For additional copies of this handbook, contact your local health department or write to —

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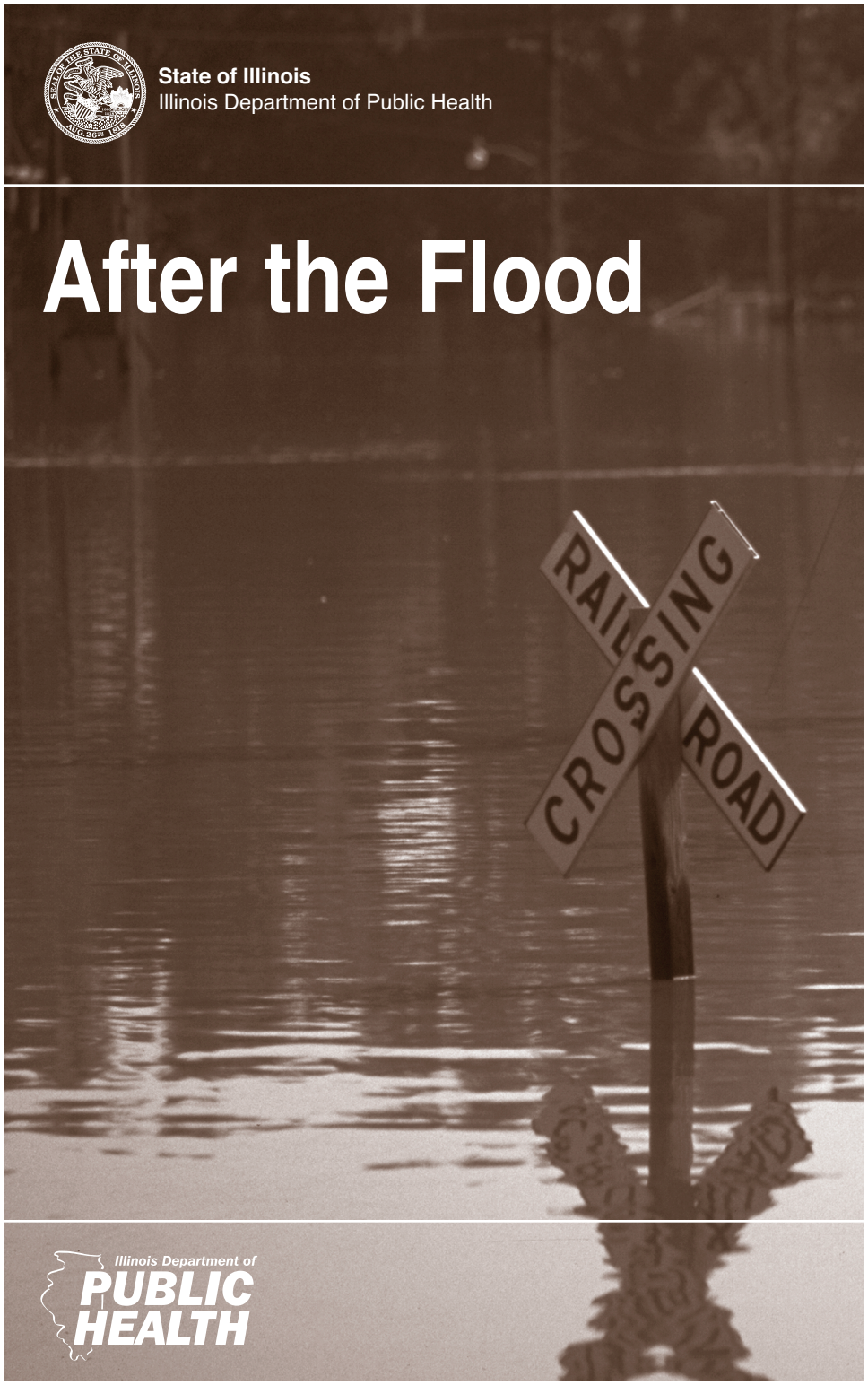


Here is another example: A well 6 feet in diameter requires 4 ounces of chlorine granules or powder per foot of water. If the well is 40 feet deep, multiply 4 (ounces) by 40 (feet). This well, then, requires 160 ounces of granules or powder, or 10 pounds.

