

Carolina Sky Watcher



2004 Hurricane Season

During the prior, relatively inactive, 1970-1994 period, hurricane seasons averaged only 9 tropical storms, 5 hurricanes, and 2 major hurricanes. Only three seasons during this entire period were classified as above normal (1980, 1988, 1989), compared to seven in the last nine years. These inactive seasons featured fewer hurricanes forming in the deep tropics, and fewer hurricane landfalls in the United States, Claudette, a category 1 hurricane hit the Central Texas coast on July 15, and Isabel, a category 2 hurricane, that made landfall on September 18 along the Outer Banks. National Weather Service

performance during Isabel is considered a model of success. Forecasts issued for Isabel had track and timing errors that were well below the average errors over the past 10 years.

Isabel was a well-behaved storm, meaning her steering currents were well defined and changed little. Isabel validated our new 5-day forecast, which was only off by 137 miles at day five. The average 48-hour error for Isabel was only 68 miles, which is 173 miles more accurate than the 10-year average. Our ability to track and predict movement of storms is better than ever. As a result, countless lives are saved and millions of dollars in financial loss is prevented.

In this Issue...

2004 Hurricane Season	1
2004 Hurricane Season (continued)	2
Hurricane Climatology	3
Anniversary of Two NC Hurricanes	4-5
Hurricanes Can Kill	6
Hurricane Family Plan	7

NOAA has been issuing hurricane seasonal for the last six years and they have been very accurate. They are based on NOAA's Accumulated Cyclone Energy – or ACE –Index. The ACE index measures the collective strength and duration of tropical storms and hurricanes in a given region. It has proven to be highly predictable and is a key forecast parameter for NOAA hurricane outlooks.

For 2004, NOAA predicts an above normal hurricane season. The outlook calls for

- * 12-15 tropical storms
- * 6-8 becoming hurricanes – at least 74 mph winds
- * 2-4 becoming major hurricanes (Categories 3-5) – at least 115 mph winds.

Based on historical data, similar seasons have averaged two to three land-falling hurricanes in the continental United States, and 1-2 hurricanes in the region around the Caribbean Sea.

This above normal forecast is continuing the trend of above normal activity since 1995. Between 1995-2003, Atlantic hurricane seasons have averaged 13 tropical storms, 8 hurricanes, and 4 major hurricanes. An above-normal season features a lot of activity in the deep tropics of the Atlantic.. These become hurricanes and major hurricanes, and have general westward tracks toward the United States. This is why we have so many more hurricane landfalls in the U.S. during above-normal seasons.

However, whatever the seasonal outlook, just ONE land-falling hurricane or tropical storm can kill hundreds if people are not prepared. **PREPAREDNESS IS KEY.** People living in Eastern North Carolina and elsewhere along the Atlantic and Gulf coast states must stay alert, listen to NOAA weather forecasts and take common sense measures to protect their property, and most importantly, their lives.

By Tom Kriehn

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A A Y S M W W A T T G T U T F S G G X Z
E M G A M N A T I E S B R K C W B I W D
X S L N J W I G J N K O U Z Z J E H B I
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L M I W E W R B C A G T R T Z K V H Y H
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C T O X X L L Y W N M N P R G E L N E F
T B R N F S S I E E I L B N N O S C F X
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D K A O K D S E O E E I C D N H B F S U
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S H X I B F T L E R P A I S Z U V G K D
Y N E C N A B R U T S I D A O Q F I C J
Y S P H T Y P H O O N R M A O Y R X J G
U T P U C E T A U C A V E P R B M Y L V
T N S F D I Z C Y Z M T J T N H E G K W
U Q W U I H K U A S D X O X J F U X O G
E Q X Z O R D H I Y A T R Z D B H O E X

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Hurricane Word Search

How many of these words can you find?

- | | | |
|-----------|-----------------|-------------|
| BAROMETER | DEPRESSION | DISTURBANCE |
| EVACUATE | EXTRATROPICAL | EYE |
| EYEWALL | FLOODING | FLOYD |
| HAZARDS | HAZEL | HIGHWINDS |
| HURRICANE | ISABEL | RADAR |
| RAINBANDS | SATELLITES | STORM SURGE |
| TORNADOES | TYPHOON | WARNING |
| WATCH | TROPICAL STORMS | |

