



Hurricane Season 2011



What Will 2011 Have in Store?

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National Weather Service – Newport/Morehead City and Raleigh, NC
Jeff Orrock
Meteorologist-in-Charge
Wakefield, VA



2010 Season Statistics

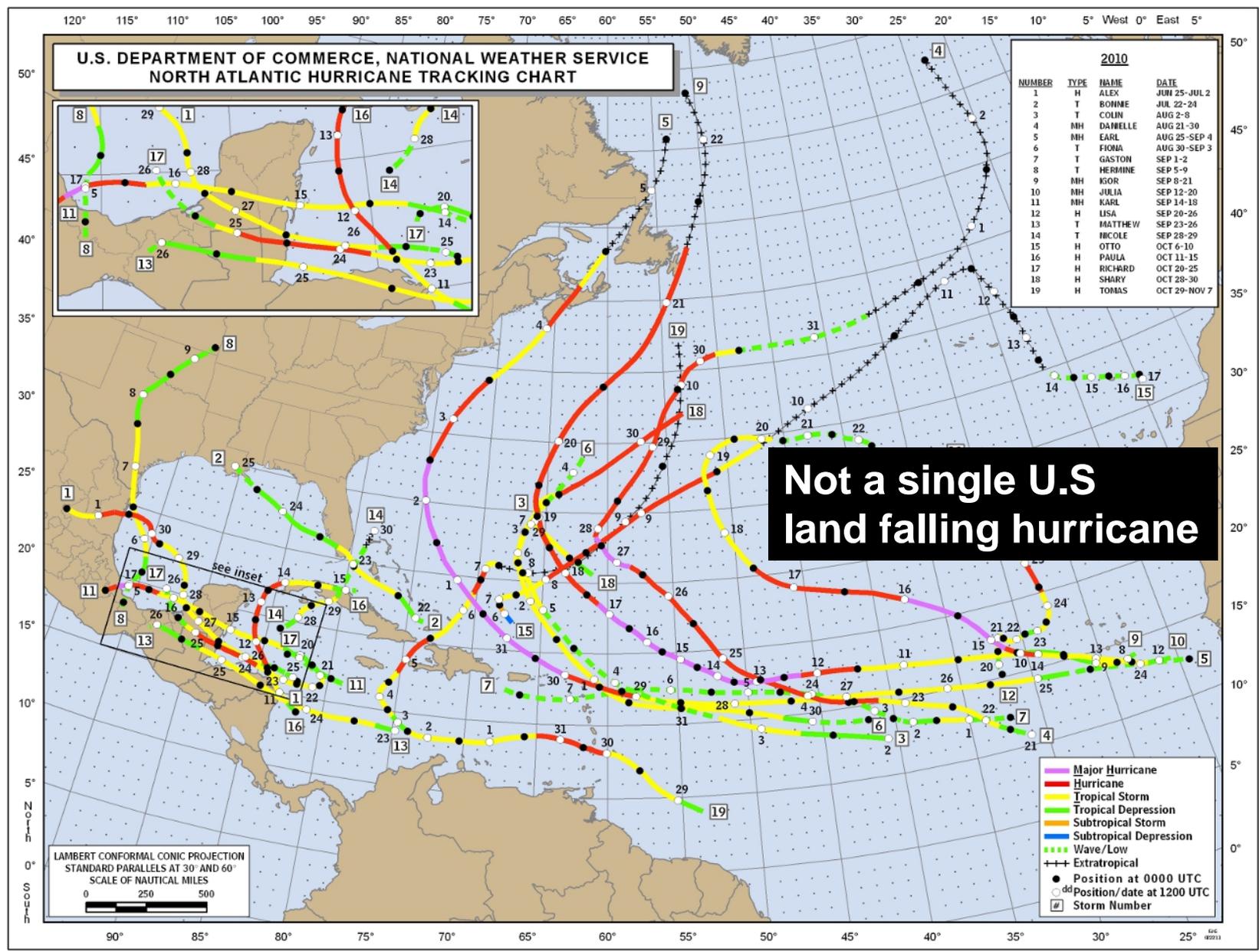


Was 2010 Active?

- 19 Named Storms
- 12 Hurricanes
- 5 Intense Hurricane (Earl)
- “Normal” = 11, 6, 2
- Nearly 2 times normal activity



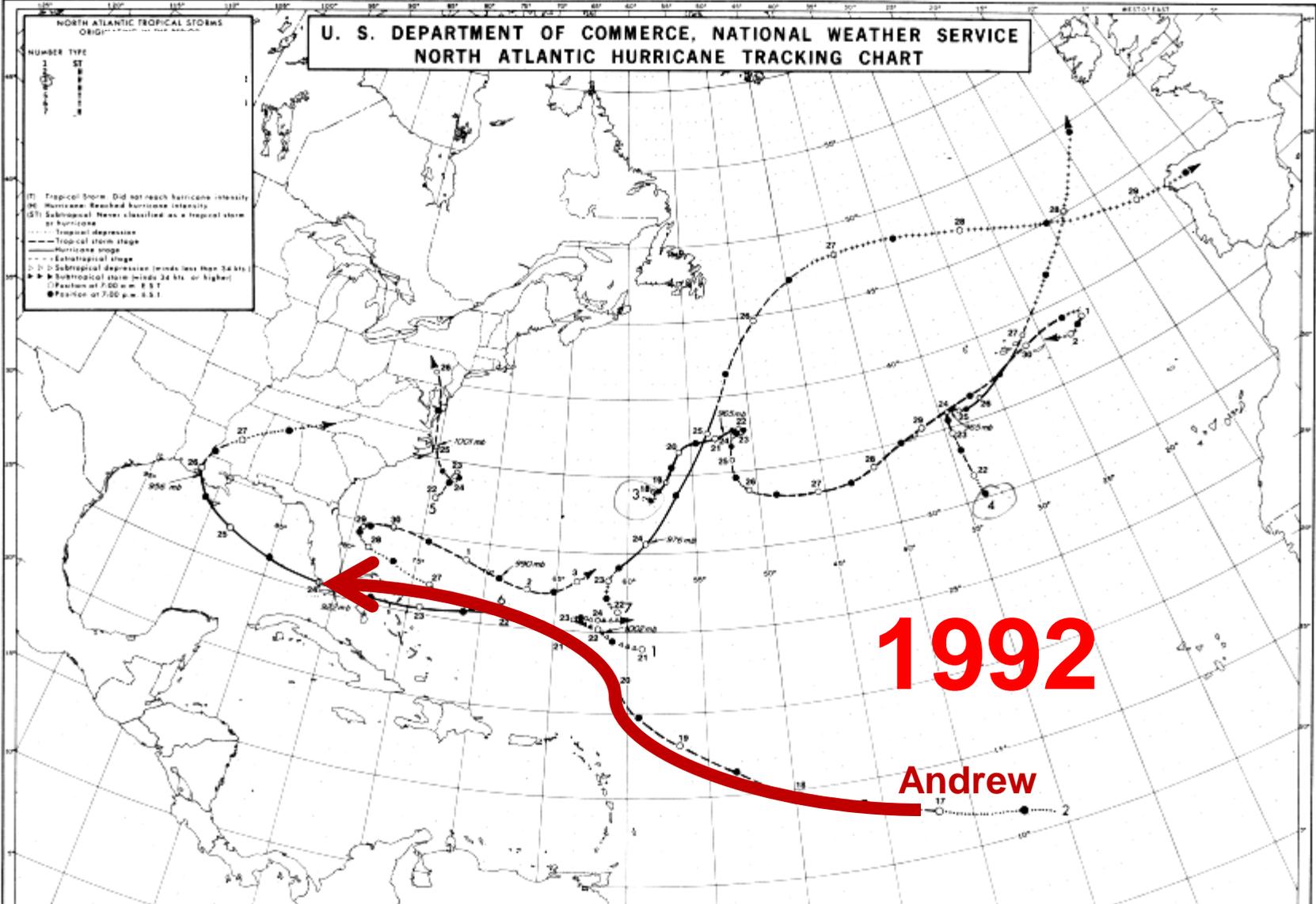
2010 Active Season Map





Quiet Hurricane Season

What year???





Near Normal Season

What year???

