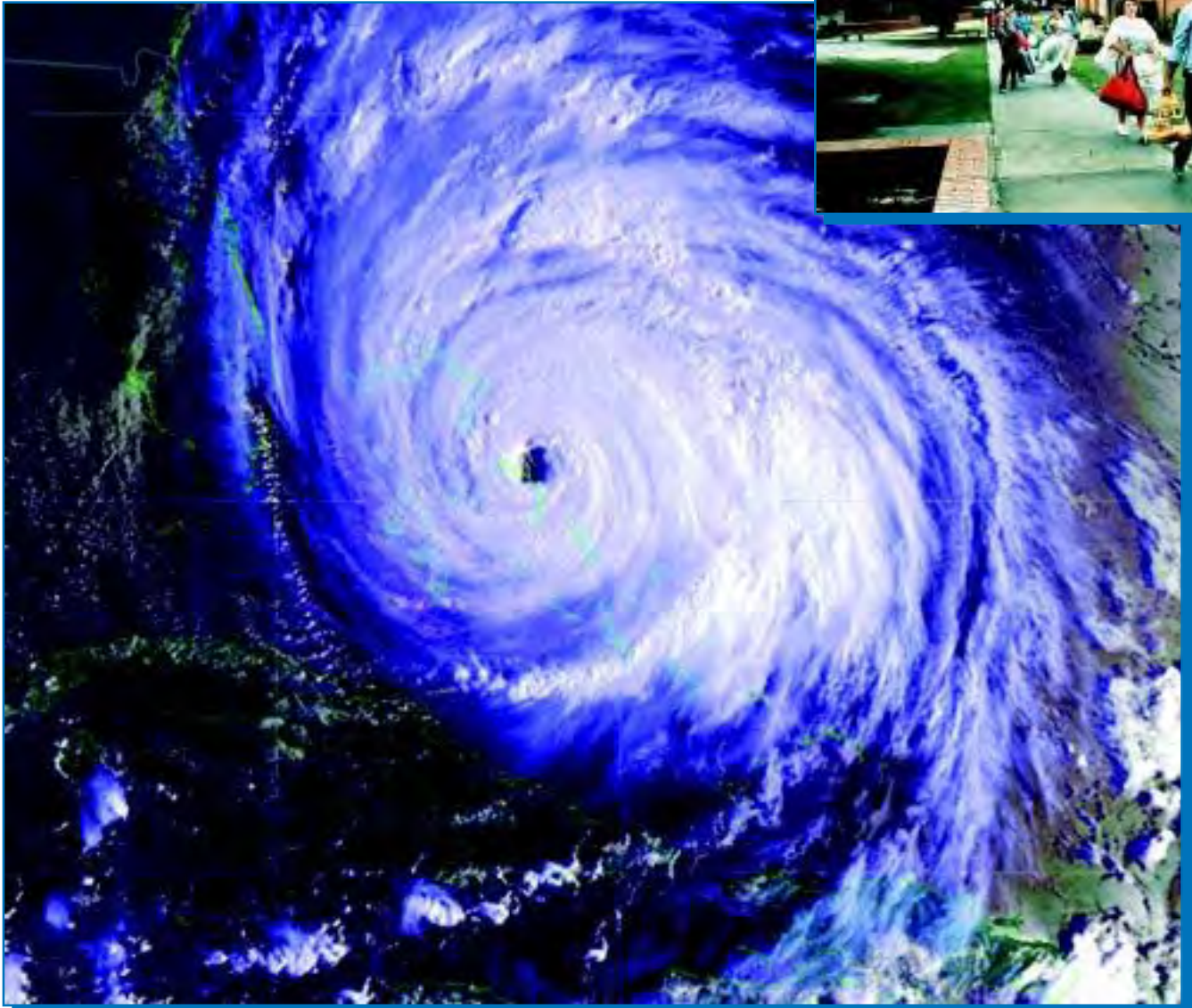


# hurricanes...

*Unleashing Nature's Fury*



FEMA

*Hurricane Floyd, 1999/NOAA*

## A PREPAREDNESS GUIDE

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Weather Service

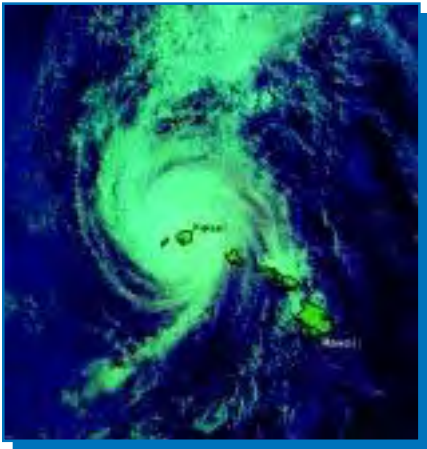
Revised August 2001



# What is a Hurricane?

The term hurricane has its origin in the indigenous religions of old civilizations. The Mayan storm god was named *Hunraken*. A god considered evil by the Taino people of the Caribbean was called *Huracan*. Hurricanes may not be considered evil but they are one of nature's most powerful storms. Their potential for loss of life and destruction of property is tremendous. Those in hurricane-prone areas

