURCES OF non-potable WATER Must Be Treated Before Drinking

RAIN



PONDS, LAKES



STREAMS & RIVERS



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We can put these ideas into three categories for planning. There are really only three sources of water for survival other than what you've already got stored, and then a potential FEMA and Emergency Response water delivery by truck. All of them will require treating before drinking

- Rain: A variety of rain catchment devices can be installed to collect rainwater, especially runoff from your roof. Remember: birds poop on the roof, you have to treat it before its drinkable.
Lincoln Thomas, one of our members here tonight, has installed rain barrels around his house, and he can answer questions later if you have them.
- Ponds: We have Commonwealth Lake and lots of ponds in our area. Remember, again, that birds, other animals use these sources of standing water; that and runoff require the water to be treated before before you can use it safely.
- Streams: We have a number of streams and creeks in the Beaverton area, which vary in volume as weather changes. Johnson creek and Beaverton creek are running pretty full right now. All of these have street runoff and who knows what else in them -
TREATMENT WILL BE NEEDED
- Just a note: Do NOT use flood water; it could have toxic substances that cannot be filtered or treated out of the water. The same is true of water with fuel, pesticides, heavy metals or swimming pool chemicals.

What are the methods you could use to treat non-potable water to make it safe?

TREATING OTHER SOURCES OF WATER

Pre-Treating



CHEMICAL

FILTER

BOIL

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Two notes regarding water that needs to be treated:

- Regardless of what method you choose for treating raw water, you should always pre-filter non-potable water that is cloudy or has visible particles in it, before treating it with any of these methods. You can run it through a clean rag or a coffee filter into a bucket or other container before treating the clear water. This picture shows paper towels in a funnel.
- There are water testing kits you can purchase that can give you a reading on the drinkability of your water; there is a variety, used to test for microbes, heavy metals, other chemicals. You can look up the variety of kits available on the internet.

There are three basic ways to treat non-potable water to make it safe to drink and cook with:

- Boiling
- Treating with chemicals
- Filtering with very fine filters
- Let's look at these one at a time:

TREATING NON-POTABLE WATER

1. Boil Water

- Pre-filter water that is visibly dirty with a paper towel or coffee filter
- Rolling boil for one full minute

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- Easiest method
- Limited capacity
- Uses up fuel



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Again, remembering that you need to pre-filter any water that is visibly dirty as a first step, you can then boil it.

- Boiling is the easiest method of treating water. Heating it at a rolling boil for a full minute will kill most dangerous microbes. Again, don't boil water if it has fuel or chemicals in it. They could produce dangerous fumes, and the water still won't be safe even with boiling.
- The Drawback to the boiling method is that it is limited to what size pot you can boil at one time, although you can store boiled water in sanitized containers for up to a week – but you have to wait for it to cool to use it.
- More importantly, it uses up precious fuel you may need for cooking or for heating your house.

TREATING NON-POTABLE WATER

2. Treat Chemically (bleach)



- Use unscented household bleach
- Pre-filter water that is visibly dirty with a clean rag or coffee filter
- Mix 1/4 teaspoon per gallon of water
- Wait 30 minutes before using
- Bleach becomes ineffective with age

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The second method is chemical treatment.

- You can buy tablets to put into non-potable water at any camping supply store, but
- The most reliable chemical treatment for water is simple, unscented household bleach. You can treat most water with ¼-½ teaspoon per gallon, wait 30 minutes, and then you can use the water. It should have a slight bleachy smell. If not, treat it again before using.

Drawbacks are

- It smells like bleach,
- Bleach itself loses its potency over time.
- Also, while bleach kills most harmful micro-organisms, it is less effective against Giardia and CryptoSporidium, two very common resistant organisms.

Like Boiling, chemical treatment requires that you maintain replaceable supplies – tablets or bleach. And, in the case of boiling, fuel.

TREATING
NON-POTABLE
WATER

3. Filter
Systems

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Personal Filter systems:








Immediate emergency use for one person

For Personal Water Filter Systems, try: <https://www.google.com/search?q=personal+water+filters>

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The third type of treating water is by filtering it through a micro-filter. By contrast, if you have a reliable filter, you don't need to replenish supplies frequently. Most of them last a year or so.

There are a number of one-person filters that can filter water effectively. The LifeStraw is perhaps the most popular one of these – it's about \$15; In a dire emergency, you can usually stick it into a puddle and get a fairly quick drink. Others pictured here run from \$35 to \$75.

