National weather service, Newport/Morehead City, NC

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Carolina Sky Watcher

SUMMER 2013 EDITION

TROPICAL SEASON 2013 IS HERE

by Chris Collins, Meteorologist

The Tropical Season is here again. While it is impossible to predict when or if a storm will affect eastern North Carolina in 2013, we can look back at the 2012 tropical season. The 2012 season tied as the third most active season on record with 19 named storms, 10 of which became hurricanes, with 2 becoming major hurricanes. This was the third consecutive year with 19 named storms and the fifth time 19 named storms were recorded (also occurred in 1887 & 2003 in addition to 2010, 2011 and 2012). The long term average in the Atlantic basin is 12 named storms, 6 hurricanes and 3 major hurricanes. Additionally in 2012, for only the third time in recorded history, we had two tropical systems form before the official start of the hurricane season on June 1st. Alberto formed on May 19th and Beryl, formed on May 26th. The last time this occurred was back in 1908. Beryl also produced an EF-1 tornado over western Carteret County that damaged numerous homes. There were also 8 named storms in August, tying 2004 for the busiest August on record. Two major hurricanes formed in 2012, Hurricane Michael, a Category 3 storm formed on September 2nd, and luckily remained out over the ocean and never made landfall. Hurricane Sandy, which was upgraded to a Category 3 storm when it crossed over Cuba, will also go down in the record books as the second most costly storm with nearly $50 billion in damages. Sandy caused 147 deaths across the Atlantic basin with 72 of these fatalities occurring in the United States. This is the greatest number of U.S. direct fatalities related to a tropical cyclone outside of the southern states since Hurricane Agnes in 1972.

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2013 NOAA HURRICANE FORECAST

by Chris Collins, Meteorologist

In its 2013 Atlantic hurricane season outlook, NOAA's Climate Prediction Center is forecasting an active or extremely active season this year. For the six-month hurricane season, which begins June 1, NOAA's Atlantic Hurricane Season Outlook says there is a 70 percent likelihood of 13 to 20 named storms (winds of 39 mph or higher), of which 7 to 11 could become hurricanes (winds of 74 mph or higher), including 3 to 6 major hurricanes (Category 3, 4 or 5; winds of 111 mph or higher). These ranges are well above the seasonal average of 12 named storms, 6 hurricanes and 3 major hurricanes.

Three climate factors that strongly control Atlantic hurricane activity are expected to come together to produce an active or extremely active 2013 hurricane season. These are:

- A continuation of the atmospheric climate pattern, which includes a strong west African monsoon, that is responsible for the ongoing era of high activity for Atlantic hurricanes that began in 1995.
- Warmer-than-average water temperatures in the tropical Atlantic Ocean and Caribbean Sea.
- El Niño is not expected to develop and suppress hurricane formation.

NOAA's seasonal hurricane outlook is not a hurricane landfall forecast; it does not predict how many storms will hit land or where a storm will strike. Forecasts for individual storms and their impacts will be provided throughout the season by NOAA's National Hurricane Center. New for this hurricane season are improvements to forecast models, data gathering, and the ter communication procedure for post-tropical cyclones. In July, NOAA plans to bring online a new supercomputer that will run an upgraded model that provides significantly enhanced depiction of storm structure and improved storm intensity forecast guidance.

Atlantic Tropical (and Subtropical) Storm Names for 2013		
Andrea	Ingrid	Rebekah
Barry	Jerry	Sebastien
Chantal	Karen	Tanya
Dorian	Lorenzo	Van
Erin	Melissa	Wendy
Fernand	Nestor	
Gabrielle	Olga	
Humberto	Pablo	

NWS HOSTS FIRST SCOUT DAY

by Andrew McKaughan, Meteorologist

On Saturday, April 20, over 250 Boy Scouts, Cub Scouts, Girl Scouts, Scout Leaders and parents braved chilly temperatures and intermittent rain showers for the first ever Scout Day hosted by WFO Newport / Morehead City. Planning for the event started in February of 2012 when office staff wanted to host an outreach event strictly for the benefit of local scouts across eastern North Carolina. Scout Day was an all-day event which ran from 9 AM until 5 PM with a morning and afternoon session; each of which contained 6 groups of 20 or more. The event was designed to enable scouts to learn about weather, the mission of the National Weather Service, emergency preparedness and how the NWS keeps the community safe.