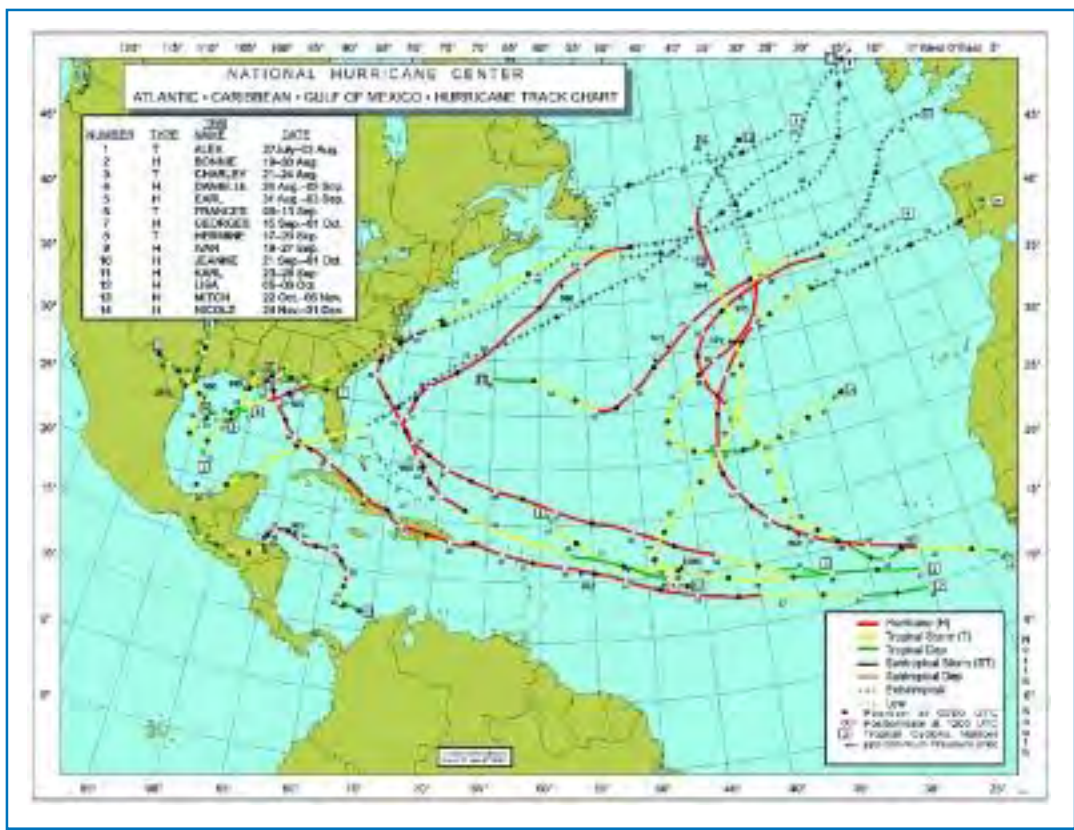
need to be prepared for hurricanes and tropical storms. Even inland areas, well away from the coastline, can experience destructive winds, tornadoes and floods from tropical storms and hurricanes.



*Hurricane Iniki/NOAA*

*A hurricane is a type of tropical cyclone—an organized rotating weather system that develops in the tropics. Hurricanes rotate counterclockwise in the Northern Hemisphere. Tropical cyclones are classified as follows:*

- **Tropical Depression**—An organized system of persistent clouds and thunderstorms with a closed low-level circulation and maximum *sustained* winds of 38 mph (33 knots) or less.
- **Tropical Storm**—An organized system of strong thunderstorms with a well defined circulation and maximum *sustained* winds of 39 to 73 mph (34-63 knots).
- **Hurricane**—An intense tropical weather system with a well defined circulation and *sustained* winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons, and similar storms in the Indian Ocean are called cyclones.



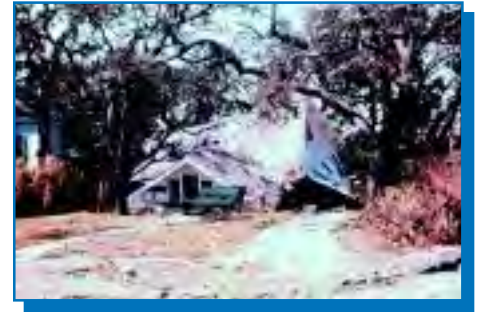
*1998 Atlantic Ocean Hurricane Season Summary/NOAA*



Tropical depressions and tropical storms, while generally less dangerous than hurricanes, still can be deadly. The winds of tropical depressions and tropical storms are usually not the greatest threat. Heavy rains, flooding and severe weather, such as tornadoes, create the greatest threats from tropical storms and depressions.

On average each year, 10 tropical storms, 6 of which become hurricanes, develop in the Atlantic Ocean, Caribbean Sea or Gulf of Mexico. In a typical 3-year span, the U.S. coastline is struck on average five times by hurricanes, two of which will be designated as major hurricanes.

Tropical cyclones are sometimes steered by weak and erratic winds, making forecasting a challenge. Warnings issued from the National Oceanic and Atmospheric Administration's (NOAA) National Hurricane Center and Central Pacific Hurricane Center continue to improve and have greatly diminished hurricane fatalities in the United States. Despite improved warnings, property damage continues to increase due to growing population on our coastlines. Federal agencies, such as the Federal Emergency Management Agency (FEMA), and organizations such as the American Red Cross, have combined with state and local agencies, rescue and relief organizations, the private sector and the news media to improve preparedness efforts.



