

**BEFORE, DURING
AND AFTER
DISASTER STRIKES
A RESOURCE GUIDE
FOR FOOD AND
WATER SAFETY
IN THE HOME**



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What's this pamphlet for?

This pamphlet focuses on the safety of food and water. It provides resources for:

- 1) Assembling an emergency food and water supply kit BEFORE a disaster strikes.
- 2) Evaluating the safety of foods, saving undamaged food packages and water disinfection DURING and AFTER a disaster.

Consumption of contaminated food or water may result in illness or death, but careful planning can help ensure a safe food and water supply for you and your family.

What this pamphlet is not for:

This pamphlet does not provide guidelines for assembling an emergency kit with non-food and water items, such as a flashlight, first-aid kit, batteries, etc.

For more information about building a complete emergency kit that does not include food and water items, please see [Build a Kit](#), a webpage prepared by Ready.gov.

BEFORE DISASTER STRIKES

1. Plan ahead

Planning for situations when you may need an emergency food and water supply is essential. The type and amount of food that you may choose to store depends on several factors:

- Number of members in household, including pets.
- Members with potential special needs/conditions, such as diabetics, seniors, pregnant women, infants, etc.
- Ability to use the food in an emergency.
- Space for storage.
- Accessibility to local markets.

Prepare an emergency food supply that will last at least two weeks. Emergency food supplies should:

- Be nonperishable.
- Require no refrigeration.
- Require minimal preparation or cooking.
- Require a minimal amount of water if preparation is needed.
- Be compact and lightweight.

Good examples of emergency foods include:

- Ready-to-eat canned meats, fruits and vegetables.
- Soups (canned or dried soups in cups).
- Smoked or dried meats like beef jerky.
- Dried fruit.
- Juices (canned or powdered).
- Milk (canned, powdered or shelf-stable ultra-high-temperature — UHT — milk).
- Staples (sugar, salt, pepper, instant rice and potatoes).
- Ready-to-eat and instant cereals.
- High-energy foods (peanut butter, jelly, nuts, granola bars).
- Cookies, candy and other snacks.
- Foods for infants, the elderly and those with special diet needs.



Avoid storing foods high in salt that will increase thirst. Also, store single servings or one-meal sizes to avoid leftovers. Canned foods keep almost indefinitely if cans are undamaged. However, for the best quality and nutritional value, replace canned goods every year. Finally, emergency food and supplies must be safely stored from pests and rodents. Grains and other dry goods must be stored in a cool, dry location. Tightly sealed bags, plastic containers and metal canisters are good storage containers for dry goods.

For more general guidelines for replacement of common emergency foods, please see page 4 of [Food and Water in an Emergency](#), a free downloadable booklet prepared by the Federal Emergency Management Agency (FEMA, 2004).

2. Prepare an emergency water supply that includes a three-day supply for each person.

How much water is needed?

- Your emergency water supply should include a **three-day supply of water** for each person in your household.
- Be sure to include water for drinking, brushing teeth, cooking and cleaning.
- You will need to store 1 gallon of water per person per day, on average.
- This amount may vary depending upon age, physical condition, activity, diet and climate.
- A normally active person needs to drink at least two quarts of water a day. Hot environments can double the amount.
- Children, nursing women and ill persons need more.

Safest water source

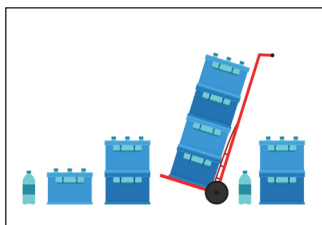
To prepare the safest and most reliable emergency supply of water, it is recommended that you purchase commercially bottled water (FEMA, 2004).

Store your own water

If you decided to store your own water, it is recommended to purchase food-grade water storage containers from surplus or camping supply stores to use for water storage (FEMA, 2004).

If you reuse containers, water may be stored in plastic, glass, fiberglass or enamel-lined metal containers. Intact, durable plastic containers like soft drink bottles or water bottles are best to use.

Food-grade plastic buckets or larger containers can also be used. Containers that held toxic (poisonous) substances should never be used for storing emergency water. Do not use milk jugs and other containers that previously held food items because they are difficult to clean adequately. These types of jugs can harbor disease-causing bacteria.



For general guidelines for preparing containers and filling water containers, please see Page 9 of [Food and Water in an Emergency](#), a free downloadable booklet prepared by the Federal Emergency Management Agency (FEMA, 2004).

Stored water may eventually develop an unacceptable appearance, taste or odor. Plan to replace your emergency water supply every six months if not using commercially bottled water.

3. Prepare for power outage

- Keep an appliance thermometer in the refrigerator and freezer. An appliance thermometer will indicate the temperature in the refrigerator and freezer in case of a power outage and help determine the safety of the food. Make sure the freezer is at 0 degrees Fahrenheit or below and the refrigerator is at 40 degrees Fahrenheit or below.



