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National Weather Service, Newport/Morehead City, NC

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Spring 2017 Edition

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Staying Safe and Informed at the Beach

By Tom Lonka, Meteorologist

Summertime in Eastern North Carolina brings flocks of visitors to our beautiful beaches. Unfortunately, sometimes tragedy strikes unsuspecting folks that head into the ocean. Tragically, nine fatalities occurred in the surf zone across Eastern NC beaches during the summer and fall of 2016. Eight of those fatalities were caused by rip currents, which are defined as powerful, channeled currents of water flowing away from the shore. Rip currents often form where there is a break or low spot in the sandbar, and near man-made structures such as piers and jetties. One of the fatalities occurred on Shackleford Island adjacent to Beaufort Inlet. The strong tidal pull of the inlet and battering waves make this area a dangerous place to swim. Other injuries and fatalities in the past have been attributed to strong shorebreak, which is defined as large waves breaking directly on the beach, which can cause spinal and neck injuries. Longshore, or lateral currents, can sweep swimmers into rip currents or other hazards like piers and jetties. Fatalities and injuries can be prevented by becoming informed about hazards in the surf.

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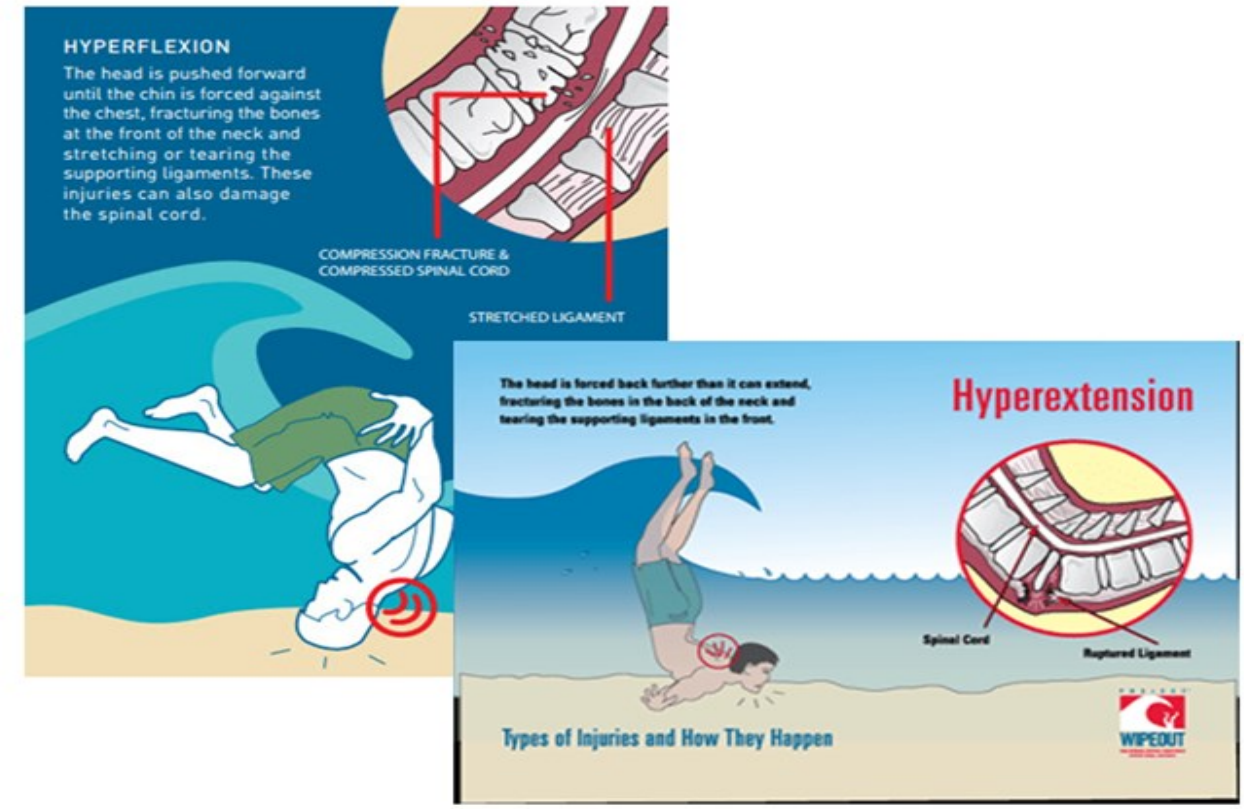
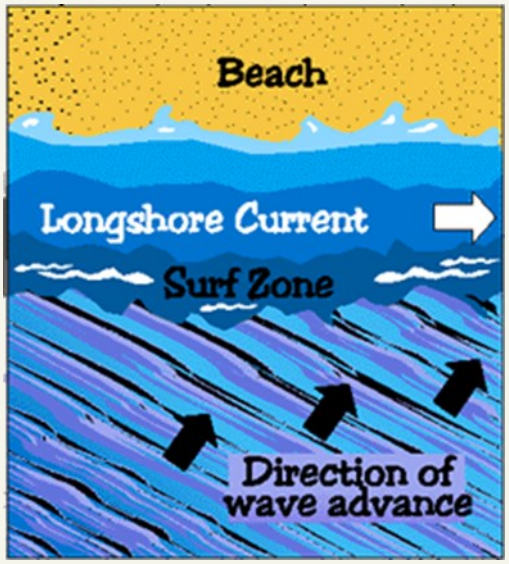
Overhead view of a rip current (courtesy of UNC Coastal Studies Institute).