- These are great additions to your go-bag or for camping.
- The drawback is that these have very limited capacity and cannot supply a family's drinking water needs conveniently.
- Think Setting Up House for a family of four – it takes teamwork.

TREATING NON-POTABLE WATER

3. Filter Systems

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Multi-person filter systems:



For filter systems, you can visit:
<https://www.amazon.com/Portable-Water-Filtration-System/s?k=Portable+Water+Filtration+System>

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There are a number of larger capacity kits available:

- Some, like the one on the left, cost a few hundred dollars, and will last for the duration of an extended outage; capacity depends on the one you buy. Katadyn and Berkey are trusted brands and you can find these on the internet. We don't endorse, and others are also available on the internet.
- The two bucket system on the right is a much less expensive alternative, and it is highly recommended by most Emergency Planning agencies and by FEMA. These use ceramic filters, are long-lasting, as much as a year, and several hundred uses before it needs replacement.

The TWO-BUCKET SYSTEM is worth spending a little bit of time on, because it is easy to assemble and can generate up to 35-50 gallons of drinkable water a day, plenty for a large family's needs for an extended period – All you need to do is keep the top bucket filled with water from your raw source.



You need to buy two 5-gallon food-quality buckets; these can be had for around \$4 at Lowes, most grocery stores. You need the lids with them.

Next, you purchase a kit like the one shown in the middle; it has a 0.2 micron ceramic filter, and the filter kit comes with all the necessary hardware and parts you need to assemble your system. These kits are available on Amazon for \$30. We use the one from JustWater, a company from Texas.

There is a video on Utube that is easy to follow: I've put the location at the bottom of the slide: <https://www.youtube.com/watch?v=QHVEeTs5Ms0>

You will need to drill some holes – you'll need a 3/4 in drill bit, a 5/8 inch bit and a 1/8 inch bit and a drill

- Instructions come with the kit, along with all the parts.
- Along with your two standard food-grade 5 gallon buckets, it's nice to buy an 18 inch length of standard surgical hose. The instructions indicate this can increase the flow rate to produce as much as 35-50 gallons of water per day.
- Assemble it, Test for leaks, and you have a system that will last as long as you need it.

Our recommendation is that you obtain the materials for building a two-bucket water filter system which can provide your water needs for as long as it takes for the utility companies to get the public supply systems up and running again, even if it takes months.

We're so positive about it, we at Cedar Hills Ready will be organizing a filter kit workshop at which we will sell these \$30 kits and, if you bring in your two buckets, help you drill holes and assemble the kit for you. You'll walk out with a complete system! We have not scheduled this workshop yet because of the COVID Pandemic, but are hopeful that by Summer or Fall we can pull it off.

If you are interested, give us your email and we will make sure you are invited.

If you don't need this help, we have a one-page handout with a list of these parts and instructions for do-it-yourself, on our website.

<https://www.youtube.com/watch?v=QHVEeTs5Ms0>

www.rei.com/learn/expert-advice/water-treatment-backcountry.html

www.cdc.gov/parasites/crypto/gen_info/filters.htm

Water is everything

Water is life

Be Prepared to have water for survival!

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Water is everything. It's the basis of good health, good eating, and living a reasonable life while recovering from a disaster.

Buy or make a kit to treat water; don't run the risk of being without good water.

Three steps to stay healthy

1 Clean drinking water

2 Hand washing

3 Safe storage of **FOOD**

**WATER
SANITATION
HYGIENE**

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Okay, we're going to move to the next topic But you're not done with buckets. . . .

- I'm going to go to number 3 on this picture first. The next water issue is SANITATION, and two more buckets are going to show up.
- As we start, Remember the planning assumption of 3 + months of disrupted sewer systems. No toilets



Remember our visualization of an 8- 9 point earthquake?

- After the shaking is over and you have seen to family safety, attended to the utility shutoffs, and checked in with everyone; then, according to my wife, the most urgent thing is always, you gotta go to the bathroom! No toilets?!!
- When you gotta go, you gotta go!

DIY WASTE MANAGEMENT



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1. COLLECTION

2. DISPOSAL

3. SANITATION-HYGIENE

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Okay, hold your water. One thing at a time. We're going to be dealing with Waste Management – Do It Yourself. Collection, Disposal, and Sanitation

First, An important side note: I hate to make you wait, but . . . one of the recommendations of our emergency planners is that, after shutting off the water, you immediately tape all your toilet seats in the house shut tight. . . WHAT?

