

# Surviving the Storm

## A Guide to Hurricane Preparedness

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Photo by Dave Gatley

*A 15-foot storm surge spawned by a hurricane flattened the dunes on this beach and a home that was on ground level.*

### THE POWER OF HURRICANES

Walls torn from concrete buildings, 15-foot trees ripped from the earth, 20-foot waves crashing to shore. The power of hurricanes is awesome.

Hurricanes can spawn tornadoes. Floods and flash floods are generated by torrential rains that accompany hurricanes. Even more dangerous is the storm surge -- a dome of ocean water that, at its peak, can be 25 feet high and 50-100 miles wide. The surge can devastate coastal communities as it sweeps ashore.

A hurricane is a tropical weather system with winds that have reached a sustained speed of 74 mph or more. Hurricane winds blow in a large spiral around a relatively calm center, known as the "eye." The eye is generally 20-30 miles wide, and the storm may extend outward from it for 400 miles.

As a hurricane approaches, the sky darkens and winds strengthen. As it nears land, it can bring torrential rains, high winds and storm surges. A hurricane can stretch the entire length of the eastern seaboard. The 74-160 mph winds can extend inland for hundreds of miles.

Hurricanes are classified into five categories according to wind velocity. Category 1 is the mildest, with winds from 74-95 mph. Category 5 is the strongest, with winds above 155 mph.

August and September are peak months of hurricane season, which lasts from June 1 to November 30.

## KNOW YOUR RISKS FOR HURRICANES

One of the most dramatic, damaging and potentially damaging weather events that occur in this country is a hurricane. Fortunately, there are measures that can be taken by individuals and communities before a hurricane strikes to reduce vulnerability to hurricane hazards.

During a hurricane, homes, businesses, public buildings, roads and power lines may be damaged or destroyed by high winds and floodwaters. Debris can break windows and doors. Roads and bridges can be washed away by flash flooding or blocked by debris.

The force of wind alone can cause tremendous devastation, toppling trees and power lines and undermining weak areas of buildings.

These storms cost our nation millions, if not billions, of dollars in damage annually.

But there are ways to offset such destruction. Simple construction measures, such as placing storm shutters over exposed glass or installing hurricane straps on roofs, have proved effective in lessening damage when hurricanes strike.

Communities can reduce vulnerability to hurricanes by adopting and enforcing building codes for wind and flood resistance. Sound land-use planning also can ensure that structures are not built in high-hazard areas.

A goal of the U.S. Department of Homeland Security/FEMA is to help prevent future damage from disasters by providing information as well as direct, hands-on help when needed. Building disaster-resistant communities is an achievable goal. It requires action by individuals, businesses and local governments. Working together, we can reduce the number of lives, property and businesses lost the next time a hurricane strikes.

## WEATHER TERMS USED FOR HURRICANE SEASON

Part of staying informed about weather conditions is understanding the different terms used by weather forecasters. Following are some of the most common terms:

*Advisory:* Hurricane and storm information is disseminated to the public every six hours.

*Special Advisory:* Information is disseminated when there is significant change in storm-related weather conditions.

*Gale Warning:* Sustained winds of 35-54 mph and strong wave action are expected.

*Storm Warning:* Sustained winds of 55-73 mph are expected.

*Hurricane Watch:* There is a threat of hurricane conditions within 24-36 hours.

*Hurricane Warning:* A hurricane is expected to strike within 24 hours or less, with sustained winds of 74 mph or more and dangerously high water.

*Tropical Disturbance:* A moving area of thunderstorms is in the tropics.

*Tropical Depression:* An area of low pressure, rotary circulation of clouds and winds up to 38 mph is identified.

*Tropical Storm:* A storm characterized by counterclockwise circulation of clouds and winds 39-73 is brewing.



### A MESSAGE FROM

#### DHS UNDER SECRETARY MICHAEL D. BROWN

We can depend on hurricanes to arrive each year along our eastern, southern and Gulf coasts, but we cannot depend on luck or chance to protect us. The power and strength of hurricanes demands respect, as anyone who has seen up close the terrible devastation they can cause can attest.

Hurricane winds can topple trees, tear homes from their foundations and toss boats around like toys. But wind is often not the worst damage hurricanes bring. The ocean surge and flooding that follow in its wake can do even more harm. Storm surges have been known to go 25 miles inland, submerging cars and flooding houses in its path.

There is nothing we can do to prevent hurricanes from forming year after year, but there is a lot we can do to reduce or even prevent the damage they cause. This newsletter contains some helpful information on how to better prepare and protect your family and property from the ravages of a hurricane.

