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Bulletin

Texas Water Conservation Association Risk Management Fund

HURRICANE PREPAREDNESS

Hurricane season runs from June 1 through November 30 but that doesn't mean that's the only time they can occur. In April of 2017, Tropical Storm Arlene formed in the mid-Atlantic and had winds of 50 miles per hour before it dissipated. In 2016 Hurricane Alex formed in January and Tropical Storm Bonnie formed in late May. No matter when a storm forms, early preparation is crucial to minimizing the impact of tropical storms on people and property. This bulletin provides an overview of some of the key steps to consider before there is an imminent threat of a hurricane making landfall on the Texas coast. It also provides a listing of important resources that can help your water district or authority in its disaster preparations as well as dealing with the aftermath of a storm.

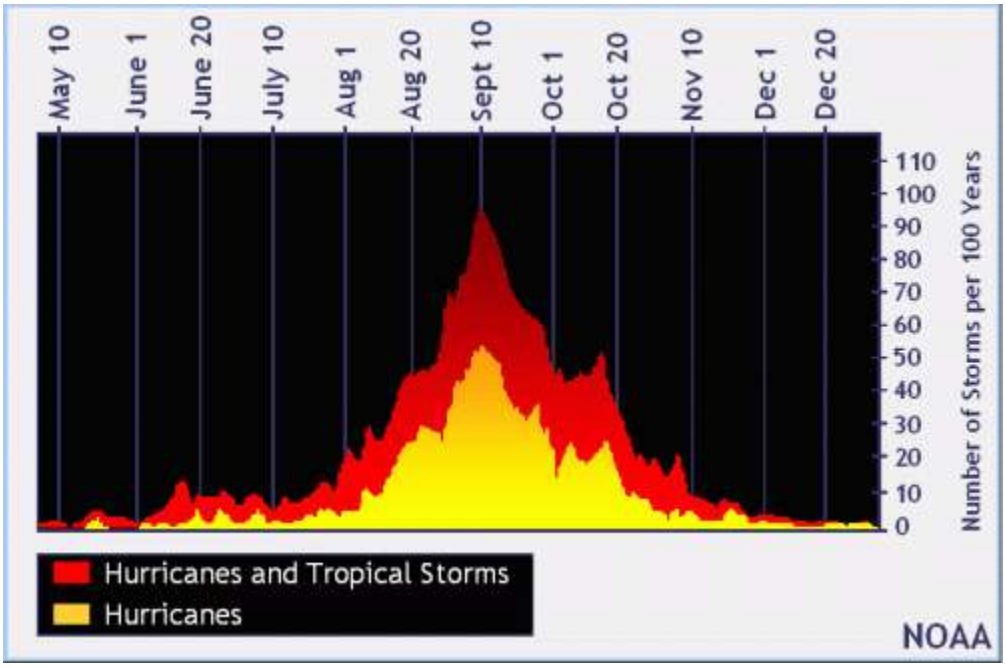
Exposures

Since the year 2000 the United States has been hit by 25 hurricanes with five of them coming ashore in Texas. During the same period through 2016 Texas has also experienced nine tropical storms. The Atlantic/Gulf Coast hurricane season averages 9.6 named storms, 5.9 hurricanes, and 2.3 intense hurricanes per year. The 2005 season set a record with 28 named storms and 15 hurricanes. Four of those hurricanes hit the United States, including Hurricanes Katrina ($81 billion in damage) and Rita ($11.3 billion in damage). Hurricane activity for Texas in 2008 included Dolly ($1.05 billion in damage), Gustav ($6.6 billion) and Ike ($29.6 billion in U.S. damages and 112 deaths, mostly in Texas). Although the 2010 hurricane season was the third worst since 1851, with five "major" hurricanes, no major hurricanes hit the United States. However, Hurricane Alex came ashore in northern Mexico and had an enormous impact on the Rio Grande Valley of Texas with over 50 inches of rainfall that caused flooding affecting large sections of the Valley for weeks. Since then no hurricane has made a direct hit on Texas.

Current predictions by forecasters at the national Hurricane Center indicate 2017 will be a "very active" year with 11 to 17 named storms including 5 to 9 hurricanes, 2 to 4 of which will be major, meaning Category 3 or stronger. Forecasters at Colorado State University also estimate that the Gulf coast has a 47 percent chance of being hit by a major storm this year.

Historical data from the National Hurricane Center indicates that Texas is second behind Florida in the number of direct hits by hurricanes since recordkeeping began in 1851. Both states have long coastlines which increase the probability that tropical storm damage will occur in any given year. Between 1851 and 2016, Texas was hit by 66 hurricanes, of which 20 were classified as major storms (category 3-5).