3. Add this total amount of liquid or dry bleach to about 10 gallons of water. Splash the mixture around the lining or wall of the well. Be certain the bleach solution contacts all parts of the well.

4. Seal the well top.

5. Open all faucets and pump water until strong odor of chlorine is noticeable at each faucet. Then stop the pump and allow the solution to remain in the well overnight.

6. After it stands overnight, operate the pump, discharging water from all outlets (turning on ALL faucets) until the chlorine odor disappears. Adjust the flow of water faucets or fixtures that discharge to septic tank systems to low flow to avoid overloading the disposal system.

HOW TO DISINFECT A DUG OR BORED WELL

Diameter of Well (in feet)	Amount of 5.25% Laundry Bleach Per Foot of Water	Amount of 70% Chlorine Granules Per Foot of Water
3	1.5 cups	1 oz.
4	3.0 cups	2 oz.
5	4.5 cups	3 oz.
6	6.0 cups	4 oz.
7	9.0 cups	6 oz.
8	12.0 cups	8 oz.
10	18.0 cups	12 oz.

Driven Well

All that is necessary to restore a driven or sand-point well is to pump it out thoroughly.

If the well has a pit, pump out any water that has accumulated in it.

HOW TO DISINFECT A DRILLED WELL

Diameter of Well (in inches)	Gallons Per Foot
3	0.37
4	0.65
5	1.0
6	1.5
8	2.6
10	4.1
12	6.0

Amount of Disinfectant Required for Each 100 Gallons of Water

Laundry bleach (5.25% chlorine) .....3 cups*
Hypochlorite granules (70% chlorine) .....2 ounces**

* 1 cup = 8 oz. measuring cup ** 1 ounce = 2 heaping tablespoons of granules

5. 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.
6. Let stand for several hours, preferably overnight.
7. After you have let the water stand, operate the pump, discharging water from all outlets (turning on ALL faucets) until all odor of chlorine disappears. Adjust the flow of water from faucets or fixtures that discharge into septic tank systems to a low flow to avoid overloading the disposal system.

Dug or Bored Wells

1. The amount of water in the well determines how much disinfectant (bleach or granules) is required. Use the table below to make calculations.

2. To determine the exact amount of chlorine liquid or granules to use, multiply the amount of disinfectant indicated (according to the diameter of the well) by the depth of the well. For example, a well 5 feet in diameter requires 4.5 cups of bleach per foot of water. If the well is 30 feet deep, multiply 4.5 by 30 to determine the total cups of bleach required (4.5 x 30 = 135); 135 cups = 8.44 gallons (16 cups = 1 gallon), so use 8.5 gallons.

AFTER THE FLOOD

After a flood, the physical devastation to personal property and the community is obvious. These tragic consequences can be compounded by injuries or illness, though, if certain precautions are not taken to protect your personal health and safety. In addition to your physical health, you need to take time to consider your mental health as well. Remember, some sleeplessness, anxiety, anger, hyperactivity, mild depression or lethargy is normal. If these symptoms are acute or if they persist, however, seek some counseling.

This information is provided by the Illinois Department of Public Health to help flood victims protect themselves against diseases and other hazards in the days and weeks following a flood.

PERSONAL PRECAUTIONS

Hygiene

Following a flood, it can be difficult to maintain good hygiene and cleanliness. Doing so is imperative, however, if the risk of infectious disease is to be minimized.

Keeping your hands clean helps you avoid getting sick. Hands can be cleaned by either hand washing with soap and water or use of an alcohol-based hand rub (waterless hand sanitizer containing 60%-95% ethyl alcohol [ethanol] or isopropyl alcohol [isopropanol]). When hands are visibly soiled or dirty, it is best to wash your hands with soap and clean running water for 20 seconds. However, if clean running water is not available, you can use bottled, boiled or chemically disinfected water for washing hands (and brushing teeth). An alcohol-based hand rub can be used when hands are not visibly soiled or dirty, or when soap and water are not available.

When washing hands with soap and water:

- Wet hands with clean running water and apply soap. Use warm water if it is available.
- Rub hands together to make a lather and vigorously scrub all surfaces of hands and fingers.
- Continue rubbing hands for 20 seconds. (Helpful hint: singing “Happy Birthday” twice through will take approximately 20 seconds.)
- Rinse hands well under clean running water.

