FLOOD RESPONSE RESOURCE

Safe Drinking Water from Wells in Flooded Areas

UNIVERSITY OF MINNESOTA EXTENSION

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If your well has been inundated with floodwater, you need to disinfect it to ensure a safe domestic water supply to protect your family's health. Floodwater carries bacteria, viruses, parasites, and other pathogens (disease-causing organisms), as well as chemicals.

Diseases such as dysentery, hepatitis and giardiasis can be transmitted through private wells that have been contaminated by floodwaters. Man-made chemicals—such as pesticides, solvents and petroleum-based products—can pose a health risk. This is a very minor risk, since it will flush out as soon as the well is pumped.

Sediment that enters your well during flooding can cause problems for your pumps and plumbing system. Bacteria that create a rotten-egg smell and stain plumbing fixtures or laundry may also be introduced by floodwaters. Although these do not present a health risk, they are a nuisance that can be eliminated through disinfection.

Safe water supply

If the floodwater covered your wellhead (the top of the well at or above ground level) you need to disinfect the well and then test to make sure pathogens have been eliminated. If you have a shallow sandpoint or driven well and floodwaters approached it, even if the well was not inundated you should disinfect it to ensure a safe water supply.

Boiling your water at a full rolling boil for one minute should be used as a temporary measure to protect against contaminating bacteria. Household water treatment systems will not provide sufficient protection and should also be disinfected. Sediment can clog these systems and high levels of certain chemicals can over load their capacity. Membranes, cartridges and filters within water treatment devices should be replaced. Water softeners and water heaters should also receive special attention because they will serve as sources to reintroduce bacteria into your water system if not properly disinfected.

Bacteria and other living organisms can be killed through disinfection with chlorine, but disinfecting the well will not remove other chemicals or sediment. If you suspect nitrate or man-made chemicals have been introduced to the well, use an alternate water supply until you can confirm it is safe. Purchase or carry your water from a known safe source.

Shock chlorination of a private well is a relatively simple process, but contractors or plumbers could be hired to disinfect it for you. It is important to thoroughly disinfect both the well and the household plumbing so that no places remain where bacteria pathogens can survive to recontaminate your water supply.

Chlorine bleach will not be as effective if the water is muddy or cloudy, so you should wait until the water is clear before you begin to disinfect it. You can pump water for several hours to see if that clears up such muddiness, but if pumping does not work you may just have to wait for the sediment to settle before you disinfect your water. If you do pump the well for an extended period of time, do not run all that water into your septic system. Drain it away from the house through a hose.

How to disinfect

To guarantee that pathogens are completely eliminated, you need to expose them to chlorine at a sufficient concentration for an adequate time period. Thus, both the amount of chlorine you add and the length of time you allow it to stand are important considerations. The chart in this fact sheet will help you judge how much bleach to add, depending on the diameter and depth of water in your well. The chlorine bleach should be diluted with water so you are not working with a concentrated solution. Be careful not to exceed recommended levels of chlorine bleach, because the excess will be hard to remove from your system and it can adversely affect your water's taste.

For a shallow well, you can use any laundry bleach containing a 5.25-percent hypochlorite solution.

Diameter of Well (in)	Depth of Water in Well (feet)							
	50 or less	100	150	200	250	300	350	400 or more
2	1/4	1/4	1/4	1/4	1/2	1/2	1/2	1
4	1/4	1/2	1	1	1 1/2	1 1/2	2	2
5	1/2	1	1	1 1/2	2	3	3	3
6	1/2	1	1 1/2	2	3	3	4	4
8	1	2	3	4	5	6	7	8

Table 1. Amounts of chlorine bleach (in quarts) to use for disinfecting wells

For a deeper well, you may want to use chlorine in a solid tablet or pellet form (sodium hypochlorite), available from well drillers. The pellets settle to the bottom of the well and dissolve to ensure the entire water column is disinfected.After you have disinfected the well and household plumbing, it is very important to do a follow-up test

to make sure the water supply is safe. The procedure described below should make your well safe, but any bacteria remaining in the system will reproduce and will be detectable in a water test after 48 hours.The water should be tested at a lab certified by the Minnesota Department of Health. A list of certified labs is available at your local public health department. Test for coliform bacteria and nitrate-nitrogen as indicators of water contamination. Single-page fact sheets on bacteria and nitrate are available at no charge from University of Minnesota Extension, extension.umn.edu, or the Minnesota Department of Health, health.state.mn.us. Tests for coliform bacteria and nitrate-nitrogen will cost about $25 to $30 at a certified lab.If a test shows lingering bacterial contamination, shock chlorinate again and retest. If there is nitrate contamination above the health based advisory of 10 parts per million, find an alternative water supply until the problem is resolved. The well should be tested again in about three months to be sure that bacteria have not returned.

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Steps for disinfecting

Step 1 Remove cap from the well. There are many types of well caps. If you have questions, contact a certified well driller for assistance. There are certain guidelines for wells with submersible pumps to ensure the chlorinated water gets past the pump seal.

