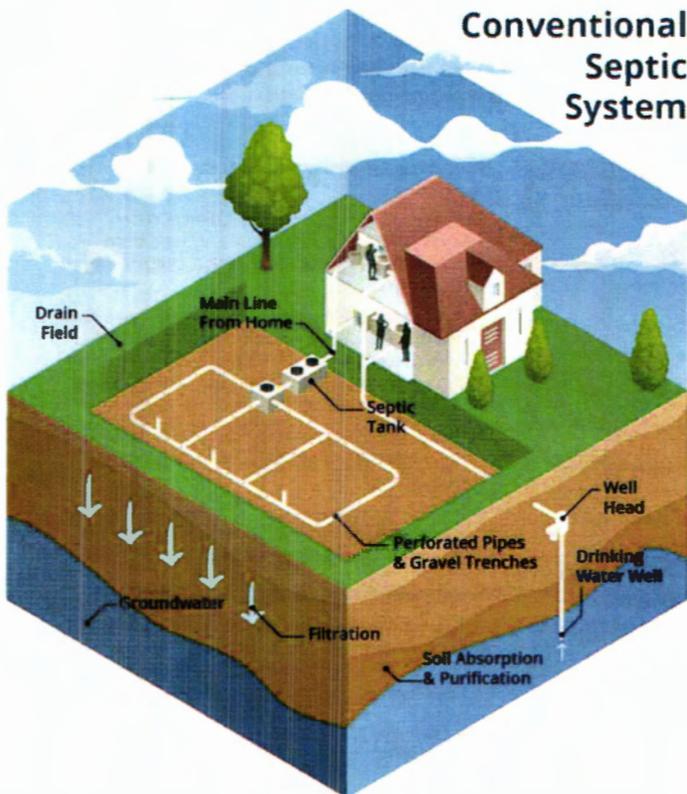


SEPTIC SYSTEMS

What should you do if flooding occurs?



Conventional
Septic
System

water needs to drain freely in the drainfield. Under flooded conditions, water can't drain properly and can back up in your system. Remember that in most homes all water sent down the pipes goes into the septic system. Clean up floodwater in the house without dumping it into the sinks or toilet.

- **Avoid digging around the septic tank and drainfield while the soil is water logged. Don't drive heavy vehicles or equipment over the drainfield.** By using heavy equipment or working under water-logged conditions, you can compact the soil in your drainfield, and water won't be able to drain properly.
- **Don't open or pump out the septic tank if the soil is still saturated.** Silt and mud can get into the tank if it is opened and can end up in the drainfield, reducing its drainage capability. Pumping under these conditions can cause a tank to pop out of the ground.
- **If you suspect your system has been damaged, have the tank inspected and serviced by a professional.** How can you tell if your system is damaged? Signs include: settling, wastewater backs up into household drains, the soil in the drain field remains soggy and never fully drains, a foul odor persists around the tank and drain field.
- **Keep rainwater drainage systems away from the septic drainfield.** As a preventive measure, make sure that water from roof gutters doesn't drain into your septic drainfield. This adds an additional source of water that the drainfield has to process.
- If your household relies on private well water for home consumption and your property has flooded, it is important to have your well water tested for bacteria (total coliform and *E. coli*) through your county health department or a private certified lab.

During floods or heavy rains, the soil around the septic tank and in the drainfield become saturated, or water-logged, and the effluent from the septic tank can't properly drain through the soil. Special care needs to be taken with your septic system during and after a flood or heavy rains.

The U.S. Environmental Protection Agency (EPA) offers these guidelines:

- **Relieve pressure on the septic system by using it less or preferably not at all until floodwaters recede and the soil has drained.** For your septic system to work properly,

By taking special care with your septic system after flooding, you can contribute to the health of your household, community and environment.

SEPTIC SYSTEM CARE AFTER THE STORM

Septic systems are most susceptible to issues after periods of heavy rainfall, including after a hurricane. Flooding and power outages may impact the system. Here are some tips on what to look for and how to prevent further issues.