The month of September is by far the most active single month for hurricane strikes along the Gulf and Atlantic coasts. The month of August has been the most active month for major hurricanes hitting Texas, however. The threat of major hurricanes begins to move from west to east during August, with major hurricanes beginning to favor the east coast of the United States by late September.



Monitoring

The National Weather Service provides current information on hurricanes through the National Hurricane Center's web site (www.nhc.noaa.gov). This includes the latest forecasts and advisories. NOAA weather radio also provides continuous weather information. Exhibit B provides additional information on radio broadcasts and frequencies.

Persons involved in emergency planning and preparations should be familiar with the terminology used by forecasters. For example:

- A **"hurricane watch"** means that a hurricane has become a threat to coastal areas. It indicates that hurricane conditions are possible within 36 hours.
- A **"hurricane warning"** means that hurricane force winds (74 miles per hour or greater) are expected within a specific coastal area within 24 hours.

- **Saffir –Simpson** scale is like the Enhanced Fujita scale used to rate tornados. Its metrics are listed below.
- **Storm surge** is the combination of tide and the mound of water being pushed by winds toward the coast. It is the most damaging and deadly aspect of tropical storms
- **Storm quadrant** is the area of the storm in quarters. The northeast quadrant of a storm usually causes the most damage because the forward motion of the storm combines with the counter clockwise circulating wind field to increase the intensity of wind and storm surge. This is also an area where the most tornados occur over land.

A hurricane's intensity, speed and direction can change rapidly, so the threat to particular areas of the coast can also change quickly. Therefore, it is necessary to monitor the National Hurricane Center's forecasts as well as local radio and television newscasts whenever a hurricane is in the Gulf of Mexico.

The intensity of a hurricane is measured by the Saffir-Simpson scale. The scale is based on sustained wind speeds, storm surge, and potential property damage. Hurricanes reaching category 3 and above are classified as major hurricanes because of their potential for loss of life and property damage.

Typical Characteristics of Hurricanes by Category			
Category	**Winds (mph)**	**Surge (feet)**	**Damage**
1	74-95	4 to 5	Minimal
2	96-110	6 to 8	Moderate
3	111-130	9 to 12	Extensive
4	131-155	13 to 18	Extreme
5	>155	>18	Catastrophic

Source: NOAA

After the unusually large and destructive storms Ike and Sandy which only reached category two status the National Hurricane Center began to think about factoring in storm surge as a more prominent element in their warning protocols. Although neither of these storms reached the coast at greater than category two strength, their huge destructive force was equivalent to many stronger storms because of their size and storm surge. In response, the National Hurricane Center will now report more information about the height and areas expected to be impacted by storm surge. According to the National Weather Service

> *Beginning with the 2017 hurricane season, the National Weather Service (NWS) will issue storm surge watches and warnings to highlight areas along the Gulf and Atlantic coasts of the continental United States that have a significant risk of life-threatening inundation from an ongoing or potential tropical cyclone, a subtropical cyclone, or a post-tropical cyclone.*

