

BAINBRIDGE PREPARES



★ ROCK STEADY ★

**WATER RESOURCE TEAM
FRED ST.AMOUR**



Why bother becoming individually

“Water Ready” ?

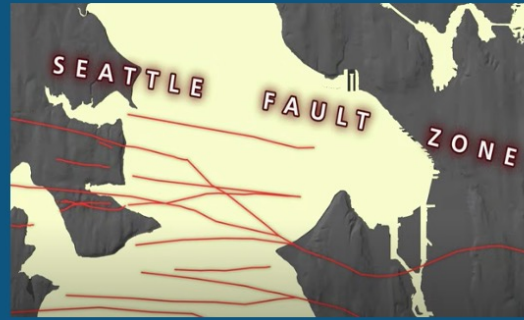
The "Event": Cascadia Earthquake

- ▶ Centered off Washington's west coast.
- ▶ Potentially a 9.0 earthquake followed by tsunami hitting west coast and arriving Bainbridge within 2 hrs
- ▶ Last occurrence: Jan 26, 1700.
Re-occurrences ~ every 320 yrs
- ▶ Impact on Bainbridge: Moderate shaking; inundation of lower elevations; Potential bridge & probable ferry disruption; potential water & waste water disruption.



The "Event": Seattle Fault

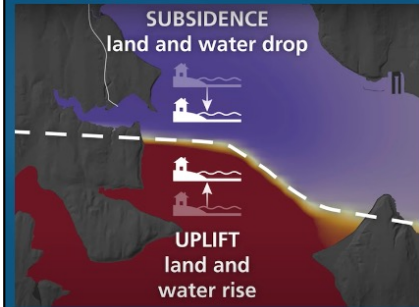
- ▶ Highest potential damage to Bainbridge
- ▶ Fault runs West-East through Bainbridge and Seattle.
- ▶ Potentially a 7+ earthquake followed by tsunami hitting Bainbridge within 3 min



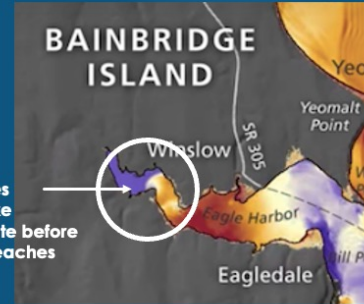
The "Event": Seattle Fault

- ▶ Up to 20 ft of terrain displacement
- ▶ 10+ ft inundation
- ▶ Bridge damaged or destroyed; ferry damaged / destroyed; Water and waste water severely damaged

Damage to local infrastructure and resources and injury to personnel are projected to be so severe in Seattle area that it will take weeks to mount effective response.



~ 3 minutes after quake to evacuate before Tsunami reaches Place 18



Reality Checks

- ▶ **Hurricane Ian (Sept 2022)** [Reference: <https://www.fema.gov/fact-sheet/hurricane-ian-response-and-recovery>]
 - ▶ 19 days after landfall to restore water, food, shelter logistics
 - ▶ 10 days to re-establish transport lines to Sanibel Island.
 - ▶ FEMA delivered ~2.9 mil gallons of water for an effected population of ~ 3 mil
 - ▶ That's 1 gallon per person in total, NOT "per person per day".
- ▶ **Loma Prieta Earthquake (San Francisco 1989)**
 - ▶ 7.1 magnitude
 - ▶ Reservoirs and tanks survived, but pipes were broken. Tanks had no earthquake valves, and therefore lost significant water.
 - ▶ For areas with water service, "boil water" notices in effect up to 7 days.
- ▶ **Cascadia 2022 After Action Report:** "Statewide water (hydration) critical infrastructure impacts, delivery system capabilities, supply chain demand and needs, and local water planning efforts are not well understood." [Reference: <https://mil.wa.gov/asset/6390e374e0f21> ; Page 14]

The Bottom Line

The cavalry is not coming.

We're on our own.

Be ready or deal with the consequences.



Fukushima tsunami: <https://www.youtube.com/watch?v=oWzdgBNfhQU>



Individual Water Readiness

Individual Water Readiness

Key Planning Considerations

- ▶ *How much do I need?*
- ▶ *How much water should I store?*
- ▶ *How should I store it?*

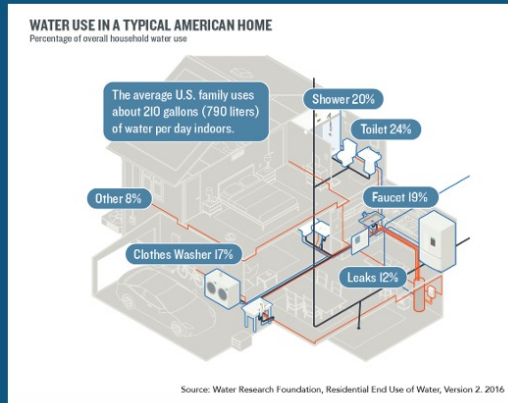
How much do I need?