Signs that you may have a problem:

- Standing water or a soggy yard.
- Foul smelling water or odor backing up into the house.
- If the rest of your yard has dried after a few days but your drainfield is still wet.
- Foul odor, your septic tank should not smell if it is doing its job.

The standing water in your yard could be contaminated! Disinfect your hands or any areas that come in contact with the water.

If a problem is detected, take the pressure off your septic system.

- Limit water use until the yard has dried and the septic system has had time to recover.
- Do not pour excess water into your toilet or sink.
- If your system is flooded, do not pump the septic tank. Pumping after the drainfield and surrounding areas have dried will be more effective and healthier for the tank long term.
- Don't dig or compact the soil on your drainfield.
- Once water has receded, inspect your yard around the drainfield for erosion and replace sod or any landscaping that was compromised.

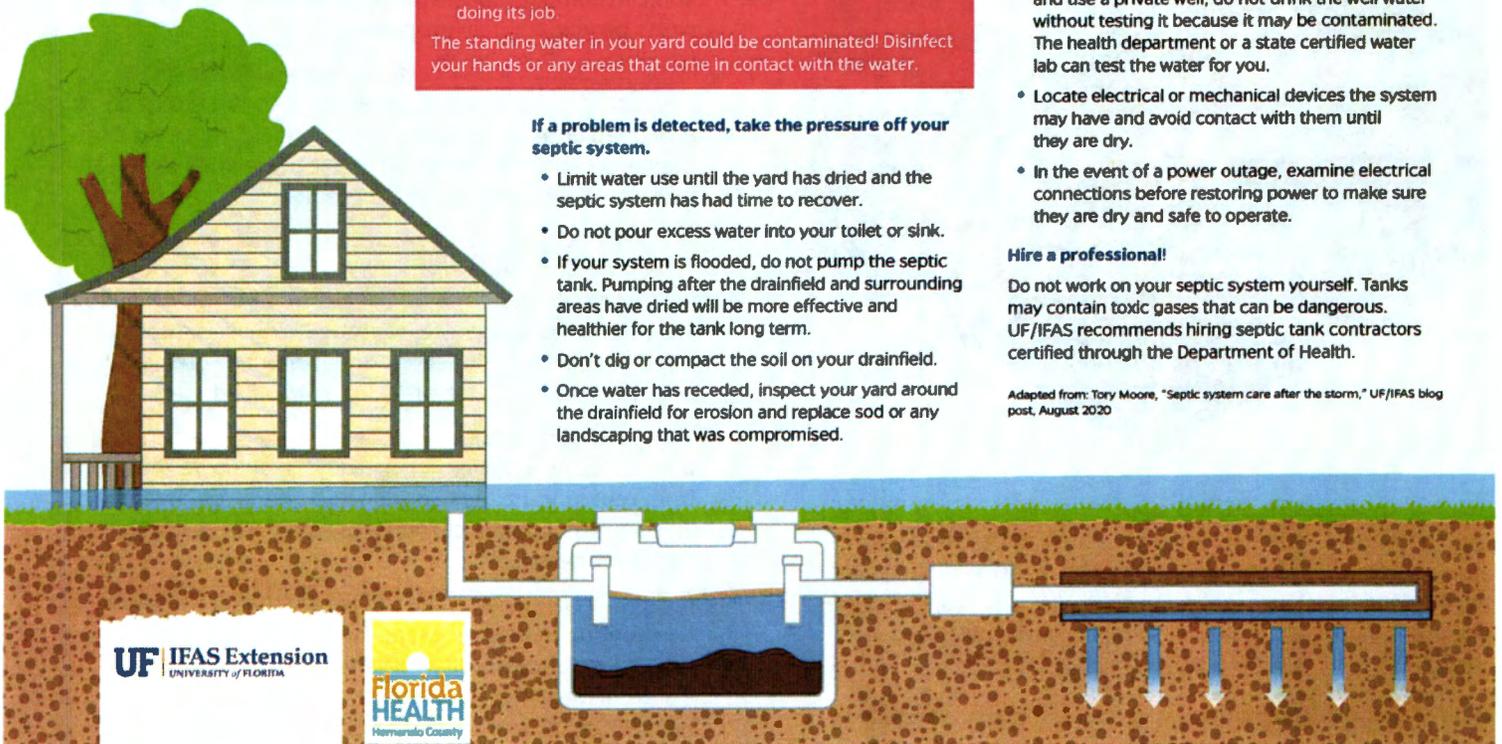
Keep safety in focus when assessing septic tank impacts.