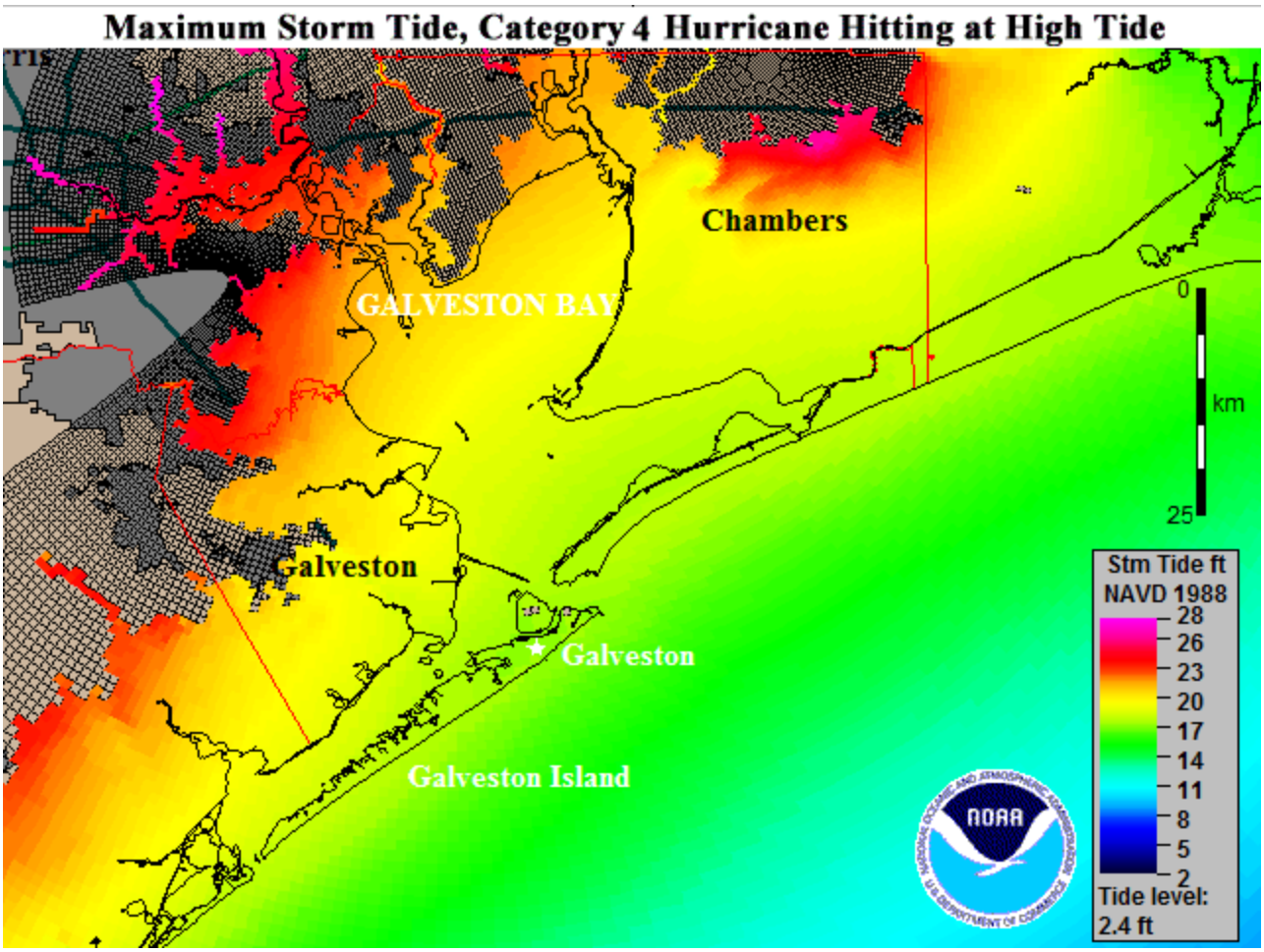
The areas affected will be characterized by "breakpoints" like those used to describe the extent of coast likely to be impacted by a storm. For instance the extent of Ike's impact was finally characterized as the Gulf coast between "Morgan City, Louisiana and Baffin Bay, Texas." *NWS Hurricane Warning, Thursday, September 11, 2008 (*a stretch of the Gulf coast of 500 miles.)

Similar descriptions will now be used to describe impact areas of significant storm surge. It is noteworthy that Ike's storm surge of 18 feet places it in Category 4.

Another recent development is that the National Hurricane Service will now declare and track Potential Tropical Cyclones from their earliest detection and development before they become official "tropical storms." The description of this term in the glossary gives more information about this new category effective in 2017.

Additional resources for monitoring the formation and path of tropical storms are available from several very good independent web sites. The following list gives a brief description of the site, some of the features, and its address:

- **Weather Underground** is a general weather site with good information about weather in your area. It also has a Tropical Weather section that gives very detailed discussion of potential development of tropical systems and tracks them day by day. A link on the site will take you to "Storm Surge inundation Maps for the U. S. Coast." The storm surge models present potential surge for Category 1 – 5 hurricanes. Models are shown for the coastal areas around Port Arthur, Galveston, Matagorda Island, Corpus Christi, Padre Island, and Brownsville. www.wunderground.com/hurricane



Storm surge impact map for Galveston Bay area based on a Category 4 storm at high tide, NOAA

- **Accuweather.com** is another good web site with a hurricane section with tracking and prediction capabilities. www.accuweather.com

- **The National Data Buoy Center** is a specialized site that shows information from buoys tethered in the ocean, including the Gulf of Mexico. The buoys report real time wind and sea state information such as wind speed, direction, gusts, wave height, and barometric pressure. Information from buoys offshore Texas can give current information about storm conditions as a tropical storm approaches the coast. www.ndbc.noaa.gov

- **The Tropical Meteorology Project** at Colorado State University makes annual predictions of tropical cyclone activity. This web site gives the predictions and reviews their historical accuracy. www.hurricane.atmos.colostate.edu

Planning and Preparation

The following is an overview of suggested planning and preparation activities. This is intended as a general outline that can be used to begin a hurricane preparedness planning process or to evaluate an existing plan. Information in Exhibit A provides more detailed examples of actual procedures. Refer also to the list of resources on pages 9 and 10 for further sources of information on these topics.

