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Evacuation and Contingency Zones Corpus Christi Area

Counties: Aransas Kenedy Kleberg Nueces Refugio San Patricio

The enclosed map and accompanying chart show the zones susceptible to hurricane hazards (wind and/or storm surge) and the time required for partial or complete evacuation of people in each area. These evacuation guidelines are a result of information obtained using the National Weather Service's storm surge computer model called SLOSH (Sea, Lake, Overland Surge from Hurricanes). The resulting **Hurricane Relocation Planning for Aransas, Kenedy, Kleberg, Nueces, San Patricio and Refugio Counties** is a unique program that presents a carefully developed method of forecasting when evacuation routes may become unsafe or impassible because of high winds or storm surge flooding, and the length of time required for residents and vehicles in each evacuation zone and each contingency zone to safely clear the hazardous area.

Evacuation and contingency zones as represented on this map indicate areas of differing hurricane hazards. **Evacuation zones** are those areas considered to be hazardous because of storm surge or hurricane-force winds. These zones are represented by solid shading and indicated by letters (N for Nueces, R for Refugio, etc.) with subscript **numbers** for areas within the county. Areas subject to storm surge flooding have wave symbols. **Contingency zones** are those areas that could become hazardous if hurricane winds exceed 130 mph. These areas are represented by a dot pattern and indicated by letters (N for Nueces, R for Refugio, etc.) with a subscript **letter** for area identification.

This is a very thorough forecasting program. It must be understood, however, that this

program cannot take into consideration the effect that isolated rain and local drainage may have on your ability to evacuate your area.

Use this map to determine your zone. Using the chart, check the number of hours that it could take you to evacuate your family to a safe area during peak traffic. Remember that the estimated number of hours listed means that evacuation from your zone would need to be completed before evacuation routes are closed. Also remember--**evacuation routes can be blocked many hours before the hurricane makes landfall.**

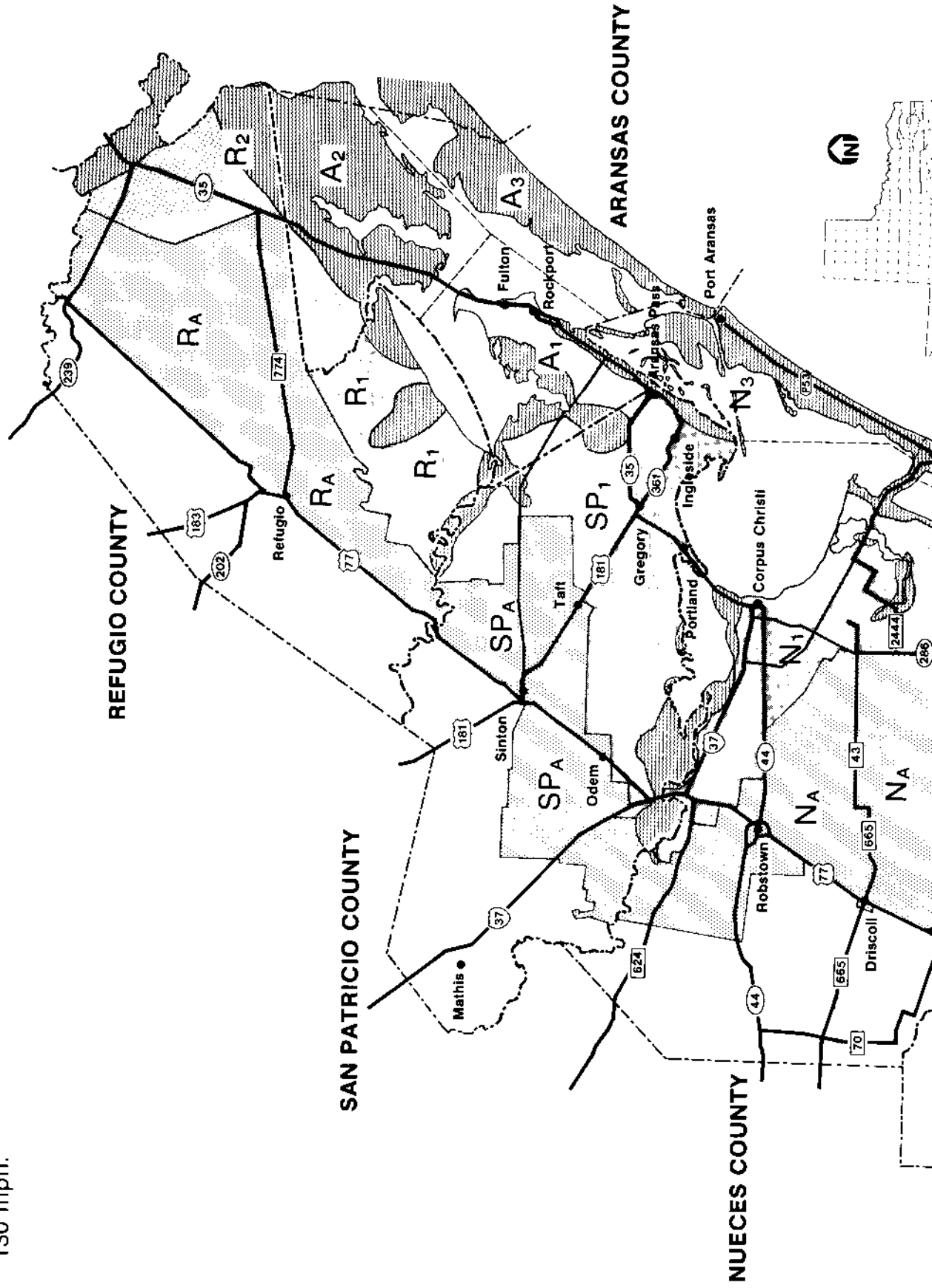
If you prefer to leave early, do so during the **hurricane watch** period. Otherwise, wait until your local governing authority recommends evacuation of your area and **then leave promptly**. Persons in non-incorporated areas receive evacuation recommendations from their county governments, while those living within incorporated areas are advised by their municipal governments.

