



Snohomish County Health Department advises you to follow health and safety precautions when preparing for, or returning home after a flood. This *Emergency Flood Sanitation* fact sheet addresses:

- **flood preparation**
- **water sanitation**
- **disinfection of a well**
- **food contamination**
- **sewage and garbage disposal**
- **electrical safety**
- **household effects**
- **building clean up**
- **important resources**



Flood waters might be contaminated and can make you sick if you drink it or eat flood-contaminated food. If you have an open sore or wound, keep the wound as clean as possible as soon as possible by washing with soap and clean water.

Parents, do not allow children to play in flood waters or with toys the flood water touched. Disinfect contaminated toys with a solution of 1 cup of bleach in 5 gallons of water. Wash children's hands frequently, and always before meals.

Shut off all electrical power and natural gas or propane tanks. Returning home in daylight is best. If you have to get there in the dark, use battery-powered flashlights and not candles or gas lanterns. Notify the gas company or the police/fire departments immediately if you smell gas or suspect a gas leak.



Do you have a safe drinking water supply? If you are on a public water supply, check with your local water Department for current conditions. If you are on a well or private water system, please read "Disinfection of a Well" on page 3.

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## **FLOOD PREPARATION**

1. Have emergency food, water and medical supplies in a convenient dry place. Food should require little cooking and no refrigeration.
2. Store water in thoroughly washed containers. Plastic containers such as soft drink bottles are best. Seal tightly, label them and store in a cool dark place. Rotate water every 6 months.
3. Keep liquid chlorine household bleach handy for use in disinfecting water and clean up.
4. Protect food freezers and refrigerators, particularly if they are in a basement. Units should be raised or removed entirely.
5. If water rises, protect the water supply equipment. Remove the electric pump to a safe location to protect the motor.
6. Remove the sump pump before water reaches the basement. The pump will be useful in later clean-up operations if you have kept it dry.
7. If time permits, turn off all utilities at the main power switch and close the main gas valve before you evacuate the building. Don't touch electrical equipment unless it is in a dry area.

## **WATER SANITATION**

**Drinking water** – Do not use water from a private water system that's been flooded. Use only boiled or treated water. Bring the water to a full rolling boil for 1 minute before using. Water for brushing teeth, washing dishes, or preparing food requires the same treatment as drinking water.

1. If you need large quantities of water or if boiling is inconvenient, use ordinary liquid household chlorine bleach to treat the water. Household bleach is usually 5.25 to 8.25% chlorine. **Don't use bleach that contain perfumes, dyes, or other additives.** Be sure to read the label. Filter cloudy water before adding bleach. Using a clean container, add 1 teaspoon to each 5 gallons of water, or 1/4 teaspoon to a gallon of water. Allow the mixture to stand for 60 minutes before using.
2. Purifying tablets or chemicals designed for camping or backpacking can also treat water effectively. Always follow directions on the package.

*\*Boiling, bleach, and other treatments intended to destroy pathogens in water will not remove other pollutants such as chemicals or toxic metals. Also note that bleach will not kill some disease-causing organisms such as cryptosporidium. Boiling is the surest method to kill disease-causing germs.*

3. Once flood waters recede and power returns, the well will need to be disinfected.

**NOTE:** If you are on a public water supply and your area has flooded, check with your local water Department or company about current conditions. Boil your water for 1 minute if you see any indications of problems with water quality.

## **DISINFECTION OF A WELL**

Snohomish County Health Department recommends following the CDC's guidance for disinfecting a well after an emergency (<https://www.cdc.gov/disasters/wellsdisinfect.html>). Below are the CDC's steps listed, current as of November 2023. Visit the link above for the most up-to-date information.

### **Safety Precautions**

*Clear hazards away from wells before cleaning and disinfecting them. Follow these precautions:*

- *Turn off all electricity to the well area before clearing debris. Do not attempt to repair the water system unless you are experienced with this type of work: electrical shock can occur. Inspect all electric connections for breaks in insulation and for moisture. Connections must be dry and unbroken to avoid electric shock.*
- *Carefully inspect the area around the well for hazards such as power lines on the ground or in the water; sharp metal, glass, or wood debris; open holes; and slippery conditions.*
- *Do not enter the well pit. Gases and vapors can build up in well pits, creating a hazardous environment. Clear debris from dug wells using buckets, grappling hooks, nets, and long-handled scoops.*
- *Before the power is turned back on for the well, a qualified electrician, well contractor, or pump contractor should check the equipment wiring system.*
- *Wear protective goggles or a face shield when working with chlorine solutions. Chlorine solutions may cause injury to the eye, irritate skin and damage clothing.*
- *Work in well-ventilated areas and avoid breathing vapors when mixing and handling chlorine solutions.*
- *Warn users not to drink or bathe in water until all the well has been disinfected.*