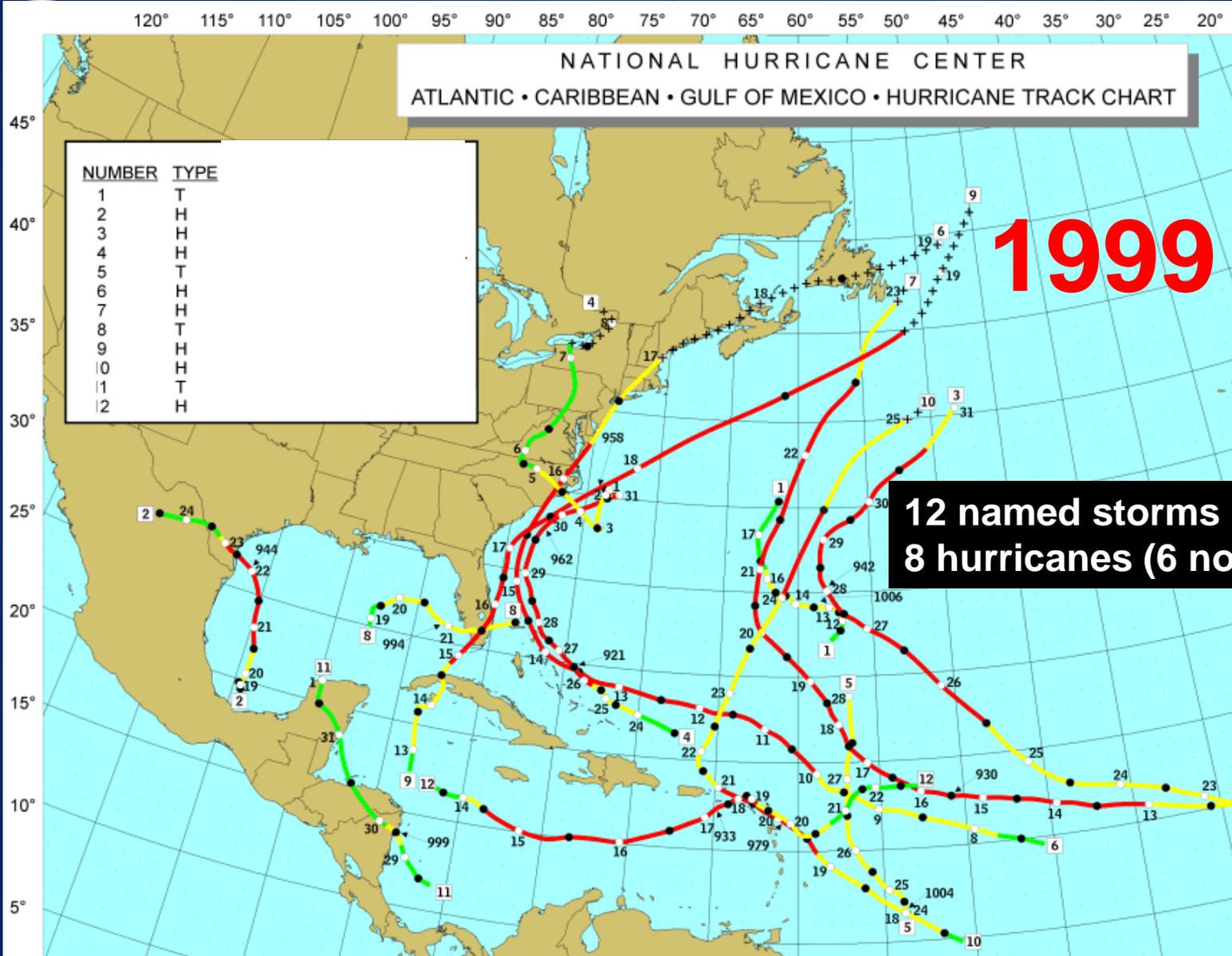


NATIONAL HURRICANE CENTER
ATLANTIC • CARIBBEAN • GULF OF MEXICO • HURRICANE TRACK CHART

NUMBER	TYPE
1	T
2	H
3	H
4	H
5	T
6	H
7	H
8	T
9	T
10	H
11	T
12	H

1999

12 named storms (11 normal)
8 hurricanes (6 normal)

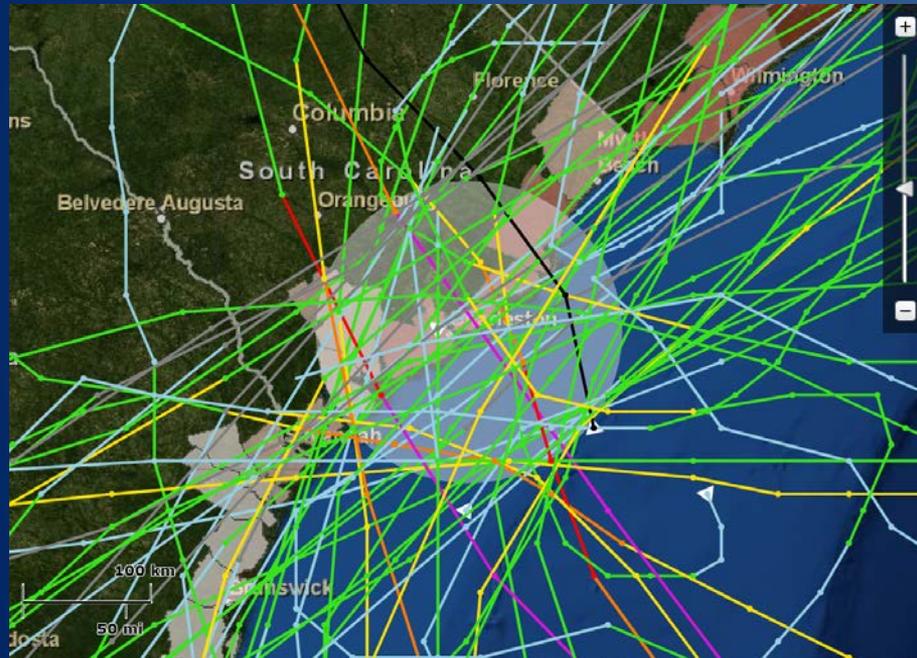




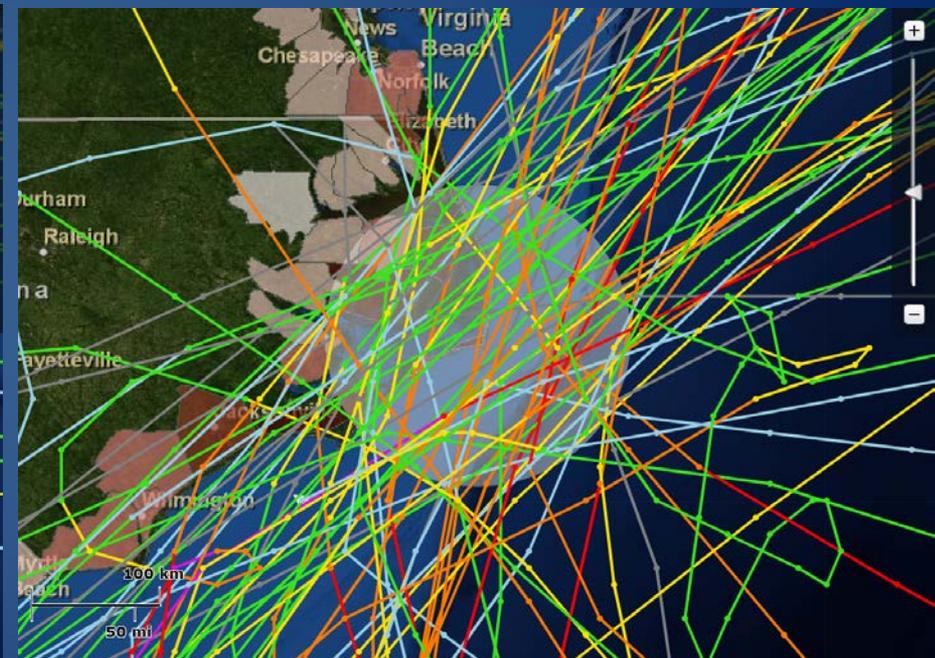
Tropical Storms and Hurricanes Impacting the Carolinas in the last 100 years



Carolinas: We have a Hurricane Problem.



61 Tropical Storms or Hurricanes within 65 NM of Charleston



72 Tropical Storms or Hurricanes within 65 NM of Cape Hatteras



Ingredients for an Active Season



Warmer SSTs
Reduced Wind Shear
Lower Surface Pressure
(red area)