Activities for the day were intended to satisfy some of the requirements scouts needed for weather, water and emergency preparedness related belt loops, patches and badges. Six different 30 minute activities were setup throughout the day. Four of these were located outside on the office grounds, set-up in tents which were donated by local scout groups. Outside activities consisted of: building a weather instrument, weather jeopardy, an interactive watershed / water cycle display, and constructing an emergency preparedness kit. The activities inside the office consisted of a PowerPoint presentation on what the NWS does and another station was a tour of the operations area.

The highlight of the day took place between the morning and afternoon sessions at 1 PM when over 200 were in attendance for an actual weather balloon launch. Scouts got the opportunity to watch how NWS meteorologists take an upper-air observation from start to finish and why the information obtained by radiosondes is so valuable for our operations. They were able to ask questions, take pictures, and ultimately provide a countdown for the launch.

Scout Day was a success thanks to the hard work of the dedicated NWS Newport staff, as well as the rest of our local community which provided support for the event. This list includes: the American Red Cross which provided water for those in attendance, the Carteret County Sheriff's office which handled traffic control and ensured safe street crossing for the children, Merit Badge Counselors: Tom Kriehn (former Meteorologist-in-Charge of WFO Newport), Cindy De LaFuente, and NWS MHX Electronics Technician Jon Petry. A final thanks needs to go to Grace Baptist Church across the street which donated tables, chairs and their parking facilities for the event.

Scout Day proved to be an excellent way for the National Weather Service to educate area Scouts and to ensure that the youngest generation is Weather-Ready for years to come!

NWS HOSTS FIRST SCOUT DAY (CONTINUED)

Scouts play Weather Jeopardy during Scout Day on April 20, 2013.

Crowd gathers for a weather balloon launch during Scout Day, April 20, 2013.

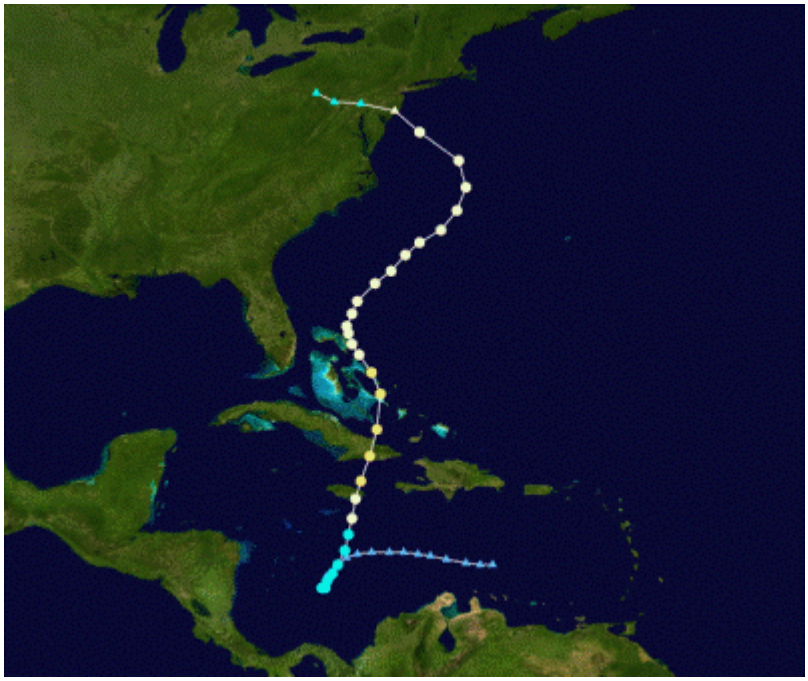
REVIEW OF HURRICANE SANDY

by Chris Collins, Meteorologist

Hurricane Sandy was the largest Atlantic hurricane on record, as well as the second-costliest Atlantic hurricane in history, only surpassed by Hurricane Katrina in 2005. The eighteenth named storm and tenth hurricane of the 2012 Atlantic hurricane season, Hurricane Sandy devastated portions of the Caribbean, Mid-Atlantic and Northeastern United States in late October 2012. Sandy is estimated to have caused damage of at least $20 billion. Preliminary estimates of losses that include business interruption surpass $50 billion, behind only Hurricane Katrina. At least 191 people were killed along the path of the storm in seven countries.