### **Disinfection of Bored or Dug Wells**

*Bored and dug wells can be difficult to disinfect because the shallow depth and inadequate protection from flood water can allow contaminants to re-enter the well.*

**IMPORTANT:** *Bored or dug wells contaminated with fuel or toxic chemicals will not be made safe by disinfection. If your water smells like fuel or has a chemical odor, contact your local, state, or tribal health department for specific advice.*

*Follow these steps to disinfect bored or dug wells:*

1. *If the well has an electrical pump, turn off all electricity and clear debris from around the top of the well.*
2. *Repair the electrical system and pump if needed. Contact a qualified electrician, well contractor, or pump contractor if you are not experienced with this type of work.*
3. *Start the pump and run water until it is clear. Use the outside faucet closest to the well to drain potentially contaminated water from the well and keep unsafe well water out of*

the interior household plumbing. If there isn't a pump, bail water from the well with a bucket until water is clear.

4. If the well is connected to interior home plumbing, close valves to any water softener unit.
5. Use Table 1 below to determine the amount of liquid household bleach needed to disinfect the well. Use only unscented bleach.

Table 1. Approximate amount of bleach for disinfection of a bored or dug well

Depth of Water	Diameter of Well					
	0.5 foot	1 foot	2 feet	3 feet	4 feet	5 feet
10 feet	½ cup	1 ¾ cups	7 cups	1 gal	1 ¾ gal	2 ¾ gal
20 feet	1 cup	3 ½ cups	14 cups	2 gal	3 ½ gal	5 ½ gal
30 feet	1 ½ cups	5 ¼ cups	1 ¼ gal	3 gal	5 ¼ gal	8 ¼ gal
40 feet	2 cups	7 cups	1 ¾ gal	4 gal	7 gal	11 gal
50 feet	2 ½ cups	8 ¾ cups	2 ¼ gal	5 gal	8 ¾ gal	13 ¾ gal

**Notes:**

- Use only unscented household liquid chlorine bleach.
- Bleach concentrations are generally between 5%-9%.
- Quantities given in this table are approximate and are rounded to the nearest practical measurement. Amounts given are calculated in accordance with reaching a chlorine concentration of > 100 mg/L

**Key:**

- gal: gallon
- 1 cup = 8 fluid ounces
- 1 gallon = 16 cups

6. Using a 5-gallon bucket, mix the bleach from Table 1 with 3-5 gallons of water (12-19 liters).
7. Add the bleach water mixture to the well. Avoid all electrical connections. Attach a clean hose to an outside faucet and use it to circulate water back into the well for thorough mixing. If there isn't a pump, mix water by pouring it back into the well using a bucket.
8. Rinse the inside of the well casing with a garden hose or bucket for 5-10 minutes.
9. Open all faucets inside the home and run the water until you notice a strong odor of chlorine (bleach) at each faucet. Turn off all faucets and allow the solution to remain in the well and plumbing for at least 12 hours.
10. After at least 12 hours, attach a hose to an outside faucet and drain the chlorinated water onto an area without plants or vegetation, such as a driveway. Continue draining until the chlorine odor disappears. Avoid draining into open sources of water (streams, ponds, etc.).
11. Turn on all indoor faucets and run water until the chlorine odor disappears.
12. Until well water has been tested, boil it (roiling boil for 1 minute) before using or use another alternative water source. Wait at least 7-10 days after disinfection, then have the water in your well tested. Water testing cannot be done until all traces of chlorine have been flushed from the system.

## Disinfection of Drilled or Driven Wells

Follow these steps to disinfect drilled or driven wells:

1. If the well is equipped with an electrical pump, turn off all electricity and clear debris from around the top of the well.
2. Repair the electrical system and pump if needed. Contact a qualified electrician, well contractor, or pump contractor if you are not experienced with this type of work.
3. Start the pump and run water until it is clear. Use the outside faucet closest to the well to drain potentially contaminated water from the well and keep unsafe well water out of the interior household plumbing. If there isn't a pump, bail water from the well with a bucket or other device until the water is clear.
4. If the well is connected to interior home plumbing, close valves to any water softener units.
5. Use Table 2 to determine the amount of liquid household bleach needed to disinfect the well. Use only unscented bleach.