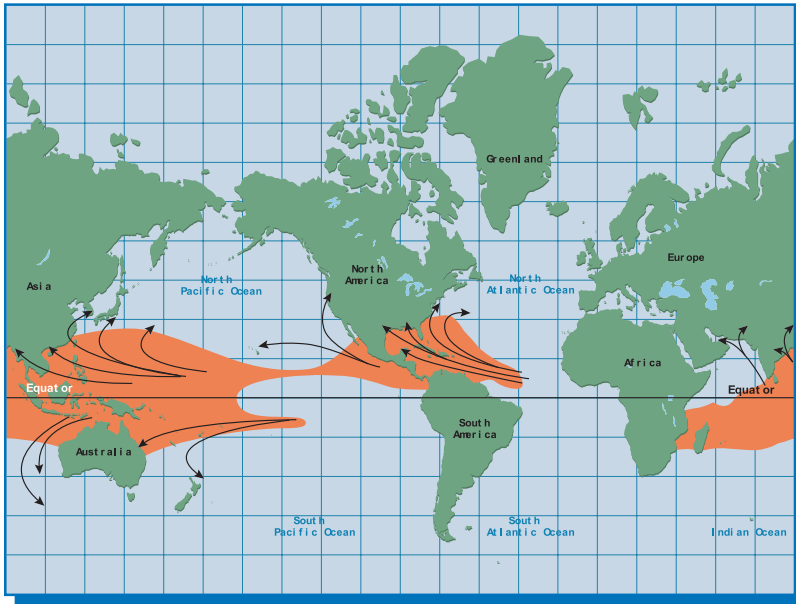
*Hurricane Camille, Category 5  
Hurricane/NOAA*

## Saffir-Simpson Hurricane Scale

The *Saffir-Simpson Hurricane Scale* is a 1 to 5 rating based on the hurricane's intensity. This scale estimates potential property damage. Hurricanes or typhoons reaching Category 3 and higher are considered *major* hurricanes because of their potential for loss of life and damage. Category 1 and 2 storms are still very dangerous and warrant preventative measures. In the western North Pacific, the term "Super Typhoon" is used for tropical cyclones with sustained winds exceeding 150 mph. For more information on the Saffir-Simpson Hurricane Scale, go to [www.nhc.noaa.gov/aboutsshs.html](http://www.nhc.noaa.gov/aboutsshs.html).

Saffir-Simpson Hurricane Scale			
Scale Number (Category)	Sustained Winds (MPH)	Types of Damage	Hurricanes
1	74-95	<b>Minimal:</b> Damage primarily to shrubbery, trees, foliage and unanchored mobile homes. No real damage to other structures.	<i>Irene, 1999</i>
2	96-110	<b>Moderate:</b> Some trees blown down. Major damage to exposed mobile homes. Some damage to roofing materials, windows and doors.	<i>Georges, 1998 Floyd, 1999</i>
3	111-130	<b>Extensive:</b> Large trees blown down. Mobile homes destroyed. Some structural damage to roofing materials of buildings. Some structural damage to small buildings.	<i>Betsy, 1965 Alicia, 1983</i>
4	131-155	<b>Extreme:</b> Trees blown down. Complete destruction of mobile homes. Extensive damage to roofing materials, windows and doors. Complete failure of roofs on many small residences.	<i>Andrew, 1992</i>
5	>155	<b>Catastrophic:</b> Complete failure of roofs on many residences and industrial buildings. Extensive damage to windows and doors. Some complete building failure.	<i>Camille, 1969</i>
<b>NOTE:</b> Damage can vary greatly and may not apply to all areas, such as Hawaii.			

# How Hurricanes Form



NOAA

## Breeding Grounds

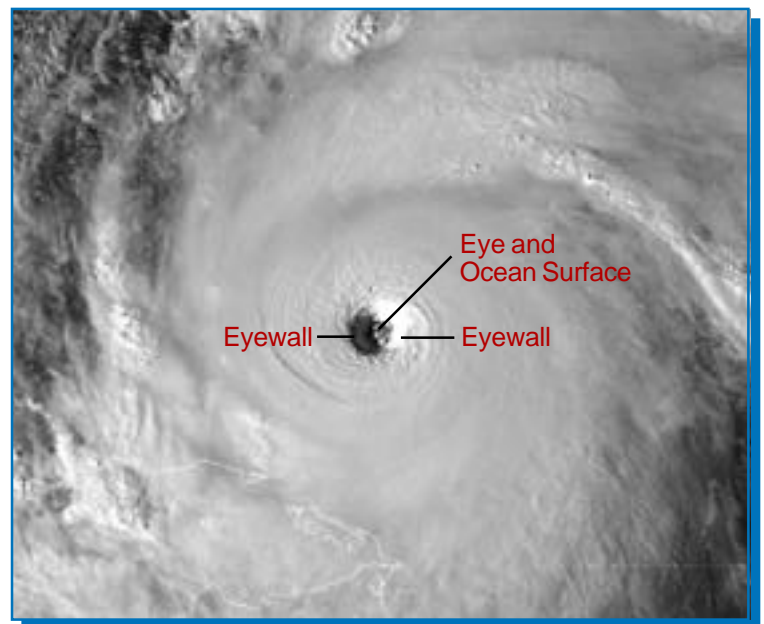
Hurricanes are products of a tropical ocean and a warm, moist atmosphere. Powered by heat from the sea, they are typically steered by high-level easterly winds while in the tropics, generally south of 25° north latitude and by high-level westerly winds north of 25° north latitude. When hurricanes become very strong, they can create their own steering winds.

The Atlantic hurricane season starts on June 1. For the United States, the peak hurricane threat exists from mid-August to late October, although the official hurricane season extends through November. Over other parts of the world, such as the western North Pacific, typhoons can occur year-round.

## Storm Structure

The process by which a disturbance forms and strengthens into a hurricane depends on at least three conditions. First, a disturbance gathers heat and energy through contact with warm ocean waters. Next, added moisture evaporated from the sea surface powers the infant hurricane like a giant heat engine. Third, the hurricane forms a wind pattern near the ocean surface that spirals air inward. Bands of thunderstorms form, allowing the air to warm further and rise higher into the atmosphere. If the winds at these higher levels are relatively light, this structure can remain intact and further strengthen the hurricane.