Staying Safe and Informed at the Beach (Continued)



Strong shorebreak can cause spinal and neck injuries (image courtesy of Project Wipeout).



Longshore or lateral current.

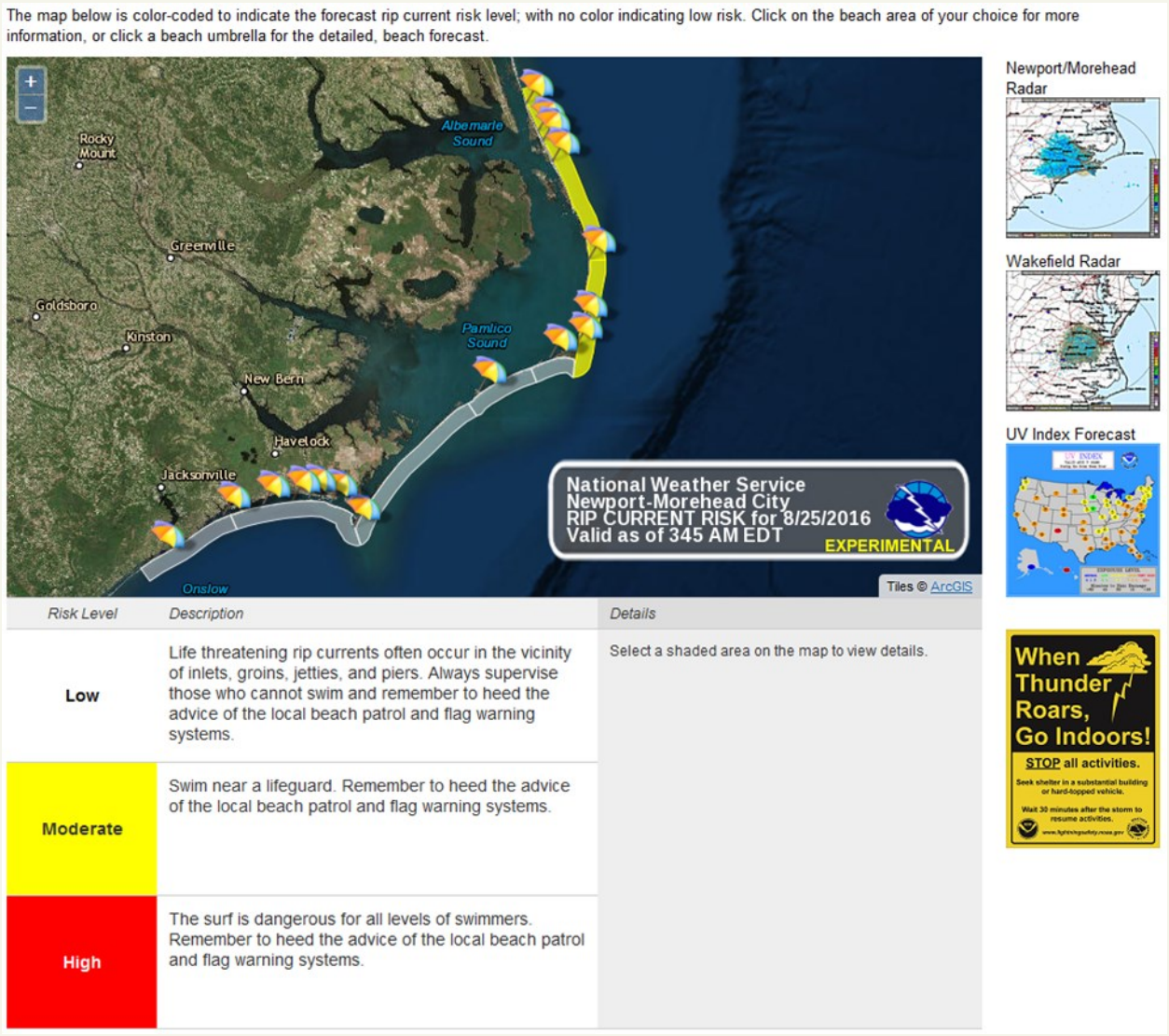
Staying Safe and Informed at the Beach (Continued)