- Dry hands using a paper towel, air dryer, or clean cloth towel. If available, use a paper towel to turn off the faucet.

When using alcohol-based hand rub:
- Apply product to palm of one hand using the manufacturer's recommendations regarding volume of product to use.
- Cover all surfaces of hands and fingers.
- Rub all surfaces of hands and fingers until dry.
- NOTE: If manufacturer's recommendations don't specify volume, use the following approximate amounts:
  - — Liquid gel: dime-sized amount
  - — Foam: egg-sized amount

Example of when you should wash your hands include:
- Before preparing or eating food
- After going to the bathroom
- After changing diapers or cleaning up a child who has gone to the bathroom
- Before and after tending someone who is sick
- After blowing your nose, coughing, or sneezing
- After handling an animal or animal waste
- After handling garbage
- Before and after treating a cut or wound
- After handling items contaminated by flood water or sewage
- After removing protective clothing, including gloves

It is important to keep wash cloths, towels, linen, and clothing clean. Bacteria can remain on these items, so wash them with clean hot water and laundry detergent.

Parents need to take special care that their children follow these precautions. Do not allow children to play in floodwater or in areas that have been flooded. Wash their hands frequently, especially before meals. Contaminated toys should be cleaned and disinfected (see Cleanup section).

Protective Clothing

When entering an area that is or has been flooded, it is important to wear protective clothing, such as boots, rubber gloves and long-sleeved shirts, to help reduce contact with contaminated items. Take care not to step on nails or other protruding items.

Chemical Hazards

When returning to your area, be aware of potential chemical hazards you may encounter during flood recovery. Floodwater may have buried or moved hazardous chemical containers. These containers may harbor solvents or other industrial chemicals.

Propane tanks or drums, including those from gas grills, should not be moved. Contact your police or fire department for assistance.

Car batteries, when submerged in water, may still contain an electrical charge. They should be moved with extreme caution using insulated gloves.

HOW TO DISINFECT A WELL

To assist water well owners with disinfection, a 10-minute video titled ***How to Disinfect Your Water Well*** is available through local libraries and health departments.

Drilled Wells

1. Using the table "How to Disinfect a Drilled Well," determine the amount of water in the well by multiplying the gallons per foot by the depth of the well in feet. For example, a well with a 6-inch diameter contains 1.5 gallons of water per foot. To determine the number of gallons in a well that is 120 feet deep, multiply by 120 (1.5 x 120 = 180).
2. For each 100 gallons of water in the well, use the amount of chlorine (liquid or granules) indicated. For example, 180 gallons of water x 2 ounces of chlorine granules per 100 gallons of water = 3.6 ounces of granules (use 4 ounces).

   Mix this total amount of liquid or granules in about 10 gallons of water. Be sure dry granules or tablets are completely dissolved before adding them to the well.
3. Pour the solution into the top of the well before the seal is installed.
4. Connect a hose from a faucet on the discharge side of the pressure tank to the well casing top. Start the pump. Spray the water back into the well and wash the sides of the casing for at least 15 minutes.

Overexertion and Musculoskeletal Injuries

Recovering a flood-damaged building requires removal of soaked flooring, furnishings, wallboard and insulation. These items, when soaked with water, weigh much more than you would normally anticipate. Be aware that soaked furnishings will be harder to move and lift with your legs instead of your back. It is best to use a two-man crew to move bulky items.

Other Hazards

Swiftly Flowing Water

Do not enter swiftly flowing water, regardless of your ability to swim. You risk drowning even in swiftly moving shallow water. Do not rely on cars or other vehicles to protect you from floodwaters. People are more likely to drown inside a vehicle.

Even **shallow standing water** holds hazards. Small children can drown in standing water. You should avoid wading in standing water because it may hide glass or metal fragments.

Animals

Many wild animals are forced from their natural habitats by flooding. Take care to avoid these animals because they may carry rabies. Many domestic animals also are without homes after a flood. Remember, both wild and domestic animals are disoriented when displaced. Do not corner any animal. If an animal must be removed for safety reasons, contact your local animal control authorities.