As soon as you've heard from local authorities that a disaster may strike or your area is getting into hurricane season:

- Freeze containers of water for ice to help keep food cold in the freezer, refrigerator or coolers after the power is out.
- Freeze refrigerated items such as leftovers, milk, and fresh meat and poultry that you may not need immediately. This helps keep them at a safe temperature longer.
- Have coolers on hand to keep refrigerator food cold if the power will be out for more than four hours.
- Purchase or make ice and store it in the freezer for use in the refrigerator or in a cooler. Freeze gel packs ahead of time for use in coolers. Plan ahead and know where dry ice and block ice can be purchased.
- Group food together in the freezer. This helps the food stay cold longer.



For more information about preparing for power outages, please see [A Consumer's Guide to Food Safety: Severe Storms and Hurricanes](#), a webpage prepared by the United States Department of Agriculture (USDA, 2015).

4. Prepare other essential items for food and water safety, including:

- Freezer and refrigerator thermometers.
- Tip-sensitive thermometers for cooking and temperature checking.
- Manual can opener.
- One-time use utensils.

- Containers of ice to keep food cold or to melt if the water supply is contaminated or unavailable.
- Coolers, frozen gel packs and dry ice to keep refrigerated food at or below 40 degrees and frozen food at or below 0 degrees if the power is out for more than four hours.
- Bleach for disinfecting.

DURING AND AFTER DISASTER STRIKES

1. Power outage: Evaluate the safety of food

Frozen foods

If an appliance thermometer was kept in the freezer, **check the temperature** when the power comes back on. If the freezer thermometer reads 40 degrees Fahrenheit or below, the food is safe and may be refrozen.

If a thermometer has not been kept in the freezer, **check each package** of food to determine if it is safe. You can't rely on appearance or odor. If the food **still contains ice crystals** or is 40 degrees Fahrenheit or below, it is safe to refreeze or cook.

Refrigerated food

Refrigerated food should be safe as long as the power was out for **no more than four hours** and the refrigerator door was kept shut. Discard any perishable food, such as meat, poultry, fish, eggs or leftovers, that has been at temperatures above 40 degrees Fahrenheit for two hours or more (or one hour if temperatures are above 90 degrees Fahrenheit).

Perishable food

Perishable foods, 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.

For more information of when to save and when to throw out foods, please see [A Consumer's Guide to Food Safety: Severe Storms and Hurricanes](#), a webpage prepared by the United States Department of Agriculture (USDA, 2015).

2. Flooding: Evaluate the safety of food (FDA, 2018)

Do not eat any food that may have come into contact with floodwater.

Discard any food and beverages that are not in a waterproof container if there is any chance that they have come into contact with floodwater.

- Food containers that are waterproof include undamaged, commercially prepared foods in all-metal cans and retort pouches, such as flexible, shelf-stable juice or seafood pouches.
- Food containers that are not waterproof include those with screw-caps, snap lids, pull tops and crimped caps.
- Also discard cardboard juice/milk/baby formula boxes and home canned foods if they have come in contact with floodwater because they cannot be effectively cleaned and sanitized.

Discard any food in damaged cans. Damaged cans are those with swelling, leakage, punctures, holes, fractures, extensive deep rusting or crushing/denting that is severe enough to prevent normal stacking or opening with a manual, wheel-type can opener.



For more information about the safety of meat and poultry items, please call the USDA Meat and Poultry Hotline toll free at 1-888-MPHotline (1-888-674-6854), or visit [Ask USDA](#) website. This automated system contains answers to thousands of typical Hotline questions. Live chat is available during specified weekday hours.

3. How to save undamaged food packages exposed to floodwater (FDA, 2018)

Undamaged, commercially prepared foods in **all-metal cans** and **retort pouches**, such as flexible, shelf-stable juice or seafood pouches, can be saved if you follow this procedure. Food in reconditioned cans or retort pouches should be used as soon as possible thereafter.

- 1) Remove the labels if they are removable because they can harbor dirt and bacteria.
- 2) Brush or wipe away any dirt or silt.
- 3) Thoroughly wash the cans or retort pouches with soap and water, using hot water if it is available.
- 4) Rinse the cans or retort pouches with water that is safe for drinking, if available, because dirt or residual soap will reduce the effectiveness of chlorine sanitation.
- 5) Sanitize cans and retort pouches by immersion in one of the two following ways:
 - Place in water and allow the water to come to a boil and continue boiling for two minutes.
 - Place in a solution of 1 cup (8 oz/250 mL) of unscented household (5.25 percent concentration) bleach mixed with 5 gallons of water and soak for 15 minutes.
- 6) Air dry cans or retort pouches for a minimum of one hour before opening or storing.
- 7) If the labels were removable, then relabel your cans or retort pouches, including the expiration date, with a permanent marking pen.



4. How to make water safe to drink (EPA, 2017)

After a natural disaster, water may not be safe to drink. Area health departments will determine whether the tap water can be used for drinking. If the local or state authority decided the water is not safe for consumption (not potable) or is questionable, then follow these directions:

Use **bottled water** or water you have properly prepared and stored as an emergency water supply.

Boil water if you do not have bottled water. Boiling is sufficient to kill pathogenic bacteria, viruses and protozoa.