Hurricane Sandy affected at least 24 states, from Florida to Maine and west to Michigan and Wisconsin, with particularly severe damage in New Jersey and New York. Its storm surge hit New York City on October 29, flooding streets, tunnels and subway lines and cutting power in and around the city. In addition to the strong winds, heavy rain and coastal flooding, Sandy brought snow to the higher elevations from the Carolinas north into West Virginia and Maryland.

Despite being far out to sea, Sandy had numerous impacts on North Carolina. Ocracoke and Highway 12 on Hatteras Island were flooded with up to 2 feet of water, closing part of the highway, while 20 people on a fishing trip were stranded on Portsmouth Island. On October 29, the Coast Guard responded to a distress call from the H.M.S. Bounty, which was built for the 1962 movie Mutiny on the Bounty. It was taking on water about 90 miles southeast of Cape Hatteras. Sixteen people were on board. The Coast Guard said the 16 people abandoned ship and got into two lifeboats, wearing survival suits and life jackets. The ship sank after the crew got off. As of mid-morning on October 29, the Coast Guard rescued 14. Another crew member was found hours later but was unresponsive and died later on. On November 1, the Coast Guard suspended its search for Robin Walbridge, the captain of the Bounty. The search lasted more than 90 hours, covering approximately 12,000 square nautical miles in the Atlantic Ocean. As of November 4, there were three Hurricane Sandy-related fatalities in North Carolina.



Path of Hurricane Sandy, 2012

REVIEW OF HURRICANE SANDY (CONTINUED)

HMS Bounty submerged in the Atlantic Ocean about 90 miles SE of Hatteras, NC after 16 crew members abandoned the sinking ship and were rescued by helicopter. (Courtesy US Coast Guard).

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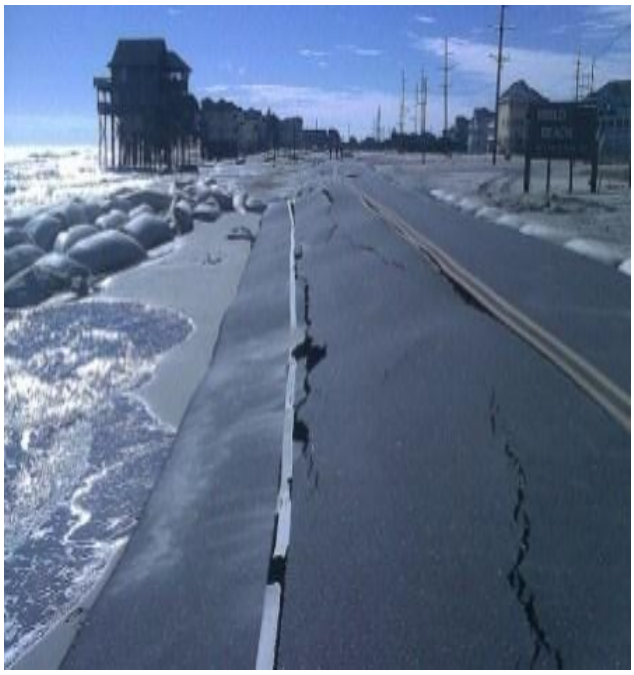


Damage to Highway 12 near Mirlo Beach, NC. (Courtesy North Carolina Department of Transportation).

Satellite image of Hurricane Sandy well off the U.S. East Coast.