The center, or eye, of a hurricane is relatively calm with sinking air, light winds and few clouds. The most violent winds and rain take place in the eyewall, the ring of thunderstorms immediately surrounding the eye. At the top of the eyewall (about 50,000 feet), most of the air is propelled outward, increasing the air's upward motion. Some of the air, however, moves inward and sinks into the eye, creating a cloud-free area.



Hurricane Mitch/NOAA

# Hurricane Impacts

## Storm Surge

Storm surge is a large dome of water often 50 to 100 miles wide that sweeps across the coastline near where a hurricane makes landfall. The surge of high water topped by waves is devastating. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. Along the immediate coast, storm surge is the greatest threat to life and property.



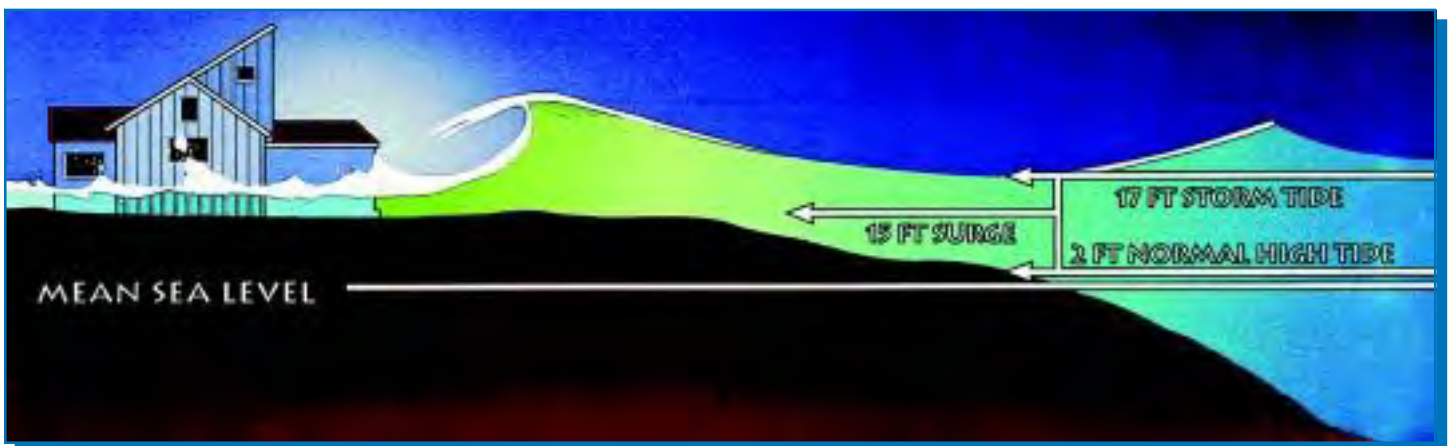
*Before—Folly Beach, SC/NOAA*



*After Hurricane Hugo, 1989—  
Folly Beach, SC/NOAA*

## Storm Tide

The storm tide is the combination of the storm surge and the astronomical tide. If the storm surge arrives at high tide, the water height will be even greater. For example, as a hurricane moves ashore, a 15-foot surge added to the 2-foot high tide creates a storm tide of 17 feet. This mound of water, topped by battering waves, moves ashore along an area of the coastline as much as 100 miles wide. The combination of the storm surge, battering waves and high winds is deadly and causes great property damage.



### Storm Tide Facts

- More than 8,000 people were killed in the 1900 Galveston hurricane, most by the storm tide.
- Hurricane Camille in 1969 produced a 24-foot storm tide in Mississippi.
- Hurricane Hugo in 1989 generated a 20-foot storm tide in South Carolina.
- Hurricane Andrew in 1992 generated a 17-foot storm tide in south Florida.





*Hurricane Hugo wind damage, Charlotte, NC/NOAA*

## Winds

Hurricane-force winds, 74 mph or more, can destroy buildings and mobile homes. Debris, such as signs, roofing material, siding, and small items left outside, become flying missiles in hurricanes. Winds can stay above hurricane strength well inland. Hurricane Hugo (1989) battered Charlotte, North Carolina—about 175 miles inland—with gusts to near 100 mph, downing trees and power lines.

## Tornadoes

Hurricanes and tropical storms also produce tornadoes. These tornadoes most often occur in thunderstorms embedded in rain bands well away from the center of the hurricane; however, they can also occur near the eyewall. Usually, tornadoes produced by tropical cyclones are relatively weak and short-lived, but still pose a threat.



*Hurricane Andrew tornado damage, LaPlace, LA/NOAA*

- **Hurricane Andrew**—August 16-28, 1992: Damage in the United States is estimated at \$27 billion, making Andrew the most expensive hurricane in U.S. history. Wind gusts in south Florida were estimated to be at least 175 mph.
- **Hurricane Hugo**—September 10-22, 1989: Wind gusts reached nearly 100 mph as far inland as Charlotte, North Carolina. Hugo sustained hurricane-strength winds until shortly after it passed west of Charlotte.
- **Hurricane Agnes**—June 14-22, 1972: Devastating floods from North Carolina to New York produced many record-breaking river crests. The storm generated 15 tornadoes in Florida and 2 in Georgia.

# Inland/Freshwater Flooding

All tropical cyclones can produce widespread torrential rains often in excess of 6 inches. This rain can produce deadly and destructive floods. Heavy rain can trigger landslides and mud slides, especially in mountainous regions. Flooding is the major threat from tropical cyclones to people well inland.