Bainbridge Prepares and multiple state and federal agencies recommend having immediate access to not less than one gallon of water per person for 3 weeks.... = 21 gallons per person.

How much do I need?

Avg Washingtonian consumes an average of ~111 gallons of water a day at home

Reference:
<https://www.neefusa.org/story/water/home-water-use-united-states#Washington>



How much do I need?

Factors that increase water requirements

- Ill, infirmed, pregnant, infants, and elderly who require higher degrees of hygiene and hydration to remain healthy.
- Some medications recommend higher water consumption.
- Extended periods of heavy work in of high temperatures and humidity.
- Preparation of dehydrated foods.
- Care of pets and livestock
- Treatment of casualties.
- Damage to an d spillage from stored water supplies

How much do I need?

Bottom Line: Immediate access to a minimum of 30 gallons per person, ... but more is always better.

Personal Challenge: Try doing without any water other than for drinking for one weekend.

+ *Your current water sources will be interrupted and likely contaminated for weeks/months. Every neighborhood should create multiple methods for securing potable water.*

+ *Keep in mind that even with doubling the “one gallon per person per day” rule, you will need a radical reduction in your normal water usage habits: Americans use an average of 160 gallons of water per person per day. Even with a careful reduction in daily water use during an emergency, when you consider storing extra water for food preparation, washing hands, sanitizing surfaces and tools, and flushing toilets, that calculation starts to involve a huge amount of water.*

+ *For your pets and livestock, measure their water intake on a typical day and then account for seasonality (drinking more in warmer months) when including their water needs in your overall estimate.*

+ *Harvesting rainwater in barrels/cisterns: CATCHMENT AREA (in square feet) multiplied by the AVERAGE ANNUAL RAINFALL (in feet) multiplied by 7.48 (to convert cubic feet to gallons) equals the TOTAL RAINWATER FALLING ON*

THAT CATCHMENT IN AN AVERAGE YEAR.

How much should I store?

- ▶ 100% of the 30 gallons should be stored.
- ▶ Plan for:
 - ▶ Destruction of normal water distribution systems and lengthy delays in their repair.
 - ▶ Lengthy delays in delivery to Bainbridge of potable water.
 - ▶ Contamination or destruction of current natural ponds and streams

Plan for the worst, and hope for the best.

How should I store my water?

Under which conditions must I prepare water for use?

“Stay” or “Go”

1, Stay in your home, use your supplies, but be ready to evacuate with some of your supplies.

2, Go (evacuate) quickly with some of your supplies:

- On foot*
- In vehicle*

Easily portable yet rugged containers improve your adaptability to circumstances.

"Water Readiness" for "Stay at home"

1. **Minimum 30 gals per person**
Preferably 60 gals per person
(5 gal and 2.5 gal containers are available to make total weight manageable)



2. **Aquamira Water Treatment Kit**
(Treats stored water for 5 yrs)

3. **Chlorine bleach, unscented**
(Sterilize containers; treats water)

4. **Roller base for jugs (option):** *Makes it easy to move the water for cleaning of the storage area, elevates water above ground-level spills, and eases loading for evacuation.*



"Water Readiness" for "Stay at home"

Sample cost estimate

Line #	Item	Purpose	Quantity Required	Unit Price (Ex tax and shipping) [\$]	Total Price (Ex tax and shipping) [\$]	Purchase Link (Open this presentation in "presentation mode" and click on link below)
1	Water containers (2.5 gal)	BPA-free Water containers	12	\$ 36	\$ 432.00	Buy at Amazon
2	Aquamira Water Treatment Chems	Cleans, stabilizes 60 gal of water for up to 4 years	1 Kit	\$ 16.00	\$ 16.00	Sample vendor: Aquamira
3	Clorox Unscented Bleach	Sterilizes water containers; sterilizes water.	1 x 64 oz bottle	\$ 9.00	\$ 9.00	Sample vendor: Target Sample vendor: Ace Hardware
4	Dolly	Allows easy movement of heavy water containers	3	\$ 40.00	\$ 120.00	Bainbridge
Total					\$ 577.00	

Note: Neither Bainbridge Prepares nor its staff endorses any specific vendor of these supplies. Vendors are cited only as examples of suitable products.

"Water Readiness" for "Stay at home"

Prioritize the smaller jugs, and augment with larger containers (More is better!)

55 gal drum

Water treatment kit

Hand pump

Dolly



"Water Readiness" for "Stay at home"

Sample cost estimate: 55 gal containers

Line #	Item	Purpose	Quantity Required	Unit Price (Ex tax and shipping) [\$]	Total Price (Ex tax and shipping) [\$]	Purchase Link (Open this presentation in "presentation mode" and click on link below)
1	55 gallon drum kit	BPA-free Water container with water treatment kit and hand pump	1 kit	\$ 187.00	\$ 187.00	Sample vendor: Amazon
2	55 Gal wheeled dolly	Allows easy movement of heavy water containers	1 per 55 gal drum	\$ 70.00	\$ 70.00	Sample vendor: Amazon
Total					\$ 257.00	

Note: Neither Bainbridge Prepares nor its staff endorses any specific vendor of these supplies. Vendors are cited only as examples of suitable products.