I hope you will assess the risks you face and take steps to limit those risks. These preventive measures are some of the best investments you can make, and they will allow you to face the next hurricane better prepared, knowing you are ready to weather the storm.

## PREPARE A FAMILY DISASTER PLAN NOW

A well-thought-out plan of action for you and your family can go a long way toward reducing potential suffering from any type of disaster that could strike. With hurricane season upon us, preparing your family disaster plan is the first step.

Household emergency plans should be kept simple. The best emergency plans are those that are easy to remember.

Maintaining a link to the outside can be crucial. Keep a battery-operated radio and extra batteries on hand as part of your disaster supply kit. Make sure family members know where the radio is kept. Be sure to include pets in your family disaster plan.

Post emergency numbers (fire, police, ambulance) by the phone. Teach children how to call 911 for help.

Teach responsible family members how to turn off the utilities in your home.

Identify family meeting places in case you are separated. Choose a place in a building or park outside your neighborhood. Everyone should be clear about this location. Develop an emergency communication plan. Ask an out-of-state relative or friend to serve as the family's contact. Make sure everyone knows the telephone number of this contact.

Be familiar with escape routes in case you need to evacuate your neighborhood. Plan several escape routes for different contingencies.

For more information visit [www.ready.gov](http://www.ready.gov) on the Internet or, for printed information, call 800-BE-READY.

# ACTIONS TO TAKE BEFORE -- AND AFTER -- A HURRICANE

The hurricane warning system is increasingly effective in providing warnings in time for people to move inland when hurricanes threaten.

However, it is becoming more difficult to evacuate people from densely populated areas. Roads are easily overcrowded, particularly during summer tourist season.

The problem is compounded by the complacency of people who do not understand the awesome power of the storm.

Complacency and delayed action could result in needless loss of life and damage to property.

## Before a Hurricane Strikes

Plan a safe evacuation route that will take you 20-50 miles inland. Contact your local emergency management office or Red Cross chapter and ask for the community preparedness plan.

Have disaster supplies on hand, including:

- Flashlight and extra batteries
- Portable battery-operated radio and extra batteries
- First-aid kit
- Emergency food and water
- Nonelectric can opener
- Essential medicines

## If Evacuation Is Necessary

If officials order evacuation, leave as soon as possible. Avoid flooded roads and watch for washed-out bridges.

Secure your home. Unplug appliances and turn off electricity and the main water valve. If time permits, elevate furniture to protect it from flooding or move it to a higher floor.

Take your pre-assembled emergency supplies and warm, protective clothing.

- Cash and credit cards
- Sturdy shoes and a change of clothing
- Copies of important papers, including bank accounts, insurance and household inventory records

Make sure your family goes over the family disaster plan (see page 2).

Make plans for protecting your house, especially the roof, windows and doors (see page 4).

Trim dead or weak branches from trees.

Check into flood insurance. Homeowners policies do not cover damage from flooding that often accompanies hurricanes. Call your local insurance agent for information or the National Flood Insurance Program at 800-720-1090 (see page 6).

## When a Hurricane Watch or Warning Is Issued

Listen to radio or television for hurricane progress reports. Follow instructions if ordered to evacuate.

Check your emergency supplies. Store drinking water in clean bathtubs, jugs, bottles and cooking utensils.

Bring in outdoor objects such as lawn furniture, toys and garden tools; anchor objects that cannot be brought inside but that could be wind-tossed. Remove outdoor antennas, if possible.

Secure your home by installing hurricane shutters or pre-cut plywood.

Turn the refrigerator and freezer to the coldest settings if not instructed by officials to turn off utilities.

Fuel your car. Review evacuation routes and gather your disaster supply kit in case you are instructed to evacuate.

Store valuables and personal papers in a waterproof container.

If you have a boat, moor it securely or move it to a designated safe place, if time permits.

## After a Hurricane

Return home only after authorities say it is safe to do so. Keep tuned to your local radio or tv station for recovery information.

Beware of downed or loose power lines.

Report them immediately to the power company, police or fire department.

Enter your home with caution. Open windows and doors to ventilate or dry your home. Do not use candles or open flames in doors. Use a flashlight to inspect for damage.

Check for gas leaks. If you smell gas or hear a blowing or hissing noise, quickly leave the building and leave the doors open. Call the gas company.

Look for electrical system damage. If you see sparks or frayed wires, turn off electricity at the main fuse box. If you have to step in water to reach the electric box, call an electrician for advice.

Check for sewage and water-line damage. If you suspect there is such damage, call the water company. Do not drink or prepare food with tap water until notified it is safe to do so.

Take pictures of the damage for insurance claims and contact your service agent.