Steps to Take Before Hurricane Season

The most basic element is an emergency action plan that addresses issues such as preservation of human life, property, emergency response actions, evacuation procedures, disaster recovery and roles of key personnel. The action plan should be in writing, posted on your website and provided to employees along with periodic training on hurricane procedures. The plan should be as specific as possible in regard to responsibilities, timing and needed actions or results. Some key elements that should be addressed in the planning process include:

Communications: The ability to communicate before, during and after an emergency can be critical, so communication procedures should be planned in advance. Maintain a list of contacts with telephone numbers, cell phone numbers, e-mail addresses and home addresses. Supply cellular phones or satellite phones to key personnel if necessary. Consider setting up a toll-free telephone number for employees and customers to call for messages. E-mail and social media such as Facebook, Instagram and Twitter could also supplement a district's or authority's ability to communicate with staff and the public. Prepare for the possibility of complete disruption of landline or cell phone service for some period after the passage of a storm.

Data and records: The ability to resume business quickly after a storm depends on having reliable back-up systems for computer data and methods of preserving paper documents. This may involve a secure on-site system or transfer of data and records to another location. Develop plans for safeguarding financial, personnel, customer and other records essential for operations. Secure back-up server sites or cloud sites could also be used to store important data and programming.

Buildings and facilities: Items such as roofs and freestanding structures are often most vulnerable to storms. Repairing or securing these items early may help prevent extensive damage later. Anything that is unsecured outside could become a destructive missile if high winds hit your location. Storm surge can also batter buildings and facilities with objects carried by the waves.

Supplies and materials: Storm preparations may require the use of plywood or shutters to protect doors and windows. Some materials or equipment may need to be covered with tarpaulins or plastic sheets. Acquire these items early to ensure that they are available when a hurricane watch is announced. Emergency supplies such as flashlights, battery-powered radios, extra batteries, non-perishable food, drinking water, portable generators and fuel should also be on the list of items to have on hand. Make sure that fuel supplies are adequate for emergency generators necessary to keep vital water and wastewater treatment facilities operating. Vehicles should also be filled with gasoline or diesel as widespread power outages may make it impossible to refuel for a period after the storm passes.

Monitor and track any tropical disturbances that look like they might come into the Gulf of Mexico. Keep your staff aware of tropical activity in the Gulf of Mexico or western Atlantic that might enter the Gulf. When Gulf waters are very warm tropical systems can develop very quickly. Hurricane Humberto went from barely tropical depression status 60 miles from High Island to a category one storm 15 miles from the coast in less than 24 hours. Factors like forward speed, outer rain bands, storm surge and high tides can close off evacuation routes long before the body of a storm comes ashore.

Provisions for paying staff and purchasing necessities after the storm should also be part of your plan. Widespread electrical outages could make ATM's inoperable so there should be some cash on hand to pay for supplies or lodging for staff who must return soon after the storm passes. Other evacuated staff will also need to be paid if administrative facilities are closed for an extended period of time.

Essential Staff may need to ride out the storm to help keep vital services operating during and immediately after the storm. Provision for their safety and provisioning should be accomplished long before Hurricane season. Some districts and authorities have established hardened sites that have been built to withstand hurricane force winds and be above storm surge elevations. If you don't have a hardened site use a sturdy, well-protected building that can withstand high winds and is not in an area subject to storm surge. Check your location against the storm surge maps published by NOAA and illustrated above.

Steps to Take When a Hurricane Watch is Issued

When a hurricane watch is issued for your area, it is time to activate the emergency action plan and to start taking steps to protect people and property. For example, non-essential personnel should be notified of evacuation plans. Preparations should also begin for protection of facilities and equipment. This should include moving vehicles or equipment inside a building or to a safe location, as well as securing items stored outside. Vehicles that will be used for evacuation or recovery efforts should be fully fueled at this time. Computer data should be backed up and records either protected or moved to a safe location. This is also the time to make sure that emergency equipment is working and that there is an adequate supply of non-perishable food, first-aid supplies, batteries, and drinking water. Test cell and satellite phones at this time.

Bolivar Peninsula near Crystal Beach before and after Ike, USGS

Steps to Take When a Hurricane Warning is Issued

Close monitoring of forecasts and advisories is critical when a hurricane warning has been issued. Building protection activities should be completed as soon as possible and remaining employees should be relocated to a safe area according to evacuation instructions issued by the responsible local emergency officials. Employees who are required to be on duty during the storm should be given time to see to their families and homes before they are required to be back at their posts.

Steps to Take After a Storm

When the storm is over, persons surveying the facilities for damage should use caution, especially in flooded areas. Personnel should be trained to avoid hazardous situations such as fallen utility lines and flooded roadways. When conditions permit, a preliminary inspection should be made to assess the stability of flooded or wind-damaged buildings. If feasible, temporary repairs should be made to protect facilities and their contents from further damage. When initial damage assessments have been completed, employees should be notified of the condition of the facilities and the estimated schedule for returning to work. Employees entering a storm affected area after the storm has passed should carry identification credentials that will allow them to pass checkpoints and reach vital flood control, drainage, dams, water, and wastewater treatment facilities.

