



Severe Weather

What to do and
What not to do

Updated December 2008



The National Weather Service defines severe weather as:

- any aspect of the weather which can "pose a threat to life and property".



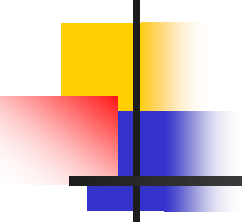
This may include:

- Tropical cyclones (Hurricanes),
- Snowstorms,
- Ice storms,
- Wind storms (High winds),
- Blizzards,
- Flooding,
- Heat waves,
- Severe thunderstorms,
- Tornadoes,
- Hail,
- Lightning,



In general. What to do in each type of severe weather.

- 1. Gather information about the severe weather.
- 2. Create a plan for your family.
- 3. Implement the plan when severe weather occurs.



Severe Weather phenomena more likely to occur in the Texas A&M area.

- These include:

- Severe thunderstorms.
- Hail.
- Flooding.
- High winds.
- Lightning.
- Tornadoes.
- Heat waves.
- Hurricanes.



Watches & Warnings

- **Watch** - The National Weather Service issues a **watch** whenever atmospheric conditions are more favorable for a particular severe weather hazard to occur.
- **Warning** - A particular weather hazard is either imminent or has been reported.

Thunderstorms

- By definition, **lightning** accompanies thunderstorms.
- These may also be accompanied by **strong winds, hail, tornadoes**.
- A thunderstorm is defined as severe if it produces damaging wind gusts (60 mph or higher), large hail (3/4" or larger), a tornado, or a combination of these elements.



Thunderstorms



- The peak season for thunderstorms is from May through September, and during the afternoon or evening hours.
- The most common type of severe weather is damaging thunderstorm wind, also known as "straight line wind". Strong thunderstorm wind gusts can reach hurricane force and in extreme cases - 100+ mph.

Thunderstorms



- Wind damage can be extensive and affect entire counties instead of narrow tracks like tornadoes.
- Objects like branches, trees, barns, outbuildings, tall vehicles, and power lines/poles can be toppled or destroyed, but as wind gusts increase you can have damage to roofs, windows, or homes.
- Secure loose objects in your yard which may get blown around and do damage.

Thunderstorms

- Large hail is also common and can produce tremendous property damage. Usually large hail does not become life threatening unless people are stuck outdoors without shelter. Hail is considered severe when it reaches the size of a penny or larger.



- Have a good source of weather information.

Weather Radio, Local TV or radio station that reports up-to-date weather information.

<http://www.nws.noaa.gov/om/brochures/ttl.pdf>

Includes: Thunderstorms, tornadoes, lightning.



Thunderstorm

- When a severe thunderstorm moves into your area, or a warning is issued for your county, take action to protect yourself and property:
 - Move to a sturdy building.
 - Stay away from windows.
 - If boating or fishing, move to shore.



Tornadoes

- A tornado is a violently rotating column of air in contact with the ground.
- They form from severe thunderstorms.
- The peak tornado months are April, May, June in our area, but tornadoes can occur during other times of the year if conditions are right.
- Peak tornado time is 3:00 to 9:00 PM, but they can occur day or night, and may be hard to spot or wrapped in rain at times.

Tornadoes



- [Seymour TX](#), 10 April 1979, looking NW. Though massive and well-organized, the tornado crossed largely open countryside, hitting flimsy outbuildings, vegetation and utility poles. It snapped and uprooted mesquite trees, which are deep-rooted and notoriously tough, and was rated F2 by NSSL survey teams. The next tornado from this supercell was even larger and would devastate Wichita Falls within an hour.



Prepare a Home Tornado Plan

- Pick a place where family members could gather if a tornado is headed your way. It could be your basement or, if there is no basement, a center hallway, bathroom, or closet on the lowest floor. Keep this place uncluttered.
- If you are in a high-rise building, you may not have enough time to go to the lowest floor. Pick a place in a hallway in the center of the building.

If a Tornado Warning is issued:

■ At home...

- Move to a sturdy building if there is time, shelters are more safe than a mobile home.
- Move to a basement or interior bathroom or closet on the lowest level.
- Get under something sturdy.
- Leave large rooms.
- Stay away from windows, doors, garage doors.
- Do not try to open or close windows.
- Mobile homes offer very little protection. Plan to go to a more sturdy building as a storm shelter if there is time.
- Follow your safety plan.