Higher Pressure in
Upper Atmosphere

Favorable African Easterly Jet

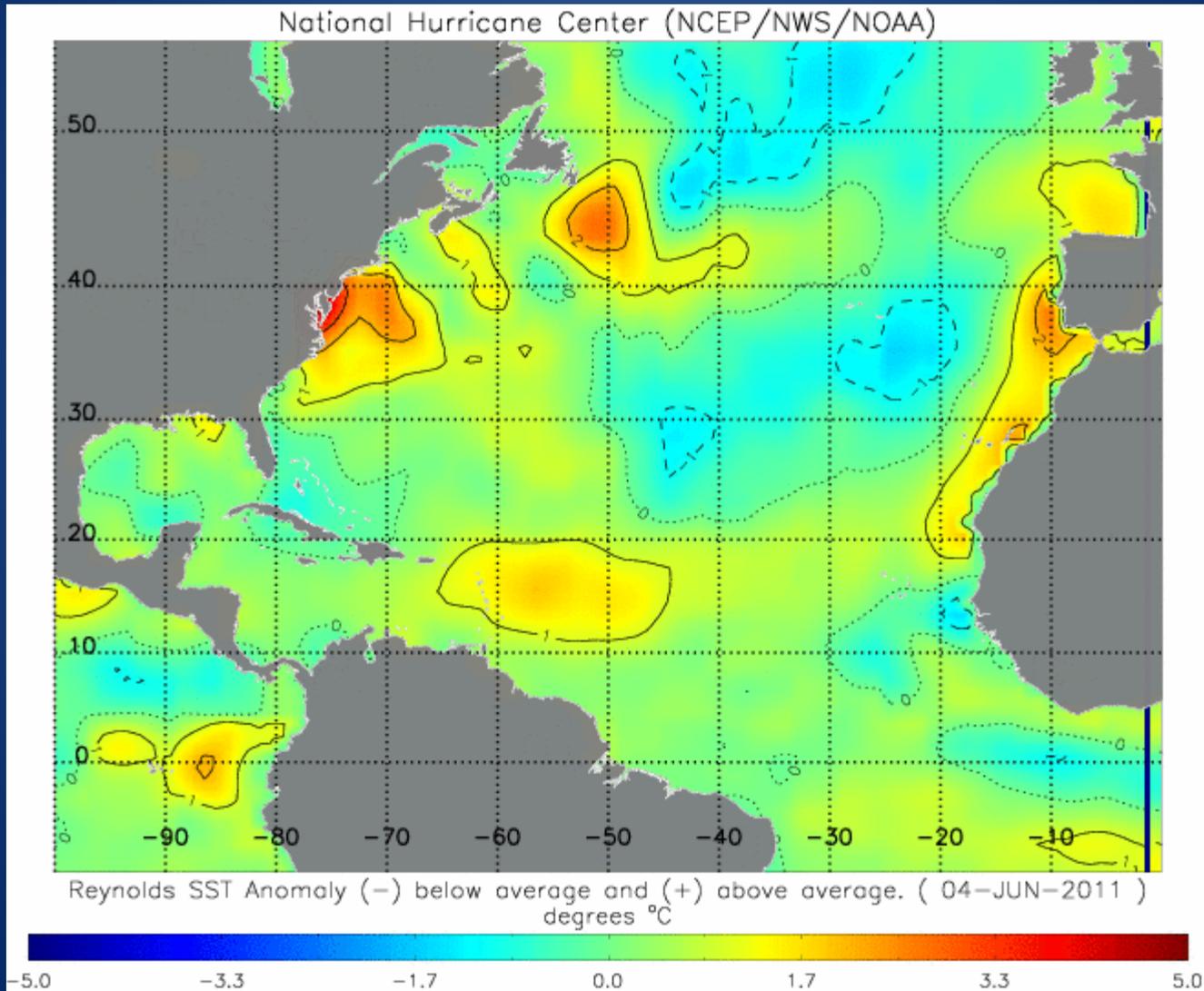
Weaker Easterly
Trade Winds
(dark blue arrow)

Upper-level
Easterlies Expand
Westward
(Green arrows)





Atlantic Sea Surface Temperature Anomalies





2011 Hurricane Season Forecast



NOAA Forecast

- 12 – 18 named storms
- 6 – 10 hurricanes
- 3 – 6 major hurricanes

“NORMAL”

11 storms

Other Forecasts (CSU, NCSU)

- 13 - 16 named storms
- 7 - 9 hurricanes
- 3 - 5 major hurricanes

6 hurricanes

**2 major (Cat 3+)
hurricanes**

For those superstitious, back to the 2005 name list.



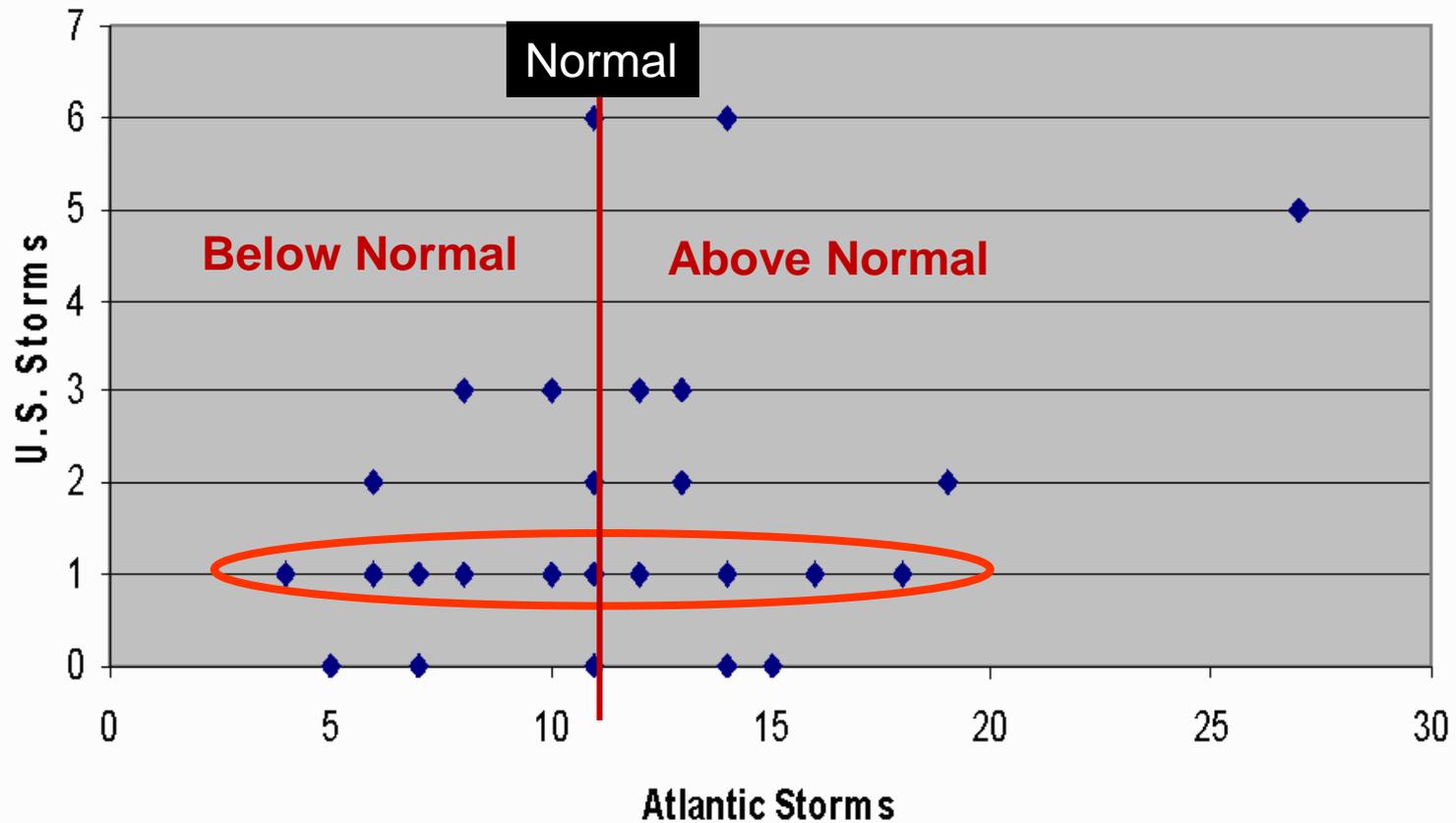
Hurricane Season Predictions



The Seasonal Forecast Fallacy

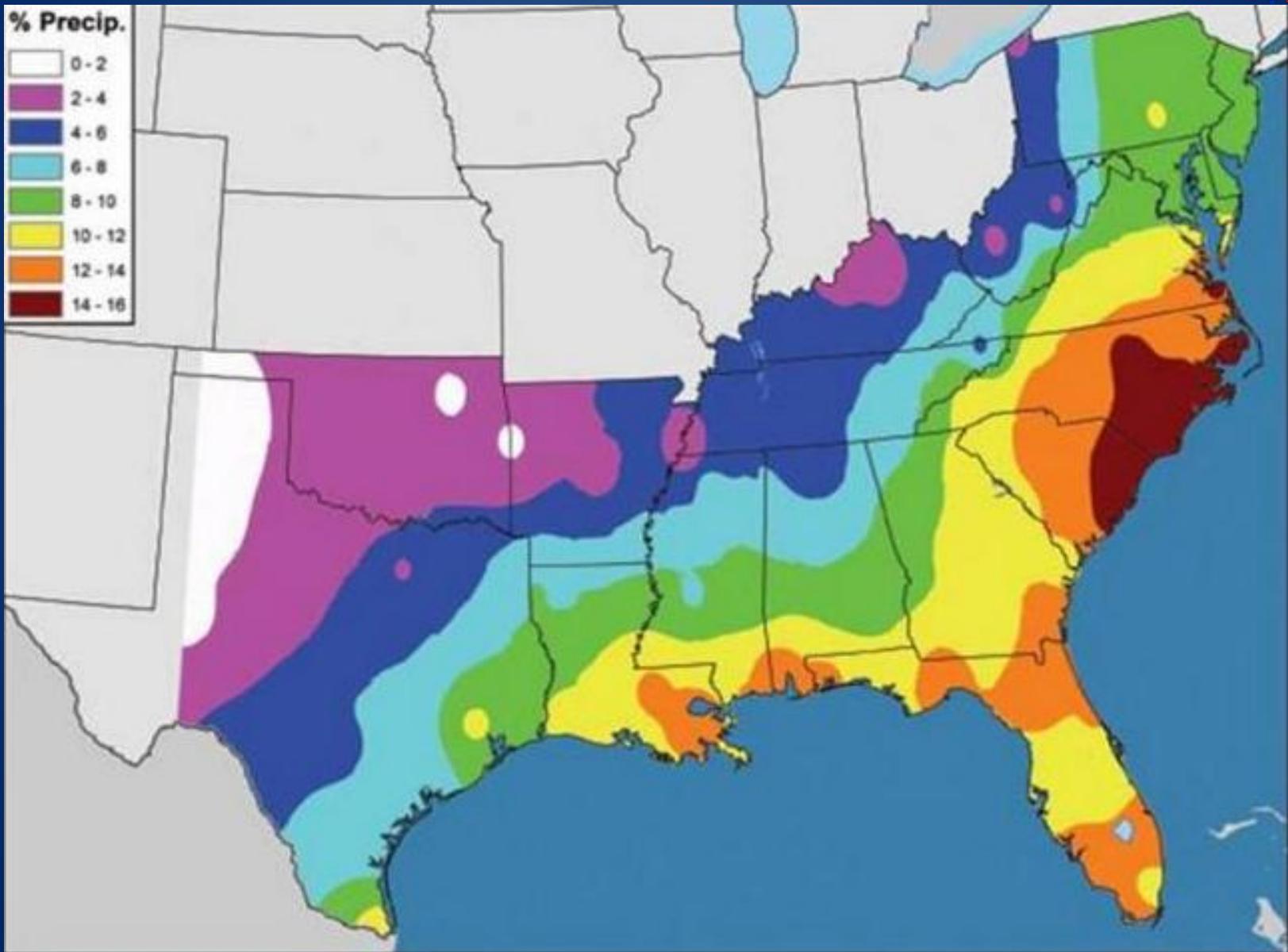
Atlantic Storms vs U.S. Storms 1966-2006