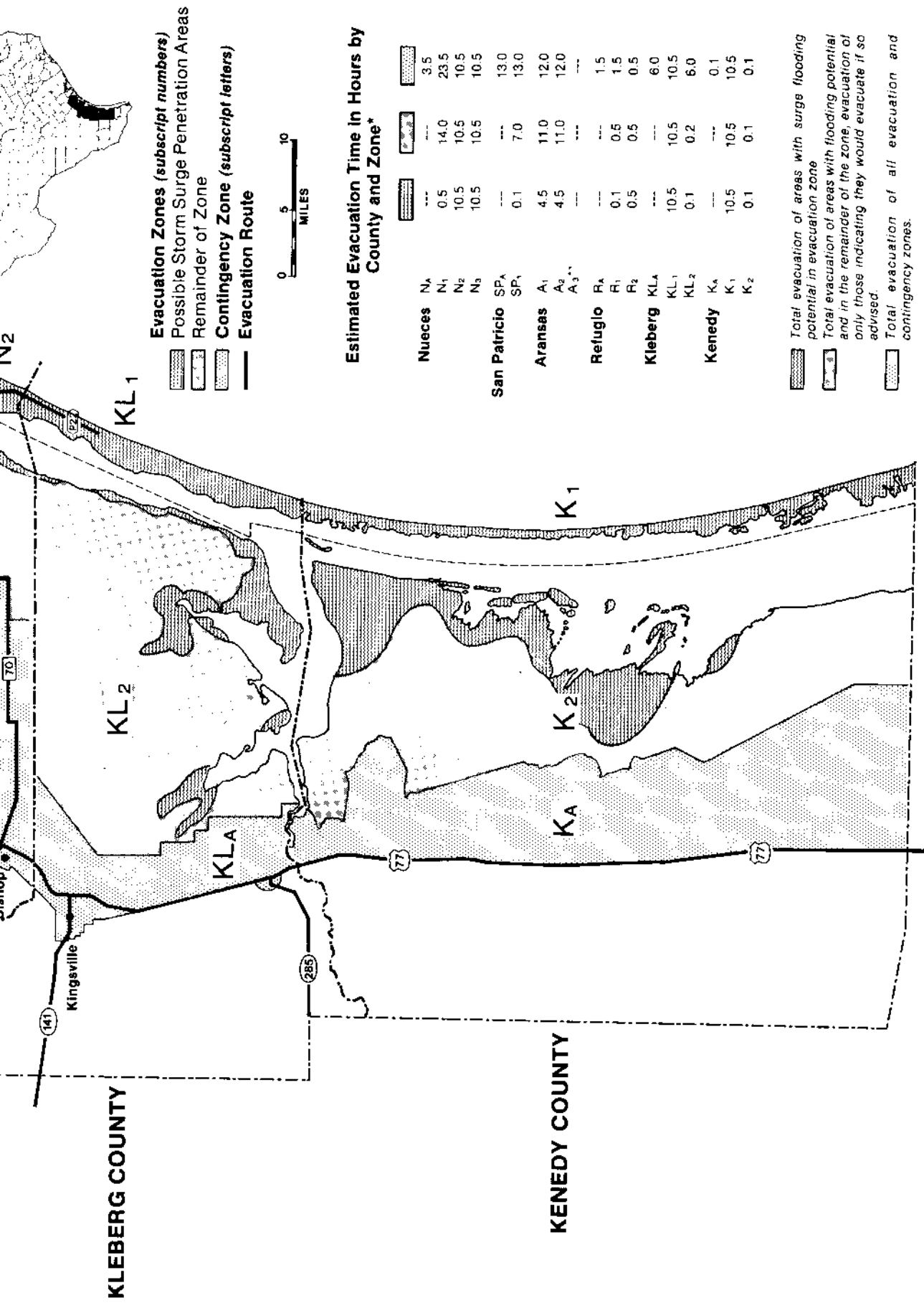
The **Emergency Broadcasting Station** for the Corpus Christi area is **KEYS (1440 AM)**. NOAA Weather Radio is a service of the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. It provides continuous 24-hour per day broadcasts of the latest weather information directly from National Weather Service offices. Taped weather messages are repeated every four to six minutes and are revised regularly. During severe weather, forecasters can interrupt the routine broadcasts and substitute special warning messages. **NOAA Weather Radio** broadcasts are made on a high-band **FM frequency--162.55** megahertz (MHZ) from Corpus Christi.