If a Tornado Warning is issued:

- **At work...**

- Move to a basement or interior hallway on the lowest level.
- Leave large rooms.

- **At school...**

- Leave classrooms that have windows or that are on the exterior of the building.
- Leave large rooms, like gymnasium or auditoriums.
- Seek shelter in interior rooms and get under desks or sturdy objects.
- Be careful in hallways that may act as wind tunnels and funnel debris.
- Move students off buses and back into the school.
- Do not let students board buses during a Tornado Warning.



Tornadoes

■ When traveling...

- **Do not** try and outrun a tornado.
- If the tornado is some distance away, drive away from it.
- If the tornado is relatively close, leave your vehicle for a sturdy building.
- If no shelter is available, seek refuge in a ditch or culvert. Crouch down and protect your head.
- **DO NOT** seek shelter under an overpass bridge.

■ If outdoors...

- Find a shelter if possible.
- If boating or fishing, move to shore.
- If no shelter is available, seek refuge in a low spot. Crouch down and protect your head.

Hail

- Hail causes more than \$1 billion in damage to property and crops each year.
- Large hail stones fall as speeds faster than 100 mph.



- Preparation:
 - Bring pets inside.
 - Move vehicles inside.

Lightning

- Lightning causes an average 80 fatalities and 300 injuries each year.
- People will often dangerously continue outdoor activities as thunderstorms approach.
- You do not have to be directly under the storm, or where the heaviest rain is falling to get struck.
- Lightning strikes can occur many miles away from the parent thunderstorm. If you are near a storm or hear thunder, you are potentially close enough to get struck.



Lightning

- With lightning in the area:
 - Move indoors or to a shelter. A vehicle is more safe than standing outdoors.
 - Bring your pets inside.
 - Avoid standing in an open or high area.
 - Avoid standing near tall objects, or objects that may attract lightning; such as trees, poles.
 - Avoid standing near objects, like chain link fences or grandstands, that may be struck and carry a charge quite a distance.
- If in a boat, get to shore quickly.
- **30/30 Rule:** Go indoors if, after seeing lightning, you cannot count to 30 before hearing thunder. Stay indoors for 30 minutes after hearing the last clap of thunder.



Lightning

- If you cannot get indoors:
 - Find a low spot away from trees, fences, and poles. Make sure the place is not subject to flooding.
 - If in a wooded area, take shelter under the shortest trees.
 - Avoid standing in an open or high area.
 - If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Place your hands over your ears and your head between your knees. Make yourself the smallest target possible and minimize your contact with the ground. **DO NOT LIE DOWN.**



Lightning

- The University has installed a **Thor Guard Lightning Prediction System** that will sound a warning when atmospheric conditions are favorable for lightning.
- Horns will sound for approximately 15 seconds and the system lights will continue to flash until the danger is past.
- When the danger has passed, the horns will sound 3 blasts for 5 seconds each and the lights will turn off.



- Seek shelter inside.
- Cease outside activities.
- Avoid open areas.
- Avoid use of radios and cell phones.

Flash Flooding

- Flash flooding, one of the leading thunderstorm killers, is a rapid rise in small creeks or streams, usually from excessive thunderstorm rains.
- Flash flooding can also occur with ice jams on rivers or if a dam fails.
- A mudslide can also indicate flash flooding and can be just as dangerous.
- Most people don't respect or understand the force of flowing water.



Flash Flooding

- Many automobiles become in as little as 2 feet of you can lose control vehicle in as little as 6 inches.
- Even pickup trucks or SUVs may begin to float in relatively shallow water given the size of the tire.
- Most flash flood related deaths occur from people driving into high water.
- This is especially dangerous at night when people may not see the flooding and simply drive into it.
- When flash flooding is observed, or a warning is issued for your county, take action to protect yourself and property.



or your

Flash Flooding

- What to do and not do.

- Move to high ground.
- Avoid flash flood prone areas.
- Never drive into flood waters.
- Obey all road closure or high water signs - find an alternative route if needed.
- Be especially at night when flash flooding. when more difficult

- Visit this web site: **Turn Around Don't Drown**
<http://www.flash.org/tadd.cfm>



High Winds - Straight-Line Winds

- These are severe winds which meet or exceed 58 miles per hour. They may be convective gusts, outflow or downbursts.
- Straight-line winds are responsible for most thunderstorm wind damage.
- They can be as powerful as tornado winds.