Graphic Courtesy Steve Lyons

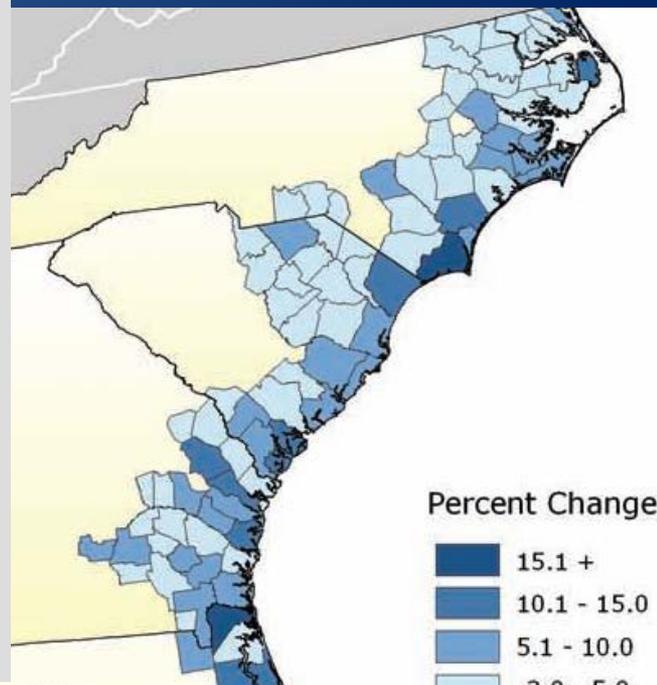
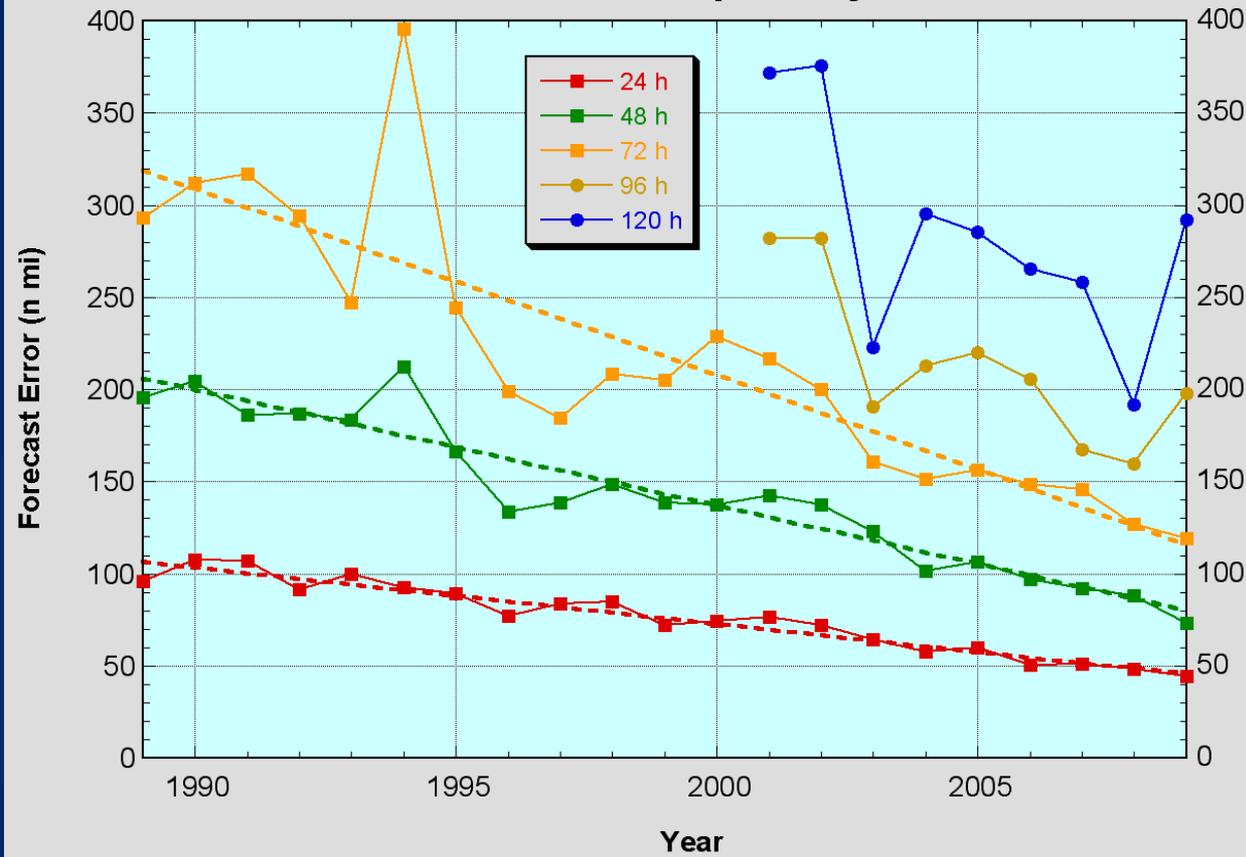




Percentage of Annual Rainfall Attributed to Tropical Cyclone Activity



NHC Official Annual Average Track Errors Atlantic Basin Tropical Cyclones



Accuracy vs. Population

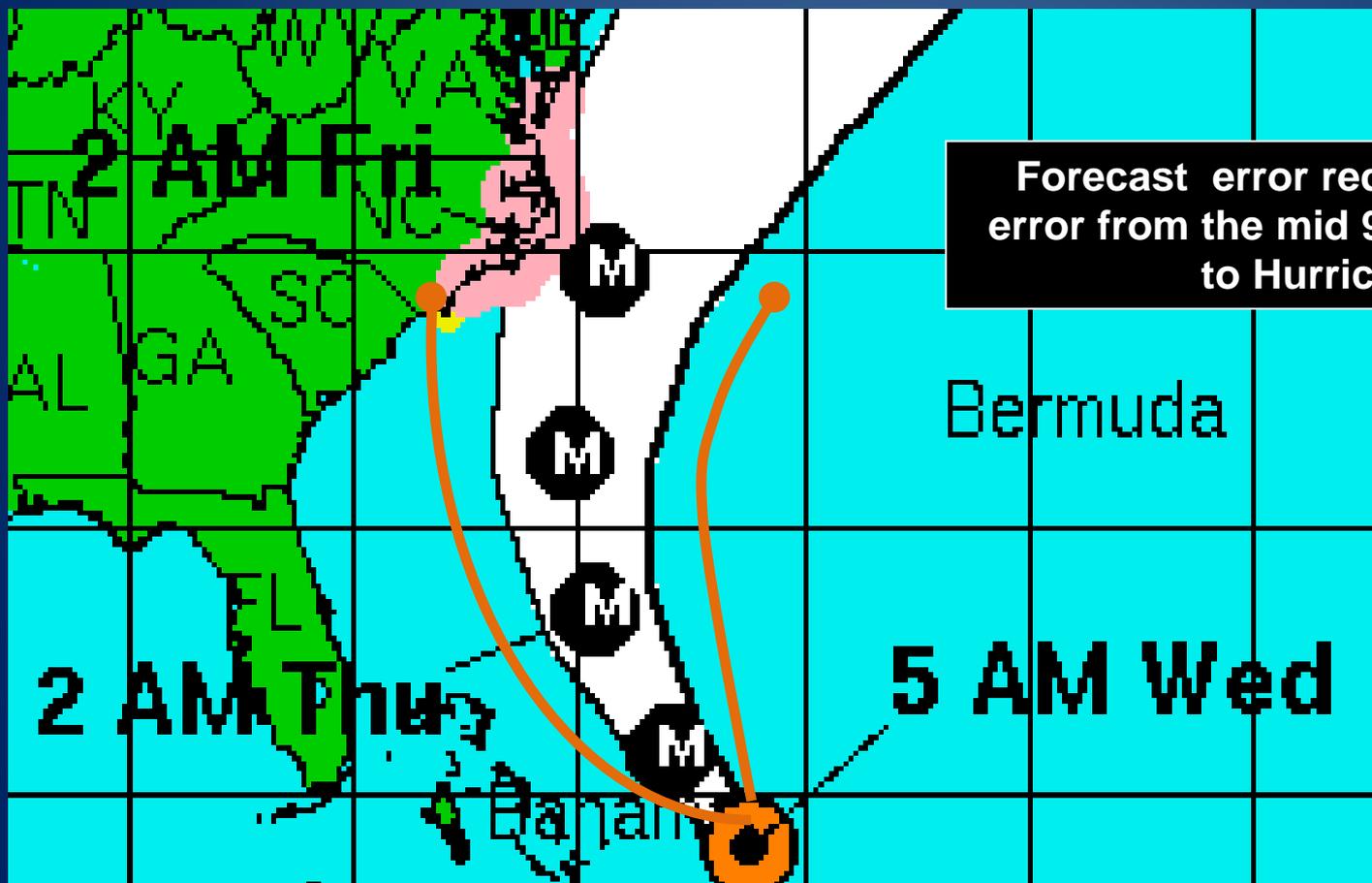
**Projected Percent
Population Change
in the Southeast Region:
2003-2008**