Rats may be a problem during and after a flood. Secure all food supplies and have any animal carcasses in the vicinity removed by local animal control authorities or private rendering companies.

If you are bitten by any animal, seek immediate medical attention. If bitten by a snake, first try to accurately identify the type of snake. If it is poisonous, seek medical care immediately so that the correct anti-venom may be administered.

Illness/Injury

Floodwater may contain fecal material from overflowing sewage systems, and agricultural and industrial byproducts. While skin contact with floodwater does not, by itself, pose a serious health risk, ingesting anything contaminated with floodwater can cause disease.

Although disease outbreaks are rare after flooding, floodwater can contain various bacteria, viruses and other infectious organisms that may cause disease. If you are in a flood area and become ill, report your condition to your physician or local health department. The symptoms of most waterborne illnesses are similar — nausea, vomiting, diarrhea, abdominal cramps, muscle aches and fevers. Individuals may need to seek medical attention if these symptoms are severe or persist.

If you have any kind of cut, burn or infection on your hands, be sure to use plastic or rubber gloves if you must to be in contact with floodwater. If open sores become exposed to contaminated water, Immediately cleanse the area(s) with soap and clean water to prevent infection. If a wound develops redness, swelling or drainage, immediately seek medical attention.

One of the most serious problems that can arise from skin contact with floodwater is tetanus. The tetanus bacteria typically enters the body through places where the skin is broken, so it is very important to protect these areas. Anyone sustaining a puncture wound or who has a wound that becomes contaminated with feces, soil or saliva should have a doctor determine whether a tetanus booster is necessary. Specific recommendations for vaccinations should be made on a case-by-case basis.

DRINKING AND COOKING WATER

Public and private water supplies may be contaminated in a flood. After a flood, consider all water unsafe. Listen for public announcements on the safety of your area's water supply and follow the instructions of local authorities.

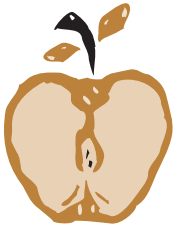
Private water wells should be pumped out, allowed to recharge naturally, disinfected and the water tested before drinking or being used for cooking. If you need assistance in having your well water analyzed, contact the local health department in your area for information. In

areas without local health departments, persons can contact the nearest Illinois Department of Public Health regional office.

The safest approach is to drink and cook with bottled water or water previously stored in the refrigerator. If you have to use tap water, boil it vigorously for at least five minutes. If you cannot boil it, add eight drops of household bleach to each gallon of water. Mix thoroughly and allow to stand for 30 minutes. This method should be used only with water that is clean in appearance and free of odor.

Do not use contaminated water to make ice, brush your teeth or wash dishes. If there is a shortage of safe drinking water, use clean disposable eating utensils, plates and napkins.

FOOD SAFETY



Do not eat any food that has come in contact with flood-water. If the safety of any food or beverage is questionable, follow this simple rule: ***When in doubt, throw it out.***

Canned Goods

Carefully examine all canned and bottled goods that have been submerged or came in contact with floodwater. Some cans or bottles may be safe to use after a good cleaning. Follows these guidelines:

- After being under water, containers with cork-lined lids or caps, screw tops or pop tops are nearly impossible to clean thoroughly around the opening. Any major temperature changes can actually cause contaminants to be sucked into such containers. They should be discarded. Also, discard any cardboard juice/milk/baby formula boxes and home canned foods if they have come in contact with flood water, because they cannot be effectively cleaned and sanitized.
- Inspect canned foods and discard any food in damaged cans. Can damage is shown by swelling, leakage, punctures, holes, fractures, extensive deep rusting, or crushing/denting severe enough to prevent normal stacking or opening with a manual, wheel-type can opener.
- Undamaged, commercially prepared foods in all-metal cans and “retort pouches” (like flexible, shelf-stable juice or seafood pouches) can be saved is you follow this procedure:
  - — Remove the labels, if they are the removable kind, since they can harbor dirt and bacteria.