There are steps you should take before planning on heading into the surf. First and foremost, it is advised to swim at a lifeguarded beach. The fatalities that occurred this summer all occurred at beaches that did not have a lifeguard. Most lifeguarded beaches fly flags to inform beachgoers whether it is safe to enter the water or not. A yellow flag usually means be extra vigilant when entering the surf. A red flag usually means the water is extremely unsafe. Many times a red flag will mean the beach is closed to swimming. Familiarize yourself with the beach's flag system before entering the water.

Familiarize yourself with your beach's flag system.

The Newport/Morehead City NC NWS office, along with most coastal and great lakes offices in the U.S., issues a daily Surf Zone Forecast. The Surf Zone Forecast includes the rip current risk for the day, classified as low, moderate, or high. Before heading to the beach, be sure to check out the Surf Zone Forecast for your area of interest. Other important parameters are included in the Surf Zone Forecast, such as the U.V. index, water temperatures, and surf height.

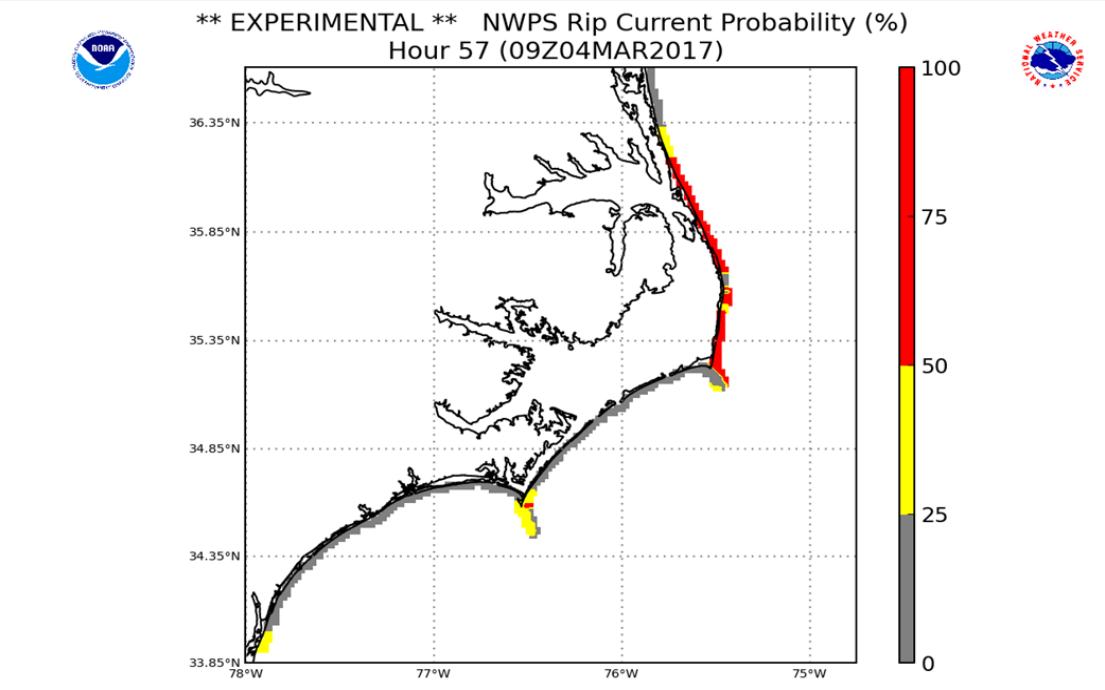
Staying Safe and Informed at the Beach (Continued)



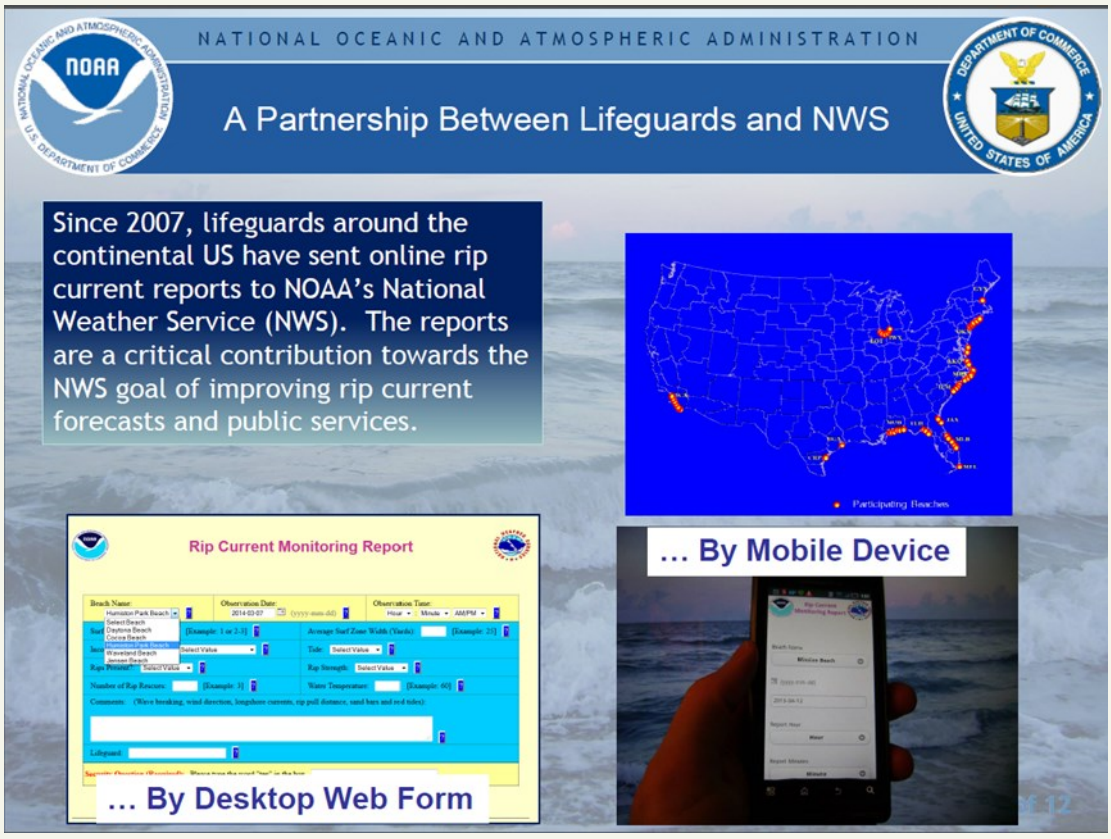
Daily Rip Current Forecast, http://weather.gov/beach/mhx.