Forecast Improvements Applied

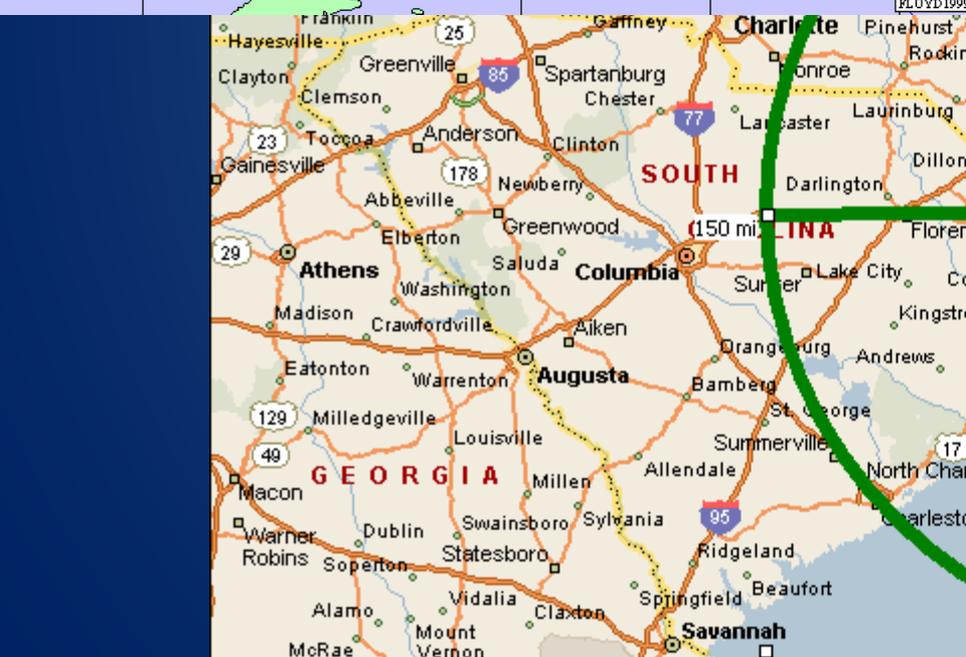
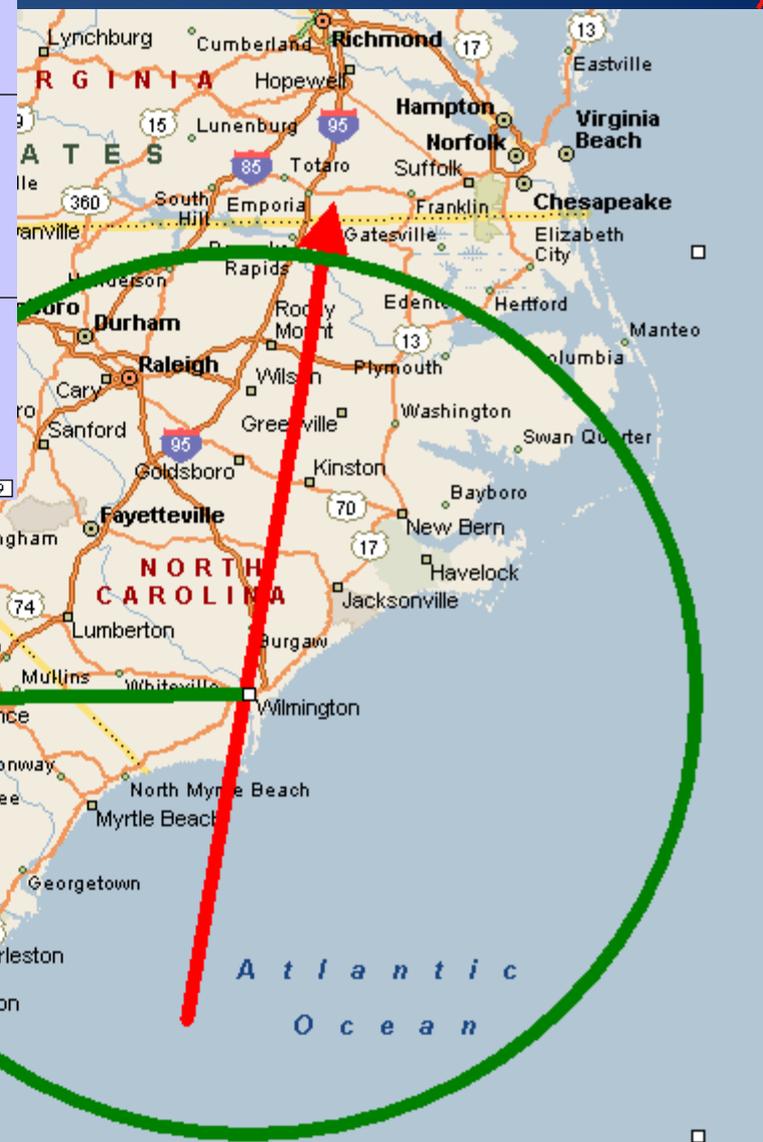
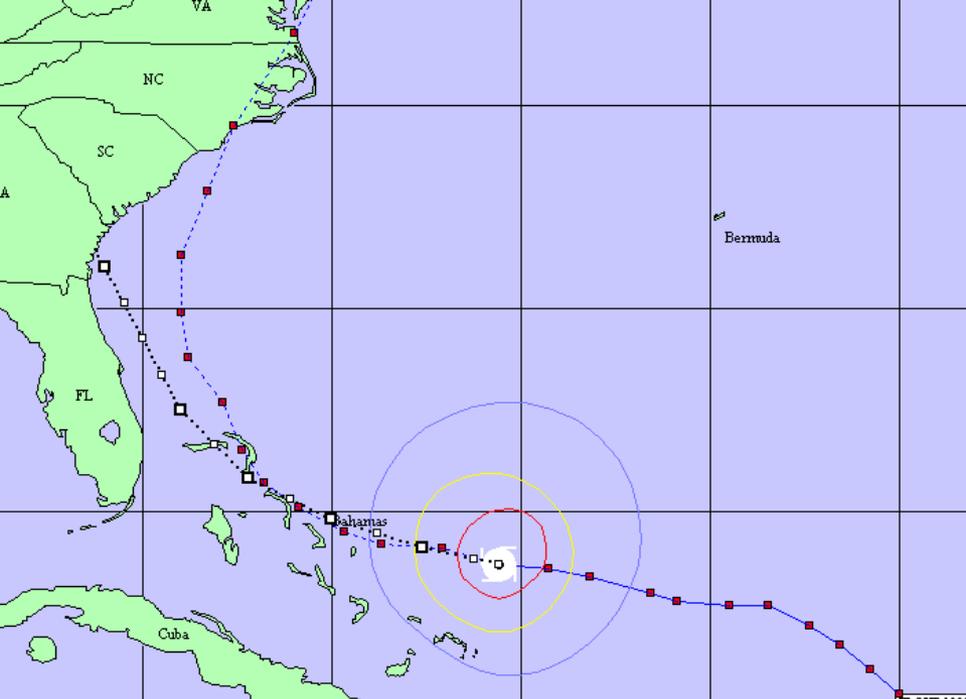


Hurricane forecast track improvements greatly reduce evacuations and impacts on local communities.