Carbon Monoxide

Power outages also occur during cold weather and many people use space, or room, heaters. Keep in mind that any heater that uses wood, coal, natural gas or kerosene produces carbon monoxide gas, so adequate ventilation is essential. This is especially true in small spaces, such as recreational vehicles or mobile homes. Kerosene heaters can use up the oxygen in a room or small house, so use a kerosene heater which has a sensor that detects the oxygen level. Place all space heaters at least 3 feet from any surfaces or materials that burn easily.

Mosquitoes

The large amount of pooled water that remains after a flood provides an ideal breeding ground for mosquitoes. While the majority of these mosquitoes will be merely pests, some can carry communicable diseases.

To protect yourself from mosquitoes, you should —

- Be sure door and window screens are tight-fitting and in good repair.
- Wear long-sleeved and long-legged clothing.
- Check to see that your mosquito repellent contains DEET, a chemical commonly found in these products. When outdoors, apply repellent sparingly to exposed skin or clothing, as indicated on the product’s label.
- Drain standing water in old tires, tin cans, bird baths, yard ornaments or other places where mosquitoes might breed.

Solid Waste

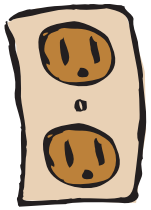
Proper disposal of garbage and refuse is necessary to minimize the development of odors, prevent such waste from becoming an attractant for insects and rodents, and prevent the soiling of food preparation and food service areas. Improperly handled garbage creates nuisance conditions, makes housekeeping difficult, and may be a possible source of contamination of food, equipment and utensils.

OTHER PRECAUTIONS

Gas Lines

When returning to your home, check immediately for leaking gas pipes. Do this by smell only. If you must have light, use battery-powered flashlights or lanterns. **DO NOT** turn lights on or off and do not use candles, oil or gas lanterns, or torches because, if gas lines are broken, an explosion could occur.

If you smell gas or suspect a leak, turn off the main gas valve at the meter, open all windows and leave the house. Notify the gas company or the police or fire department. Do not re-enter the house until you are told it is safe to do so.



Electricity

Your electrical system also may be damaged. If you see frayed wiring or sparks, or if there is an odor of something burning, but no visible fire, you should immediately shut off the electrical system at the circuit breaker.

Consult your utility company before using electrical equipment, including power generators. Be aware that it is against the law and a violation of electrical codes to connect generators to your home's electrical circuits without approved, automatic interrupt devices. If a generator is on-line when electrical service is restored, it can be a major fire hazard. In addition, improperly connecting a generator to your home's electrical circuits may endanger line workers helping to restore power.

If any of your electrical appliances are wet, first turn off the main power switch, then unplug the appliance, dry it out, reconnect it and finally turn on the main power switch. If fuses blow when the electric power is restored, turn off the main power switch again and then inspect for short circuits in your home wiring, appliances and equipment. **Caution: Do not do any of these things if you are wet or standing in water.**

Outdoors, exercise extreme caution if you find yourself around power lines. Do not touch downed power lines, particularly those in water, or objects that are in contact with downed power lines.

— Brush or wipe away any dirt or silt.

— Thoroughly wash the cans or retort pouches with soap and water, using hot water if it is available. Rinse the cans or retort pouches with water that is safe for drinking since dirt or residual soap will reduce the effectiveness of chlorine sanitation.

— Sanitize cans and retort pouches by immersion in a freshly-made solution consisting of 1 tablespoon of unscented liquid chlorine bleach per gallon of drinking water (or the cleanest, clearest water available) for 15 minutes.

— Air dry cans or retort pouches for a minimum of one hour before opening or storing.

— If the labels were removed, relabel your cans or retort pouches, including the expiration date (if available) with a marking pen.

— Food in reconditioned cans or retort pouches should be used as soon as possible thereafter.

What to Do When the Power Goes Out

Keep the refrigerator and freezer doors closed as much as possible to maintain the cold temperature. The refrigerator will keep food cold for about four hours if it is unopened. A fully stocked freezer will keep food frozen two days if the door remains closed. A half-full freezer can keep foods frozen about one day. What can you do if electric service will not be restored within one or two days?