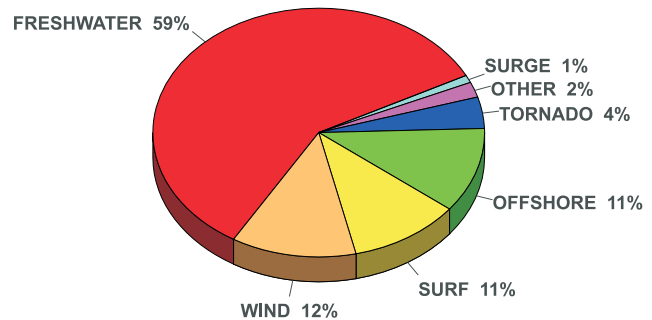


*Hurricane Floyd inland flooding, Franklin, VA/  
Courtesy of Darnell Stewart and Kevin Michalek*

Flash flooding, a rapid rise in water levels, can occur quickly due to intense rainfall. Longer term flooding on rivers and streams can persist for several days after the storm.

Intense rainfall is not directly related to the winds of tropical cyclones but rather to the speed of movement and geography of the area affected. Slower moving storms produce more rainfall. Mountainous terrain enhances rainfall from a tropical cyclone. Inland flooding can be a major threat to people hundreds of miles from the coast.

## 1970-99 U.S. TROPICAL CYCLONE DEATHS



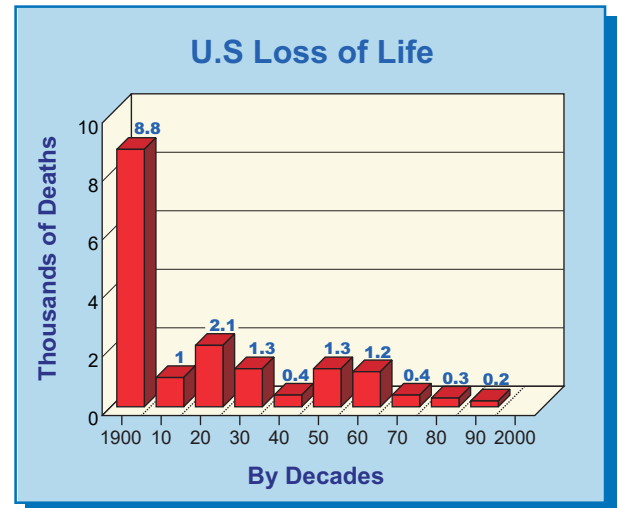
***Between 1970 and 1999, more people have lost their lives from freshwater flooding associated with landfalling tropical cyclones than from any other weather hazard related to tropical cyclones***

- **Tropical Storm Allison (2001)** was the most costly tropical storm in U.S. history with more than \$5 billion in flood damage to southeast Texas and southern Louisiana. Twenty-three fatalities were reported in Texas and one in Louisiana.
- **Hurricane Floyd (1999)** brought extremely heavy rainfall to many locations in the eastern United States. Of the 56 people who perished in this country during Floyd, 50 died from inland flooding, including 35 in North Carolina.
- **Tropical Storm Alberto (1994)** produced tremendous rainfall along the Gulf coasts of Alabama and Georgia, killing 33 people and producing damages exceeding \$750 million.
- **Hurricane Agnes (1972)** fused with another storm system, producing floods in the Northeast United States which contributed to 122 deaths and \$6.4 billion in damage.
- **Hurricane Camille (1969)** brought 27 inches of rain in Virginia, causing severe flash flooding and 150 deaths.

# U.S. Hurricane Problem

## Population Growth

The United States has a significant hurricane problem as the coastal population continues to rapidly increase. More than one in six Americans now live in a county abutting the eastern Atlantic or Gulf of Mexico coast, and this does not include those living in Puerto Rico or Hawaii. In the more popular resort areas, numbers can swell 10- to perhaps 100-fold when holiday, weekend, and vacation visitors arrive. From Maine to Texas, our coastlines are filling with new homes, condominium towers and cities built on sand. These homes are waiting for the next storm to threaten its residents' dreams. In fact, the coastal population is expected to double between 1995 and 2010. The most significant danger to coastal citizens is from the hurricane's storm surge. Historically, storm surge has caused the greatest loss of life and extreme property damage.



## Perception of Risk

Over the past several years, the hurricane warning system has provided adequate time for people on the barrier islands and the immediate coastline to move inland when hurricanes threaten. However, it is becoming more difficult to evacuate people from the barrier islands and other coastal areas because roads have not kept pace with the rapid population growth. The problem is further compounded because 80 to 90 percent of the population now living in hurricane-prone areas have never experienced the core of a "major" hurricane. Many of these people have been through weaker storms. The result is a false impression of a major hurricane's damage potential. This can lead to complacency and delayed actions resulting in injuries and loss of lives.



NOAA

## Frequency of Hurricanes

During the '70s, '80s and '90s, major hurricanes striking the United States were less frequent than the previous three decades. With the tremendous increase in population along the high-risk areas of our shorelines, the United States may not fare as well in the future. Some hurricane experts think the frequency of major hurricanes making landfall in the United States will increase over the next few decades.

In the final analysis, the only real defense against hurricanes is the informed readiness of your community, your family and **YOU**.



# Coastal Areas At Risk

## Coastal Areas and Barrier Islands



*Miami Beach, FL/NOAA*

All Atlantic and Gulf coastal areas as well as the U.S. Pacific Islands are subject to hurricanes/typhoons or tropical storms. Although rarely struck by hurricanes, parts of the southwest United States and Pacific Coast can experience heavy rains and floods from the remnants of hurricanes spawned off Mexico. Hawaii and the U.S. territories, such as Guam, American Samoa and Puerto Rico, are also subject to hurricanes. Hurricane Iniki struck Kauai, Hawaii, on September 11, 1992, resulting in \$2.5 billion in damage. During 1992, Guam was battered by five typhoons. On December 16, 1997, Guam was hit by Super Typhoon Paka, causing over \$520 million in damage.

