

Hurricanes



A hurricane is a type of tropical cyclone, the generic term for a low pressure system that generally forms in the tropics. The ingredients for a hurricane include a pre-existing weather disturbance, warm tropical oceans, moisture, and relatively light winds aloft. A typical cyclone is accompanied by thunderstorms, and in the Northern Hemisphere, a counterclockwise circulation of winds near the earth's surface. Tropical cyclones are classified as follows:

Tropical Depression. An organized system of clouds and thunderstorms with a defined surface circulation and maximum sustained winds of 38 mph (33 knots) or less. Sustained winds are defined as one-minute average wind measured at about 33 ft (10 meters) above the surface.

Tropical Storm. An organized system of strong thunderstorms with a defined surface circulation and maximum sustained winds of 39-73 mph (34-63 knots).

Hurricane. An intense tropical weather system of strong thunderstorms with a well-defined surface circulation and

maximum sustained winds of 74 mph (64 knots) or higher.

All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes or tropical storms. Although rarely struck by hurricanes, parts of the Southwest United States and the Pacific Coast experience heavy rains and floods each year from hurricanes spawned off Mexico. The Atlantic hurricane season lasts from June to November with the peak season from mid-August to late October.

Hurricanes can cause catastrophic damage to coastlines and several hundred miles inland. Winds can exceed 155 miles-per-hour. Hurricanes and tropical storms can also spawn tornadoes and microbursts, create surge along the coast, and cause extensive damage due to inland flooding from trapped water.

Tornadoes most often occur in thunderstorms embedded in rain bands well away from the center of the hurricane; however, they also occur near the eye-wall. Typically, tornadoes produced by tropical cyclones are relatively weak and short-lived but still pose a threat.

A storm surge is a huge dome of water pushed on-shore by hurricane and tropical storm winds. Storm surges can reach 25 feet high and be 50-100 miles wide. Storm tide is a combination of the storm surge and the normal tide (i.e., a 15 foot storm surge combined with a 2 foot normal high tide over the mean sea level creates a 17 foot storm tide). These phenomena cause severe erosion and extensive damage to coastal areas.

Despite improved warnings and a decrease in the loss of life, property damage continues to rise because an increasing number of people are living or vacationing near coastlines. Those in hurricane-prone areas need to be prepared for hurricanes and tropical storms.

Hurricanes are classified into five categories based on their wind speed, central pressure and damage potential (see chart below). Category Three and higher are considered major hurricanes, though Category One and Two are still extremely dangerous and warrant your full attention.

Inland/freshwater flooding from hurricanes

Hurricanes can produce widespread torrential rains. Floods are the deadly and destructive result. Excessive rain can also trigger landslides or mud slides, especially in mountainous regions. Flash flooding can occur due to the intense rainfall. Flooding on rivers and streams may persist for several days or more after the storm.

The speed of the storm and the geography beneath the storm are the primary factors regarding the amount of rain produced. Slow moving storms and tropical storms moving into mountainous regions tend to produce more rain.

Between 1970 and 1999, more people lost their lives from freshwater flooding associated with landfalling tropical cyclones than from any other weather hazard related to tropical cyclones.

See the “Floods” chapter for more specific information on flood related emergencies.

What to do before a hurricane

1. Know the difference between “Watches” and “Warnings.”
 - **Hurricane/Tropical Storm Watch**—Hurricane/tropical storm conditions are possible in the specified area, usually within 36 hours.
 - **Hurricane/Tropical Storm Warning**—Hurricane/tropical storm conditions are expected in the specified area, usually within 24 hours.
 - **Short Term Watches and Warnings**—These warnings provide detailed information on specific hurricane threats, such as flash floods and tornadoes.

Saffir-Simpson Hurricane Scale

Scale Number (Category)	Sustained Winds (MPH)	Damage	Storm Surge
1	74-95	Minimal: Untied mobile homes, vegetation and signs.	4-5 feet
2	96-110	Moderate: All mobile homes, roofs, small crafts, flooding.	6-8 feet
3	111-130	Extensive: Small buildings, low-lying roads cut off.	9-12 feet
4	131-155	Extreme: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.	13-18 feet
5	>155	Catastrophic: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.	>18 feet

2. Listen for local radio or television weather forecasts. Purchase a NOAA Weather Radio with battery backup and a tone-alert feature that automatically alerts you when a Watch or Warning is issued (tone alert is not available in some areas). Purchase a battery-powered commercial radio and extra batteries as well because information on other events will be broadcast by the media.
3. Ask your local emergency management office about community evacuation plans relating to your neighborhood. Learn evacuation routes. Determine where you would go and how you would get there if you needed to evacuate. Sometimes alternate routes are desirable.
4. Talk to your household about hurricane issues. Create a household disaster plan. Plan to meet at a place away from your residence in case you are separated. Choose an out-of-town contact for everyone to call to say they are safe.
5. Determine the needs of your household members who may live elsewhere but need your help in a hurricane. Consider the special needs of neighbors, such as people that are disabled or those with limited sight or vision problems.
6. Prepare to survive on your own for at least three days. Assemble a disaster supply kit. Keep a stock of food and extra drinking water. See the “Emergency Planning and Disaster Supplies” and “Evacuation” chapters for more information.
7. Make plans to secure your property. Permanent storm shutters offer the best protection for windows. A second option is to board up windows with 5/8" marine plywood, cut to fit and ready to install. Tape does not prevent windows from breaking.
8. Learn how to shut off utilities and where gas pilots and water mains are located.
9. Have your home inspected for compliance with local building codes. Many of the roofs destroyed by hurricanes were not constructed or retrofitted according to building codes. Installing straps or additional clips to securely fasten your roof to the frame structure will substantially reduce roof damage.
10. Be sure trees and shrubs around your home are well trimmed. Dead limbs or trees could cause personal injury or property damage. Clear loose and clogged rain gutters and downspouts.
11. If you have a boat, determine where to secure it in an emergency.
12. Consider flood insurance. Purchase insurance well in advance—there is a 30-day waiting period before flood insurance takes effect.
13. Make a record of your personal property. Take photographs or videotapes of your belongings. Store these documents in a safe place.