The National Weather Service has partnered with researchers at the National Ocean Service (NOS) and Environmental Modeling Center (EMC) to produce experimental rip current probability forecasts generated by the Nearshore Wave Prediction System (NWPS). The NWS has also been partnering with lifeguards and ocean rescue units for many years to refine and improve rip current forecasting. The lifeguard units send rip current and surf reports to the NWS via a rip current reporting form.

Staying Safe and Informed at the Beach (Continued)



Experimental rip current forecast guidance generated by the NWPS.



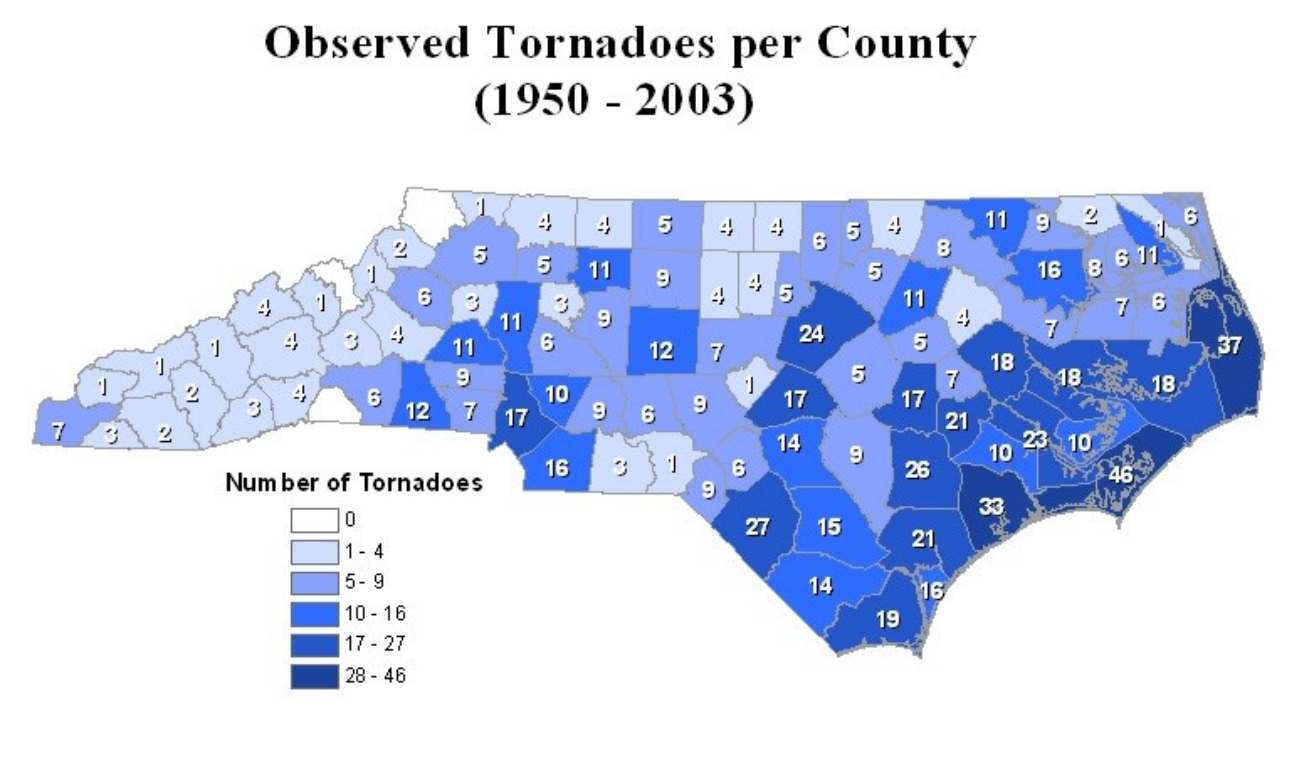
Lifeguard rip current reporting form.