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Evacuation Zones: Areas where storm surge and high winds could be extremely hazardous from hurricanes with sustained winds up to 130 mph.

Contingency Zones: Areas where high wind could be extremely hazardous from hurricanes with sustained winds over 130 mph.





Evacuation Zones (subscript numbers)
 Possible Storm Surge Penetration Areas
 Remainder of Zone
Contingency Zone (subscript letters)
 Evacuation Route



Estimated Evacuation Time in Hours by County and Zone*

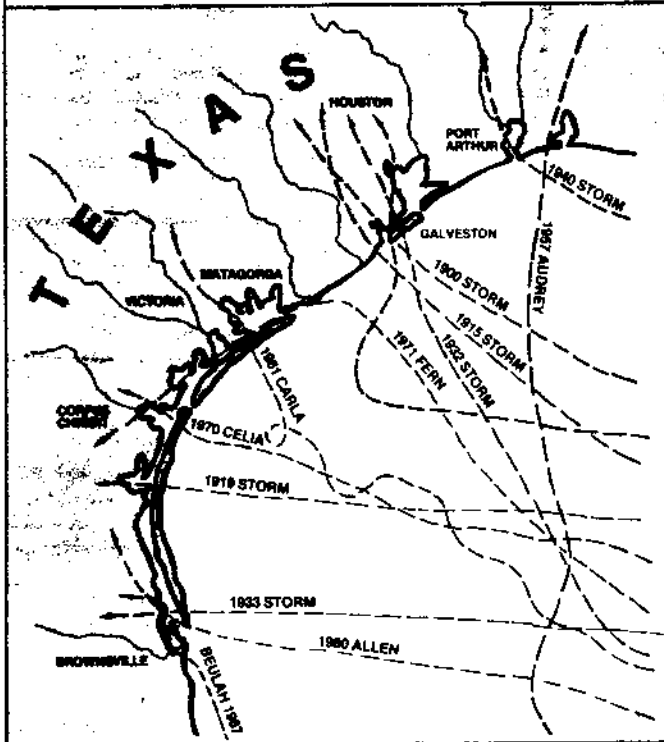
Nueces	N _A	---	---	3.5
	N ₁	0.5	14.0	23.5
	N ₂	10.5	10.5	10.5
	N ₃	10.5	10.5	10.5
San Patricio	SP _A	---	---	13.0
	SP ₁	0.1	7.0	13.0
Aransas	A ₁	4.5	11.0	12.0
	A ₂	4.5	11.0	12.0
	A ₃ **	---	---	---
Refugio	R _A	---	---	1.5
	R ₁	0.1	0.5	1.5
	R ₂	0.5	0.5	0.5
Kleberg	KL _A	---	---	6.0
	KL ₁	10.5	10.5	10.5
	KL ₂	0.1	0.2	6.0
Kenedy	K _A	---	---	0.1
	K ₁	10.5	10.5	10.5
	K ₂	0.1	0.1	0.1

Total evacuation of areas with surge flooding potential in evacuation zone
Total evacuation of areas with flooding potential and in the remainder of the zone, evacuation of only those indicating they would evacuate if so advised.
Total evacuation of all evacuation and contingency zones.

*Evacuation time is the estimated number of hours it would take for all evacuating vehicles in a zone to reach safe areas using available evacuation routes.