Post-Storm Recovery

After an initial damage assessment has been made, the person responsible for the recovery efforts for the water district or authority should contact the property/casualty team at the TWCA Risk Management Fund (800-580-8922). The Fund's claims adjuster will set up claims for damaged property and arrange for inspections by the Fund's property adjusters or by engineers from FM Global, the Fund's property reinsurer. These inspections will provide a detailed assessment of damages and coverages available through the Fund.

Following a hurricane, recovery assistance may be available through the Federal Emergency Management Administration (FEMA). After a natural disaster or man-made event that causes extensive damage, FEMA coordinates with the state to implement the Public Assistance Grant Program. FEMA's Public Assistance Program provides supplemental federal disaster grant assistance for the repair of disaster-damaged, publicly owned facilities. To maximize recovery from this program it is essential that complete and accurate records are kept of all expenditures and staff time devoted to the recovery process. Additional information on this program is available from FEMA (www.fema.gov) and the Governor's Division of Emergency Management, which is located at the Texas Department of Public Safety (www.txdps.state.tx.us/dem).

Texas Water Conservation Association Risk Management Fund loss control consultants take to the field immediately after a storm has passed to assess the immediate needs of members and offer assistance. They also report to claims staff so necessary resources can be marshaled for effective and rapid response to claims.

RESOURCES

A. Planning and Preparation

1. National Oceanic and Atmospheric Administration (NOAA)

   National Hurricane Center—hurricane forecasts, advisories, and other information
   www.nhc.noaa.gov/
   National Weather Service—weather warnings, forecasts, and other information
   www.nws.noaa.gov/

2. FM Global
   http://www.fmglobal.com/research-and-resources/tools-and-resources/nathaz-toolkit/windstorm

3. Federal Emergency Management Administration (FEMA)

   "Emergency Management Guide for Business and Industry: A Step-by-Step Approach to Emergency Planning, Response, and Recovery for Companies of All Sizes" (FEMA 141, 67 pages)
   www.fema.gov/media-library/assets/documents/3412

   FEMA disaster planning resources
   www.ready.gov/are-you-ready-guide

4. Governor's Division of Emergency Management

   Forms and Publications—various manuals and forms related to disaster planning and recovery
   www.dps.texas.gov/dem/temoArchives/2010/Vol57No2/articles/article2.htm

B. After the Storm

1. National Institute of Occupational Safety and Health (NIOSH)

   Hurricane Response: Storm and Flood Cleanup
   http://www.cdc.gov/niosh/topics/emres/flood.html

2. Centers for Disease Control and Prevention (CDC

   Clean Up Safely After a Hurricane—Resources on specific cleanup topics
   www.cdc.gov/disasters/cleanup/index.html

3.

4. Consumer Product Safety Commission

   CPSC Safety Alert: Portable Generator Hazards
   www.cpsc.gov/s3fs-public/portgen.pdf

5. Occupational Safety and Health Administration (OSHA)

   Flood Cleanup Alerts
   www.osha.gov/OshDoc/data_Hurricane_Facts/floodcleanup.html

   Fact Sheets on Natural Disaster Recovery: Flood Cleanup
   www.osha.gov/OshDoc/floodCleanup.html

6. Texas Department of State Health Services

   Fact Sheet on "Returning to a Flooded Building"
   http://www.dshs.state.tx.us/preparedness/factsheet_flooded_building.

C. FEMA Recovery Assistance

1. FEMA
   Public Assistance Program for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities
   www.fema.gov/public-assistance-local-state-tribal-and-non-profit

2. Governor's Division of Emergency Management
   Disaster recovery information and forms
   www.dps.texas.gov/dem/Disaster/disasterChecklist.htm

D. **File a Claim**

Texas Water Conservation Association Risk Management Fund
P.O. Box 26655
Austin, Texas 78755-0655
800-580-8922
www.twcarmf.org

Exhibit A

CHECKLIST OF GENERAL HURRICANE PREPARATIONS[1]

A. Steps to Take Before Hurricane Season

1. Develop a written emergency action plan that incorporates a set of hurricane task assignments for your employees. Seek input regarding the various tasks to be accomplished from all of the facilities or work groups for your district or authority.

2. Outline the specific tasks that must be performed to protect your facilities during a hurricane and how they will be accomplished and who will perform them.

3. Determine which employees will be needed to carry out hurricane preparations. This may require all building and maintenance staff, for example.

4. Depending on the size of the organization it may be desirable to develop teams for many tasks. For example, establish a team to board up, a team to secure exterior equipment, etc. Employees who are asked to perform unfamiliar tasks may need some instruction in the tasks and any equipment that they may need to use. Safety is also an important issue to consider when asking employees to perform tasks they may not be familiar with.

