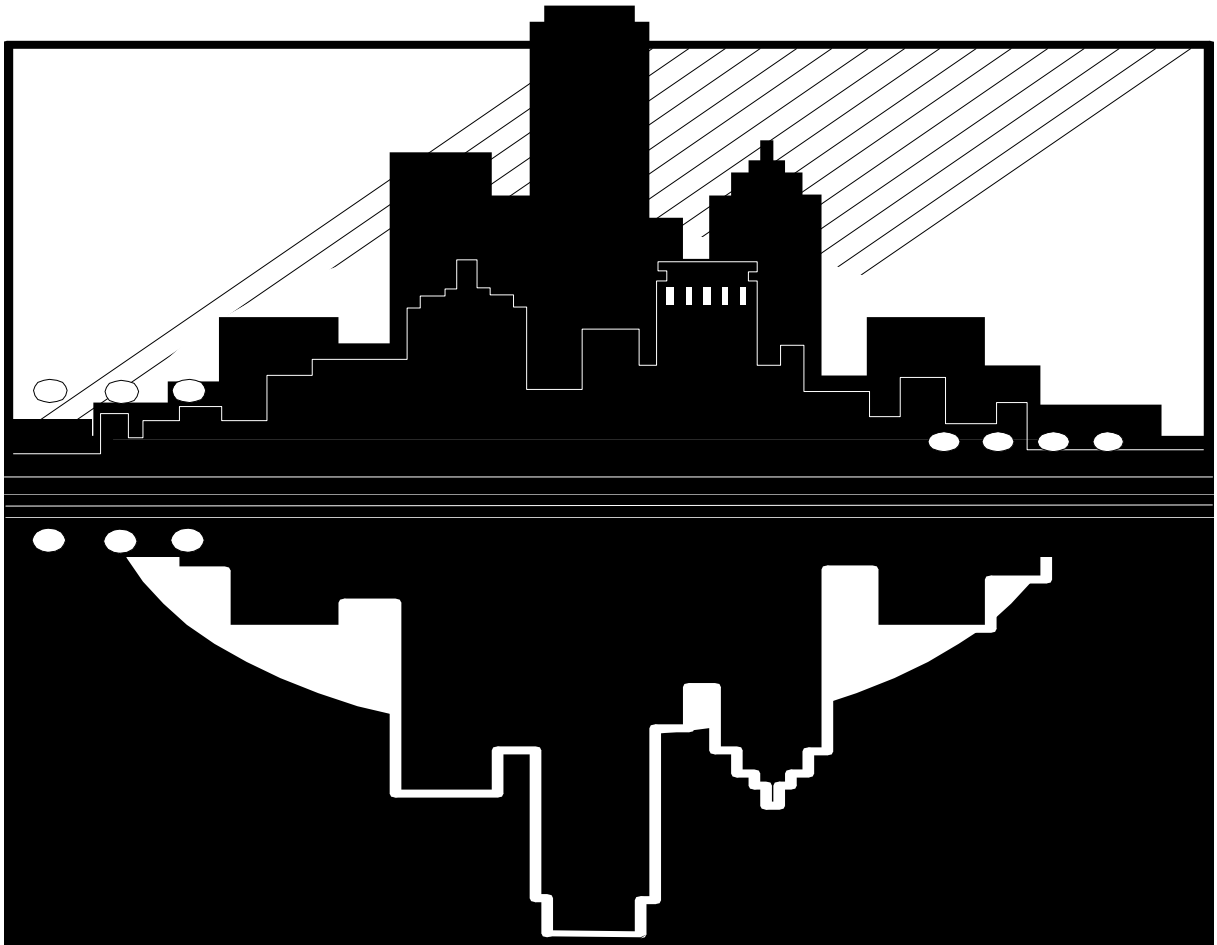


Hurricane Preparedness Planning



For Businesses

Prepared by the Plans Unit

Division of Emergency Management

Texas Department of Public Safety

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I. THE HURRICANE THREAT

The National Hurricane Center near Miami, Florida constantly monitors the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico looking for **tropical disturbances**. These disturbances develop in open ocean areas, and move across the seas. If wind speeds within such disturbances reach 39 miles per hour and move in a circular pattern in a counter-clockwise direction, they are categorized as **tropical storms**. Tropical storms that continue to grow are designated **hurricanes** when their wind speeds exceed 74 miles per hour. Hurricanes generally occur between June 1st and November 30th.