Table 2. Approximate amount of bleach for disinfection of a drilled or driven well

Depth of Water	Diameter of Well Casing						
	2 in.	4 in.	6 in.	8 in.	10 in.	24 in.	36 in.
10 feet	$\frac{3}{4}$ Tbsp	3 $\frac{1}{4}$ Tbsp	$\frac{1}{2}$ cup	$\frac{3}{4}$ cup	1 $\frac{1}{4}$ cups	7 cups	1 gal
20 feet	1 $\frac{1}{2}$ Tbsp	6 $\frac{1}{2}$ Tbsp	1 cup	1 $\frac{1}{2}$ cups	2 $\frac{1}{2}$ cups	14 cups	2 gal
30 feet	2 $\frac{1}{4}$ Tbsp	9 $\frac{3}{4}$ Tbsp	1 $\frac{1}{2}$ cups	2 $\frac{1}{4}$ cups	3 $\frac{3}{4}$ cups	1 $\frac{1}{4}$ gal	3 gal
40 feet	3 Tbsp	13 Tbsp	2 cups	3 cups	5 cups	1 $\frac{3}{4}$ gal	4 gal
50 feet	3 $\frac{3}{4}$ Tbsp	1 cup	2 $\frac{1}{2}$ cups	3 $\frac{3}{4}$ cups	6 $\frac{1}{4}$ cups	2 $\frac{1}{4}$ gal	5 gal
100 feet	7 $\frac{1}{2}$ Tbsp	2 cups	5 cups	7 $\frac{1}{2}$ cups	12 $\frac{1}{2}$ cups	4 $\frac{1}{2}$ gal	10 gal

### Notes:

- Use only unscented household liquid chlorine bleach.
- Bleach concentrations are generally between 5%-9%.
- Quantities given in this table are approximate and are rounded to the nearest practical measurement. Amounts given are calculated in accordance with reaching a chlorine concentration of > 100 mg/L

### Key:

- Tbsp: tablespoon
- gal: gallon
- 1 cup = 8 fluid ounces = 16 tablespoons
- 1 gallon = 16 cups

6. *Using a 5-gallon bucket, mix the bleach from Table 1 with 3-5 gallons of water (12-19 liters).*
7. *Remove the vent cap.*
8. *Pour the bleach water mixture into the well using a funnel. Avoid all electrical connections. Attach a clean hose to the nearest outside faucet and use it to circulate water back into the well for thorough mixing.*
9. *Rinse the inside of the well casing with a garden hose or bucket for 5-10 minutes.*
10. *Open all faucets inside the home and run the water until you notice a strong odor of chlorine (bleach) at each faucet. Turn off all faucets and allow the solution to remain in the well and plumbing for a minimum of 12 hours.*
11. *After at least 12 hours, attach a hose to an outside faucet and drain the chlorinated water onto an area without plants or other vegetation, such as a driveway. Continue draining until the chlorine odor disappears. Avoid draining into open sources of water (streams, ponds, etc.).*
12. *Turn on all indoor faucets and run water until the chlorine odor disappears.*
13. *Until well water has been tested, boil it (rolling boil for 1 minute) before using or use another alternative water source. Wait at least 7-10 days after disinfection, then have the water in your well sampled. Water sampling cannot be done until all traces of chlorine have been flushed from the system.*

### **Sampling After Disinfection**

- *Wait at least 7 to 10 days to test the water after disinfection to ensure that the chlorine has been thoroughly flushed from the system. Until well water has been tested, boil it (rolling boil for 1 minute) before using or use another alternative water source.*
- *Contact your local health department for water sampling and testing information or contact your state laboratory certification officer to find a certified lab near you. You can also get water sampling information from the U.S. Environmental Protection Agency's Safe Drinking Water (800-426-4791).*
- *Sample the water for total coliform and either E. coli or fecal coliform bacteria to confirm that the water is safe to drink.*
- *If results show no presence of total coliforms or fecal coliforms, the water can be considered safe to drink.*
- *Follow up with two more water tests, one in the next 2 to 4 weeks and another in 3 to 4 months.*
- *Check the safety of your water over the long term: continue to monitor bacterial quality at least twice per year or more often if you suspect any changes in your water quality.*