**Times would be similar to surrounding zones.

TRACKS OF SOME MAJOR OR EXTREME HURRICANES THAT HAVE STRUCK THE TEXAS COAST THIS CENTURY



HURRICANE HISTORY

Date Storm Made Landfall	Deaths	Wind MPH	Tides (Ft.)
1900-Sept. 8	6,000 +	135 +	15-20
1915-Aug. 17	275	135 +	15-20
1919-Aug. 14	287	Severe in Both Florida and Texas	
1932-Aug. 13	40	100 + 135	10-15
1933-Aug. 4	40	80 +	
1949-Oct. 3	2	135 +	10-15
1957-June 27 Audrey	381	100	12 +
1961-Sept. 11 Carla	46	135 +	15-22
1967-Sept. 20 Beulah	15	109 +	Record number of Tornadoes; Major Floods
1970-Aug. 3 Celia	11	130-170	
1980-Aug. 9 Allen	2	90-100	8-12

Hurricane Facts for the Texas Coast

The pattern of hurricanes reflects a major hurricane about every ten years. Hurricanes hit the Texas coast on an average of one every 2 1/2 years, bringing the killing and destructive storm surge, rain, wind and tornadoes.

The Texas coast continues to grow in population, and with the increased population, there is increased building right down to the water line. In addition, in some areas where this increased growth is occurring, the land has sunk as much as ten feet, making many more areas subject to tidal flooding.

Newcomers to the coast are unfamiliar with the effects of tropical storms and do not know of the necessity of planning and steps to take to protect life and property. As much as a third of the coastal population has never experienced a hurricane.

Each hurricane has its own characteristics--and is accompanied by features which provide distinctly different types of damage. For example, three hurricanes which hit Texas -- Carla (1961), Beulah (1967) and Celia (1970) -- each had different characteristics and damage effect.

Carla, one of the largest hurricanes in the Gulf of Mexico, had a 22-foot storm surge, and winds up to 160 mph. Tidal flooding occurred on most all of the Texas coast, providing the most storm damage.

Beulah was characterized by heavy rainfall (30-plus inches), providing widespread freshwater flooding, and had over 100 tornadoes, spreading into the center of the state.

Celia, different from both Carla and Beulah, was a small (70 miles across), very strong hurricane which strengthened rapidly as it was approaching land, with gusts to 162 mph before the recorder broke.

So...hurricanes can have high storm surge, widespread saltwater and freshwater flooding,

strong and violent winds, tornadoes, and will usually have a combination of them all.

Storm Surge

Nine of ten deaths which occur in a hurricane are from the storm surge. The storm surge also causes most of the loss of property in hurricanes. The storm surge is in addition to the regular tide, and is caused by the "lifting up" of the ocean under the storm. The maximum surge is usually to the right of the track of the hurricane, near the point of maximum winds. This makes the greatest danger from both winds and surge to the right of the storm track.

The 22-foot surge in Carla in 1961 at Matagorda Bay is well remembered by Texans, but in 1969, Hurricane Camille caused at 25-foot surge in Mississippi, the highest on record in the Western Hemisphere. Protection against such surges is difficult. Sea walls and strongly constructed buildings offer some protection, but are not indestructible. The only sure way to avoid damage from a storm surge is not to build in low-lying coastal areas. Since most of the Texas coast is below 20 feet MSL, much of the coastal area is susceptible to storm surge damage.

Tornadoes

Associated with the other destructive elements of a hurricane, tornadoes are a threat both at the coast and inland, and always pose a threat in the hurricane area. Hurricane Beulah, with 115 tornadoes (sixty-seven in one day), set a national record.

Effect on Shoreline

When a hurricane hits a coastline, erosion at the beach sometimes moves the shoreline several hundred feet. When a hurricane crosses offshore barrier islands, the powerful currents cut channels completely through the island. Hurricane Allen cut through South Padre Island in 69 places. To place a structure over one of these channels is deliberately courting disaster.

Building near the shore in an area susceptible to erosion is asking for trouble.

The Texas coast has been mapped showing erosion zones and washover channels. This information is public, but most existing home and condominium owners are not aware of these natural hazards.

Freshwater Flooding

Hurricanes sometime produce large amounts of rainfall, and the resultant flooding causes widespread damage well away from the coastline, as in Beulah. Even tropical storms, such as Claudette in 1979, which set a new national 24-hour rainfall of 43 inches near Alvin, can cause widespread property damage from low-level flooding. Property owners should ascertain susceptible levels for flooding and make plans to build at levels to minimize flood damage.

Increasing Danger

The increase of coastal population and the larger area of flooding potential combines to increase the chance of a major disaster. To prepare for such a disaster on the Texas coast, planning and action is needed by all involved entities, including the development of evacuation plans and a continuous awareness program to educate the public on actions before, during, and after a hurricane threat or occurrence. These hurricane facts are to remind the long-time resident and inform the newcomer of hurricane hazards. They are not intended to alarm but to inform. Sooner or later we will experience another major or extreme hurricane. Ignorance or apathy to these facts can be our worst enemy.

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