- Okay, remember that you won't have water to use in flushing, so you won't want to be using your toilets until the public agencies turn the water back on and give us the go-ahead, which might be months. BUT, even more important are the rats.
- RATS!? Yes, what we haven't mentioned is that there are hundreds, perhaps thousands of rats living in the sewer system, and when they stop getting a flow of water andwhatever Well, they are known to travel right up the now empty pipes and join you in your home. SO, Tape those lids shut!

Okay, okay, gotta go! Back to water. What you used to take for granted is now something you are going to have to attend to yourself. The collection and disposal of family waste, and camping-style hygiene for an indeterminate period of time. Local gas stations, restaurants and gyms are not going to be available for you to go potty.

Let's size the problem you are now up against . . .

VOLUME: A non-trivial problem

Each person:

- ❑ Poops an average of 10 ounces per day
- ❑ Pees $\frac{1}{4}$ to $\frac{1}{2}$ gallon of urine per day



Family of four:

- ❑ 4 poops a day minimum = 2 $\frac{1}{2}$ pounds
- ❑ 12 pees a day average = 2 gallons

- ❑ In one week, that's
28 poops = 17 pounds and
100+ pees = 14 gallons

WOW!

You need to be ready for *volume!*

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Health experts say you should drink or take in at least $\frac{1}{2}$ gallon of water every day to stay healthy and hydrated. If you do this, they tell us, you will pee $\frac{1}{4}$ to $\frac{1}{2}$ gallon of urine a day, each. You will poop an average of 10 ounces per person per day. That may not sound like a lot, but let's look at just one week for a family of four.

- 10 ounces of poo each is 2 $\frac{1}{2}$ pounds a day for four people
- $\frac{1}{2}$ gallon each for four is 2 gallons a day,
- Just One week of downtime is 7 times that – 14 gallons of pee and 17 pounds of poo, to be collected and safely disposed of every week.

I know, the NOW of “I Gotta GO!” is URGENT, or will be when it’s “now” . . . And, you have a volume challenge . . . So we need to plan ahead.

Collection, Disposal, and Sanitation – something you used to take for granted, now you have to take care of yourself. Plan ahead.



So, what are the options?

Digging multiple holes in your yard is NOT recommended – we could contaminate the water table pretty quickly if many people did that. You need a toilet system.

For this, you really have a couple of options

- You can purchase and learn how to use a chemical or composting toilet like the one shown on the left here. They work well, and they cost up to \$1,000.
- If you want to investigate purchasing a pre-manufactured composting toilet, you can find them easily on the internet, so I'm going to move to the alternative. More buckets!
- The alternative is another 2-bucket Do-It-Yourself system recommended by FEMA and the State emergency agencies. This is an inexpensive solution, and it's worth focusing on for this discussion. It was a strategy that was adopted by New Zealand in their 2016 and later earthquakes which devastated the infrastructure in Christchurch, for example. Folks liked it and it proved an effective strategy for a very long time while they have repaired their systems.

Why TWO buckets?

Why 2 buckets? Separating Pee & Poo



POO in the plastic bag-lined
POO bucket.

Pee in the PEE bucket,
but always put toilet paper
in the POO bucket

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- Volume
- Pee is not toxic, but stinks with poo
- Poo is low volume, high toxicity, needs to be treated.

To separate Pee and Poo. And why separate PEE and POO?

- Most of the volume of your waste is in urine, and urine is not toxic, at least right away.
- Most of the odor from portapotties and public toilets comes from urine mixed with poo. Keeping them separate provides a much less unpleasant environment.
- You can dilute pee one-to-one and pour it on the ground, in your garden, or on your compost, or somewhere away from your living area. It won't breed bacteria there, and it won't smell a lot. And that takes care of most of your volume challenge. There are differing instructions on diluting pee before disposing of it; some say 4 to 1 water; it shouldn't be less than 1 to 1.

Poo is a lot less volume. On the other hand, poo contains microorganisms that can cause dysentery, cholera and a whole host of dangerous diseases.

- Remember the big quake in Haiti a few years ago? Rampant Cholera. A common problem when you don't have adequate sanitary facilities.
- For that reason, you need to keep poo separate and dispose of it carefully.