Due to the limited number of evacuation routes, barrier islands such as the Outer Banks of North Carolina and areas like the Florida Keys and New Orleans, Louisiana, are especially vulnerable to hurricanes. People living near coastal areas may be asked by local officials to evacuate well in advance of a hurricane landfall.

**If you are asked to leave your home, do so IMMEDIATELY!**



*National Climatic Data Center/NOAA*

# Tracking the Storm



*Geostationary Operational  
Environmental Satellite/NOAA*

## Satellite

Geostationary satellites orbiting the earth at an altitude of about 22,000 miles above the equator provide imagery day and night. This satellite imagery is a valuable tool helping to provide estimates of the location, size and intensity of a storm and its surrounding environment.



*WC-130H, Hurricane Hunters/  
U.S. Air Force Reserve*

## Reconnaissance Aircraft

The U.S. Air Force Reserve provides most of the hurricane reconnaissance used by the National Hurricane Center. Pilots fly into the core of a hurricane to measure wind, pressure, temperature and humidity as well as to provide an accurate location of the center of the hurricane. NOAA also flies aircraft into hurricanes to aid scientists in better understanding these storms and to improve forecast capabilities.



*WSR-88D Radar/NOAA*

## Radar

When a hurricane gets close to the coast, it is monitored by land-based weather radars. The NWS Doppler weather radars, equipped with the latest advanced technology, add new dimensions to hurricane warning capabilities. It provides detailed information on hurricane wind fields and its changes. Local NWS offices are able to provide accurate short-term warnings for floods, inland high winds and any other weather hazards associated with a tropical cyclone.

## Tropical Prediction Center's National Hurricane Center Models

The NWS National Hurricane Center and Central Pacific Hurricane Center use several different numerical computer models to aid in forecasting the path, speed and strength of hurricanes. Data from weather satellite sensors, reconnaissance aircraft and other sources are fed into these computer models. The National Hurricane Center also has a computer storm surge model. This model provides guidance on storm surge height and the extent of flooding it will cause.



## ATLANTIC HURRICANE TRACKING CHART

**Always remember:**  
If you live along the coast or in a low-lying area, if you live in a mobile home or are exposed to hurricanes, wind, or storm surge, you should evacuate.

**Storm Surge:**  
A storm surge is a dome of water that can rise 10 feet or more above the normal water level. The surge can be as high as 15 feet. It is the surge that causes the most damage to property from high winds. Being in a path of a hurricane, you should take steps to protect your property from surge. If you live in a mobile home or are exposed to hurricanes, wind, or storm surge, you should evacuate. If you live in a low-lying area, you should evacuate. If you live in a high-lying area, you should evacuate. If you live in a high-lying area, you should evacuate.

**Wind Damage:**  
Hurricanes can cause significant damage to homes and businesses. If you live in an area exposed to the path of a hurricane, you should take steps to protect your property from high winds. Being in a path of a hurricane, you should take steps to protect your property from high winds. If you live in a mobile home or are exposed to hurricanes, wind, or storm surge, you should evacuate. If you live in a low-lying area, you should evacuate. If you live in a high-lying area, you should evacuate.

**Other Hurricane Effects:**  
Hurricanes can produce flooding by inland, especially if the storm "backs" or produces a lot of rain. Also, hurricanes can cause power outages. If you live in an area exposed to the path of a hurricane, you should take steps to protect your property from high winds. Being in a path of a hurricane, you should take steps to protect your property from high winds. If you live in a mobile home or are exposed to hurricanes, wind, or storm surge, you should evacuate. If you live in a low-lying area, you should evacuate. If you live in a high-lying area, you should evacuate.

**More Information:**  
More information about hurricanes, including how to prepare for a hurricane, is available from the American Red Cross. The American Red Cross is a national organization that provides disaster relief and emergency assistance. For more information, contact your local American Red Cross chapter or the National Hurricane Center. The National Hurricane Center is a federal agency that provides information about hurricanes and other tropical weather systems.





# Stay Informed!

## NOAA Weather Radio

NOAA Weather Radio (NWR) is the prime alerting and critical information delivery system of the NWS. NWR broadcasts warnings, watches, forecasts and other hazard information 24 hours a day. Known as the “voice of the NWS,” the NWR network has more than 590 stations, covering the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands and U.S. Pacific territories.

Many weather radios are equipped with a special alarm tone feature that sounds an alert giving you immediate information about a life-threatening situation. Routine weather radio programming is interrupted during tropical cyclone threats to send out the special tone that activates weather radios in the listening area. The hearing and visually impaired can get these warnings by connecting weather radios to devices such as strobe lights, pagers, bed-shakers, personal computers and text printers.

The NWS encourages people to buy a weather radio equipped with the Specific Area Message Encoder (SAME) feature. This feature automatically alerts you when important tropical cyclone information is issued for your area.

More information on NOAA Weather Radio can be found by contacting your local NWS office or on the Internet at:  
**[www.nws.noaa.gov/nwr](http://www.nws.noaa.gov/nwr)**.

## NOAA Weather Wire Service

The NWS NOAA Weather Wire Service (NWWS) provides reliable and timely warnings. NWWS has been improved and now makes limited graphic images available through a standard computer.



NOAA

## Emergency Managers Weather Information Network

The Emergency Managers Weather Information Network (EMWIN) offers an economical way to receive all products available on NWWS, plus graphical forecasts and select satellite data. For details, go to **[iwin.nws.noaa.gov/emwin/index.htm](http://iwin.nws.noaa.gov/emwin/index.htm)**.

## Interactive Weather Information Network

The Interactive Weather Information Network (IWIN) is a Web site with live data similar to EMWIN. It is open to all users and contains warnings in addition to many routine NWS products. To view IWIN products, go to **<http://weather.gov>**.