5. Review and explain the 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 staff turnover. Update team assignments on a regular basis. A table top or more extensive drill using the scenario of an impending landfall of a hurricane would be an invaluable tool to evaluate the performance of your action plan.

6. Regularly update your list of employee telephone numbers and other information and make sure each department head or team leader has a hard copy in addition to any electronic source.

Facility Preparation

1. If your facilities are in a storm surge inundation zone or if they appear to be unsafe for occupancy during high winds, it may be necessary to completely evacuate them. Identify essential business records that should be removed and where you plan to take them. Back up computer records on disk, tape, cloud or mirrored server and move the physical back-ups along with other essential records.

2. Review your list of major equipment and furnishings and determine which items need to be protected or removed. The basic choice is to try to protect the equipment and

[1] Adapted from "Hurricane Preparedness Planning for Businesses," prepared by the Governor's Division of Emergency Management

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

3. Identify outside equipment and furnishings that could be blown loose and become missiles in hurricane winds. Determine where they will be stored or how they will be secured in-place.

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 to the roof deck.

6. If the roof is a built-up roof with a gravel covering, remove loose gravel to preclude damage to unprotected windows at your building or others in the vicinity.

7. Ensure that designated employees know how to turn off the electrical power, water, gas, and other utility services.

Equipment

1. Obtain several battery-operated radios and spare batteries to ensure that you can receive emergency information. The radios should be capable of receiving NOAA weather radio frequencies. Most cell phones also have this capability. Cell phones need to be re-charged so some system needs to be available for this vital purpose independent of electric service to your facilities.

2. Obtain sufficient flashlights and other battery-powered lights to allow essential tasks to be performed in the event of a power outage. Ensure that an adequate supply of fresh batteries is on hand during the hurricane season.

3. Prepare a disaster supply kit and have it ready for emergencies. Contents should include items such as: non-perishable foods; water (one gallon per person per day); manual can opener and eating utensils; personal hygiene items such as soap, shampoo, toothbrush, toothpaste, and toilet paper; first aid kit; fire extinguisher; rainwear; insect repellent; gloves and blankets. Re-check the items in this kit as part of your preparations before hurricane season. Essential items may have a tendency to disappear during the year.

4. Ensure you have the necessary equipment and supplies to board up windows and brace doors. Tools such as saws, drills and bits, hammers or nail guns, screwdrivers, and wrenches may be needed. Stock a supply of sand bags that are already filled for use where water may come into a building.

5. Obtain an ample supply of brooms, squeegees, mops, fans, wet vacs, and absorbents to remove water.

6. It doesn't take long for mold to form on wet surfaces such as drywall. Affected wall coverings should be removed soon after inundation to prevent mold.

7. An emergency generator could be useful in order to maintain lighting, recharge battery-powered equipment, and provide power for pumps and tools that may be needed for repairs after the hurricane passes.

Supplies

1. Use plywood (preferably 5/8 inch thick exterior type) to cover large windows and glass doors. If possible obtain plywood before hurricane season begins; precut it to size, and mark each panel to identify where it goes.

2. Obtain sufficient lumber (2 x 4's or larger) for bracing doors.

3. Use waterproof tape (duct tape or filament tape) to help protect smaller windows from wind gusts.

4. Obtain tie-down material (rope or chain) and anchors for outside equipment and furnishings that cannot be moved.

5. Obtain heavy duty plastic sheeting (4 mil thickness or greater) and a nail or staple gun for making temporary 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 to create a wall one foot high and twenty feet long.

7. Obtain the emergency supplies needed before the hurricane season starts. These items disappear rapidly from retail outlets when a hurricane threatens.

B. When a Hurricane Watch is Issued

1. Refer to the emergency action plan and review task assignments; begin pre-planned activities to prepare the facility and employees for the threat of a hurricane.

2. Suggested actions:

    a. Monitor radio and television newscasts and web sites for further information.

    b. Perform an inventory and verify the adequacy of essential emergency equipment and supplies.

c. Begin to secure or store exterior equipment.

d. Assemble equipment and materials to protect windows and other glass by boarding up; protect vulnerable doors by bracing and sandbagging.

e. Fill vehicle fuel tanks and obtain fuel for the emergency generators.

f. Begin storing water in containers for emergency use or obtain supplies of bottled water.

g. Update the list of business records that may need to be removed or protected as well as computer data that will need to be backed up.

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h. Back up batteries for SCADA and other remote monitoring or control equipment should also be checked and replaced if necessary at this time

C. When a Hurricane Warning is Issued

1. In general, businesses located in evacuation zones should be evacuated promptly when hurricane warnings are issued. Refer to the task assignments in the emergency action plan for a hurricane warning.