So, what is this 2-bucket system, how do you assemble it, and how do you use it? It's actually pretty easy. No drills required

- What do you need? Two plastic buckets, standard 5 gallon buckets available at Lowes, construction suppliers, Fred Meyer. These buckets don't need to be food-grade, but they do need to be sturdy enough to support your weight. You can get free used 5-gallon paint buckets from Metro, call 503-234-3000.
- Most big-box hardware stores have new branded buckets for about three dollars apiece. Restaurants, bakeries, food production facilities, paint stores, often have them available free.
- A toilet seat. You can adapt a regular toilet seat, or buy a seat that is designed for use with buckets. The Reliance Luggable Loo is what I have bought; it is sold at Sportsman's Warehouse, Dicks Sporting Goods, Cabela's, Walmart, REI, and numerous other local sporting goods retailers, for about 15 dollars, and they snap right on and off easily.
- You'll need a roll of sturdy, heavy-duty, plastic garbage bags. Sized 13 to 20 gallons. Trash compactor bags are recommended, because they are stronger. You are going to line your poo bucket with a bag so that you can empty your poo bucket simply and cleanly. Don't let the liner get more than half full before changing the liner. I'll talk about disposal of used bags in a minute.

- You'll need a supply of Carbon-based material. This can be sawdust, shredded newspaper, bark chips, dry leaves, peat moss, woodstove pellets – anything that's compostable carbon. Ask an office for a free bag of shredded paper. Get a free bag of sawdust from a lumber yard. I use a wood lathe and I generate lots of wood shavings and save a big bag of these for this purpose.
- The purpose of the carbon material is to create a cover layer in your poo bucket every time you use it. This will fill up your bag liner faster, but there are important reasons to do this:
 1. Covering up your poo will reduce odors
 2. Carbon is the source of material that will start the composting process for human waste. This will transform it into a safe material faster, and reduce the hazard of the material over time. BUT, don't make the mistake of creating a compost heap for poo next to your kitchen scrap compost. Poo processing is much more complicated and can take years – you don't want to be responsible for it.
 3. In the bucket, Keeping the poo covered with a layer of sawdust or leaves will keep flying insects away, which reduces the possibility of spreading infections.

TOILET STATION KIT

- Two (2) 5 gallon buckets with labels (Pee & Poo)
- two (2) *Luggable Loo* toilet seats to fit on buckets
- 13 gallon plastic bags to fit into poo bucket, plus wire twists to seal bags
- Shovel – just in case
- Supply of kitty litter (non-clay), sawdust, wood shavings or pellets
- Nitrile Gloves
- Supply of toilet tissue
- One seven gallon Reliance water tank (or Another 5 gallon bucket with attachable spigots for hand washing)
Plus another 5 gallon bucket to catch wash water
- Supply of Paper towels and/or hand towels
- Hand soap
- Container of hand sanitizer
- One 16x20 tarp for rain protection, and a structure to drape it on

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We have put together a handout which has a list of elements needed, pictures and average prices for everything in your two-bucket toilet station and we are happy to direct you to it on our website; we will also be sending it out along with a similar handout with our newsletter.

There are also websites with details of setting up 2-bucket Pee-Poo stations, and we will include the in our resource page:

- <https://preparednessmama.com/emergency-toilet/>
- <http://www.phlush.org/wp-content/uploads/2014/03/Twin-Bucket-Leaflet-in-pdf.pdf>



Where to put your toilet station?

For modesty, and to keep out of the rain, there are shelters like this one you can buy at REI or other camping and sports stores, or you can construct your own. Location depends on your particular circumstances – on your deck, on in a select place in the yard that is flat and easy to get to in the dark. It's important to have enough room to have pee and poo buckets next to each other so you can make sure the poo bucket always gets the toilet paper. If you have a big enough bathroom and are still living in your house, why not put them there?

You also need a wash station nearby, with a place to hold soap, water and towels. There are lots and lots of do-it-yourself designs on line, and ideas for pouring water, because you are not going to be using your sink. I am going to talk about this in more detail in the next section on hygiene.



What we haven't talked about is disposal.

Obviously, you may need to store your poo bags for quite a while, as pickup service is unlikely to be available for some period until utility services are restored.

- It's important that you do NOT bury these bags, as animals can and will dig them up and rupture the bags and create a mess.
- If you have an extra garbage bin, that can be a safe temporary storage for your family. Do NOT use recycle or garbage cans that you use for regular pickup by the garbage service. You won't want to use it for that after you've been storing poo in it. Your poo bin will have to be separate and stay safe until public services resume and can come pick up your stored bags.
- Your neighborhood might organize a common storage site that can be a temporary disposal station for a neighborhood's waste for a time. It needs to have sufficient capacity for the neighborhood, and be a secure container that is safe from children, pets, rats and flies.