Photo by NOAA

Hurricanes generate a series of threats to lives and property. The most obvious is the threat posed to buildings, equipment, and people by the high winds which characterize such storms. Another serious threat to life and property comes from the storm surge, which occurs in coastal areas. Storm surges consist of huge domes of water and storm driven waves, which are pushed inland ahead of a hurricane. Tides of three to ten feet above normal are common, but the storm surge may rise twenty feet or more in large hurricanes. Waves come ashore with great force, far beyond the reach of normal surf. In relatively flat areas, the storm surge may push many miles inland. Hurricanes often generate heavy rainfall, which can cause severe flooding over wide areas. Hurricanes also may spawn deadly tornadoes. Flooding and tornadoes may affect areas well inland.

The National Weather Service rates hurricanes by their intensity, using a scale of one to five. The scale, which is outlined below, categorizes storms according to their sustained winds, the storm surges produced, and expected damage. The Texas coast is divided into five Study Areas. These are Lake Sabine, Houston/Galveston, Matagorda, Coastal Bend, and Valley. Each risk area consists of the geographic area that is expected to be affected by the corresponding hurricane category. Risk Area One is the area that is expected to be affected by hurricane Category One, Risk Area Two is the area that is expected to be affected by hurricane Category Two, and so on.

- A. Category One – Winds of 74 to 95 mph, storm surge of 4 to 5 feet above normal tide. Damage to shrubbery, trees, poorly constructed signs, and unanchored mobile homes. Low lying coastal roads inundated.
- B. Category Two – Winds of 96 to 110 mph, storm surge of 9 to 12 feet above normal tide. Some damage to roofing materials of buildings; some wind and door damage. Major damage to exposed mobile homes. Coastal roads and low lying escape routes made impassable by rising water 2 to 4 hours before arrival of hurricane.

- C. Category Three – Winds of 111 to 130 mph, storm surge 9 to 12 feet above normal tide. Large trees blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Serious flooding at the coast; many small structures destroyed; large structures damaged by waves and debris.
- D. Category Four – Winds of 131 to 155 mph, storm surge 13 to 18 feet above normal tide. Shrubs and trees blown down, all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs of many small residences. Complete destruction of mobile homes. Flat terrain 10 feet or less above sea level flooded inland as far as six miles. Major damage to lower floors of structures near shore.
- E. Category Five – Winds greater than 155 mph, storm surge greater than 18 feet above normal tide. Shrubs and trees blown down; considerable damage to roofs of buildings. Very severe and extensive damage to windows and doors. Complete failure of roofs on many residences and industrial buildings. Some complete building failures. Complete destruction of mobile homes. Massive evacuation of residential areas on low ground within 5 to 10 miles of shore possibly required.

The damage expected from various categories of storms outlined above is typical; actual damage caused by a storm will vary depending on building code compliance, condition of structures, zoning restrictions, and a number of other factors.

A **“Hurricane Watch”** means a hurricane has become a threat to coastal areas. Residents and businesses in those areas should monitor the situation and be prepared to take precautionary action promptly if a hurricane warning is issued.

A **“Hurricane Warning”** indicates that hurricane force winds, dangerously high water, and rough seas are expected in a specific coastal area within 24 hours and precautionary actions should begin immediately.

A hurricane’s intensity, speed, and direction can change rapidly, so the threat to particular areas of the coast may also change quickly. It is essential that people in coastal areas of Texas regularly monitor radio and television newscasts for information and instructions whenever a hurricane is in the Gulf of Mexico.



II. Is Your Business at Risk?

- A. Where to get information. Each jurisdiction within the state is required to have an emergency manager. This may be the chief elected official (the mayor or county judge), who is by law the emergency management director, or a coordinator appointed by the director to oversee emergency management. Check with your local government to determine the name and phone number of your emergency manager. Owners or managers of businesses within incorporated towns or cities should check with their municipal officials; those whose businesses are in unincorporated areas should check with the county government.



Photo by FEMA

Emergency management offices may be listed in the telephone book under emergency management, emergency operations, or similar titles, sometimes they may be listed under the fire department or the police department. Emergency management offices are also listed on Internet at this website: <http://www.txdps.state.tx.us/dem/links.htm#localgov>.