Hurricane Climatology of Eastern North Carolina from 1850-2000

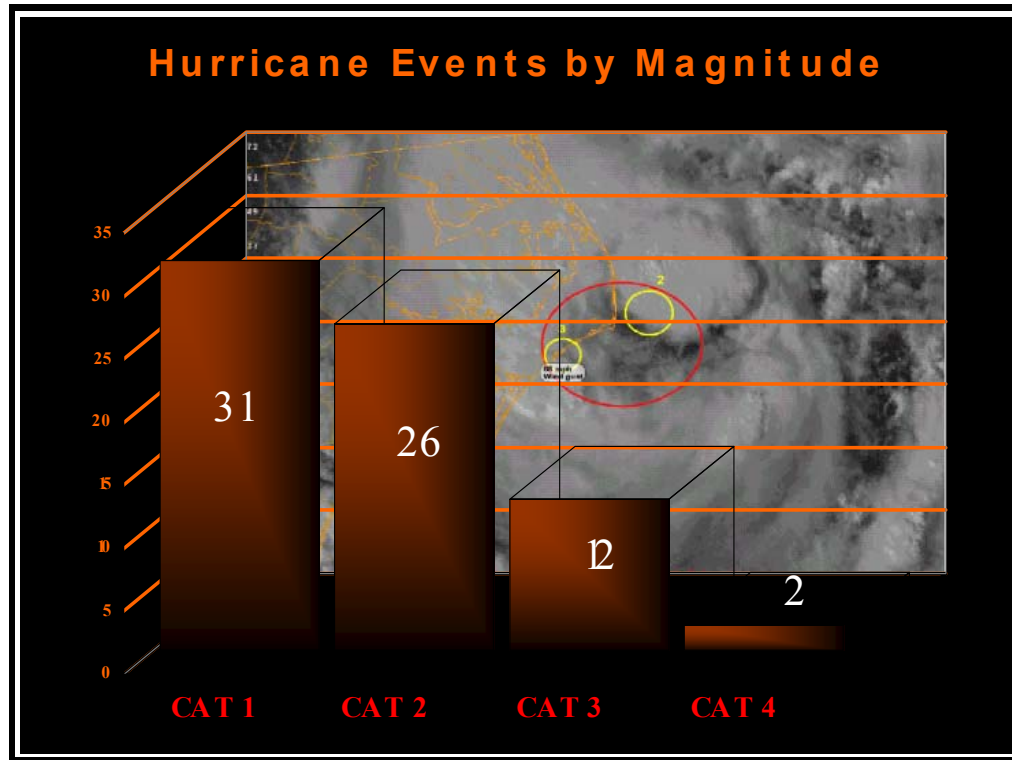


Figure 1: Total number of hurricanes to affect Eastern North Carolina per category of the Saffir- Simpson scale.

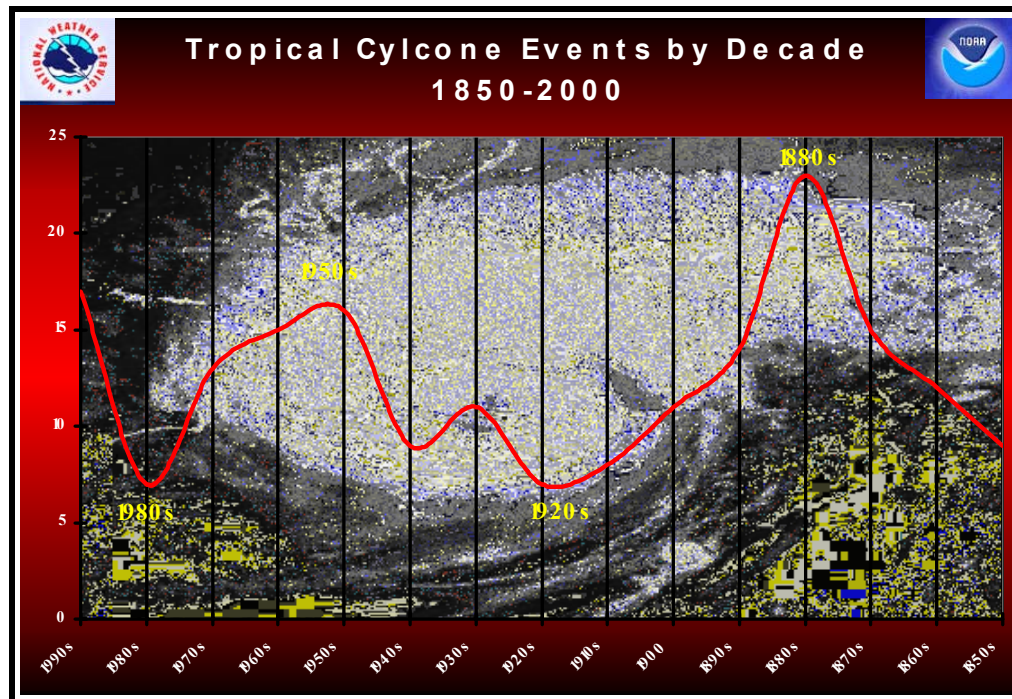


Figure 2: Trends in hurricane strikes by decade across Eastern North Carolina.