High Winds - Straight-Line Winds

- If a severe thunderstorm watch is issued, follow the same plan as for a tornado warning.
 - Secure loose objects outside.
 - Bring pets inside.
 - Put your vehicle inside the garage if possible.
 - Keep dead branches trimmed.
 - Remove dead trees.



High Winds - Straight-Line Winds

- If a Severe Thunderstorm warning is issued:
 - Go to an interior room, bathroom or closet, or go to a basement if available.
 - Take your weather radio.
 - You may want to have sleeping bags, toys, games for children.





Heat Waves

- A heat wave is a prolonged period of excessive heat and high humidity.
- The National Weather Service issues a Heat Index that expresses the effect that excessive heat and high humidity has on the human body.

Heat Index

Temperature (°F)

| | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 | 102 | 104 | 106 | 108 | 110 |
|------------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 40 | 80 | 81 | 83 | 85 | 88 | 91 | 94 | 97 | 101 | 105 | 109 | 114 | 119 | 124 | 130 | 136 |
| 45 | 80 | 82 | 84 | 87 | 89 | 93 | 96 | 100 | 104 | 109 | 114 | 119 | 124 | 130 | 137 | |
| 50 | 81 | 83 | 85 | 88 | 91 | 95 | 99 | 103 | 108 | 113 | 118 | 124 | 131 | 137 | | |
| 55 | 81 | 84 | 86 | 89 | 93 | 97 | 101 | 106 | 112 | 117 | 124 | 130 | 137 | | | |
| 60 | 82 | 84 | 88 | 91 | 95 | 100 | 105 | 110 | 116 | 123 | 129 | 137 | | | | |
| 65 | 82 | 85 | 89 | 93 | 98 | 103 | 108 | 114 | 121 | 128 | 136 | | | | | |
| 70 | 83 | 86 | 90 | 95 | 100 | 105 | 112 | 119 | 126 | 134 | | | | | | |
| 75 | 84 | 88 | 92 | 97 | 103 | 109 | 116 | 124 | 132 | | | | | | | |
| 80 | 84 | 89 | 94 | 100 | 106 | 113 | 121 | 129 | | | | | | | | |
| 85 | 85 | 90 | 96 | 102 | 110 | 117 | 126 | 135 | | | | | | | | |
| 90 | 86 | 91 | 98 | 105 | 113 | 122 | 131 | | | | | | | | | |
| 95 | 86 | 93 | 100 | 108 | 117 | 127 | | | | | | | | | | |
| 100 | 87 | 95 | 103 | 112 | 121 | 132 | | | | | | | | | | |

Relative Humidity (%)

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution
 Extreme Caution
 Danger
 Extreme Danger



Heat Index

- **Caution** - fatigue is possible with prolonged exposure and activity.
- **Extreme caution** - heat exhaustion, heat cramps, and heat stroke (sunstroke) are possible.
- **Danger** - Heat exhaustion, heat cramps and heat stroke (sunstroke) are likely.
- **Extreme danger**- heat stroke (sunstroke) are likely with continued exposure.




Heat Index

- **Heat exhaustion** - A milder form of heat-related illness characterized by: heavy sweating, paleness, tiredness, weakness, dizziness, headache, nausea, fainting, muscle cramps.
- **Heat cramps** are associated with cramping in the abdomen, arms and calves. This can be caused by inadequate consumption of fluids.
- **Sunstroke, Heat Stroke** - The heat-regulating mechanisms of the body becomes overwhelmed and unable to effectively deal with the heat, causing the body temperature to climb uncontrollably. It is a medical emergency which requires immediate treatment.



What to do

- **Slow down.** Avoid strenuous activity. If you must do strenuous activity, do it during the coolest part of the day, which is usually in the morning between 4:00 a.m. and 7:00 a.m.
- **Stay indoors as much as possible.** If air conditioning is not available, stay on the lowest floor, out of the sunshine. Try to go to a public building with air conditioning each day for several hours. Remember, electric fans do not cool the air, but they do help sweat evaporate, which cools your body.
- **Wear lightweight, light-colored clothing.** Light colors will reflect away some of the sun's energy.

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- **Drink plenty of water** regularly and often. Your body needs water to keep cool.
 - Drink plenty of fluids even if you do not feel thirsty.
 - Water is the safest liquid to drink during heat emergencies.
 - **Avoid drinks with alcohol or caffeine** in them. They can make you feel good briefly, but make the heat's effects on your body worse. This is especially true about beer, which dehydrates the body.
 - **Eat small meals and eat more often.** Avoid foods that are high in protein, which increase metabolic heat.
 - **Avoid using salt tablets** unless directed to do so by a physician.