- B. Hurricane Threat Zones. Coastal areas in Texas which could be affected by hurricanes are categorized into two types of zones.
1. **Evacuation zones** are coastal areas in which there is a danger from both strong winds and storm surge. Take note that if your business is located in an evacuation zone, you need to plan for both high wind and high water.
 2. **Contingency zones** are areas which can be affected by high winds from major hurricanes, some of these zones extend well inland.

Businesses located within either type of zone should have a hurricane preparedness plan. It is a good idea to develop a plan of action for your business and your staff to be ready for this type of disaster. Contact your local emergency management staff to determine if your business is in a hurricane evacuation or contingency zone.

- C. Know the Vulnerability of your Business. Geographical information and infrastructure knowledge of your location will be of great benefit.
1. Know the elevation of your business above sea level. The elevation is the major factor in determining your vulnerability to storm surge (tidal flooding) or flooding by area streams and waterways. Information on the elevation can be obtained from property site plans, city building officials, and city or county floodplain administrators. Your local emergency management office has hurricane planning materials which outline areas which are likely to be affected by storm surge in various categories of hurricanes. The National Weather Service can supply information on flood stages for

area waterways. If your business is vulnerable to flooding, you should develop plans to evacuate it during a hurricane.

2. Know the condition of your building. If your business is located in an evacuation zone, hire an engineering firm to inspect the building and foundation to determine if the structure could withstand the forces of hurricane winds and waves. If the building and its foundation are not structurally able to withstand severe wind and water, then you should plan to evacuate it completely during a hurricane – it is probably not safe for any person to remain in the facility.

D. Know your Evacuation Routes

1. Depending on the severity of a hurricane and its projected path, local officials may recommend the evacuation of people in evacuation zones only or for people in both evacuation and contingency zones. If your business is located in an evacuation or contingency zone, it may have to be evacuated.
2. Obtain information on the specific evacuation routes that should be used from your local emergency management office. Get an estimate of travel times on those routes and potential problem areas (traffic bottlenecks, low areas that might flood, etc.). Your local emergency management office can also obtain copies of public information brochures on the hurricane threat prepared by federal and state emergency management officials.



III. General Hurricane Preparations

All business owners and managers should develop a basic hurricane awareness. You are responsible for planning to protect facilities and employees. Suggested pre-hurricane season planning activities are outlined below.



Photo by FEMA

A. Employee Preparation

1. Determine which members of your staff you will need to carry out hurricane preparations and who you can reasonably expect to be available. Some employees may need to assist their own families or relatives in evacuating from threatened areas. You will probably need all of your building maintenance staff to prepare your facility for a hurricane. Regularly update your list of employee phone numbers and ensure each department head has a copy.
2. Develop a simple **written plan** which incorporates a set of Hurricane Task Assignments for your staff. Inputs regarding the tasks to be accomplished should be solicited from all of the various work centers at your facility.
 - a. Outline the specific tasks which must be performed to protect your facility during a hurricane watch and a hurricane warning, how they will be accomplished, and who will perform them. See the sample format for Hurricane Task Assignments in Appendix 1.
 - b. It is probably desirable to develop teams for many tasks – a team to board up, a team to secure exterior equipment, and so forth. Staff members who will be performing unfamiliar tasks may need some instruction in these tasks and the use of any equipment that may be required to accomplish those tasks.
3. Outline your hurricane response plan and task assignments at a training session. Familiarization training should be conducted at the beginning of every hurricane season – and during the season if there is high staff turnover. Update team assignments on a regular basis.

B. Facility Preparation

1. If your facility is in a storm surge inundation zone or appears to be unsafe for occupancy during high winds, you may have to completely evacuate it. Identify essential business records that should be removed from the facility and determine where you plan to take them. Back up computer records on disk or tape and move these with other essential records.
2. Review your list of major equipment and furnishings to determine which items need to be protected or removed and record how you plan to do it. The basic choice is to

try to protect your equipment and furnishings in-place or move them out of the area which is at risk. In either case, determine what equipment and manpower will be needed to relocate these items. If you plan to protect equipment in-place, move it to well-protected interior rooms on floors above the level of potential flooding.

3. Identify outside equipment and furnishings which could be blown loose and may become deadly missiles in hurricane winds. Determine where they will be stored or how they will be secured in-place. Among the items to be secured are any available outside merchandise, trash cans, signs, awnings, antennas and tools.
4. Strongly anchor any portable storage buildings.
5. Ensure rooftop equipment such as exhaust fans, wind turbines, and air conditioning units are securely fastened or strapped down to the roof deck.
6. If the roof is a composition roof with a gravel covering, remove loose gravel to preclude damage to unprotected windows by stones being blown off of the roof.
7. Ensure that members of your staff know how to turn off the electrical power, water, gas, and other utility services within your building at main switches.