- Use ½ cup of bleach per one gallon of water to disinfect surface areas that may have been contaminated if your septic tank backed up into your home.
- If your area is flooded and you are on a septic tank and use a private well, do not drink the well water without testing it because it may be contaminated. The health department or a state certified water lab can test the water for you.
- Locate electrical or mechanical devices the system may have and avoid contact with them until they are dry.
- In the event of a power outage, examine electrical connections before restoring power to make sure they are dry and safe to operate.

Hire a professional!

Do not work on your septic system yourself. Tanks may contain toxic gases that can be dangerous. UF/IFAS recommends hiring septic tank contractors certified through the Department of Health.

Adapted from: Tory Moore, "Septic system care after the storm," UF/IFAS blog post, August 2020





SERCAP's Individual Household Well & Septic Loan Program

SERCAP's Individual Household Well & Septic Loans are Available in All Seven States in SERCAP's Service Region, including: DE, MD, VA, NC, SC, GA, and FL!



For More Information,
Visit SERCAP on-line at www.sercap.org

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SERCAP's Individual Household Well & Septic Loan products, which are underwritten by USDA Rural Development, provide Low-Interest (1%) Loans to Eligible Low-to-Moderate Income (LMI) Homeowners for the repair or replacement of an Individual Household Well or Septic System.

The Loan Criteria, includes:

- Loans of up to \$15,000.00 for Installation of a New Well or Septic System (standard or alternative) or Repair of an Existing Well or Septic System
- Interest Rate of Only 1%
- Loan Terms up to 10 Years
- Credit Report Fee of \$30.00 per Applicant
- 1% Loan Application Fee*
- 2% Loan Origination Fee*
- Loan Recipient **MUST Own and Occupy the Property**
- Property **MUST be Located in a Rural Area**
- Individual Household Well or Septic System **May Not be Used to Substitute Water/Wastewater Service Available from a Public System**
- Individual Household Well or Septic System **May Not be Associated with the Construction of a New Dwelling.**

Maximum Income Eligibility by State

- Delaware - \$83,000.00
- Maryland - \$106,000.00
- Virginia - \$91,000.00
- North Carolina - \$70,900.00
- South Carolina - \$68,700.00
- Georgia - \$74,700.00
- Florida - \$70,000.00

**Please Note that a Deed of Trust (aka a Lien) will be Placed on the Property, in order to Secure the Loan. Additionally, the Application, Origination, and Closing Fees (\$350) may be rolled into the total loan \$ amount, if sufficient funds are available.*

SERCAP is Currently Accepting Applications for its Individual Loan Products!

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www.sercap.org

Private Wells 101: Bacterial Contamination and Shock Chlorination¹

Yilin Zhuang and Mary Lusk²

Introduction

The Florida Department of Environmental Protection defines a private well as a water system that “provides piped water to one or two residences, one of which may be a rental residence” (Rule: 62-532.200). An estimated 2.5 million Floridians, or 12%, rely on private wells for home drinking water consumption (Florida Department of Health 2020). While public water systems are monitored under the federal Safe Drinking Water Act, private wells are not regulated (US EPA 2020). Private well users are responsible for the management and protection of their wells.

This EDIS publication is for Florida homeowners who are interested in learning more about their well water system and understanding how to properly shock the well.

Bacterial Contamination in Private Wells

When heavy rain brings flooding to an area, people do not often think about the damage caused to their private drinking wells. There are two telltale signs that your well has flooded: your wellhead was surrounded by floodwaters, or it was submerged in floodwaters. Sometimes you may also notice the change of color or odor in your well after a storm event. This flooding places your private well in danger of contamination from pollutants found in floodwaters and especially at risk of bacterial contamination.