2. If evacuation of your area is recommended by local emergency officials:

   a. Close business operations.

   b. Relocate vital records and valuables to a safe location out of the area being evacuated. Back up computerized records and protect the backup copy.

   c. Relocate expensive equipment out of the area or move it to the most heavily constructed area of the facility. In areas that could be subject to surge flooding, move equipment to floors above the possible surge level. Cover vulnerable equipment that cannot be moved with plastic sheeting to minimize the damage in the event of roof leaks or broken windows.

   d. Where possible, move furnishings away from exterior windows and doors and get as many items as possible off the floor.

   e. Brace inward-opening doors and any rollup doors. Wedge sliding glass doors to prevent them from lifting in their tracks.

   f. Close storm shutters if available. Close, lock, and board up large windows and glass doors. Board up or tape over smaller windows. Lower blinds and close curtains to help hold back flying debris.

   g. Turn off electricity, gas, water, and other utility services.

h. Ensure that all personnel depart the facility before evacuation routes become impassable due to flooding or high winds.

3. If local officials do not recommend evacuation of your area, your facility may still experience high winds, storm surge and heavy rain generated by a hurricane.

   a. Take appropriate protective measures to reduce the potential damage from wind and heavy rain as indicated in C.2, above.

   b. Have building maintenance personnel on standby and materials ready for emergency repairs.

   c. Prepare for a possible loss of utilities for up to 72 hours. This means having battery powered lights, a battery powered radio, and supply of potable water, and if possible, an emergency generator. [Portable generators are useful when temporary power is needed, but they can also be hazardous. For safety tips on use of portable generators, see the Consumer Product Safety Commission Safety Alert listed in the "Resources" section of this Bulletin, pp. 9-10.]

   d. If employees are sheltering in the facility during the storm, use interior rooms and corridors. In multi-story buildings, shelter people on the lower floors and avoid corner rooms. Avoid areas near exterior windows and glass doors.

   e. Continue to monitor radio or television for hurricane condition updates and emergency information.

D. Steps to Take After a Storm

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. Do not drive through water.

2. Access to storm affected areas may be restricted by law enforcement. You will need some form of identification with name, photo and the name of the water district or authority to get in.

3. Listen to your radio or television for instructions before attempting to return to your facility.

Checking Your Facility

1. Look for obvious structural damage to your buildings and foundations. If there is significant structural damage, do not attempt to enter the affected buildings.

2. Stay away from downed or dangling electrical power 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.

3. Make sure the electrical outlets and appliances throughout your facility are dry and free of water before turning the power back on.

4. Wear sturdy shoes when walking through debris and use gloves when moving it.

5. Be alert for snakes and other wild animals displaced by flooding that may have taken refuge around your facilities.

6. Use insect repellant and sunscreen.

E. Recovery Activity

1. Document the extent of damage to your facilities and their contents with photographs or video. Make temporary repairs to prevent additional damage. For example, cover broken windows and holes in the roof or walls to prevent further harm from the weather, but do not make extensive repairs until the property has been inspected by an adjuster sent out by the Fund. Do not allow anyone else claiming to be an independent adjuster to inspect your facilities. This will only delay the claims handling process.

2. Report storm damage to the TWCA Risk Management Fund at 800-580-8922 as soon as possible.

Exhibit B

NOAA Weather Radio

NOAA weather radio (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from a nearby National Weather Service office. NWR broadcasts warnings, watches, forecasts, and other hazard information 24 hours a day.

NWR requires a special radio receiver capable of picking up VHF signals. Broadcasts are found in the VHF public service band at the following seven frequencies (MHz):

Standard NWR frequencies (MHz)

162.400	162.425	162.450	162.475	162.500	162.525	162.550

The broadcasts cannot be heard on a simple AM/FM radio receiver. However, there are many receiver options, ranging from handheld portable units that just pick up weather radio to desktop and console models that receive weather radio in addition to other broadcasts. Receivers can be found at many retail outlets, including electronics, department, sporting goods, and boat and marine accessory stores and their catalogs. They can also be purchased via the Internet from online retailers or directly from manufacturers.

NWR station listing for coastal areas of Texas

Call Sign	**Site Name**	**Site Location**	**Frequency (MHz)**
WWG40	Bay City	Bay City	162.425
WXK28	Beaumont	Beaumont	162.475
WWG34	Brownsville	Brownsville	162.550
KHB41	Corpus Christi	Corpus Christi	162.550
KHB40	Galveston	Galveston	162.550
KGG68	Houston	Houston	162.400
KHB33	Pharr	Pharr	162.400
WXL26	Port O'Connor	Port O'Connor	162.475
WNG609	Riviera	Kingsville	162.525
WXK34	Victoria	Victoria	162.400

Source: NOAA

Exhibit C

GLOSSARY

Cyclone:
An atmospheric closed circulation rotating counter-clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

Gale Warning:
A warning of 1-minute sustained surface winds in the range 39 mph to 54 mph, either predicted or occurring, and not directly associated with tropical cyclones.