A final note on the assembly and use of your sanitation station. Always be careful when bagging your contents. For example, wear disposable gloves, and afterwards, always wash your hands with soap and water, or alcohol-based hand sanitizer.

Three steps to stay healthy

- 1** Clean drinking water
- 2** Hand washing
- 3** Safe storage of **FOOD**

**WATER
SANITATION
HYGIENE**

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Nice Seque. Enough of toilet talk!

Let's switch to talking about hygiene – more need for clean water.



Hand Hygiene is Critical to Preserving Health

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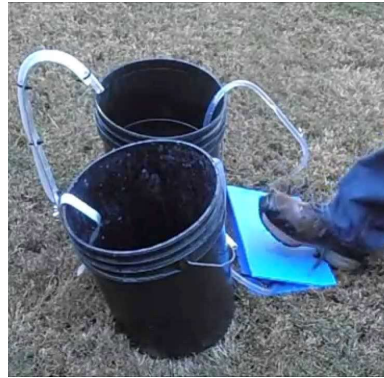
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I mentioned a wash station earlier. Hand hygiene is critical to preserving health. When you no longer have easy access to clean water, what will you need? You need a place for soaps, and a way to dispense water.

- Hand sanitizer is important to have for emergency use and when water isn't handy
- Foaming hand soap is handy when your hands are visibly dirty. It doesn't require water to lather up, helping you to save your stored water supplies.
- But, soap and water are still the best long-term solution to cleanliness. While I don't recommend using hypoallergenic soap in general because of its effect on resistant bacteria, it is a very good idea in this situation.



Hands-Free Hand Wash Stations

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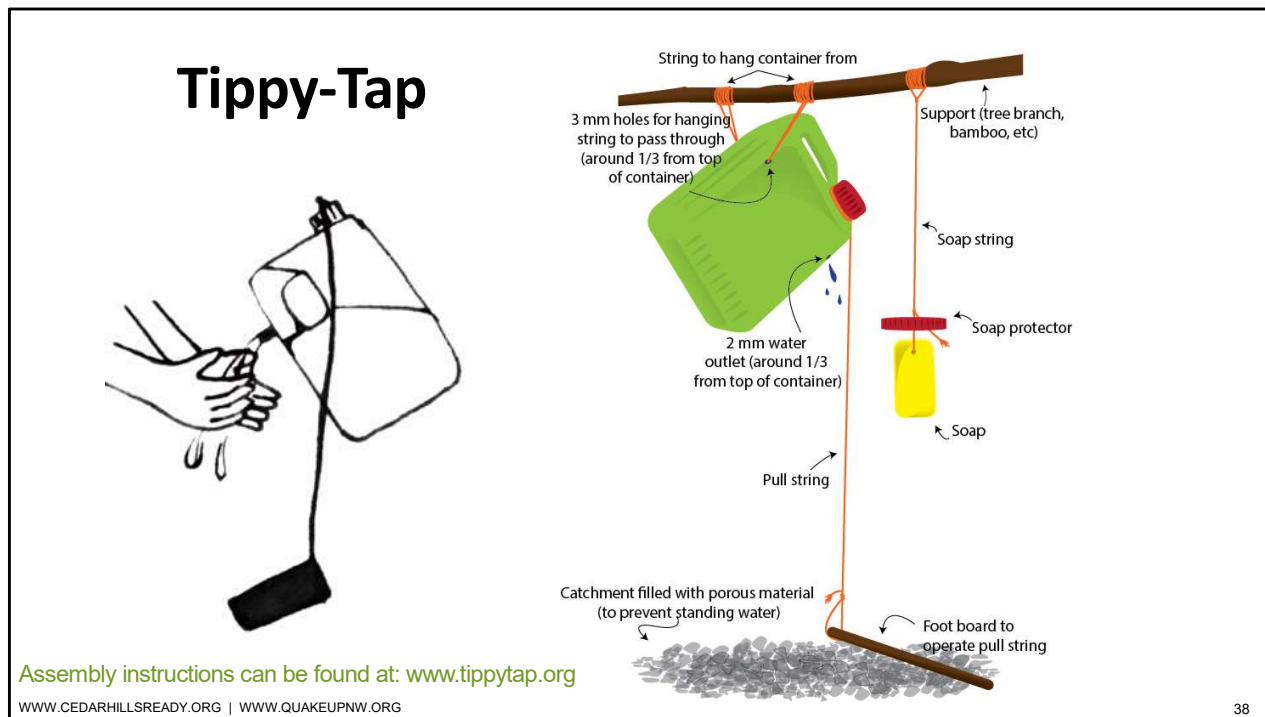
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There are commercially available Hands-Free Hand Wash stations on the internet, like the one shown on the left here.