Having your well water tested following a flooding event is the only surefire way to know if your well has been contaminated or not. The Environmental Laboratory Certification Program was established in 1979 to “ensure laboratory quality and capacity to perform testing of drinking water regulated in the Florida Safe Drinking Water Act” (Florida Department of Health 2020). A list of laboratories accredited by the National Environmental Laboratory Accreditation Program in Florida can be found on the Florida Department of Environmental Protection’s website: <https://floridadep.gov/dear/florida-dep-laboratory/content/nelap-certified-laboratory-search>.

Before receiving your test results, be sure to use alternative safe water sources (such as bottled water) for drinking, making beverages, cooking, brushing your teeth, washing dishes, and washing areas of the skin that have been cut or injured. You can also bring your well water to a rolling boil for at least one minute to kill bacteria.

If test results reveal bacterial contamination, your well and water system must be disinfected. Nonscented chlorine bleach is often used to disinfect a bacterial-contaminated well (Branz et al. 2017). In addition to disinfecting your well, you must also flush out all household plumbing, including the water heater. If you have water treatment systems or devices, remove all membranes, cartridges, and filters, and replace them after the disinfection process is completed.

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2. Yilin Zhuang, Extension agent I, and Mary Lusk, assistant professor, Department of Soil and Water Sciences, UF/IFAS Gulf Coast Research and Education Center, Wimauma, FL 33598.

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Effectiveness of Chlorine Bleach

On average, common household nonscented bleach contains 5%–6% sodium hypochlorite, more commonly known as chlorine. Nonscented splashless bleach is slightly thicker than regular household bleach, making it less likely to splash; however, the sodium hypochlorite concentration is only 1%–5%. At these concentrations, nonscented splashless bleach is not strong enough to sanitize and disinfect your well. As the label warns, you will be left with suds in your water. If you have already used splashless nonscented bleach, you will need to flush your well system longer to remove all the suds.

Before disinfecting your well, be sure to check the “sell-by date” because bleach loses strength in its container over time. If you cannot purchase a new container of bleach, try to use bleach that is less than three months old. Nonscented bleach is preferred to avoid adding unneeded chemicals to the well.

To make the disinfection procedure more effective, make sure the pH of the water in the well is between 6.5 and 7 (Pieper et al. 2020). If the pH of your well is not in this range, consult a well treatment professional to adjust the pH and maintain it in the correct range during the disinfection process.

Drinking Well Shock Chlorination Disinfection Procedure

The Florida Department of Health recommends taking the following steps to disinfect a bacterial-contaminated private drinking water well.

1. Pump out the well to remove any potential contaminants. Generally, pump out at least three well volumes of water from a faucet near the wellhead. If you do not know your well size, pump the well for at least 1 hour before beginning the shock chlorination disinfection process.
2. Flush out all household plumbing, including the water heater. Make sure the water is clear and free of sediment. If you have not drained your water heater, you may have to drain it twice to completely drain all the sediments in the bottom of your water heater.
3. Turn off electric power to the pump and remove the well cap. Keep in mind, every time you open your well cap, you increase the chances of bacterial contamination.

4. Prepare a solution of sodium hypochlorite and water and pour the solution into the top of the well. Diluting sodium hypochlorite will reduce the chance of corrosion of the well system. Please note: do not mix chlorine solutions with other cleaning products, including ammonia, because toxic gases will be created. Sodium hypochlorite is usually found in nonscented household bleach. The amount of nonscented bleach depends on the depth of water in the well and the diameter of the well casing. The solution should be diluted with a 1:10 ratio of nonscented bleach to water. For example, when mixing a solution for a 2" diameter and 100-foot-deep well, mix 1 cup of bleach with 10 cups of water before pouring it into your well. Table 1 provides standard ratios of nonscented bleach to water for typical well sizes. Typical Florida drilled wells are 2" in diameter and approximately 100 feet in depth for residential wells and 4" in diameter and approximately 150 feet in depth for agricultural wells. Be sure to review “Effectiveness of Chlorine Bleach” (above) when mixing a nonscented bleach solution.