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Copies of *Surviving the Storm* are available on the FEMA Web site: [www.fema.gov](http://www.fema.gov)

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Photo by Liz Roll

*The windows of this store had not been boarded up, allowing hurricane winds to enter and do major damage inside the structure.*

In choosing the appropriate connectors for your walls, check with lumber-supply outlets, a building professional or local building and planning officials.

## Windows

Installing storm shutters over all exposed windows and other glass surfaces is one of the easiest and most effective ways to protect your home. Cover all windows, French doors, sliding glass doors and skylights.

There are many types of manufactured storm shutters available. Before installing shutters, check with local building officials to find out whether or not a permit is required.

Plywood shutters that you make yourself, if installed properly, can offer a high level of protection from flying debris during a hurricane. Plywood shutters can be installed on all types of homes.

# STRENGTHENING YOUR HOME

After Hurricane Andrew, which caused large-scale destruction in parts of southern Florida in 1992, a team of experts examined homes that failed and ones that survived. They found four areas that should be checked for vulnerability to strong winds: the roof, windows, doors and garage doors. Measures can be taken to strengthen each of these areas of your home.

## Roof

The roof of your house is most vulnerable to damage from high winds. Proper roof construction is essential. A small investment made before a storm hits can save thousands in future damage.

The connection between the roof and walls must be strong enough to resist the “uplift” effect of strong winds. Roof trusses or rafters should be tied properly to exterior walls with metal hurricane connectors or straps.

Have a building professional use specially designed metal connectors to attach the roof to wall plates, which are already well connected to wall studs.

You may choose instead to use metal strapping or connectors to tie the roof truss to both the wall top plate and the wall studs (see Figure 1).

Special connectors also are available to attach a roof to a masonry wall.

Gable-end roofs are more susceptible to damage from high winds than hip or flat roofs. Bracing for trusses and rafters can add protection to your home.

## Doors

If you have double-entry doors, one is active and one is inactive. Check to see how the fixed half is secured top and bottom. The bolts or pins that secure most doors are not strong enough to withstand hurricane winds.

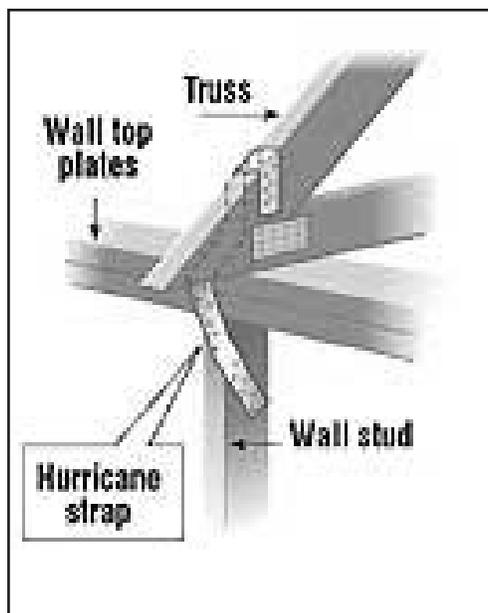
Check with your local building supplies retailer to find out what kind of bolt system will work for your door. Doors with windows will need additional protection from flying debris.

## Garage Doors

Double-wide (two-car) garage doors can pose a problem during hurricanes. Because they are so large, they wobble as high winds blow and can pull out of their tracks or collapse from wind pressure.

Certain parts of the country have building codes requiring garage doors that withstand high winds. Some garage doors can be strengthened with retrofit kits. Check with your local building supplies dealer.

More detailed information on protecting your home from wind is available in the FEMA publication *Against the Wind: Protecting Your Home from Hurricane Wind Damage*. You will find it on the FEMA web site: [www.fema.gov/pdf/hazards/agstwnd.pdf](http://www.fema.gov/pdf/hazards/agstwnd.pdf)



**Figure 1**

## MOBILE HOMES REQUIRE SPECIAL PRECAUTIONS

Mobile homes are particularly vulnerable to hurricane-force winds. Anchor the mobile home with over-the-top, or frame, ties. When a storm threatens, do what you can to secure your home, then take refuge with friends or relatives or at a public shelter.

Before you leave, take the following precautions:

- Pack breakables in boxes and put them on the floor.
- Remove mirrors and tape them. Wrap mirrors and lamps in blankets and place them in the bathtub or shower.
- Install hurricane shutters or precut plywood on all windows.
- Shut off utilities and disconnect electricity, sewer and water lines. Shut off propane tanks and leave them outside after anchoring them securely.
- Store awnings, folding furniture, trashcans and other loose outdoor objects.

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## MAKE PLANS FOR YOUR PETS

In planning for the hurricane season, do not forget your pets. If you evacuate your home, do not leave pets behind.