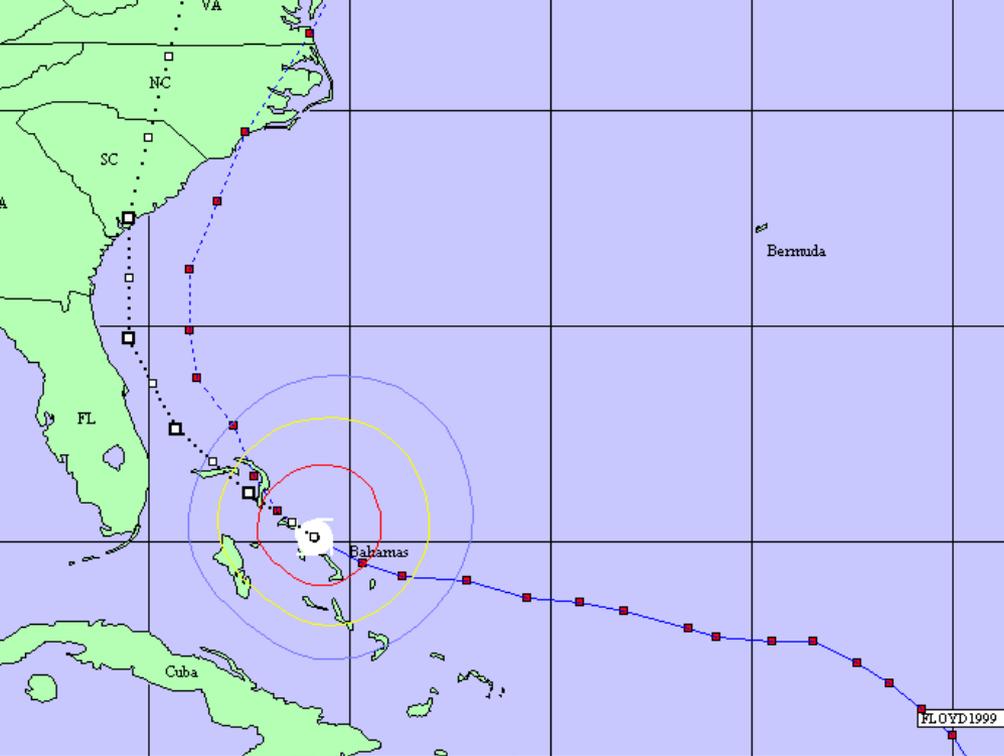


500 AM Wednesday - Landfall in less than 48 hours

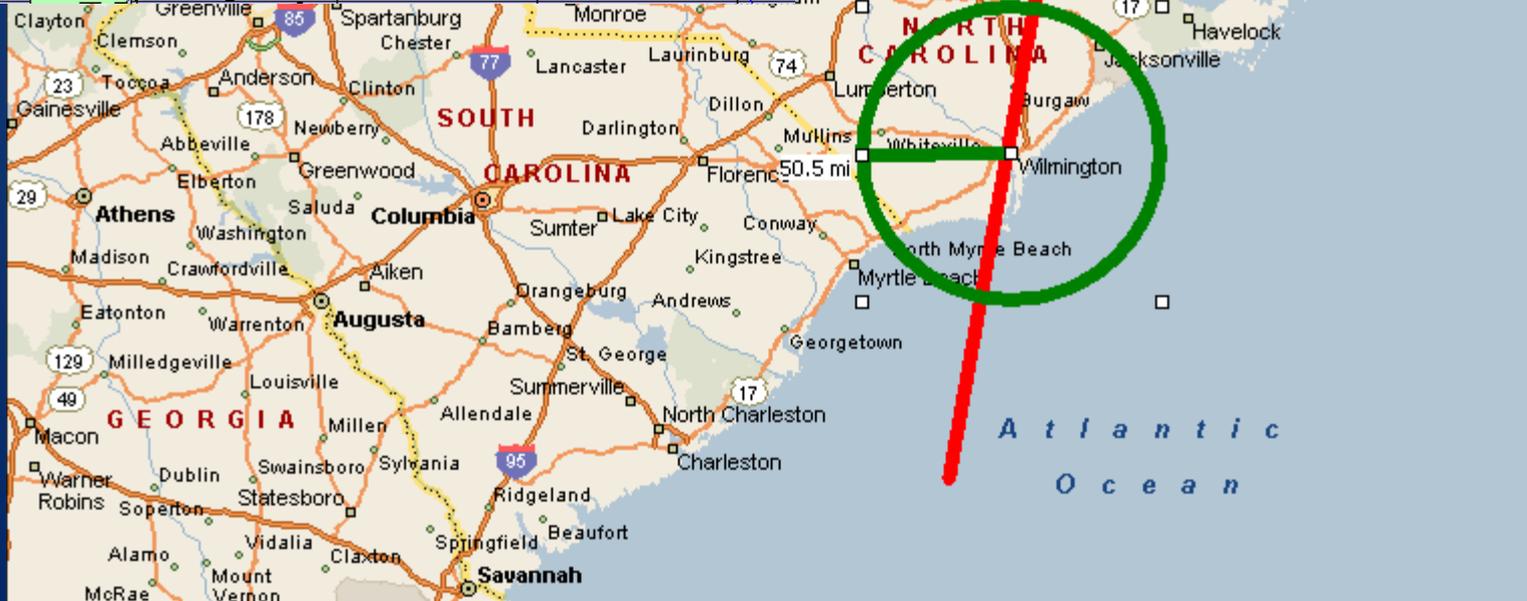
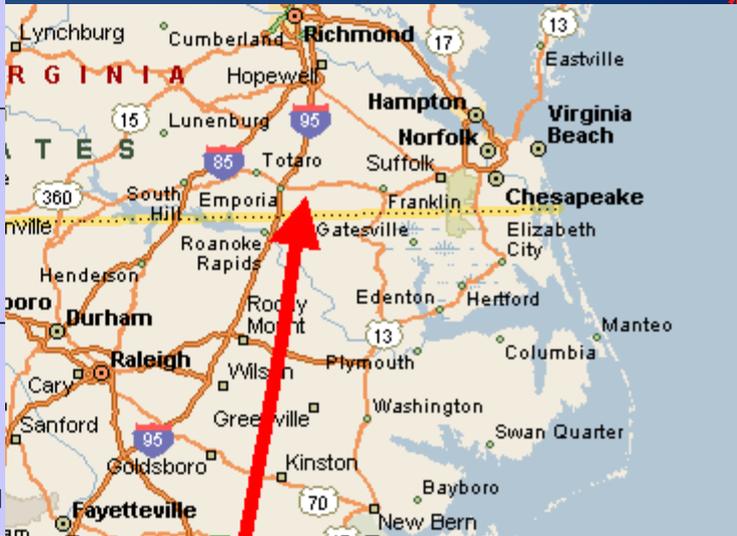
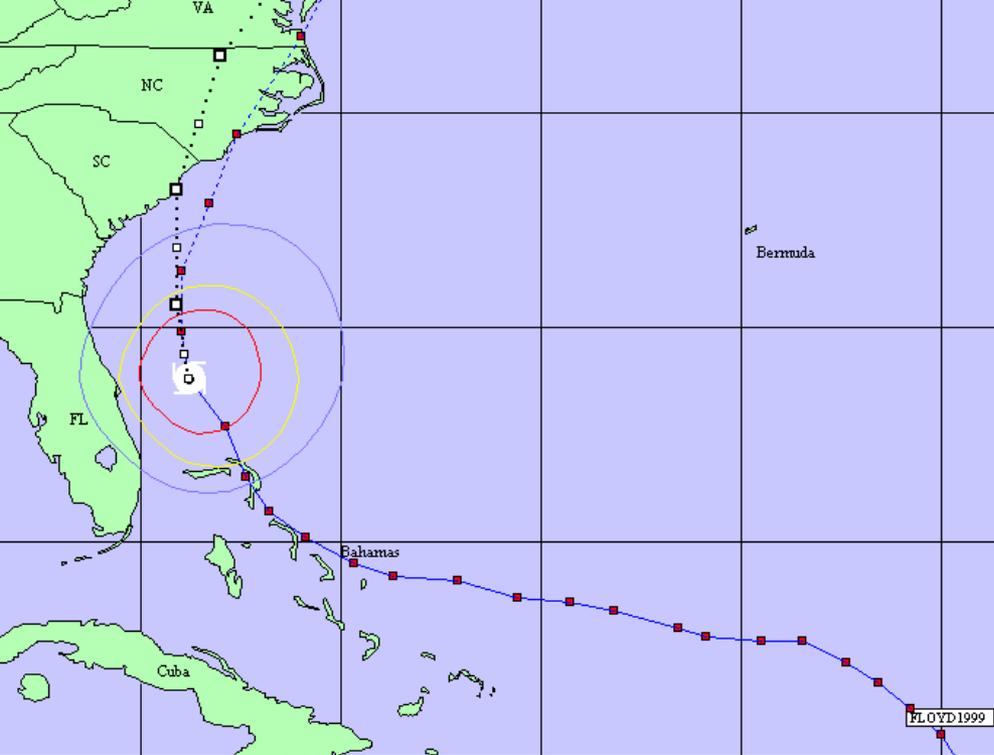
...ors (150 nm)...



rs (100 nm)...