5. Recirculate the water in the well by connecting a hose to a faucet and spraying the water back into the well for at least 10 minutes.
6. Open every faucet in the system and let the water run until the smell of chlorine can be detected. Then, close all the faucets and seal the top of the well.
7. Allow the chlorinated water to stand in the system for at least 12 hours but no longer than 24 hours.
8. The next day, operate the pump by turning on all faucets, beginning with outside and flushing out the water until there is no chlorine odor.
9. Test well water again in 5 to 10 days to make sure there is no bacterial contamination. If bacteria are still present, you may need to repeat the process to remove long-established bacterial colonies. If the problem persists, you need to contact a water treatment professional familiar with bacterial contamination in wells.

The shock chlorination process outlined above is only effective for treating bacterial contamination. When you have elevated nitrate or lead concentration in your drinking well, shock chlorination will not reduce concentrations of these contaminants. Meanwhile, shock chlorination is not a continuous disinfection method. It is only recommended after construction of a new well, after working on an existing well or installing a new submersible pump, or after receiving a positive water test report for coliform bacteria.

If your test result shows bacteria positive again, you may need to think about a continuous disinfection method, such as chlorination injection tank or ultraviolet (UV) disinfection, to ensure your water is safe to drink.

Even after shock chlorination, bacterial contamination can reoccur in your well due to problems caused by source contamination. Common sources of contamination include a nearby malfunctioning septic system, an improper well location, the absence of a well cap, an improperly placed or loose well cap, inadequate grouting or other construction problems during well construction, or a cracked well casing.

References

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Florida Department of Health. 2020. "Private Well Testing." <http://www.floridahealth.gov/environmental-health/private-well-testing/index.html>

Pieper, K. J., W. J. Rhoads, L. Saucier, A. Katner, J. R. Barrett, and M. Edwards. 2020. "Improving State-Level Emergency Well Disinfection Strategies in the United States." *Science of the Total Environment* 720:137451.

US Environmental Protection Agency. 2020. "Private Drinking Water Wells." <https://www.epa.gov/privatewells>

Table 1. 6% Sodium Hypochlorite Rates Relative to Well Depth and Diameter.*

Well Depth in Feet	Well Diameter in Inches			
	2"	4"	5"	6"
50'	1 cup	2 cups	2 cups	3 cups
80'	1 cup	2 cups	4 cups	4 cups
100'	1 cup	3 cups	4 cups	6 cups
150'	2 cups	4 cups	8 cups	10 cups
200'	3 cups	6 cups	10 cups	12 cups

* Table 1 is adapted from the Florida Department of Health publication "What Should I Do if My Well Is Flooded?" (Florida Department of Health 2020). Common household nonscented bleach contains 5%-6% sodium hypochlorite.

What to Do After the Flood

Drilled, driven or bored wells are best disinfected by a well or pump contractor, because it is difficult for the private owner to thoroughly disinfect these wells.

If you suspect that your well may be contaminated, contact your local or state health department or agriculture extension agent for specific advice on disinfecting your well. The suggestions below are intended to supplement flood precautions issued by State and local health authorities.

WARNING!
DO NOT TURN ON THE PUMP
There is danger of electrical shock and damage to your well or pump if they have been flooded

WARNING!
DO NOT WASH WITH WELL WATER
People drinking or washing with water from a private well that has been flooded will risk getting sick.

Well and Pump Inspection

Flood Conditions at the Well - Swiftly moving flood water can carry large debris that could loosen well hardware, dislodge well construction materials or distort casing. Coarse sediment in the flood waters could erode pump components. If the well is not tightly capped, sediment and flood water could enter the well and contaminate it. Wells that are more than 10 years old or less than 50 feet deep are likely to be contaminated, even if there is no apparent damage. Floods may cause some wells to collapse.