NEW UPPER-AIR RADIOSONDES

by Andrew McKaughan, Meteorologist

Beginning on March 1st of this year, the National Weather Service office in Newport started using a new radiosonde for upper-air weather observations. The radiosonde is a small meteorological instrument which collects valuable information which is used to aid in weather forecasts as well as serving as a source dataset for global weather forecast models. The instrument is attached to a weather balloon which is launched twice daily from our office as well as over 90 others throughout the United States and hundreds around the world. An entire weather balloon flight takes about 90 to 120 minutes. The weather balloons routinely reach heights of 100,000 to 110,000ft before they ultimately burst. This is almost 20 miles high! During that time, the balloon and radiosonde can experience winds in excess of 150 mph and air temperatures as cold as -90 to -100 °F! For the duration of the flight, the radiosonde collects information on temperature, relative humidity, air pressure, wind speed and wind direction. This data is processed in real time by NWS meteorologists and computer software for interpretation and use.

Our office was selected as one of the first locations in the National Weather Service to begin using the Vaisala RS-92 radiosonde regularly. The Vaisala radiosonde is smaller than its predecessor and has significantly improved accuracy, especially in regards to relative humidity observations. The current plan is to have the RS-92 implemented throughout the entire National Weather Service over the year or so. If you'd like to know more about the radiosonde or see it in person…call our office at (252) 223-5737 and set up a tour!