High Wind Warning:
A high wind warning is defined as 1-minute average surface winds of 40 mph or greater lasting for 1 hour or longer, or winds gusting to 58 mph or greater regardless of duration that are either expected or observed over land.

Hurricane/Typhoon:
A tropical cyclone in which the maximum sustained surface wind is 74 mph or more. The term "hurricane" is used for Northern Hemisphere tropical cyclones east of the International Dateline to the Greenwich Meridian. The term "typhoon" is used for Pacific tropical cyclones north of the Equator west of the International Dateline.

Hurricane Season:
The portion of the year having a relatively high incidence of hurricanes. The hurricane season in the Atlantic, Caribbean, and Gulf of Mexico runs from June 1 to November 30.

Hurricane Warning:
A warning that sustained winds 74 mph or higher associated with a hurricane are expected in a specified coastal area in 24 hours or less. A hurricane warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue, even though winds may be less than hurricane force.

Hurricane Watch:
An announcement for specific coastal areas that hurricane conditions are possible within 36 hours.

Landfall:
The intersection of the surface center of a tropical cyclone with a coastline. Because the strongest winds in a tropical cyclone are not located precisely at the center, it is possible for a cyclone's strongest winds to be experienced over land even if landfall does not occur. Similarly, it is possible for a tropical cyclone to make landfall and have its strongest winds remain over the water.

Major Hurricane:
A hurricane that is classified as Category 3 or higher.

Potential Tropical Cyclone
The new Potential Tropical Cyclone advisories will provide more detailed guidance on systems that are not yet at depression strength but that have a chance of intensifying and bringing tropical storm or hurricane conditions to land areas within 48 hours. In their announcement of this and other service changes for 2017, NHC said: *"Under previous longstanding NWS policy, it has not been permitted to issue a hurricane or tropical storm watch or warning until after a tropical cyclone had formed. Advances in forecasting over the past decade or so, however, now allow the confident prediction of tropical cyclone impacts while these systems are still in the developmental stage. For these land-threatening 'potential tropical cyclones', NHC will now issue the full suite of text, graphical, and watch/warning products that previously has only been issued for ongoing tropical cyclones."*

Potential tropical cyclones will be assigned numbers as part of the same chronological list that includes tropical depressions. Thus, the current system is PTC 2, even though it is the first PTC ever to be classified, because it follows Subtropical Depression 1 (which later became Tropical Storm Arlene). A potential tropical cyclone will retain its PTC number should it intensify to Tropical Depression strength.

Weather Underground, Category 6 Blog, June 19, 2017

Storm Surge:
Essentially a huge pile of water created by the winds of a storm that accompanies the storm as it moves ashore. It acts like an inexorable high tide that floods low lying areas and moves up rivers, streams, and bayous. A storm surge of 18 feet generated by Ike in 2008 would advance on shore until the elevation of the land exceeded 18 feet. The storm surge also carries wave action far inland from the coast. Be aware of the elevation of your facilities.

Storm Warning:
A warning of 1-minute sustained surface winds of 55 mph or greater, either predicted or occurring, not necessarily associated with tropical cyclones.

Tropical Cyclone:
A cyclone, originating over tropical or subtropical waters, with organized deep convection and a closed surface wind circulation around a well-defined center. Once formed, a tropical cyclone is maintained by the extraction of heat energy from the ocean at high temperature and the movement of warmed air to the areas of low temperatures above the circulation in the upper troposphere.

Tropical Depression:
A tropical cyclone in which the maximum sustained surface wind speed is 38 mph or less.

Tropical Disturbance:
A discrete tropical weather system of apparently organized convection -- generally 100 to 300 nautical miles in diameter -- originating in the tropics or subtropics, having a nonfrontal migratory character, and maintaining its identity for 24 hours or more. This is the precursor system that may develop further into a tropical depression or tropical storm. The National

Hurricane Center also uses the term “Invest” to designate an area of disturbed weather that may develop tropical characteristics.

Tropical Storm:
A tropical cyclone in which the maximum sustained surface wind speed ranges from 39 mph to 73 mph. Tropical storms often generate tremendous rainfall, wind gusts in excess of 73 mph, tornadoes and storm surge.

Tropical Storm Warning:
A warning that sustained winds within the range of 39 to 73 mph associated with a tropical cyclone is expected in a specified coastal area within 24 hours or less.

Tropical Storm Watch:
An announcement for specific coastal areas that tropical storm conditions are possible within 36 hours.