Create a household disaster plan. Plan to meet your family in case you are separated. Choose an out-of-town contact for everyone to call to say they are safe.

What to do during a hurricane threat

1. Listen to radio or television newscasts. If a hurricane “Watch” is issued, you typically have 24 to 36 hours before the hurricane hits land.
2. Talk with household members. Make sure everyone knows where to meet and who to call, in case you are separated. Consider the needs of relatives and neighbors with special needs.
3. Secure your home. Close storm shutters. Secure outdoor objects or bring them indoors. Moor your boat if time permits.
4. Gather several days’ supply of water and food for each household member. Water systems may become contaminated or damaged. Sterilize (with diluted bleach solution of one part bleach to ten parts water) and fill the bathtub to ensure a supply of safe water in case you are unable or told not to evacuate. Refer to the “Shelter and Emergency Planning” and “Disaster Supplies” chapters for important information.
5. If you are evacuating, take your disaster supply kit with you to the shelter. Remember that alcoholic beverages and weapons are prohibited within shelters. Also, pets are not allowed in a public shelter due to health reasons. See the “Animals in Disaster” chapter and contact your local humane society for additional information.
6. Prepare to evacuate. Fuel your car—service stations may be closed after the

Alcoholic beverages and weapons are prohibited within shelters. Also, pets are not allowed in public shelters for health reasons.

storm. If you do not have a car, make arrangements for transportation with a friend or relative. Review evacuation routes. If instructed, turn off utilities at the main valves.

7. Evacuate to an inland location, if:
 - Local authorities announce an evacuation and you live in an evacuation zone.
 - You live in a mobile home or temporary structure—they are particularly hazardous during hurricanes no matter how well fastened to the ground.
 - You live in a high-rise. Hurricane winds are stronger at higher elevations.
 - You live on the coast, on a floodplain near a river or inland waterway.
 - You feel you are in danger.
8. When authorities order an evacuation:
 - Leave immediately.
 - Follow evacuation routes announced by local officials.
- Stay away from coastal areas, riverbanks and streams.
- Tell others where you are going.
9. If you are not required or are unable to evacuate, stay indoors during the hurricane and away from windows and glass doors. Keep curtains and blinds closed. Do not be fooled if there is a lull, it could be the eye of the storm—winds will pick up again.
 - Turn off utilities if told to do so by authorities.
 - If not instructed to turn off, turn the refrigerator to its coldest setting and keep closed.
 - Turn off propane tanks.

10. In strong winds, follow these rules:

- Take refuge in a small interior room, closet or hallway.
- Close all interior doors. Secure and brace external doors.
- In a two-story residence, go to an interior first-floor room, such as a bathroom or closet.
- In a multiple-story building, go to the first or second floors and stay in interior rooms away from windows.
- Lie on the floor under a table or another sturdy object.

11. Avoid using the phone except for serious emergencies. Local authorities need first priority on telephone lines.

12. See the “Evacuation” chapter for important information.

Consider your household's health and safety needs and be aware of symptoms of stress and fatigue. Seek crisis counseling if you have need.

What to do after a hurricane

1. Stay where you are if you are in a safe location until local authorities say it is safe to leave. If you evacuated the community, do not return to the area until authorities say it is safe to return.
2. Keep tuned to local radio or television stations for information about caring for your household, where to find medical help, how to apply for financial assistance, etc.
3. Drive only when necessary. Streets will be filled with debris. Roads may have weakened and could collapse. Do not drive on flooded or barricaded roads or bridges. Closed roads are for your protection. As little as six inches of water may cause you to lose control of your vehicle—two feet of water will carry most cars away.
4. Do not drink or prepare food with tap water until notified by officials that it is safe to do so.
5. Consider your family's health and safety needs. Be aware of symptoms of stress and fatigue. Keep your household together and seek crisis counseling if you have need. See the “Mental Health and Crisis Counseling” section of the “Recovering from Disaster” chapter for more information.
6. Talk with your children about what has happened and how they can help during the recovery. Being involved will help them deal with the situation. Consider the needs of your neighbors. People often become isolated during hurricanes.
7. Stay away from disaster areas unless local authorities request volunteers. If you are needed, bring your own drinking water, food and sleeping gear.
8. Stay away from riverbanks and streams until potential flooding has passed. Do not allow children, especially under the age of 13, to play in flooded areas. There is a high risk of injury or drowning in areas that may appear safe.
9. Stay away from moving water. Moving water only six inches deep can sweep you off your feet. Standing water may be electrically charged from underground or downed power lines.
10. Stay away from downed power lines and report them to the power company. Report broken gas, sewer or water mains to local officials.

11. Don't use candles or other open flames indoors. Use a flashlight to inspect damage.
12. Set up a manageable schedule to repair property.
13. Contact your insurance agent. An adjuster will be assigned to visit your home. To prepare:
 - Take photos of your belongings and your home or videotape them.
 - Separate damaged and undamaged belongings.
14. Consider building a "Safe Room or Shelter" to protect your household. See the "Thunderstorms" chapter for additional information in the "Tornadoes" section.
15. See the "Recovering From Disaster" chapter for more important information.
- Locate your financial records.
- Keep detailed records of cleanup costs.