There are also instructions on how to make your own like on the right hand picture. It requires a siphon, more buckets, and some hardware. Lots of instructions available on the internet.

The important point is to have a way to wash your hands without touching the spigot where the water comes out.



We recommend constructing what is called a Tippy Tap. It's not difficult to put together, requires few moving parts, and will allow you to wash your hands without touching a spigot.

A Tippy Tap is operated by a foot lever, and thus reduces the chance for bacteria transmission, as the user touches only the soap. It uses only 2 ounces of water to wash your hands, versus 17 ounces using a bowl. High-resolution instructions are available at WWW dot Tippy Tap dot org.

Hands-Free washing

Tippy Tap



Camp Table



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Where you situate your wash station will vary with your circumstances. You won't be using your kitchen sink, at least until the go-ahead is announced by the authorities; so you will need to set things up in a convenient place, and manage it like home. It's pretty much like camping.

Detailed instructions that are easy to follow are available on the CDC website; we have included that address on a sheet we are making available as a handout.

WaSH



WATER SANITATION HYGIENE

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Water, Water, Water. We are all going to need to find ways to manage our use of water to stay healthy and alive after a big Earthquake. I hope we have provided you with a sense of how important it is to be prepared to take over from Tualatin Hills Water and Sewer, at least for a while, because someday, each of us may have to.

And I hope we have provided some useful information and resources to put together the supplies you need. There is lots and lots of information on-line, and we have assembled a list of great website links, as well as downloadable handouts covering specific areas we have covered today - all of this available on our QuakeUp! site.

Get Prepared Now!

Cedar Hills Neighborhood Ready!

Resources List

For links and downloads see:
<https://tinyurl.com/chrwash21721>

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You can get there via this URL: tinyurl.com/chrwash21721. On that site, we also have our Get Prepared Now! Neighborhood Ready! Booklet for you to download, which includes all kinds of information to help you get prepared for disasters.

Thank you for listening.

NOW, I'll turn the meeting back over to Karen.

Karen?



Wrap Up & Q&A

Contact:

Info.CedarHillsReady@gmail.com

For links and downloads see for this meeting:

<https://tinyurl.com/chrwash21721>

To register for next month's meeting

"What goes into your go bag?" 7 PM, Wed, March 17th:

<https://tinyurl.com/chrgobag3-17-21>

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There lot of things to do to be prepared for in a disaster. Today, we've highlighted three of the most important things to think about... Water, Sanitation, and Hygiene. Preparing for a disaster may feel a bit overwhelming. It's a learning process, and we advocate you make a list and take one step at a time. Before we go into our Q&A session, I'd like to tell you a bit about what's up next for March 17th.

Next month, our topic will be, "What goes into your go bag?" We are seeing an increase in disasters that require fast evacuation or sheltering in place. For example, the Sept 2020 fires in Oregon required many of our friends and family to evacuate in with no time to spare. Some barely escaped with their lives. Did you learn anything about what supplies you may need in the ice storm this last weekend?

Join us on Wednesday, March 17th, 2021 at 7 PM. We'll talk about under-bed kits, car/work/school packs (for 1 - 2 days), go bags (for 5 day - 2 weeks), and home emergency supplies storage (for 3 weeks minimum). Go bags and emergency storage items is personal... there are some basics that we'll talk about, and then we will do breakout sessions where neighbors will discuss various disaster scenarios and discuss their own ideas on what may be needed. So come ready with your ideas, tips, and tricks. Register in advance: <https://tinyurl.com/chrgobag3-17-21>

So, now I'd like to turn this over to Barbara for our Q&A portion of the presentation. Our speakers will stay after for a bit to answer your questions. If you'd like to leave, that's also fine. Questions? [Respond to the questions. Then close the meeting. Reinforce address, website, phone number, etc.]



Thank You!

Contact:

Info.CedarHillsReady@gmail.com

For links and downloads see for this meeting:

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