- If your friends/family have electricity, divide your frozen foods among their freezers.
- Know where you can buy dry and block ice. Dry ice freezes everything it touches; 50 pounds of it will keep a 18 cubic food freezer below freezing for two days. When using dry ice, **never touch dry ice with bare hands** and do not stick your head into a freezer with dry ice as it gives off carbon dioxide. Add block ice to the refrigerator if the electricity is off longer than four to six hours.
- If you plan to eat refrigerated or frozen meat, poultry, fish or eggs while it is still at safe temperatures, it's important that each item is thoroughly cooked to its proper temperature to assure that any foodborne bacteria that may be present are destroyed. However, if at any point the food was above 40 F for two hours or more – discard it.

Keep in mind that perishable food such as meat, poultry, seafood, milk and eggs that are not kept adequately refrigerated or frozen may cause illness if consumed, even when they are thoroughly cooked.

CLEANUP

The following cleaning guidelines may help prevent disease and reduce property loss:

- Discard contaminated objects that cannot be thoroughly washed or laundered.
- Wash contaminated surfaces and objects with warm, soapy water and disinfect with a bleach and water solution made of no more than 1 cup of bleach per 1 gallon of water. For food-contact surfaces (counter tops, pantry shelves, refrigerators, stoves, cutting boards, etc.) and areas where small children play, use a solution made by adding 1 tablespoon (½ ounce) of laundry bleach to each gallon of water.
- Make sure to read and follow label instructions. Do not use ammonia. Do not mix ammonia and bleach; the vapors are hazardous.

Carpets and rugs that cannot be thoroughly dried and cleaned should be discarded and replaced. If the damaged area is small, you may be able to save the carpet by cleaning the area with a mild detergent.

Floors and hard surfaces should be cleaned with a bleach and water solution made of no more than 1 cup of bleach per 1 gallon of water, or use a household disinfectant.

Wash all linens and clothing in hot water or have them dry cleaned. Items that cannot be washed or dry cleaned, such as mattresses and upholstered furniture, should be air dried in the sun and then vacuumed and sprayed thoroughly with a disinfectant.

Paneling and wallboard must be immediately cleaned and dried thoroughly. If the damage is severe, they should be removed and replaced.

Contaminated toys should be cleaned and disinfected. Use soap (E.G. dish detergent) and clean water to scrub the toy, followed by clean water rinse to remove residual soap. After toy is scrubbed and

rinsed, spray toy with an EPA-registered disinfectant or immerse toy for at least two minutes in a solution of 1 tablespoon (1/2 ounce) of laundry bleach in 1 gallon of water. Allow toy to air dry or dry with clean cloth. Toys that are likely to be mouthed by infants or toddlers should be rinsed with clean water after they are disinfected. Note: if using bleach solution, ensure adequate ventilation and prepare fresh solution each day. Day care facilities should check with the Department of Children and Family Services for disinfection requirements.

MOLD

Heavily damaged, porous materials (such a carpeting or drywall) that cannot be thoroughly dried and cleaned should be discarded and replaced. Non-porous surfaces and porous materials that cannot be removed should be cleaned using a soap or detergent solution. Areas that have been cleaned also may be disinfected using a diluted bleach solution (no more than 1 cup of bleach per 1 gallon of water), but it is critical that all visible mold growth and soiling are cleaned off using a soap or detergent solution before applying a disinfectant. Water-damaged materials and debris should be double bagged, sealed, and the bag wiped clean prior to removal from work areas. This will help to prevent mold spores from spreading to other, uncontaminated areas. Wear rubber gloves and protective clothing that are easily cleaned or discarded. In addition, wear a properly fitted N95 or HEPA filter facemask. These masks can be purchased at a minimal cost at a hardware store.

SEWAGE DISPOSAL

Septic systems with a pump need electricity. Without it, sewage can backup into your home. Use very little water from your tap until power is restored. Do not continue to use water if sewage backs up into the house, or if water or sewage is observed surfacing near the septic system. Keep children out of wet areas affected by sewage. After floodwaters recede, usually only minimal repairs may be necessary for a private sewage system to properly function. Removal of debris may damage a septic system. Vehicles can crush drainfields, tanks and distribution boxes, especially when the soil is saturated. Make sure no one drives in or around your septic tank and drainfield, and either allow stumps to rot in place or have the stumps ground with a small stump grinder. In the aftermath of a flood, most communities will provide portable toilets, but these may be limited.