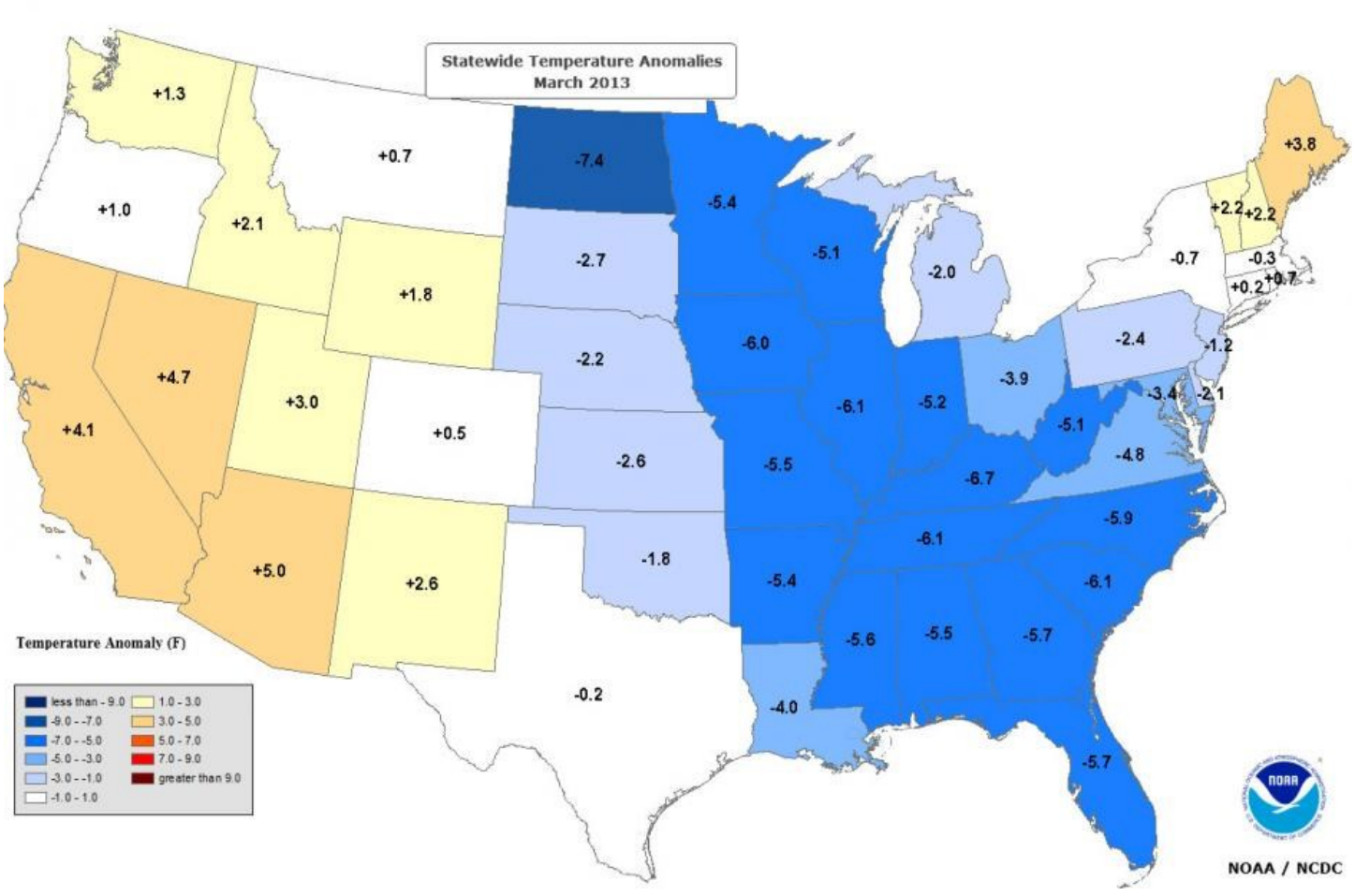
A weather balloon ready for launch

The RS-92 radiosonde.

MARCH 2013 MUCH COLDER THAN 2012

by Chris Collins, Meteorologist

After record-breaking warmth in March 2012, March 2013 was pretty much the reverse across the eastern United States with temperatures below average. The average temperature for the contiguous United States during March was 40.8° Fahrenheit, nearly 1° Fahrenheit below the twentieth-century average and the 43rd coolest March. In eastern North Carolina, the March average temperatures ranged from 1.1° degrees below normal at Cape Hatteras to 5.6° below normal at Beaufort. Most of the eastern United States was cooler than average during March 2013, with the exception of New England. Eleven states in the Ohio Valley, along the Gulf Coast, and in the Southeast had March temperatures that were among their ten coolest. In fact, Alabama, Florida, Georgia, North Carolina, and South Carolina had March 2013 temperatures that were even cooler than those of January 2013. As a contrast, in March 2012, every state in the Nation experienced at least one record warm daily temperature during the month, and over 15,000 warm temperature records were broken.



Map of temperature anomalies from March 2013. North Carolina recorded average temperatures that we 5.9 degrees below normal.

NATIONAL HURRICANE CENTER PRODUCT CHANGES

By Hal Austin, Meteorologist

The National Hurricane Center (NHC) has announced several changes to their products for the 2013 hurricane season. Below are listed the most important changes you need to know about:

1). Use of tropical cyclone watch/warnings for post-tropical cyclones; issuance of NHC advisories for post-tropical cyclones:

The National Weather Service has modified the tropical cyclone watch and warning definitions to allow them to be used after a tropical cyclone has become post-tropical. A related change allows the NHC to optionally continue issuing advisory products after a tropical cyclone becomes post-tropical, in those cases when the system continues to pose a significant threat to life and property, and when the transfer of responsibility to another office would result in an unacceptable discontinuity in service.

The tropical storm and hurricane watch and warning definitions have been modified as follows:

Hurricane Warning: Sustained winds of 74 mph or higher are expected somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the warning is issued 36 hours in advance of the anticipated onset of tropical-storm-force winds. The warning can remain in effect when dangerously high water or a combination of dangerously high water and waves continue, even though winds may be less than hurricane force.

Hurricane Watch: Sustained winds of 74 mph or higher are possible somewhere within the specified area in association with a tropical, subtropical, or post-tropical cyclone. Because hurricane preparedness activities become difficult once winds reach tropical storm force, the watch is issued 48 hours in advance of the anticipated onset of tropical-storm-force winds.

Tropical Storm Warning: Sustained winds of 39 to 73 mph are expected somewhere within the specified area within 36 hours in association with a tropical, subtropical, or post-tropical cyclone.

Tropical Storm Watch: Sustained winds of 39 to 73 mph are possible somewhere within the specified area within 48 hours in association with a tropical, subtropical, or post-tropical cyclone.