C. Equipment

1. Obtain several battery-operated radios and spare batteries to be ensure you can receive emergency information. It is desirable to have at least one radio on site which can receive National Oceanic & Atmospheric Administration (NOAA) weather radio frequencies. Weather radios with a tone alert capability are a very effective way of receiving reports of significant changes in weather conditions.
2. Procure sufficient flashlights and other battery powered lights to allow essential work to be conducted in the event of power outage. Ensure a good supply of fresh batteries are on hand throughout the hurricane season.
3. Compile a disaster supply kit and have this ready for emergencies with contents such as: foods, (canned goods, non-perishable, ready to eat), water (one gallon per person per day), manual can opener and other eating utensils, personal hygiene items such as soap, deodorant, shampoo, toothbrush and toothpaste, toilet paper, first aid kit, and manual, fire protection equipment or fire extinguisher, rainwear, gloves, and blankets.
4. If you do not have storm shutters, ensure you have the necessary tools to board up windows and brace doors. The first priority in protecting your facility will be to keep the wind out. Wind pressure and windblown debris can break windows and blow in doors. Sliding glass doors, large picture windows, skylights, French doors, inward opening double doors, and garage doors are particularly vulnerable. Such tools as a circular or hand saw, a drill with appropriate bits, a hammer or nail gun, hand or power-driven screwdriver, and a wrench may be needed. Nails will be sufficient on wood-framed windows and doors but screws or bolts and washers are necessary for metal-framed windows and doors.

5. Have an ample supply of brooms, squeegees, mops, and absorbents to remove water.
6. A small emergency generator could be useful. The power may go out before a hurricane comes ashore and may be out for an extended period. An emergency generator could provide the capability to maintain lighting, recharge battery-powered equipment, and power pumps and tools which may be needed for expedient repairs after the hurricane passes.

D. Recommended Supplies

1. Plywood (preferably 5/8 inch thick exterior type) to cover large windows and glass doors which can be blown in by hurricane force winds. If possible, obtain plywood before hurricane season begins and precut it to size, mark each panel to identify where it goes, and store it until needed.
2. Sufficient lumber to brace inward-opening exterior doors and roll-up doors on the inside. Boards should be 2 x 4's or larger.
3. Waterproof tape (duct tape or filament tape) to help protect the smaller windows in your facility from powerful wind gusts and flying debris. Apply tape in a criss-cross pattern.
4. Tie-down material (rope or chain) for outside furnishings and equipment that can't be moved.
5. Heavy duty plastic sheeting (4 mil thickness or greater), furring strips, and a nail or staple gun to be used to make expedient roof and window repairs. Plastic sheeting can also be used to cover and protect equipment in the event of roof damage or leaks.
6. A supply of sandbags may be helpful in preventing intrusion of water through doorways into low-lying sections of buildings. Sandbagging can be very time consuming. It takes two people about an hour to fill and place 100 sandbags creating a wall only a foot high and 20 feet long.
7. It is suggested that you stockpile the emergency supplies needed during the hurricane season. Many of the listed items rapidly disappear from retail outlets when a hurricane threatens.



A business is boarded up and sandbags are placed at the base of doors in anticipation of a hurricane. Photo by Bob McMillan/FEMA.

IV. WHEN A HURRICANE WATCH IS ISSUED

A hurricane watch is issued by the National Weather Service when hurricane conditions pose a possible threat to coastal areas.

A. Implement Precautionary Activities. Refer to your Hurricane Task Assignments for a hurricane watch and begin your pre-planned activities to prepare the facility and staff for the threat of a hurricane.

B. Suggested Actions

1. Monitor radio and television newscasts for further information.
2. Check and verify adequacy of essential emergency equipment and supplies.
3. Begin to secure or store exterior equipment.
4. Assemble equipment and materials to protect windows and other glass by boarding up or taping, and to protect vulnerable doors by bracing.
5. Fill vehicle fuel tanks and obtain fuel for the emergency generator, if you have one. Fuel may not be available during hurricane evacuation activities.
6. Begin storing water in containers for emergency use or obtain supplies of bottled or canned water.



Photo by FEMA

7. Update your list of all business records that may need to be removed or protected, and computer data that will need to be backed up.