Electrical System - After flood waters have receded and the pump and electrical system have dried, do not turn on the equipment until the wiring system has been checked by a qualified electrician, well contractor, or pump contractor. If the pump's control box was submerged during the flood all electrical components must be dry before electrical service can be restored. Get assistance in turning the pump on from a well or pump contractor.

Pump Operation - All pumps and their electrical components can be damaged by sediment and flood water. The pump including the valves and gears will need to be cleaned of silt and sand. If pumps are not cleaned and properly lubricated they can burn out. Get assistance from a well or pump contractor who will be able to clean, repair or maintain different types of pumps.

Emergency Disinfection of Wells that have been Flooded

Before Disinfection: Check the condition of your well. Make sure there is no exposed or damaged wiring. If you notice any damage, call a professional before the disinfection process.

Materials Needed:

- One gallon of non-scented household liquid bleach;
- rubber gloves;
- eye protection;
- old clothes; and
- a funnel.



Step 1

If your water is muddy or cloudy, run the water from an outside spigot with a hose attached until the water becomes clear and free of sediments.

Step 2



Determine what type of well you have and how to pour the bleach into the well. Some wells have a sanitary seal with either an air vent or a plug that can be removed (a). If it is a bored or dug well, the entire cover can be lifted off to provide a space for pouring the bleach into the well (b).



Step 3

Take the gallon of bleach and funnel (if needed) and carefully pour the bleach down into the well casing.



Step 4

After the bleach has been added, run water from an outside hose into the well casing until you smell chlorine coming from the hose. Then turn off the outside hose.

Step 5

Turn on all cold water faucets, inside and outside of house, until the chlorine odor is detected in each faucet, then shut them all off. If you have a water treatment system, switch it to bypass before turning on the indoor faucets.



Step 6

Wait 6 to 24 hours before turning the faucets back on. It is important not to drink, cook, bathe or wash with this water during the time period --- it contains high amounts of chlorine.

Step 7

Once the waiting period is up, turn on an outside spigot with hose attached and run the water into a safe area where it will not disturb plants, lakes, streams or septic tanks. Run the water until there is no longer a chlorine odor. Turn the water off.



Step 8

The system should now be disinfected, and you can now use the water.

Step 9

Have your water tested for bacteria 7 to 10 days after disinfection.

Sampling and Testing the Well Water

Contact the local health department to have well water sampled and tested for contamination. Or, call your state laboratory certification officer to find a certified lab near you. For more information, please email safewater@epa.gov.

If the health department issues sterile bottles for the private well owner to collect water samples, follow all instructions for the use of these bottles.

After the pump is back in operation, the health department should sample and test the water at regular intervals.

CAUTION: Because of the extensive flood area and the speed and direction of ground water flow, your well may not be a safe source of water for many months after the flood. The well can become contaminated with bacteria or other contaminants. Waste water from malfunctioning septic tanks or chemicals seeping into the ground can contaminate the ground water even after the water was tested and found to be safe. It will be necessary to take long range precautions, including repeated testing, to protect the safety of drinking water.

CONCERNS AND ADVISORIES

If in doubt about the well water supply, follow health department drinking and bathing advisories.



Remember that there is a danger of electrical shock from any electrical device that has been flooded; consult a certified electrician. Rubber boots and gloves are not adequate protection from electric shock.

Well disinfection will not provide protection from pesticides, heavy metals and other types of non-biological contamination. If such contamination is suspected, due to the nearness of these contaminant sources, special treatment is required.

Information on home water treatment units (also called point-of-use and point-of-entry units) is available from U.S. EPA by emailing safewater@epa.gov.

If you observe chemical containers (including barrels and drums) that have moved to your property, call your state or county health department or the **Superfund Hotline (1-800-424-9346)**.

For information on long-term water quality conditions in the area, consult the state or county health department.

Well owners may have information about the construction, or testing of their well and this information will be helpful to the health department in determining water quality conditions.

Septic systems should not be used immediately after floods. Drain fields will not work until underground water has receded. Septic lines may have broken during the flood.