NHC PRODUCT CHANGES (CONTINUED)

2). Planned extension of the time period covered by the NHC Tropical Weather Outlook

Pending completion of some technical development, NHC is planning to extend the time covered by the NHC Tropical Weather Outlook (TWO) from 48 hours to 5 days. The NHC TWO is a text product that describes areas of disturbed weather and the potential for tropical cyclone development during the following 48-hour period. A probabilistic genesis forecast, to the nearest 10 percent, describing the chance of tropical cyclone formation within the next 48 hours is included for each area of disturbed weather described in the Outlook. In July or August of the 2013 hurricane season, NHC is planning to begin including information about a system's potential for development during the following five-day period. This information will be provided probabilistically in 10-percent increments, and will supplement the 48-hour probabilistic formation potential already provided. NHC is currently developing a corresponding five-day genesis potential graphic that might also be available in 2013. The current Graphical Tropical Weather Outlook that highlights the location of areas of disturbed weather and shows the 48 hour probabilistic genesis potential will remain unchanged.

3). Audio podcasts will be available when the media pool is activated.

The audio podcast RSS/XML feed for top-of-the-hour briefings will be operational when the media pool is activated: www.nhc.noaa.gov/audio/. The media pool is typically activated when a hurricane watch is issued for any portion of the U.S. contiguous coastline.

There are a few other changes, as well as many items of interest and experimental products listed in the NHC announcement. To read it, go to:

www.nhc.noaa.gov/news/20130405_pa_2013productChanges.pdf

NEW WATER LEVEL MONITORING GAGES

By Brian Cullen, Meteorologist

The North Carolina Department of Public Safety has completed the installation of new water level monitoring gages at several locations along the North Carolina coast. These gages will provide valuable, accurate water level measurements in real-time to National Weather Service forecasters both at the local office in Newport, and at the National Hurricane Center (NHC) in Coral Cables Florida. The previously data sparse region of coastal North Carolina will greatly benefit from the additional information, especially when the area is impacted by the strong weather systems that frequent the region. National Weather Service forecasters will use the data to determine water levels in real-time at key strategic locations along the North Carolina coast, and along the Pamlico and Albemarle sounds. The locations for the new gages include: Ocracoke, Cedar Island, Oriental, Belhaven, and Columbia. The new instruments also include a full complement of meteorological measuring devices including wind, rainfall, atmospheric pressure, and relative humidity. These measurements will be critical for assessing water levels and weather conditions, which will be especially useful for storms that impact the coast. Water level data for eastern North Carolina can be accessed in real-time via the NWS Advanced Hydrologic Prediction System (AHPS) website at: http://water.weather.gov/ahps2/index.php?wfo=mhx.

Clicking on the icon for each site will bring up a hydrograph for that location. The purple line in the hydrograph shows the current water level, and a trace showing the stage for the past few days. Eventually, water level heights for minor, moderate, and major floods will be assigned based on the expected impacts that will be observed at specific water levels.