"Water Readiness" for "*Stay at home*"

Berkey Filter



- *Gravity water filter*
- *1.5 gal to 6 gal capacities*
- *Removes a wide range of contaminants, including chemicals.*
- *Debris-heavy water should be pre-filtered before putting it through the Berkey system.*

"Water Readiness" for "Stay at home"

LifeStraw



- Gravity or suction water filter
- Excellent filtration of bacteria, parasites, suspended solids.
- Not effective on chemicals
- Should not be used on salt water
- Debris-heavy water should be pre-filtered before putting it through the LifeStraw

Want 50 more gallons at home?

Ensure you have a hose with a valve for your water tank (~ \$25)



Purchase a 6' section of hose and a simple on / off valve. (Available at Ace Bainbridge Island)

This allows you to quickly and easily dispense water from your water heater into smaller containers.

"Water Readiness" for "*Stay at home*"

Ideas for Neighborhood Water Resources

"Water Readiness" for "Stay at home"

If space inside individual residences is a challenge, but space is available in yards, consider establishing a neighborhood storage shed.



Some residence and multi-family buildings lack ample space to store emergency water. If space is available in yards, consider establishing a community water shed, funded by contributions from neighbors. Individual water containers might be jointly owned or individually owned.

"Water Readiness" for "Stay at home"

Rain water collection can add substantially to water readiness for individuals and entire neighborhoods, but you'll need to understand how to:

- *Ensure tank and piping survive earthquake and tsunami*
 - *Consider flexible pipe connections*
- *Make that water potable*
 - *Be prepared to filter and treat*
- *Economically dispense the water it contains.*
 - *Do you need a hose and valve?*



Some residence and multi-family buildings lack ample space to store emergency water. If space is available in yards, consider establishing a community water shed, funded by contributions from neighbors. Individual water containers might be jointly owned or individually owned.

"Water Readiness" for "Go on foot"

Objective: Water for now; water for later

2 qts water in metal containers




Gravity filter



Transfer pump



All in your "Go Bag"



Total 5.5 lbs
\$170 (ex tax)

Water treatment tabs



Metal containers are reusable, survivable and easily sterilized.

Gravity filter and water treatment tablets allows you to make potable water from suspect water regardless of the location to which you temporarily evacuate.

Transfer pump allows you to easily and economically move water from large to smaller containers, speeding the process and reducing waste.

"Water Readiness" for "Go on foot"

Sample cost estimate

Line #	Item	Purpose	Quantity Required	Unit Price (Ex tax and shipping) [\$]	Total Price (Ex tax and shipping) [\$]	Purchase Link <small>(Open this presentation in "presentation mode" and click on link below)</small>
1	Water bottles	2 quarts for Go bag	2	\$ 45.00	\$ 90.00	<u>Sample vendor:</u> Amazon
2	Waterdrop Gravity Water Filter	Filter water when stationary	1	\$ 30.00	\$ 30.00	<u>Sample vendor:</u> Amazon
3	Hand water pump Aquatabs 397mg Water	transfer water from large to small containers	1	\$ 42.00	\$ 42.00	<u>Sample vendor:</u> Amazon
4	Purification Tablets (100 Pack).	treat water after filtration	1	\$ 30.00	\$ 30.00	<u>Sample vendor:</u> Amazon
Total					\$ 192.00	

Note: Neither Bainbridge Prepares nor its staff endorses any specific vendor of these supplies. Vendors are cited only as examples of suitable products.

"Water Readiness" for "Go in vehicle"

Load your Go Bag first, then as much added water as you can within available time.



Portability of containers improves your adaptability to circumstances.

Long Term Water Storage

Your water should be stored to ensure post-event it is:

- ▶ **Survivable:** To be useful, your water containers must survive the event intact. Consider storing your water under a well-built shelf, and off of the floor.
- ▶ **Accessible:** Your water must be accessible after the event. Make it easy / quick to access and easy / quick to load in your car or carry with you.
- ▶ **Portable:** Use containers that you can use wherever you need them, at home, on foot, or in car. Ensure your water is stored in containers you can carry and load quickly in your car or carry with you on foot. Consider having different sizes of containers, depending on where you might use it. Adaptability of the key.



Long Term Water Storage

- ▶ Use BPA-free, rugged containers
 - ▶ Clear retail containers are convenient but not sufficiently rugged to survive initial impact nor use under exceptional conditions.
- ▶ Store in cool (not freezing), dry, dark, clean area
- ▶ Protect against contamination & pests

Follow Up Information

- ▶ Erik will email this presentation to the MYN captain for distribution to the neighborhood.



Now, let's get ready.

Thank you!