V. WHEN A HURRICANE WARNING IS ISSUED

A hurricane warning is issued by the National Weather Service when a hurricane is expected to make landfall in a coastal area within 24 hours. In general, businesses in evacuation zones should be evacuated promptly when hurricane warnings are issued. For businesses in hurricane contingency zones, local officials may recommend evacuation during major (Category 3 or greater) hurricanes. **Remember that hurricane evacuation routes can be closed by high winds and water many hours before a hurricane hits.**

- A. Implement Protective Actions. Refer to your hurricane task assignments for a hurricane warning and begin your pre-planned activities to protect the business and employees from the threat of a hurricane.
- B. Suggested Actions when Evacuation is Recommended. If evacuation of your area is recommended by local officials:
1. Close the business.
 2. Relocate vital business records and valuables to a safe location out of the area being evacuated. Back up computerized records and protect the backup copy.
 3. Relocate expensive equipment out of the area or move it to the most heavily-constructed interior area of the facility. In areas which could be subject to surge flooding, move equipment to floors above the possible surge level. Cover vulnerable equipment which cannot be moved with plastic sheeting to minimize damage in the event of roof leaks or broken windows.
 4. Where possible, move furnishings away from exterior windows and doors and get as many items as possible off the floor.
 5. Brace inward-opening exterior doors and any roll-up doors. Wedge sliding glass doors to prevent them from lifting from their tracks.
 6. Close storm shutters, if available. Close, lock, and board up those large windows and glass doors. Board up or tape over smaller windows. Lower blinds and close curtains to help hold back flying debris.
 7. Turn off electricity, gas, water, and other utility services.
 8. Ensure all personnel have departed the facility before evacuation routes become impassable due to flooding or high winds.



Image by FEMA

- C. Appropriate Action if Evacuation is not Recommended. If local officials do not recommend evacuation of your area, your facility may still experience high winds and heavy rain generated by a hurricane.
1. Take appropriate protective measures to reduce the vulnerability of wind damage and heavy rain using the checklist in paragraph B above as a guide.
 2. Have building maintenance personnel on standby and materials for expedient repairs readily available.
 3. Prepare for a possible loss of utilities for up to 72 hours. This means having battery-powered lights, a battery-powered radio, a supply of potable water, and if possible, an emergency generator.

VI. DURING THE HURRICANE

- A. Sheltering. If your facility is not in an evacuation area but is still expected to receive some storm effects, the following guidance should be used in sheltering your staff during the passage of the storm.
1. Use interior rooms and corridors. Avoid using basements if there is a chance of flooding. Avoid sheltering people in large open rooms which do not have interior supports, such as auditoriums.
 2. In multi-story buildings, shelter people on the lower floors and avoid corner rooms.
 3. Avoid areas near exterior windows and glass doors, unless the glass is protected by shutters.

Check with your company's attorney to determine potential liability before using your facility as a hurricane shelter.

B. Other Precautions

1. Periodically conduct an internal check of buildings for roof damage, window breakage, broken pipes, and structural damage.
2. Ensure that those being sheltered remain indoors during the hurricane. If the eye of the hurricane passes over your facility, do not be fooled by the period of temporary calm, which occurs. When the eye of the hurricane has passed, storm winds will return from the opposite direction.
3. Continue to monitor your radio or television for hurricane condition updates and emergency information.

VII. AFTER THE HURRICANE

A. Reentering Evacuated Areas

1. If you evacuated your facility, you may have difficulty returning quickly because roads may be damaged, blocked by debris, or flooded in low lying areas.
2. Access to storm-damaged areas may be limited by local law enforcement personnel, to keep people out of areas with dangerous conditions, facilitate rescue and recovery work, and limit access to unoccupied properties.
3. Initially, entry to storm-damaged areas may be limited to search and rescue personnel, law enforcement personnel, firefighters, utility crews, and road clearing teams. Once it is reasonably safe, property owners and essential employees will be cleared to enter the area, but they may be required to have a permit or pass, or be included on an access list maintained by the city. Contact your local emergency management office to determine the procedures for returning to storm-damaged areas.
4. Listen to your radio or television for instructions before attempting to return to your place of business.