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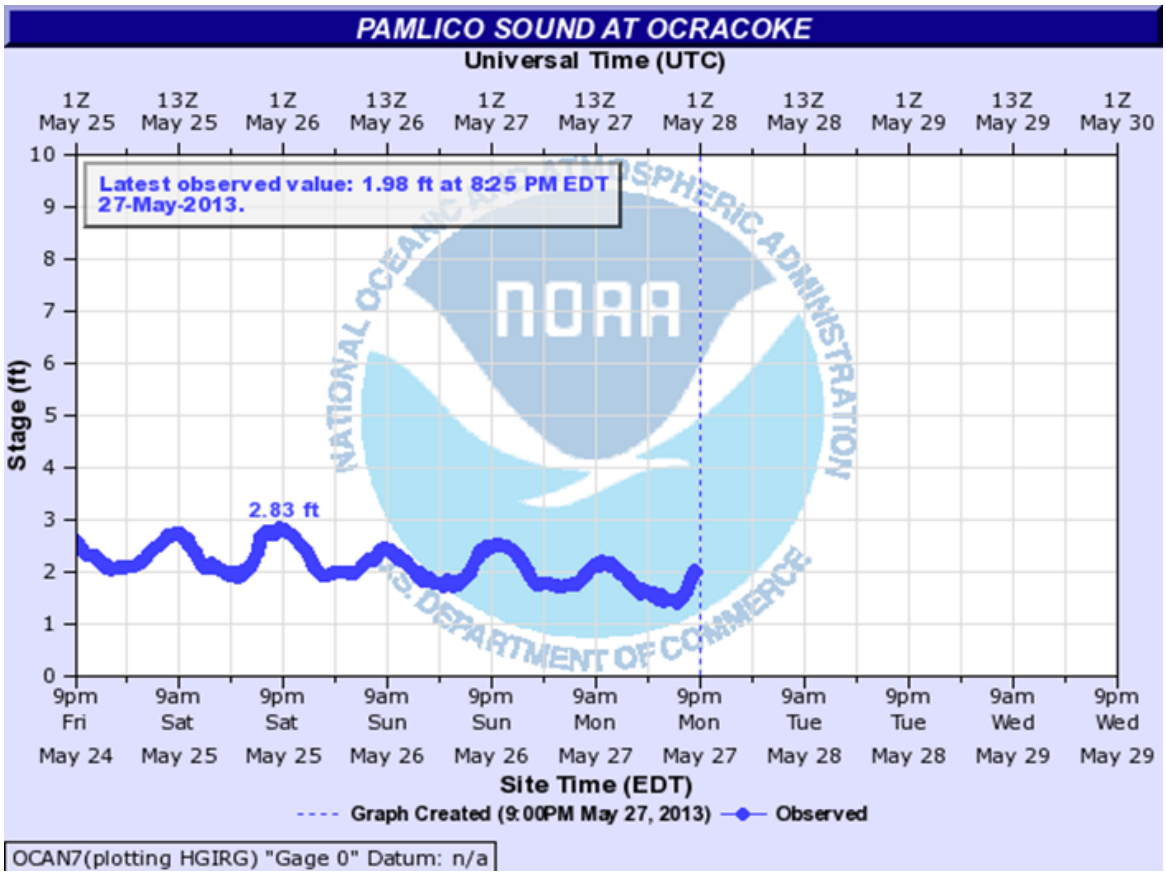
Water Level Gauge at Oriental, NC

NEW WATER LEVEL MONITORING GAGES (CONTINUED)

When non-tropical weather systems (such as Nor'easters) affect the area, coastal flood watches and warnings will be issued when moderate or greater coastal flooding is expected within the next 36 to 48 hours. Hurricanes and tropical storm watches and warnings will be issued to cover the coastal flood threat when tropical cyclones impact the region.

North Carolina coastal residents remain vulnerable to devastating storm surge not only from tropical cyclones, but also from strong extra-tropical weather systems that impact the region. The water level and meteorological data that will now be available from the new measuring devices will aid forecasters in evaluating the impacts of strong weather systems along the North Carolina coastline.



Example of a hydrograph from the new water monitoring gauge at Ocracoke.

HURRICANE CHECKLIST - BEFORE THE STORM

Here are some steps you can take to prepare before the storm.

YOUR HOME

- Know the hurricane risks for your area.
- Find out if your home is subject to storm surge flooding.
- Inspect your property for potential problems that may arise during a hurricane.
- Consider installing permanent protection for your windows. Learn how to install any manual window protection that you may have so that you can do so quickly if a hurricane threatens the area.

YOUR PROPERTY/INSURANCE

- Investigate flood insurance. Your local Emergency Management office or insurance agent can inform you about the National Flood Insurance Program.
- Inventory your property by making a list, taking photographs, or making a video. Store in a secure, dry place like your safety deposit box.

YOUR FAMILY

- Devise an emergency communications plan with your family so that you will know what to do in the event you are separated.
- Also, ask an out-of-state friend or relative to be the family contact. If family members need to call this person, it will be easier since local lines may be disrupted.
- Make sure that family members know how to respond during a hurricane emergency. Teach them how and when to turn off gas, electricity, and water.

EVACUATION/SHELTERS

- Plan your evacuation route to an area well inland. This plan should include information about the safest routes and nearby emergency shelters.
- Check how long it will take you to reach your safe area during peak evacuation traffic.
- Make advance arrangements for pets. EMERGENCY SHELTERS CANNOT TAKE PETS!