## Internet Resources

More hurricane information and news is just a click away.

- National Weather Service: [www.nws.noaa.gov](http://www.nws.noaa.gov)
- National Hurricane Center: [www.nhc.noaa.gov](http://www.nhc.noaa.gov)
- Central Pacific Hurricane Center: [www.nws.noaa.gov/pr/hnl/cphc/pages/cphc.shtml](http://www.nws.noaa.gov/pr/hnl/cphc/pages/cphc.shtml)

### Links to local NWS Offices

- NWS Eastern Region: [www.erh.noaa.gov](http://www.erh.noaa.gov)
- NWS Southern Region: [www.srh.noaa.gov](http://www.srh.noaa.gov)
- NWS Pacific Region: [www.nws.noaa.gov/pr](http://www.nws.noaa.gov/pr)

### Historical Information

- Nat'l Climatic Data Center: [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)

### Other Emergency Information Sites

- American Red Cross: [www.redcross.org](http://www.redcross.org)
- FEMA: [www.fema.gov](http://www.fema.gov)
- U.S. Geological Survey: [www.usgs.gov/hurricanes](http://www.usgs.gov/hurricanes)

# What To Listen For

- **HURRICANE/TROPICAL STORM WATCH:** Hurricane/tropical storm conditions are possible in the specified area of the **Watch**, usually within 36 hours. During a **Watch**, prepare your home and review your plan for evacuation in case a Hurricane/Tropical Storm **Warning** is issued.
- **HURRICANE/TROPICAL STORM WARNING:** Hurricane/tropical storm conditions are expected in the specified area of the **Warning**, usually within 24 hours. Complete storm preparations and leave the threatened area if directed by local officials.
- **SHORT TERM WATCHES AND WARNINGS:** These warnings provide detailed information on specific hurricane threats, such as floods and tornadoes.
- **FLOOD WATCH:** This product informs the public and cooperating agencies of *possible* flooding. If you are in a **Watch** area, check flood action plans, keep informed and be ready to act if a warning is issued or you see flooding.
- **FLOOD/FLASH FLOOD WARNING:** A flood/flash flood **Warning** is issued for specific communities, streams or areas where flooding is imminent or in progress. Persons in the warning area should take precautions IMMEDIATELY!

## National Hurricane Center and Central Pacific Hurricane Center Products

**PUBLIC ADVISORIES** offer critical hurricane watch, warning and forecast information.

**FORECASTS/ADVISORIES** provide detailed hurricane track and wind field information.

**PROBABILITIES OF HURRICANE/TROPICAL STORM CONDITIONS** offer a measure of the forecast track accuracy. The probabilities have no relation to tropical cyclone intensity.

## Local NWS Office Products

**HURRICANE LOCAL STATEMENTS** give greater detail on how the storm will impact your area.

**SPECIAL WEATHER STATEMENTS** summarize watches/warnings in effect and threats to local inland and coastal areas.

*All of the above information must be used to make an informed decision on your risk and what actions should be taken. Remember to listen to your local official's recommendations and to NOAA Weather Radio for the latest hurricane information.*

# Are You Ready?

## Before the Hurricane Season

NWS sponsors a *Hurricane Awareness Week* before each hurricane season. For dates and activities, listen to NOAA Weather Radio and check NWS Web sites and local media. If you live in a hurricane prone area:

- ✓ Know the hurricane risks in your area, e.g., determine whether you live in a potential flood zone.
- ✓ Learn safe routes inland.
- ✓ Find out where official shelters are located.
- ✓ Develop a family hurricane action plan.
- ✓ Review working condition of emergency equipment, such as flashlights and battery-powered radios.
- ✓ Ensure you have enough non-perishable food and water supplies on hand.
- ✓ Trim trees and shrubbery.
- ✓ Buy plywood or shutters to protect doors and windows.
- ✓ Clear loose and clogged rain gutters and downspouts.
- ✓ Determine where to move your boat in an emergency.
- ✓ Check policies to see if you have flood and wind insurance.
- ✓ Know your community safety plan.



FEMA

## Before the Storm

### When in a Watch Area...

- ✓ Frequently listen to radio, TV or NOAA Weather Radio for official bulletins of the storm's progress.
- ✓ Fuel and service family vehicles.
- ✓ Inspect and secure mobile home tie downs.
- ✓ Have extra cash on hand.
- ✓ Prepare to cover all windows and doors with shutters or other shielding materials.
- ✓ Check batteries and stock up on canned food, first-aid supplies, drinking water and medications.
- ✓ Bring in light-weight objects such as garbage cans, garden tools, toys and lawn furniture.

### Plan to leave if you...

- ✓ Live in a mobile home. They are unsafe in high winds no matter how well fastened to the ground.
- ✓ Live on the coastline, an offshore island, or near a river or a flood plain.
- ✓ Live in a high-rise building. Hurricane winds are stronger at higher elevations.

## Is Your Community StormReady?

To help Americans prepare for the ravages of hazardous weather, the National Weather Service has designed StormReady, a program aimed at arming America's communities with the communication and safety skills necessary to save lives and property. More information is available at [www.nws.noaa.gov/stormready](http://www.nws.noaa.gov/stormready).



## Community Preparedness Plans

Each community subject to a hurricane threat should develop its own hurricane safety plan. After you have developed a personal/family safety plan, find out about your community safety plan. Local officials should have detailed information for your immediate area. Please listen to and follow their recommendations before, during and after the storm.