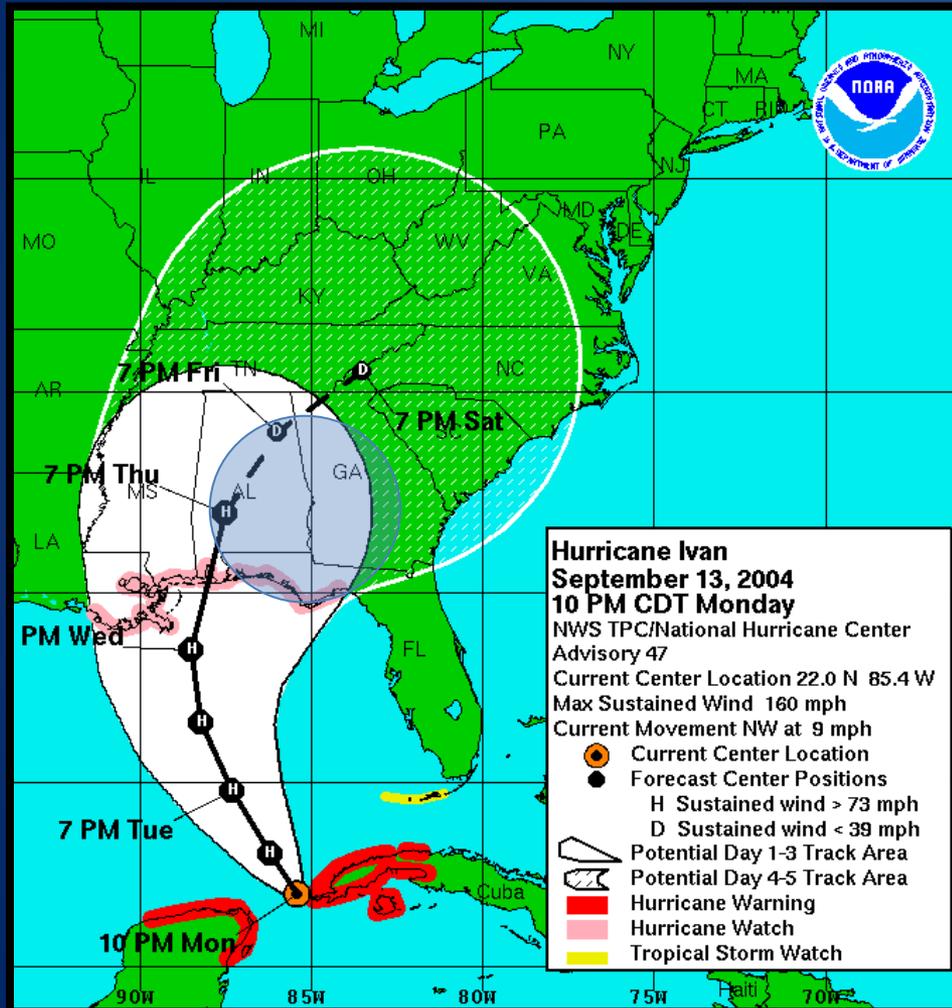


... (50 nm)...





Interpreting the Cone



- Represents the probable track of the center of the tropical cyclone.
- Formed by connecting circles centered on each forecast point (at 12, 24, 36 h, etc.)
- Size of the circles determined so that the actual storm position will be within the circle 2 out of 3 times, based on NHC statistics from the previous 5 hurricane seasons
- It is important to remember that the center of the storm will remain entirely within the cone only about 60 – 70% of the time



Interpreting the Cone



The cone **only** depicts probable track of the **center** of the tropical cyclone.

- It says nothing about wind impacts
- It says nothing about storm surge impacts
- It says nothing about rainfall and/or flooding impacts
- It says nothing about tornado impacts
- It says nothing about rip currents and waves



Tropical Impact Graphics



National Weather Service Weather Forecast Office
Newport/Morehead, NC

Home Site Map News Organization Search for:

Local forecast by
"City, St" or Zip Code

XML RSS Feeds
Current Hazards
Graphical Hazardous
Weather Outlook
Rip Currents
National Hazards
National Hurricane
Center
Storm Prediction
Center
Submit Local Storm

**Experimental
TROPICAL CYCLONE IMPACTS - DECISION SUPPORT**

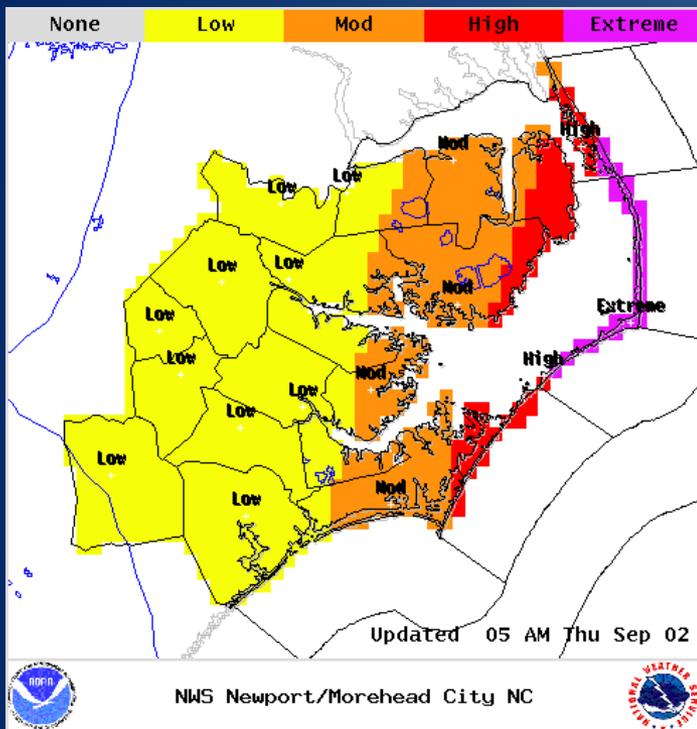
Wind Coastal Flood Inland Flooding Tornadoes

The figure displays four graphical impact maps for the Newport/Morehead, NC area. Each map shows a color-coded scale for different impact types: Wind, Coastal Flood, Inland Flooding, and Tornadoes. The maps are arranged in a row, with each map showing the geographical area and the corresponding impact levels. The maps are labeled with their respective impact types: Wind, Coastal Flood, Inland Flooding, and Tornadoes.

- For more detailed information when a storm threatens consult your local NWS Weather Forecast Office
- These graphical impact graphics become available when an area is placed under a tropical storm or hurricane watch or warning (typically 36 to 48 hours in advance of landfall.)



Tropical Impact Graphics

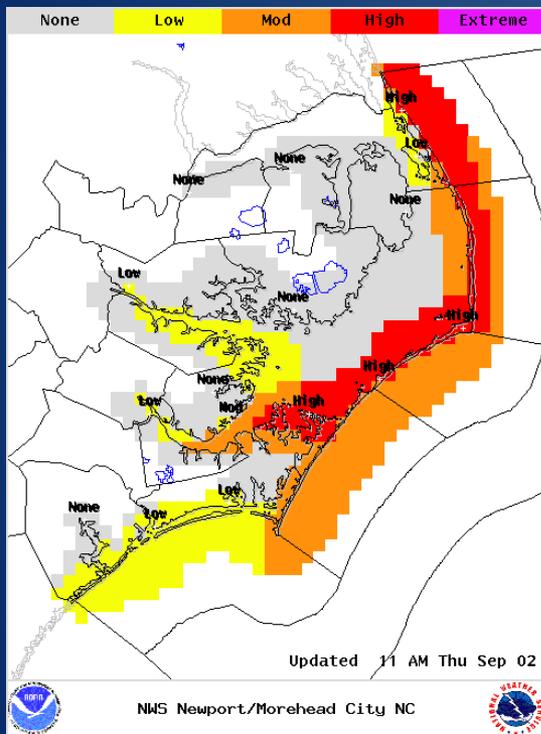


Low	<p>Threat - An elevated threat to life and property; the reasonable chance for tropical storm force winds (39 to 73 mph).</p> <p>Minimum Action - Prepare for the possibility of minor to locally moderate wind damage.</p> <p>Potential Impact - If realized, expect a low but notable impact to communities in the specified area. Winds capable of causing damage to unanchored mobile homes, porches, carports, awnings, pool enclosures and with some shingles blown from roofs. Large branches break off trees, but several shallow-rooted and diseased trees blown down. Unsecured light-weight objects easily blown about and become dangerous projectiles. Winds dangerous on bridges and causeways, especially for high profile vehicles. Scattered power outages, especially in areas with above ground lines.</p>
Moderate	<p>Threat - A significant threat to life and property; the reasonable chance for hurricane force winds (74 to 95 mph) of Category 1 intensity.</p> <p>Minimum Action - Actively prepare for the possibility of moderate wind damage.</p> <p>Potential Impact - If realized, expect a moderate impact to communities within the specified area. Winds capable of causing significant damage to mobile homes, especially if unanchored. Some damage to roofing material, doors, fences, and windows of buildings. Several large signs and trees blown down, especially shallow-rooted and diseased trees. A few roads impassable due to large debris. Scattered power outages, but widespread in areas with above ground lines.</p>
High	<p>Threat - A critical threat to life and property; the reasonable chance for strong hurricane force winds (96 to 110 mph) of Category 2 intensity.</p> <p>Minimum Action - Aggressively prepare for the possibility of major wind damage.</p> <p>Potential Impact - If realized, expect a high impact to communities within the specified area. Winds capable of causing significant damage to roofing material, doors, fences, and windows of buildings, but with some occurrences of structural damage. Considerable damage to mobile homes. Many large signs and trees blown down with further damage to standing trees. Some roads impassable due to large debris. Widespread power outages.</p>
Extreme	<p>Threat - An extreme threat to life and property; the reasonable chance for major hurricane force winds (greater than 110 mph) of Category 3, 4, or 5 intensity.</p> <p>Minimum Action - Aggressively prepare for the possibility of extreme to catastrophic wind damage.</p> <p>Potential Impact - If realized, expect an extreme impact to communities within the specified area. Winds capable of causing structural damage to buildings, some with complete wall and roof failures. Complete destruction of mobile homes. Numerous large signs and trees blown down. Many roads impassable due to large debris. Widespread power outages.</p>