5 and 50: The anniversaries of two of North Carolina's most Destructive Hurricanes:

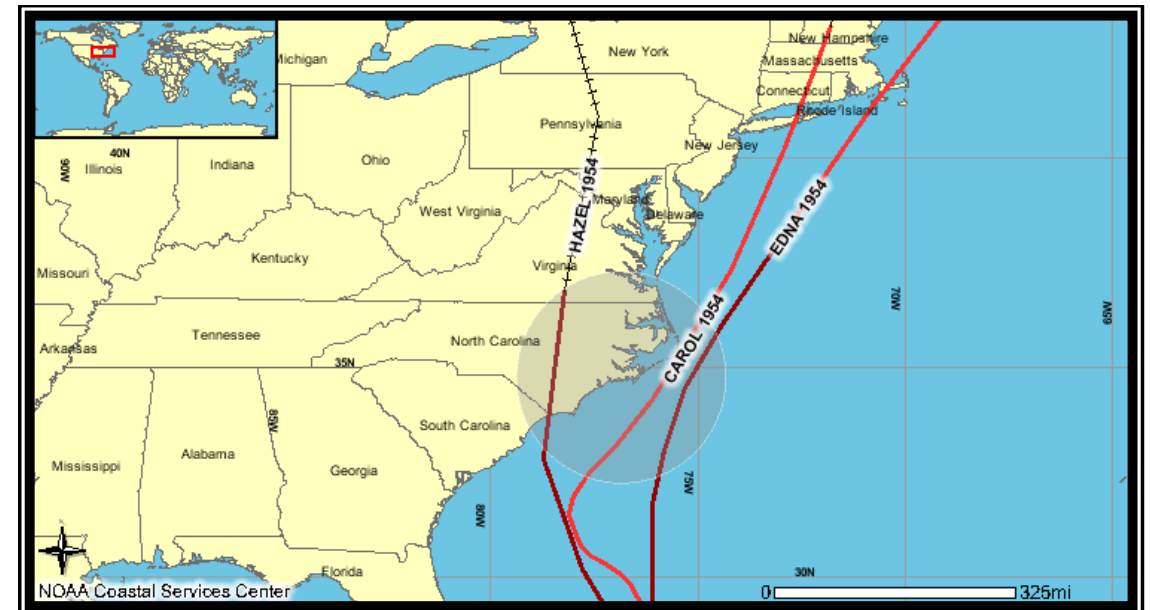
Name: Hurricane Hazel
Date: October 15, 1954
Category: 4

Hurricane Hazel was first spotted east of the Windward Islands on October 5. It moved through the islands later that day as a hurricane, then it moved westward over the southern Caribbean Sea through October 8. Hazel turned north and accelerated on October 15, making landfall as a Category 4 hurricane near the North Carolina-South Carolina border. Subsequent rapid motion over the next 12 hours took the storm from the coast across the eastern United States into southeastern Canada as it became extratropical. High winds occurred over large portions of the eastern United States. Myrtle Beach, South Carolina reported a peak wind gust of 106 mph, and winds were estimated at 130 to 150 mph along the coast between Myrtle Beach and Cape Fear, North Carolina.

Impacts: Hazel was responsible for 95 deaths and \$281 million in damage in the United States, 100 deaths and \$100 million in damage in Canada, and an estimated 400 to 1000 deaths in Haiti. The brunt of the storm hit during highest lunar tide of the year, with an 18-foot storm surge (in some areas). Many believe it was the most destructive hurricane to hit North Carolina with record rainfall. Hurricane Hazel's path of destruction spread over 2,000 miles.