# During the Storm

## When in a Warning Area...

- ✓ Listen closely to radio, TV or NOAA Weather Radio for official bulletins.
- ✓ Complete preparation activities, such as putting up storm shutters, storing loose objects, etc.
- ✓ Follow instructions issued by local officials. **Leave immediately if told to do so!**
- ✓ If evacuating, leave early (if possible, in daylight). Stay with friends or relatives, stay at a low-rise inland hotel/motel, or go to a predesignated public shelter outside a flood zone.
- ✓ Leave mobile homes.



FEMA

## What to Bring to a Shelter

- |                          |                               |
|--------------------------|-------------------------------|
| ■ First-aid kit          | ■ Flashlight (one per person) |
| ■ Prescription medicines | ■ Extra batteries             |
| ■ Baby food and diapers  | ■ Blankets or sleeping bags   |
| ■ Cards, games, books    | ■ Identification              |
| ■ Toiletries             | ■ Valuable papers (insurance) |
| ■ Battery-powered radio  | ■ Credit card or cash         |

- ✓ Notify neighbors and a family member outside of the warned area of your evacuation plans.
- ✓ Take pets with you. Leaving pets behind is likely to result in their being injured, lost or killed.
- ✓ Move to a safe area before you are cut off by flood water.

## If staying in a home...

Only stay in a home if you have NOT been ordered to leave. Stay inside a well constructed building. Examine the building and decide what you will do if winds become strong enough to produce deadly missiles and structural failure.

- ✓ Turn refrigerator to its coldest setting and keep closed.
- ✓ Turn off utilities if told to do so by authorities.

- ✓ Turn off propane tanks.
- ✓ Unplug small appliances.
- ✓ Fill bathtub and large containers with water for sanitary purposes.

## In strong winds...

- ✓ Stay away from windows and doors even if they are covered. Take refuge in a small interior room, closet or hallway.
- ✓ Close all interior doors. Secure and brace external doors.
- ✓ In a two-story house, 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.

# After the Storm

- ✓ Listen to radio, TV or NOAA Weather Radio.
- ✓ Keep abreast of road conditions through the media. Wait until an area is declared safe before entering.
- ✓ Do not attempt to drive across flowing water. As little as 6" of water may cause you to lose control of your vehicle—2 feet of water will carry most cars away.
- ✓ If you see water flowing across a roadway, **TURN AROUND AND GO ANOTHER WAY.** Many people have been killed or injured driving through

flooded roadways or around barricades. Roads are closed for your protection.

- ✓ Stay away from moving water. Moving water even 6" deep can sweep you away.
- ✓ Do not allow children, especially under age 13, to play in flooded areas. They often drown or are injured in areas appearing safe.
- ✓ If someone needs to be rescued, call professionals with the right equipment to help. Many people have been killed or injured trying to rescue others in flooded areas.

- ✓ Stay away from standing water. It may be electrically charged from underground or downed power lines.
- ✓ Have professionals check gas, water and electrical lines and appliances for damage.
- ✓ Use a flashlight for emergency lighting. Never use candles and other open flames indoors.
- ✓ Use tap water for drinking and cooking *only* when local officials say it is safe to do so.
- ✓ Use the telephone only for emergency calls.



# Family Disaster Plan

Prepare for hazards that could affect your area with a family disaster plan. Where will your family be when disaster strikes? They could be at work, school or in the car. How will you find each other? Will you know if your children are safe? Disaster may force you to evacuate your neighborhood or confine you to your home. What would you do if basic services—water, gas, electricity or telephones—were cut off?

## Steps to Take

**I Gather information about hazards.** Contact your local National Weather Service office, emergency management office, and American Red Cross chapter. Find out what type of disasters could occur and how you should respond. Learn your community's warning signals and evacuation plans. Assess your risks and identify ways to make your home and property more secure.

**II Meet with your family to create a disaster plan.** Discuss your plan with your family. Pick two places to meet: a spot outside your home for an emergency, such as fire, and a place away from your neighborhood in case you can't return home. Choose an out-of-state friend as your "family check-in contact" for everyone to call if the family gets separated. Discuss what you would do if advised to evacuate.

### Implement your plan.

- III**
- 1 Post emergency telephone numbers by the phone.
  - 2 Install safety features in your house, such as smoke detectors and fire extinguishers.
  - 3 Inspect your home for potential hazards (items that can move, fall, break or catch fire) and correct them.
  - 4 Have your family learn basic safety measures, such as CPR and first aid; how to use a fire extinguisher; and how and when to turn off water, gas and electricity in your home.
  - 5 Teach children how and when to call 911 or your local Emergency Medical Services number.
  - 6 Keep enough supplies in your home for at least 3 days. Assemble a disaster supplies kit. Store these supplies in sturdy, easy-to-carry containers, such as backpacks or duffle bags. Keep important documents in a waterproof container. Keep a smaller disaster supplies kit in the trunk of your car.

#### A Disaster Supplies Kit Should Include:

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| ■ A 3-day supply of water (one gallon per person, per day) | ■ Prescription medicines                   | ■ Emergency tools  |
| ■ Food that won't spoil                                    | ■ One blanket or sleeping bag per person   | ■ Flashlight, extra batteries                                  |
| ■ One change of clothing and shoes per person              | ■ First-aid kit                            | ■ Extra set of car keys and a credit card or cash              |
|  | ■ Battery-powered NWR and a portable radio | ■ Special items for infant, elderly or disabled family members |

**IV Practice and maintain your plan.** Ensure your family knows meeting places, phone numbers and safety rules. Conduct drills. Test your smoke alarms monthly and change the batteries at least once each year. Test and recharge your fire extinguisher(s) according to manufacturer's instructions. Replace stored water and food every 6 months. Contact your local National Weather Service office, American Red Cross chapter or emergency management office for a copy of "Your Family Disaster Plan" (L-191/ARC4466).

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