- If the water is cloudy, let it settle and filter it through a clean cloth, paper towel or coffee filter.
- Bring the water to a rolling boil for at least one minute. At altitudes above 5,000 feet (1,000 meters), boil water for three minutes.
- Let the water cool naturally and store it in clean containers with covers.
- To improve the flat taste of boiled water, add one pinch of salt to each quart or liter of water or pour the water from one clean container to another several times.

Disinfect water using household bleach if you can't boil water. Only use regular, unscented chlorine bleach products that are suitable for disinfection and sanitization as indicated on the label. The label may say that the active ingredient contains 6 or 8.25 percent sodium hypochlorite. Do not use scented or color-safe bleaches or bleaches with added cleaners. If the water is cloudy, let it settle and filter it through a clean cloth, paper towel or coffee filter.



- Use the table on the next page as a guide to decide the amount of bleach you should add to the water. For example, add eight drops of 6 percent bleach, or six drops of 8.25 percent bleach, to each gallon of water. Double the amount of bleach if the water is cloudy, colored or very cold.
- Stir and let it stand for 30 minutes. The water should have a slight chlorine odor. If it doesn't, repeat the dosage and let it stand for another 15 minutes before use.
- If the chlorine taste is too strong, pour the water from one clean container to another and let it stand for a few hours before use.

For more information on disinfecting drinking water, please see [Emergency Disinfection of Drinking Water](#), a free downloadable booklet prepared by the United States Environmental Protection Agency (EPA, 2017).

5. Clean and sanitize your kitchen after flooding (CDC, 2017)

In the event that your home is contaminated with floodwater, you will need to thoroughly clean and sanitize the kitchen area. Follow these basic steps:

- Scrub kitchen counters, pantry shelves, refrigerators, stoves and all food storage and preparation areas with warm, soapy water. Rinse each area and then sanitize with a clean cloth dipped in a sanitizing solution of 1 cup of chlorine bleach to 5 gallons of water and let it stand for 1 minute.

TABLE. Use household bleach for disinfection (5.25% – 6% bleach)

For drinking water

Agency	Prepare disinfectant solution	Contact time
CDC	Add 1/8 teaspoons (8 drops) to 1 gallon of water	30min
EPA	Add 1/8 teaspoons (8 drops) to 1 gallon of water	30min
FEMA	Add 1/8 teaspoons (16 drops) to 1 gallon of water	30min
FDA	Add 1/8 teaspoons (8 drops) to 1 gallon of water	30min
USDA	Add 1/8 teaspoons (8 drops) to 1 gallon of water	30min

For sanitizing kitchen surfaces

Agency	Prepare disinfectant solution	Contact time
CDC	Add 1 cup to 5 gallons of water	1 min
EPA	N/A	N/A
FEMA	N/A	N/A
FDA	Add 1 tablespoon to 1 gallon of water	15 min
USDA	Add 1 tablespoon to 1 gallon of water	N/A

For reconditioning canned goods

Agency	Prepare disinfectant solution	Contact time
CDC	Add 1 cup to 5 gallons of water	15 min
EPA	N/A	N/A
FEMA	N/A	N/A
FDA	Add 1 cup to 5 gallons of water	N/A
USDA	Add 1 tablespoon to 1 gallon of water	15 min

For sanitizing containers, pots, pans, dishware and utensils

Agency	Prepare disinfectant solution	Contact time
CDC	Add 1 cup to 5 gallons of water	N/A
EPA	N/A	N/A
FEMA	N/A	N/A
FDA	Add 1 tablespoon to 1 gallon of water	15 min
USDA	Add 1 tablespoon to 1 gallon of water	15 min

- Clean dishes, glassware, utensils and pans by first washing them in warm, soapy water. Rinse each item, and then sanitize by soaking for at least one minute in a chlorine solution of 1 cup of household chlorine bleach to 5 gallon of water. Drain and allow to air dry.
- Do not attempt to clean and sanitize items such as wooden spoons and cutting boards, baby bottle nipples, pacifiers and disposable tableware and plates. These items cannot be effectively cleaned and should be discarded.
- Wash all kitchen towels, wash rags and table cloths with soap and warm water in the washing machine. Use chlorine bleach to sanitize these items following the directions on the bleach container and your appliance manual.

Cited resources:

- CDC [2017 Hurricane Key Messages.](#)
- CDC [Cleaning and Sanitizing with Bleach after an Emergency.](#)
- CDC [Floodwater after a Disaster or Emergency.](#)
- CDC [Keep Food and Water Safe after a Disaster or Emergency.](#)
- CDC [Natural Disasters and Severe Weather.](#)
- EPA [Emergency Disinfection of Drinking Water.](#)
- FDA [Food and Water Safety during Power Outages and Floods.](#)
- FDA [Hurricane Safety Resources.](#)
- FDA [Protect Food and Water During Hurricanes and Other Storms.](#)
- FEMA [Food and Water in an Emergency.](#)
- READY.GOV [Build a Kit.](#)
- USDA [A Consumer's Guide to Food Safety: Severe Storms and Hurricanes.](#)

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