B. Checking your Facility

1. Look for obvious structural damage to your building and its foundations. If you see significant structural damage, don't attempt to enter the affected building.
2. Check for downed or dangling electrical power lines and broken sewer or water pipes on your property. Stay away from damaged power lines and broken sewer lines. Do not take lanterns, torches, or any kind of open flame into a damaged building – there may be leaking gas or other flammable materials present. If you see damage to power, water, or wastewater equipment, report it to your utility company.
3. Make sure the electrical outlets and appliances throughout your facility are dry and free of water before turning the power back on. If you have any doubt about the condition of wiring or appliances, have an electrician check them to make sure there are no short circuits.

C. Secure the Site. Looting of damaged facilities is possible. Normally, the presence of the owner, employees, or security guards on the property will discourage looting.

D. Safety Precautions

1. Do not drink water from your water system until local officials advise you that it is safe from contamination. Use emergency water supplies or boil tap water before drinking it.

2. Take extra precautions to prevent fire – inoperative water systems, low water pressure, and the disruption of other services may make firefighting extremely difficult.
3. Guard against spoiled food. Food in refrigerators can spoil if power is off only a few hours. Freezers will keep food safe to eat for several days if the freezer door is not opened after the power goes off. Do not refreeze food once it begins to thaw.
4. Wear sturdy shoes when walking through debris and use gloves when moving it.
5. Be aware that snakes, poisonous insects, and other animals instinctively move to higher ground to escape floodwaters. They may have taken refuge in your facility.

E. Recovery Activity

1. Report damage to your insurance company, as required by all policies. If your building is uninhabitable, paint insurer's name and point of contact information (your name, temporary address, and the phone number to be used) on a wall or large board so the adjuster can find you.
2. Document damage to your building and its contents with photographs or video. Do not make extensive repairs until a claims adjuster inspects the damage. However, you should try to make expedient repairs to prevent more damage or looting. For example, cover broken windows and holes in the roof or walls to prevent further weather damage.
3. If possible, be present when the insurance adjuster inspects your property.
4. Repair damage to automatic sprinkler systems as soon as possible in order to get fire protection equipment back in service.
5. Contact local building inspection officials to determine permit requirements and rebuilding guidelines after a disaster. Repair agreements should include the contractor's license number, specify a starting and ending date, and provide an exact description of the work to be performed. It is recommended that you do not fully prepay for repair work, but rather reserve some portion of payment until the work is completed. Maintain accurate records of all repairs and save receipts for repair work.

APPENDIX 1

HURRICANE TASK ASSIGNMENTS

Business: _____

Date: _____

() Hurricane Watch () Hurricane Warning

Employee Name	Department/ Position	Hurricane Duties And Location	Equipment Required

APPENDIX 2

FOR FURTHER INFORMATION

Your local emergency management office can order the following publications, which provide additional information on hurricanes:

Against the Wind: Protecting Your Home From Hurricane Wind Damage. FEMA pamphlet 247.

Are You Ready? Your Guide to Disaster Preparedness. FEMA pamphlet H-34.

Emergency Preparedness Checklist. FEMA pamphlet L-154.

Hurricane-Floods: Safety Tips for Coastal and Inland Flooding. FEMA pamphlet L-107.

Hurricane: It's Not Just Another Storm. Texas Division of Emergency Management pamphlet DEM-8A.

Hurricane Awareness: Action Guidelines for School Children. FEMA pamphlet.

Hurricane Awareness: Action Guidelines for Senior Citizens. FEMA pamphlet.

Hurricane Precautions. Texas Division of Emergency Management pamphlet DEM-7. Available in Spanish as pamphlet DEM-2.

Hurricane Warning: A Booklet for Boys and Girls. Texas Division of Emergency Management pamphlet DEM-55.

Hurricane: Safety Tips for Hurricanes. FEMA pamphlet L-105.

Useful Internet Sites

- Governor's Division of Emergency Management. <http://www.tcdps.state.tx.us/dem>
- Federal Emergency Management Agency -tropical storm watch page. <http://www.fema.gov>
- National Hurricane Center. <http://nhc.noaa.gov>
- Harris County Office of Emergency Management. <http://hcoem.org>
- Harris County Citizen Corps. <http://harriscountycitizen corps.com>

NWS Weather Offices

- Southern Region Headquarters. <http://www.srh.noaa.gov>
- Lake Charles, LA. <http://www.srh.noaa.gov/lch>
- Houston-Galveston. <http://www.srh.noaa.gov/hqx>
- Corpus Christi. <http://www.srh.noaa.gov/crp>
- Brownsville. <http://www.srh.noaa.gov/bro>