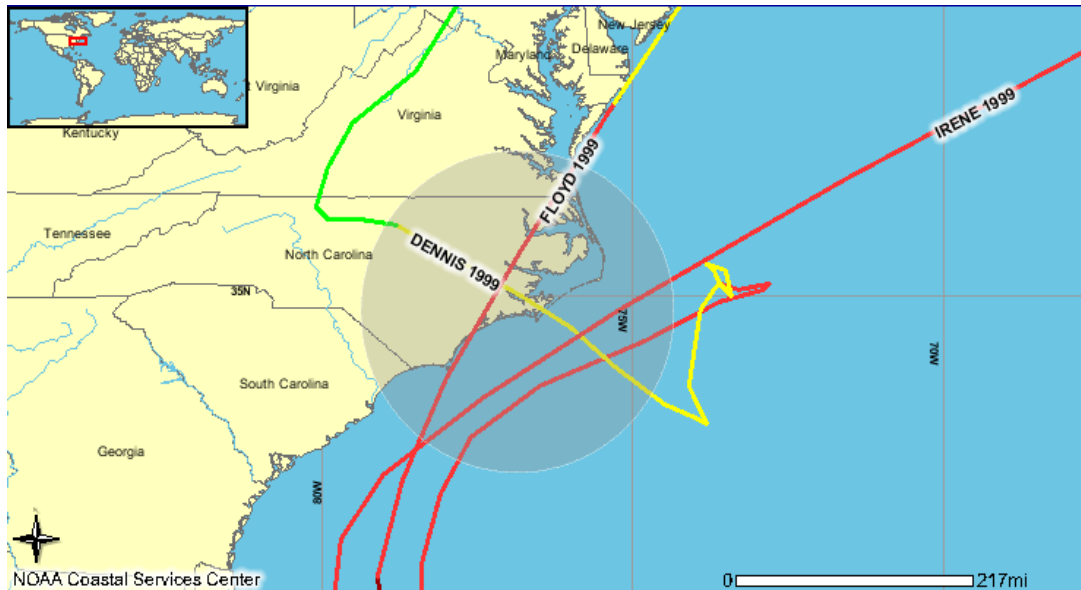
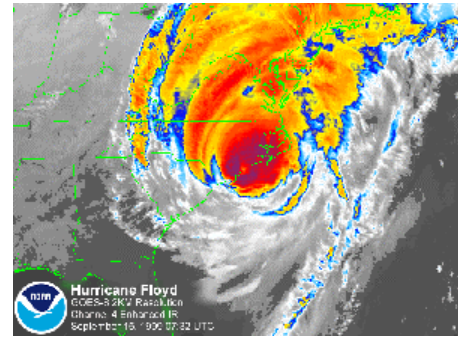
Massive destruction to the beaches of New Hanover and Brunswick counties from tidal surge. Total Dollar Damage: Estimated \$136 million

(North Carolina damage) Deaths: 19 (North Carolina) Injuries: 200 (North Carolina) Structural Damage: 15,000 homes and structures destroyed. 39,000 structures damaged.



Name: Hurricane Floyd
Date: September 16, 1999
Category: 2

Floyd was first detected as a tropical wave that moved off the African coast on September 2. The system developed into a tropical depression over the tropical Atlantic on September 7. Moving steadily west-northwestward, the system became a tropical storm the next day and a hurricane on the 10th. It became a Category 4 hurricane on September 13 as it approached the central Bahama Islands. This was followed by a gradual turn to the north-northeast, which brought the center to the North Carolina coast near Cape Fear on September 16 as a Category 2 hurricane. Floyd continued north-northeastward along the coast of the Mid-Atlantic into New England, where the storm became extratropical on the 17th. The remnants of Floyd merged with a large non-tropical low on September 19.



IMPACT

Floyd will be most remembered for its rainfall. The combination of Floyd and a frontal system over the eastern United States produced widespread rainfalls in excess of 10 inches from

North Carolina northeastward, with amounts as high as 19.06 inches in Wilmington, North Carolina and 13.70 inches at Brewster, New York. These rains, aided by rains from Tropical Storm Dennis two weeks earlier, caused widespread severe flooding that caused the majority of the \$3 to 6 billion in damage caused by Floyd. These floods also were responsible for 50 of the 56 deaths caused by Floyd in the United States. Floyd also caused damage in the Bahamas, with one death reported. Impacts: North Carolina: 51 deaths; 7000 homes destroyed; 17,000 homes uninhabitable; 56,000 homes damaged; most roads east of I-95 flooded; Tar River crests 24 feet above flood stage; over 1500 people rescued from flooded areas; over 500,000 customers without electricity at some point; 10,000 people housed in temporary shelters; much of Duplin and Greene Counties under water; severe agricultural damage throughout eastern North Carolina.