The Humane Society of the United States urges pet owners to make arrangements to evacuate their animals.

Be sure you have up-to-date identification tags, a pet carrier and a leash for them. Assemble a disaster kit that you can provide to whomever assumes care of your pet during a disaster.

Most emergency shelters will not accept pets. In the event of evacuation, make alternative arrangements for pets, such as with family friends, veterinarians or kennels in safe locations. Send medicine, food, feeding information and other supplies with them.



Photo by Dave Saville

*A river flooded as a result of a hurricane and caused major damage to the business district.*

## PLANNING COULD SAVE YOUR BUSINESS

If a hurricane is threatening the area where your business is located, you can take actions ahead of time that will save damage and lost productivity.

Clear out areas with extensive glass frontage as much as possible. If you have shutters, use them; otherwise, use precut plywood to board up doors and windows.

Remove outdoor hanging signs.

Bring inside or secure any objects that might become airborne and cause damage in strong winds.

Secure showcases. Use plywood to protect glass showcases or, if possible, turn the glass side toward an inside wall.

Store as much merchandise as high as possible off the floor, especially goods that could be in short supply after the storm.

Move merchandise that cannot be stored away from glass and cover it with tarpulins or heavy plastic.

Secure all goods in warehouses off the floor, and place sandbags in spaces where water could enter.

Remove papers from lower drawers of desks and file cabinets and place them in plastic bags or containers on top of the cabinets.

Turn off water heaters, stoves, pilot lights and other burners.

### DANGER: FLASH FLOODS

Nearly half of all flash flood fatalities are automobile related.

Water weighs 62.4 lbs. per cubic foot and typically flows downstream at 6 to 12 mph.

When a vehicle stalls in water, the water's momentum is transferred to the car. For each foot water rises, 500 lbs. of lateral force are applied to the car.

But the biggest factor is buoyancy. For each foot that water rises up the side of the car, the car displaces 1500 lbs. of water. In effect, the car weighs 1500 lbs. less for each foot water rises.

Two feet of water will carry away most automobiles.

# FLOOD INSURANCE: YOUR BEST PROTECTION

As many hurricane victims found out, homeowners policies do not cover damage from rising waters. But people who do not have flood insurance can take steps now to protect themselves against future flood losses.

Floods are the most common natural disaster, and maintaining a flood insurance policy is one of the most effective ways to protect yourself against the cost of flood damage.

## Who Is Eligible?

Flood insurance backed by the federal government is available to any homeowner, renter or business owner whose property is in a community that participates in the National Flood Insurance Program (NFIP). In order to participate, the community must adopt and enforce local floodplain management ordinances designed to reduce the risk of future flood losses.

If you live in such a community, you can purchase flood insurance from any licensed insurance agent or company -- the same one, for example, who handles your homeowners or automobile insurance.

## What Is the Cost?

Premiums vary according to the flood risk your property is exposed to, the amount of coverage you purchase, the deductible you select and the type of building you are insuring.

On a single-family home, you may purchase flood insurance coverage up to a maximum of \$250,000 on the structure and up to \$100,000 on the contents. If you are a business owner, the maximum coverage is \$500,000 on the building and another \$500,000 on contents. If you are a renter, you can purchase up to \$100,000 coverage for personal belongings.

## Do I Need Coverage?

Some people resist buying flood insurance in the false belief that if flooding occurs,



Photo by liz Roll

*These houses were victims of flooding that followed in the aftermath of a hurricane.*

the government will bail them out. Federal disaster assistance is available only if a flood (or other disaster) is so large and widespread it warrants a major disaster declaration from the president. More than 90 percent of flood events are not presidentially declared.

In the majority of floods, victims are on their own --unless they have flood insurance. And even for floods that are declared major disasters, the aid available is limited. Most assistance is in the form of loans that must be repaid, with interest.

Even if your neighborhood is not in a floodplain, flood insurance is advisable. Floods can --and do-- occur almost anywhere. Nearly 30 percent of NFIP claims come from properties considered to be at low to moderate risk.

For more information, contact your local insurance agent or company or call the toll-free NFIP number, **800-720-1090**.

## BUILDING A SAFER FUTURE

There are a number of measures that property owners can take to limit possible damage from flooding caused by storm surges.

Elevating your entire home is the most effective, but there are also other, relatively inexpensive ways to protect your home and property against flooding.

**Relocate the electrical box, the water heater and the heating system** to an upper floor or elevate it at least 12 inches above the base flood elevation. Your local building officials can determine the safe flood level for your community.

**Anchor the fuel tank** to the floor or wall to prevent it from overturning and floating. Metal structural supports and fasteners must be noncorrosive. Wooden structural supports must be pressure treated.