Hurricanes

- Hurricane hazards come in many forms:
 - Storm surge
 - High winds,
 - Tornadoes,
 - Flooding.

- Have a plan.



Hurricane Andrew

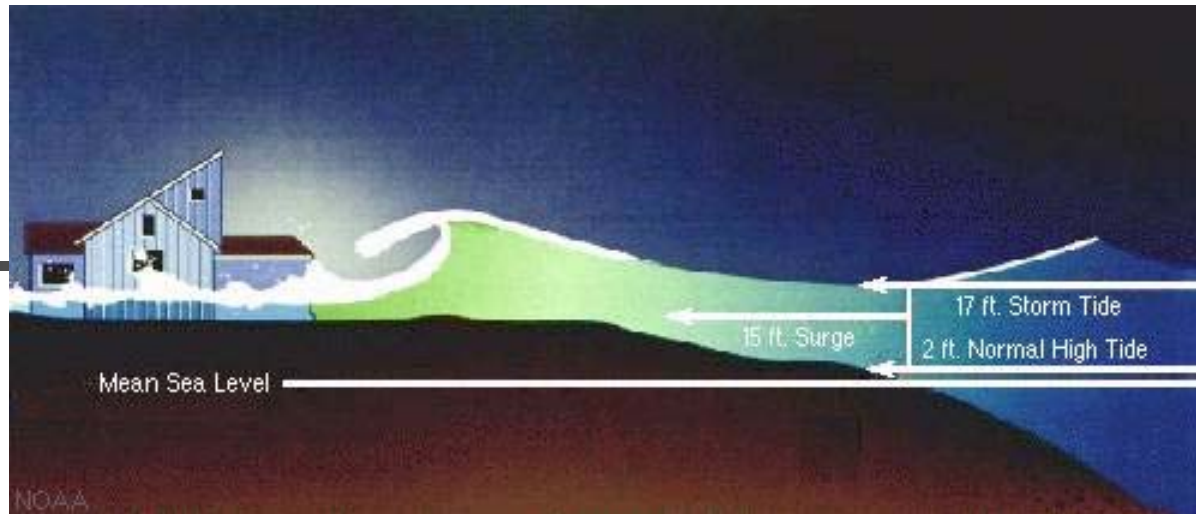
NOAA AVHRR 2020 UTC August 25, 1992
Red: 0.65 μm , Green: 0.9 μm Blue: 11.0 μm

NASA Goddard Laboratory for Atmospheres
Hasler, Pierce, Palaniappan, Manyin



Hurricane

- **Storm surge** is simply water that is pushed toward the shore by the force of the winds swirling around the storm.
- This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level 15 feet or more.
- In addition, wind driven waves are superimposed on the storm tide.
- This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.



- For our area of Bryan/College Station, storm surge is not a problem; but,
 - High winds,
 - Heavy rains,
 - Thunderstorms - tornadoes, and
 - Flooding may be.



Hurricane

- If, for some reason, you must evacuate the area:
 - Have the route you will take already planned.
 - Fill your vehicle with gas.
 - Have an out-of-state friend as a family contact.
 - If you have pets, plan now what you will do with them.
 - Post emergency telephone numbers by your phones and make certain your children know how and when to call 911.
 - Stock non-perishable emergency supplies and a Disaster Supply Kit.
 - Get a NOAA weather radio. Remember to replace batteries every 6 months.



Assemble a Disaster Supplies Kit Containing--

- First aid kit and essential medications.
- Canned food and can opener.
- At least three gallons of water per person per day.
- Protective clothing, bedding, or sleeping bags.
- Battery-powered radio, flashlight, and extra batteries.
- Special items for infant, elderly, or disabled family members.
- Written instructions on how to turn off electricity, gas, and water if authorities advise you to do so.
(Remember, you'll need a professional to turn natural gas service back on.)



Helpful web sites

- Weather Safety and Awareness Publications
<http://www.nws.noaa.gov/om/brochures.shtml>
- American Red Cross Preparedness Information
http://www.redcross.org/services/disaster/0,1082,0_500_,00.html
<http://www.redcross.org/services/disaster/keepsafe/>
- Federal Emergency Management Agency
http://www.fema.gov/hazard/tornado/to_saferoom.shtml