



## Be Aware of Basic Hurricanes Hazards

**High Winds.** The intensity of a land-falling hurricane is expressed in terms of categories that relate wind speeds and potential damage. See Categories below.

- **Tropical Storm**  
Winds 39-73 mph
- **Category 1 Hurricane** — winds 74-95 mph (64-82 kt)  
No real damage to buildings. Damage to unanchored mobile homes. Some damage to poorly constructed signs. Also, some coastal flooding and minor pier damage.  
- *Examples: Irene 1999 and Allison 1995*
- **Category 2 Hurricane** — winds 96-110 mph (83-95 kt)  
Some damage to building roofs, doors and windows. Considerable damage to mobile homes. Flooding damages piers and small craft in unprotected moorings may break their moorings. Some trees blown down.  
- *Examples: Bonnie 1998, Georges(FL & LA) 1998 and Gloria 1985*
- **Category 3 Hurricane** — winds 111-130 mph (96-113 kt)  
Some structural damage to small residences and utility buildings. Large trees blown down. Mobile homes and poorly built signs destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain may be flooded well inland.  
- *Examples: Keith 2000, Fran 1996, Opal 1995, Alicia 1983 and Betsy 1965*
- **Category 4 Hurricane** — winds 131-155 mph (114-135 kt)  
More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.  
- *Examples: Hugo 1989 and Donna 1960*
- **Category 5 Hurricane** — winds 156 mph and up (135+ kt)  
Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.  
- *Examples: Andrew(FL) 1992, Camille 1969 and Labor Day 1935*



**Note:** The strongest winds usually occur in the right side of the eyewall of the hurricane.

**Storm surge** is 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.



**Tornadoes** are most likely to occur in the right-front quadrant of the hurricane. However, they are also often found elsewhere embedded in the rain bands, well away from the center of the hurricane. The new Doppler radar systems have greatly improved the forecaster's warning capability, but the technology usually provides lead times from only a few minutes up to about 30 minutes. Therefore, preparedness is critical!

Some Tornado Facts:

- When associated with hurricanes, tornadoes are not usually accompanied by hail or a lot of lightning.
- Tornado production can occur for days after landfall.
- They can also develop at any time of the day or night during landfall. However, by 12 hours after landfall, tornadoes tend to occur mainly during daytime hours.



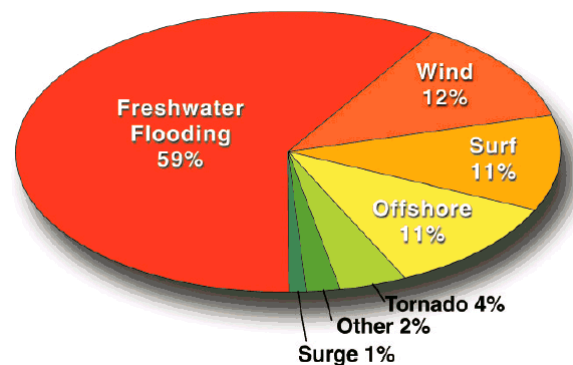
**Inland flooding** can be a major threat to communities hundreds of miles from the coast as intense rain falls from these huge tropical air masses. While storm surge is always a potential threat, more people have died from inland flooding from 1970 up to 2000. Intense rainfall is not directly related to the wind speed of tropical cyclones. In fact, some of the greatest rainfall amounts occur from weaker storms that drift slowly or stall over an area.



**Note:** In a study from 1970 to 1999, freshwater flooding accounted for more than half (59%) of U.S. tropical cyclone deaths. These floods are why 63% of U.S. tropical cyclone deaths during that period occurred in inland counties. At least 23% of U.S. tropical cyclone deaths occur to people who drown in, or attempting to abandon, their cars. 78% of children killed by tropical cyclones drowned in freshwater floods.

So, the next time you hear hurricane – be aware of inland flooding!

Leading Causes of Tropical Cyclone Deaths in the U.S 1970-1999



Source: Edward Rappaport—Chief, Technical Support Branch, Tropical Prediction Center

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