Step 2 Mix the appropriate amount of bleach and water in a large bucket to avoid handling the concentrated bleach. Bleach must be properly diluted. Use 12 parts of water to one part of bleach. For example, if the water in your well is 100 feet deep and your well has a six-inch casing, mix one quart of bleach into 12 quarts of water. Pour the mixed chlorine/water solution down the well, trying to coat the sides of the casing as you pour. If you get chlorine on the pump or wiring, flush thoroughly with fresh water so the stainless steel or other surface coating doesn't corrode.

Step 3 Turn off and drain the water heater. Chlorine is not as effective at temperatures above 105 degrees. You may want to bypass your water softener, but if contaminated water has passed through the softener, you must take steps to disinfect it also.

Step 4 Run water through all service lines in the house until you detect the odor of chlorine at each tap. Make sure you run the chlorinated water through every faucet in the system. You may also want to flush the toilets.

Step 5 Let the chlorinated water stand in the system for 8 to 12 hours.

Step 6 Flush out the system beginning with your well. Use a hose connected to an outside faucet and flush the system to a ditch or driveway. This large volume of chlorinated water should not be flushed through your septic system or run on delicate plants or the lawn. After water from the well is free of the chlorine odor, flush the rest of the household plumbing. This small volume of chlorinated water in your service pipes should not damage the septic system.

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Septic Systems: After the Flood

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According to University of Minnesota Extension and the Onsite Sewage Treatment Program (OSTP) staff, if you have a septic system that is in the area affected by the recent flooding, there is potential for damage to the system. However, you can take action after the flooding to minimize the damage. When floodwaters cover your septic system it should not be used. If the drainfield or ground above your septic tank floods, your individual sewage treatment system is not working.

If your system was flooded

The OSTP staff recommends the following steps to help your system recover:

Pump the tank(s) as soon as possible after the flood recedes and prior to resuming use of the system. Be sure to pump both the septic tank and the pump/lift station (if you have one). Silt and other debris may have collected in your septic tank while it was under water which could ultimately find its way to and damage the drainfield. Additionally, a variety of substances such as pesticides, petroleum products and other contaminants may have entered the tank. These contaminants could be detrimental to the beneficial bacteria in both the tank and the drainfield and therefore need to be removed. However, it is not advisable to leave the septic tank empty after pumping if the soil around the area of the tank(s) is saturated; this can cause the tank to "float" toward the ground's surface if the soil's water pressure remains high. If you have this concern, consult a licensed tank pumper/ maintainer.

Locate and protect the drainfield from compaction by keeping all traffic off the area. Often considerable traffic takes place around a flooded home as flood cleanup and home restoration occur. This traffic could include but is not limited to foot traffic, debris piles, dumpsters, and heavy equipment. Compaction reduces the capacity of your drainfield to treat wastewater and could lead to the early failure of your entire system.

Check electrical connections for damage or wear before turning electricity back on.

Check that the septic tank manhole cover is secure and that inspection ports have not been blocked or damaged. Check for animal damage or intrusion in the drainfield area.

Check the vegetation over your septic tank and drainfield. Repair erosion damage; sod or reseed as necessary to provide a good plant cover. You may need to mulch the area to provide insulation if the grass has not become well established before winter.

Inside your home, be sure to disinfect thoroughly if sewage backed up into the house or garage. Disease-causing organisms (pathogens) in wastewater can cause serious illness, such as dysentery, hepatitis and other waterborne illnesses. However, avoid flushing disinfectants into drains which empty into the septic system, or clean before pumping. The disinfectants could be detrimental to the beneficial bacteria in both the tank and the drainfield. If you need to chlorinate your well, follow the instructions fully on the University of Minnesota *Safe Drinking Water from Wells in Flooded Areas* fact sheet. Do not allow the bleach to enter your septic system.

If after the floodwater has receded from the drainfield and the surrounding soil has had a chance to dry, but the drainfield still will not accept effluent from the septic tank, the drainfield pipes or soil might be "plugged." At this time the homeowner should consult a licensed septic system professional.

If homeowners have additional concerns they should discuss them with a local septic system permitting authority or a licensed septic system professional.

If you have a drainfield that has not been flooded, but is soggy due to heavy rain, minimize water use within the home. The additional water added due to household use can cause poorly treated sewage to surface in your yard or raw sewage to back up into your house. You can minimize water use within the house in a variety of ways, including taking shorter showers or baths and not doing laundry until the drainfield begins to dry out.

If portions of your system were destroyed

Often flood waters can cause components of septic systems to be partially or completely washed away. The owner of such a system should not assume that soil or other "fill" can be added and new system components constructed.

Heavy rains can cause slides to partially or completely cover septic system components with rock, mud, or silt. These slides can affect the operational integrity of the system, especially the drainfield. Care needs to be taken for slide debris removal from the area on or around a septic system in order to protect system components, taking special care to keep vehicle and equipment traffic off the drainfield to avoid compaction.

If your drainfield is saturated or has standing water not caused by flooding or heavy rain, you may have a long-term problem.

For any of the problems listed above, contact a licensed septic system professional or the local septic system permitting authority to discuss options that will meet state and local codes.

Source: University of Minnesota Onsite Sewage Treatment Program staff

For more information visit **septic.umn.edu** or **extension.umn.edu**.

The Septic System Owner's Guide is an excellent resource for more information. To order, call **800-876-8636** or go to **shop.extension.umn.edu**.

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