By Sarah Jamison

Hurricanes Can Kill Even When Hundreds of Miles Away

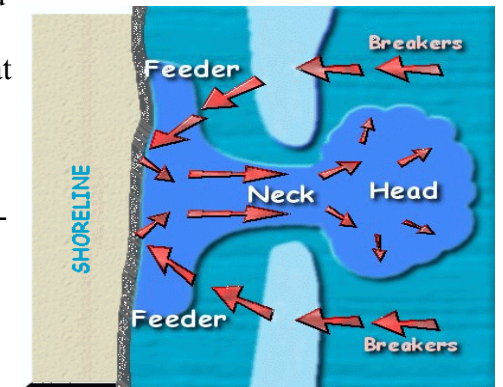
Hurricanes are best known for strong winds...heavy rain and storm surge flooding...however there is another feature they produce that leads to fatalities most every year...rip currents. Hurricanes produce swells that propagate hundreds of miles from the center of the cyclone. Many times these swells will reach the beaches several days before the Hurricane approaches the coast.

The strong winds in a Hurricane produce large waves that spread out in all directions from the center of the storm. Strong, long lived hurricanes tend to produce the largest swells that can propagate out over 1000 miles from the storm. These swells typically move at speeds between 20 and 25 mph. When these fast moving waves reach the coast they tend to break much higher than typical waves and push water further onshore. The water that is pushed onshore will then try and flow back toward the ocean, and that is what leads to rip currents. These swells can be hard to observe as they typically do not break until almost on the beach. Fortunately, these swells can be detected in advance by the National Data Buoy Centers network of offshore buoys before they reach the

coast. Forecast models also do a good job of showing when the swells will impact the region, and show how large they will be. National Weather Service meteorologists use this information when issuing the Surf Zone Forecast which includes a rip current forecast during the beach season.

Rip currents may look like frothy, choppy rivers flowing away from the shore out toward the ocean. If you see a rip current never enter the water at that location. They tend to be most dangerous approximately 2 hours before and 2 hours following low tide. Below is a picture of a rip current taken from the Field Research Facility at Duck North Carolina.

By Bob Frederick



Do You Have a Family Plan for a Hurricane?????

If you do not have a family plan in the event of a hurricane, you should strongly consider making one. People who have been stranded by hurricanes or have been adversely affected by hurricanes in the past have wished that they had made preparations prior to the onset of the event. Some of the affects of hurricanes can cause major interruptions to our normal activities that we take for granted. Heavy rainfall from tropical systems (not just Hurricanes but Tropical Storms as well) can cause major flooding, high winds can cause trees to fall, which could land on your house or car and power lines to come down with electric service interrupted for up to two or three weeks depending on your location.

You should keep a written plan and be sure to share it not only with your family, but also with your friends and neighbors. That way everyone will know what you are going to do when a hurricane threatens.

Creating a disaster supply kit

There are certain items that you need to have in your kit regardless of where you ride the hurricane out. A disaster kit is a useful tool when you evacuate, as well as making your family as safe as possible in your home. Your kit should include the following...

- ▲ At least 1 gallon of water per person per day for 3 to 7 days.
- ▲ About 3 to 7 days worth of non-perishable food.
- ▲ Blankets and pillows.
- ▲ Seasonal clothing including rain gear and sturdy shoes.
- ▲ Special items for children and the elderly.
- ▲ First aid bandages, medicine, and prescription drugs.
- ▲ Toiletries.
- ▲ Flashlights with batteries.
- ▲ A battery powered radio and NOAA Weather Radio All Hazards.
- ▲ Cash (banks and ATM's may be closed for extended periods).
- ▲ Keys.
- ▲ Toys, books, and games.
- ▲ Important documents in a waterproof container (insurance papers).
- ▲ Tools.
- ▲ A vehicle with its fuel tank filled.
- ▲ Pet care items.

There are several things you should do to reduce your homes vulnerability. Be sure to pick up all loose items in and around your yard such as garbage cans, toys, lawn furniture, potted plants, and so on. If you wish to cover your windows be sure to use hurricane shutters or at least 5/8 inch plywood. This will keep

the wind out of your house as well as protect your windows from breaking. Also be sure to reinforce your garage door. If you are asked to evacuate, you should do so without delay. THIS IS FOR YOUR PROTECTION. You may also want to evacuate even if not asked to do so if the area around your home is prone to flooding. It is very important that you evaluated your homes vulnerability. You could become cut off to the outside world by flood waters, or falling trees may threaten your family. Also it is very important to remember that in areas that have been told to evacuate, various emergency services may be hindered, meaning that fire, EMS, and police may not be able to reach you. Preventing the loss of life and minimizing the damage to property from hurricanes are responsibilities that are shared by all. The most important thing that you can do is to be informed and prepared.

By Wayne Shaffer



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In This Issue...

Hurricane Season

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This quarterly newsletter is for Skywarn Spotters, schools, emergency managers, media, and other interested parties in the 15 county area in east-central North Carolina served by the National Weather Service Office in Newport, NC.

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