Wind Impact Graphic from Hurricane Earl 2010



Tropical Impact Graphics



Coastal Flooding Impact Graphic from Hurricane Earl 2010

<p>Low</p>	<p>Threat - An elevated threat to life and property; the reasonable chance for combined storm surge and tide resulting in sea water inundation of 2 to 3 feet.</p> <p>Minimum Action - Prepare for the possibility of minor to locally moderate coastal flood damage.</p> <p>Potential Impact - If realized, expect a low but notable impact to communities in the specified area. Coastal flood waters capable of causing partial inundation within the surge zone, especially for low-lying areas. Moderate to locally major beach erosion. Very heavy surf breaching dunes in isolated locations, mainly in historically vulnerable spots.</p>
<p>Moderate</p>	<p>Threat - A significant threat to life and property; the reasonable chance for combined storm surge and tide resulting in sea water inundation of 4 to 5 feet.</p> <p>Minimum Action - Prepare for the possibility of moderate coastal flood damage.</p> <p>Potential Impact - If realized, expect a moderate impact to communities in the specified area. Coastal flood waters capable of causing large areas of inundation within the surge zone. Severe beach erosion. Several sections of near-shore roads washed out and/or low-lying escape routes flooded. Scouring surge and tide waters accentuated by battering wind waves breaching dunes and seawalls in scattered locations to result in structural damage to shoreline buildings, with a few washing into the sea. Damage accentuated by floating debris. Moderate to major damage to marinas, docks, and piers. Many small craft broken away from moorings, especially in unprotected anchorages.</p>
<p>High</p>	<p>Threat - A critical threat to life and property; the reasonable chance for combined storm surge and tide resulting in sea water inundation of 6 to 7 feet.</p> <p>Minimum Action - Prepare for the possibility of major coastal flood damage.</p> <p>Potential Impact - If realized, expect a high impact to communities in the specified area. Coastal flood waters capable of causing large areas of inundation within the surge zone. Severe beach erosion. Several sections of near-shore roads washed out and/or low-lying escape routes flooded. Scouring surge and tide waters accentuated by battering wind waves breaching dunes and seawalls in scattered locations to result in structural damage to shoreline buildings, with a few washing into the sea. Damage accentuated by floating debris. Moderate to major damage to marinas, docks, and piers. Many small craft broken away from moorings, especially in unprotected anchorages.</p>
<p>Extreme</p>	<p>Threat - An extreme threat to life and property; the reasonable chance for combined storm surge and tide resulting in sea water inundation of 8 feet or more.</p> <p>Minimum Action - Prepare for the possibility of extreme to catastrophic coastal flood damage.</p> <p>Potential Impact - If realized, expect an extreme impact to communities in the specified area. Coastal flooding capable of causing widespread inundation within the surge zone, possibly reaching several miles inland. Extreme beach erosion with several new inland cuts likely created. Many large sections of near-shore roads washed out and/or low-lying escape routes flooded. Powerful scouring surge and tide waters greatly accentuated by intense battering wind waves breaching dunes and seawalls in widespread locations to</p>



When a Storm Threatens



National Hurricane Center

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Local forecast by "City, St" or "ZIP" Go

Alternate versions
Text-only | Mobile

Get Storm Info
Satellite | Radar
Aircraft Recon
Advisory Archive
Experimental
Mobile Products
E-mail Updates
Audio/Podcasts
GIS Data | RSS
Help with Advisories

Marine Forecasts
Atlantic and E Pacific
Analysis Tools
Gridded Marine
Help with Marine

Hurricane Awareness
Be Prepared | Learn
Storm Surge
Frequent Questions
Research
Hurricane Hunters
Saffir-Simpson Scale
Forecasting Models
Glossary/Acronyms
Storm Names
Breakpoints

Hurricane History
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- **NHC issuing advisories on TS BEATRIZ**
- **Twitter Users Can Now Follow Select NHC Tropical Updates**
- **Read the June issue of the monthly Q & A with NHC professionals**
- **NOAA's Climate Prediction Center Has Released the 2011 Atlantic and East Pacific Outlooks**

Eastern Pacific Atlantic

Atlantic Tropical Cyclone Activity www.hurricanes.gov

7:29 PM EDT
Jun 19, 2011

48-hour formation potential: ■ Low <30% ■ Medium 30-50% ■ High >50%

- Look to the National Hurricane Center for information about broad scale tropical impacts.
- They provide information including tropical weather outlooks detailing the probability that a storm will form
- Once formed, they provide track graphics, wind and storm surge probabilities, and public advisory statements

www.nhc.noaa.gov



When a Storm Threatens



National Weather Service Forecast Office
Newport/Morehead City, NC

Home News Organization Search

Local forecast by "City, St" or zip code
 City, St

Weather Hazards
 Graphical Hazardous Weather Outlook
 Rip Currents
 National Hazards Center
 Storm Prediction Center
 Storm Reports
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The NWS Has Declared June 19-25 as Lightning Awareness Week
 Summer is the peak season for one of the nation's deadliest weather phenomena lightning. In the United States, an average of 55 people are killed each year by lightning.

Point and Click Forecast Map(Description)

Quick Glimpse at the Weather **Newport/Morehead City, NC**

Click on the map below for the latest forecast.

Last map update: Mon, Jun. 20, 2011 at 12:07:38 am EDT

Synopsis for Eastern North Carolina

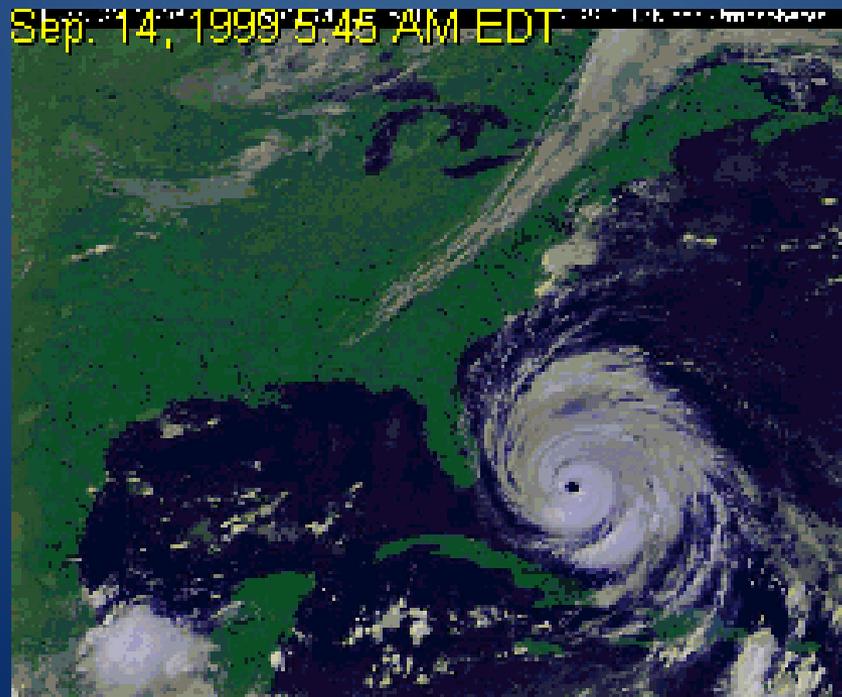
- Look to your local National Weather Service office for detailed information specific to your location. There are 9 Weather Forecast Offices that serve the Carolinas:

- WFO Wakefield, VA
- WFO Blacksburg, VA
- WFO Newport/Morehead City, NC
- WFO Raleigh, NC
- WFO Wilmington, NC
- WFO Columbia, SC
- WFO Charleston, SC
- WFO Greer, SC
- WFO Morristown, TN



Prepare for Hurricane Season

2011 planning for the worst and hoping for the best. We never know when the next Andrew, Floyd, or Hugo will come to the Southeast.



Hurricane Floyd
1999



Thanks for Your Time!