*If results show the presence of any coliform bacteria, repeat the well disinfection process and test again. If tests continue to show the presence of bacteria, contact your local health department for assistance.*

### **Disinfection Issues and Concerns**

*The disinfection process may damage water softeners due to the large amounts of chlorine used. Follow your manufacturers' instructions for appropriate methods to disinfect your softener unit. You will need to bypass the unit until completing the disinfection process.*

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### **Environmental Health Division**

3020 Rucker Avenue, Suite 104 ■ Everett, WA 98201-3900 ■ fax: 425.339.5254 ■ tel: 425.339.5250

### **FOOD CONTAMINATION**

1. Destroy foods, medicines, and cosmetics in cardboard containers or other packages that are not hermetically sealed, and which have been in contact with flood waters. This includes flour, cereal and other commodities in bags or packages. Cans should be rinsed in a dilute bleach solution before opening.
2. Discard fresh fruit and vegetables which have been contaminated.
3. Use only commercially pasteurized or canned milk that has not touched flood waters.
4. If the refrigeration is off for more than 4 hours, some foods may become unsafe for consumption. Contact us for advice, 425.339.5250.
5. If the power is off, you can use dry ice from the nearest source (such as dairies) to preserve food for many hours.
6. When in doubt about the safety of any food or drug product, throw it out.

### **SEWAGE AND GARBAGE DISPOSAL**

1. Check your septic tank and pump it out after flood waters recede. You may need to replace your septic system if it is severely damaged or corroded.
2. If you use a temporary pit privy, put lime in the pit frequently to keep down odors and flies, and again when you abandon the pit.
3. Garbage should be taken to a county drop-box or transfer station for proper disposal.

### **ELECTRICAL SAFETY**

Wet or flooded fixtures and wires present a serious threat of fire or electrocution. To reduce the danger of electrical shock or fire, do not attempt to use electricity until it is thoroughly checked by a qualified professional.

### **HOUSEHOLD EFFECTS**

1. Use soap and water to thoroughly scrub all your household belongings made of wood, metal or of other hard substances, including glass and chinaware. Allow them to dry.
2. Thoroughly launder or dry clean clothing, bedding and other effects made of soft materials. Mattresses and stuffed furniture cannot be adequately cleaned, even with steam. Discard them.
3. Dry wet-washed items for 10 hours in direct sunshine when possible.
4. Wash your hands in soap and water immediately after handling objects you have recovered from the flood areas. Keep your hands away from your mouth while cleaning or otherwise handling these objects.

## **BUILDING CLEAN-UP**

1. Clear out trash and mud and remove from building. Arrange for a dumpster with your refuse collection company.
2. Flush with clean water with a hose under pressure, if possible. Do not use river water.
3. Scrub floors and walls and all other surfaces which people are likely to touch. Do this with soap and hot water. Rinse thoroughly with clean water. Drain off water.
4. After scrubbing flooded surfaces, use a disinfectant solution (1 ounce of household bleach to 4 gallons of water).
5. Open all doors and windows and allow the entire building and everything in it to dry thoroughly. Do not reoccupy the building for at least 10 hours after it's dry.
6. Check flues, chimneys, wiring and plumbing.
7. Check for weakened foundations, warped doors and windows.
8. Flood waters may carry a variety of germs and contaminants. Wash your hands frequently with soap and disinfected water to prevent the spread of disease. Wear gloves and boots at all times.
9. If sewage has overflowed within the residence, refer to the Snohomish County Health Department's "Guidelines for Cleaning Indoor Sewage Spills" for clean up procedures.

## **OTHER RESOURCES**

For more information regarding flood hazards and assistance, contact the following agencies:

### **Snohomish County Department of Emergency Management**

<http://www.snohomishcountywa.gov/180/Emergency-Management>

720 – 80<sup>th</sup> St SW – Bldg A, Everett 98203

425.388.5060

Flood Information – 24-hr recording

- Skykomish, Snohomish, Snoqualmie: 425.388.3653
- Stillaguamish: 425.388.3702

### **American Red Cross**

<http://www.snohomishcounty.redcross.org/>

Snohomish County Chapter, 2530 Lombard Avenue, Everett 98201

Phone: 425.252.4103