This is only a partial hurricane preparedness plan. For more information, visit these sites:

NOAA Ready: http://www.ready.gov/hurricanes

Red Cross: http://www.redcross.org/prepare/disaster/hurricane

NATIONAL WEATHER SERVICE

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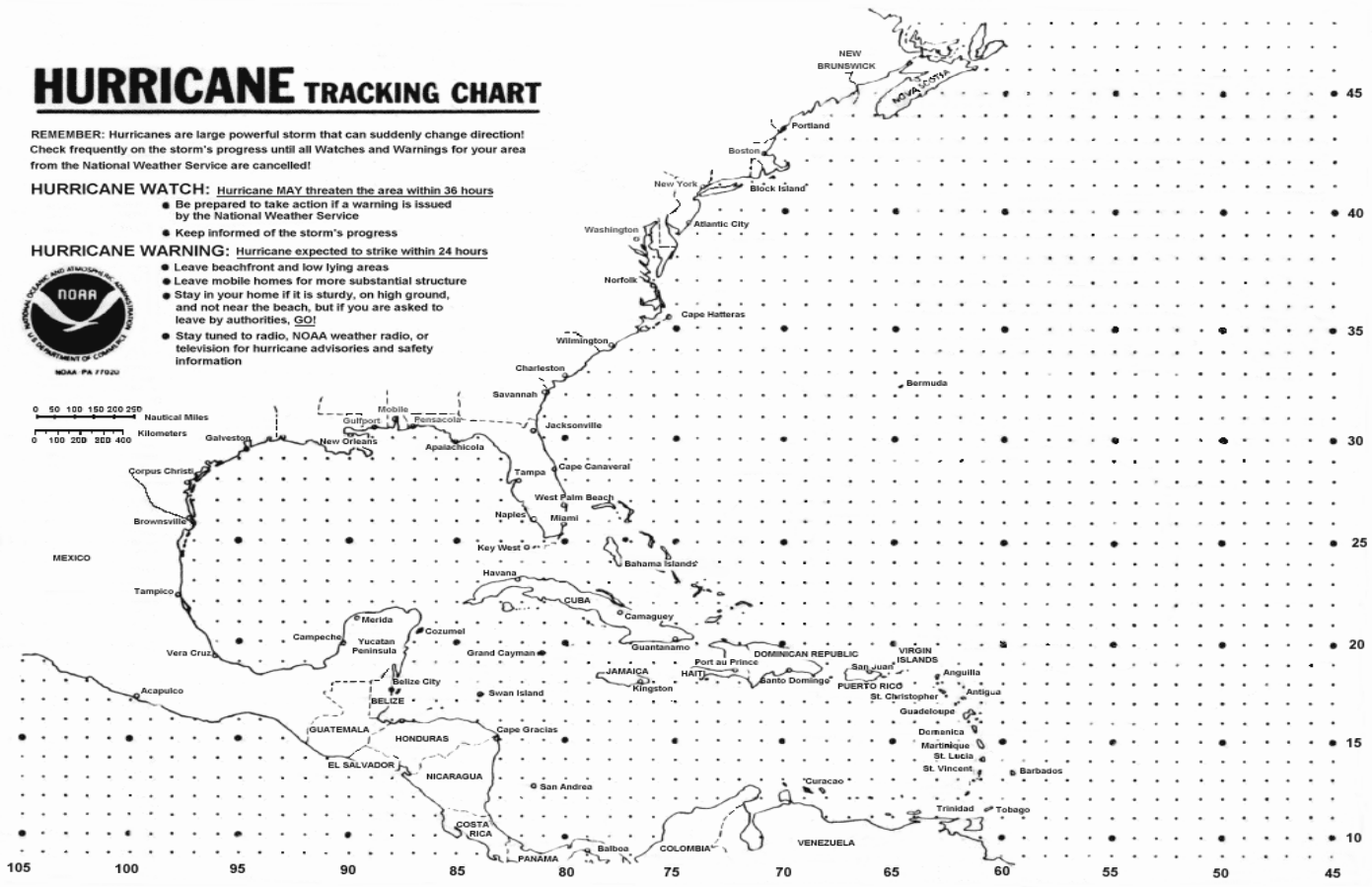

To report adverse weather conditions 24/7, please call us at:

1-800-889-6889