Tornadoes in Eastern North Carolina

by Chris Collins, Meteorologist

An analysis of the climatology of tornadoes in North Carolina for a period of fifty years (1950-1999) was performed using tornado data obtained from the National Centers for Environmental Information (NCEI) and the National Severe Storms Laboratory (NSSL). The data was examined to find evidence of significant trends in tornado occurrences on a geographic scale, time scale, and with relation to population. Analysis suggests that there is an increasing trend in tornado occurrences, tornado days, tornado deaths, and tornado injuries. Analysis also suggests that more tornadoes occur in the southeast and southcentral regions of North Carolina. Findings included:

- Most tornado occurrences are of EF0 and EF1 intensity, however, most tornado injuries and deaths are results of more significant tornadoes (EF2 +)
- Most reported tornado occurrences are in southeastern and southcentral North Carolina. Carteret, Dare and Onslow Counties reported the most tornadoes over this period. Many of these are waterspouts or associated with tropical systems.
- The majority of the intense tornadoes occur in central North Carolina
- The majority of tornado fatalities are the result of a single storm.



North Carolina Tornadoes per County (1950-2003) compiled by National Climatic Data Center and NSSL.

Cocorahs— March Madness 2017

by David Glenn, Meteorologist

Residents of North Carolina are encouraged to participate as volunteer weather observers by measuring rain,snow, hail, and drought through the CoCoRaHS Program. We are in need of new observers across the region, and especially in the less populated counties of Greene, Jones, Hyde, Martin, Washington, Tyrrell, and Dare.

So, what is CoCoRaHS? CoCoRaHS stands for Community Collaborative Rain, Hail and Snow Network. CoCoRaHS began at the Colorado Climate Center at Colorado State University in 1998 in response to the damaging Fort Collins flood in 1997. North Carolina became the 21st state to join the CoCoRaHS network in September 2007. Roughly 350-450 volunteer observers consistently report their daily precipitation across North Carolina. The CoCoRaHS network is looking for enthusiastic volunteers to report rainfall, snowfall, hail, and drought information. Your data is shared with the National Weather Service, media, researchers, farmers, emergency managers and a wide range of other users, by joining the program. If you would like to contribute valuable precipitation information unique to your location, then this program is for you! Observers record precipitation information using the recommended 4 inch rain gauge and enter their observations into the CoCoRaHS webpage. This program will help a variety of users view and study the variability of precipitation across North Carolina. The accumulated precipitation data will be available to anyone using the web. Become a piece of the meteorological puzzle and join the other 10,000 plus volunteers from across the nation by becoming a CoCoRaHS observer. Recently, drought reporting has also become an important observation within the CoCoRaHS program across the nation. In fact, drought observations from CoCoRaHS are now being included in the National Integrated Drought Information System.

Please visit the CoCoRaHS website at http://www.cocorahs.org/ to learn more about the program. You can click on the "Join CoCoRaHS" link to become an observer. Then go through the on-line training to be on your way to become a part of the meteorological community. If you have any questions please contact David Glenn, North Carolina State Co-coordinator, or Bel Melendez, Eastern North Carolina Regional Coordinator by phone at (252) 223-5737, or by e-mail at David.Glenn@noaa.gov or Belkys.Melendez@noaa.gov.

2016 - An Active Weather and Climate Year

by Chris Collins, Meteorologist

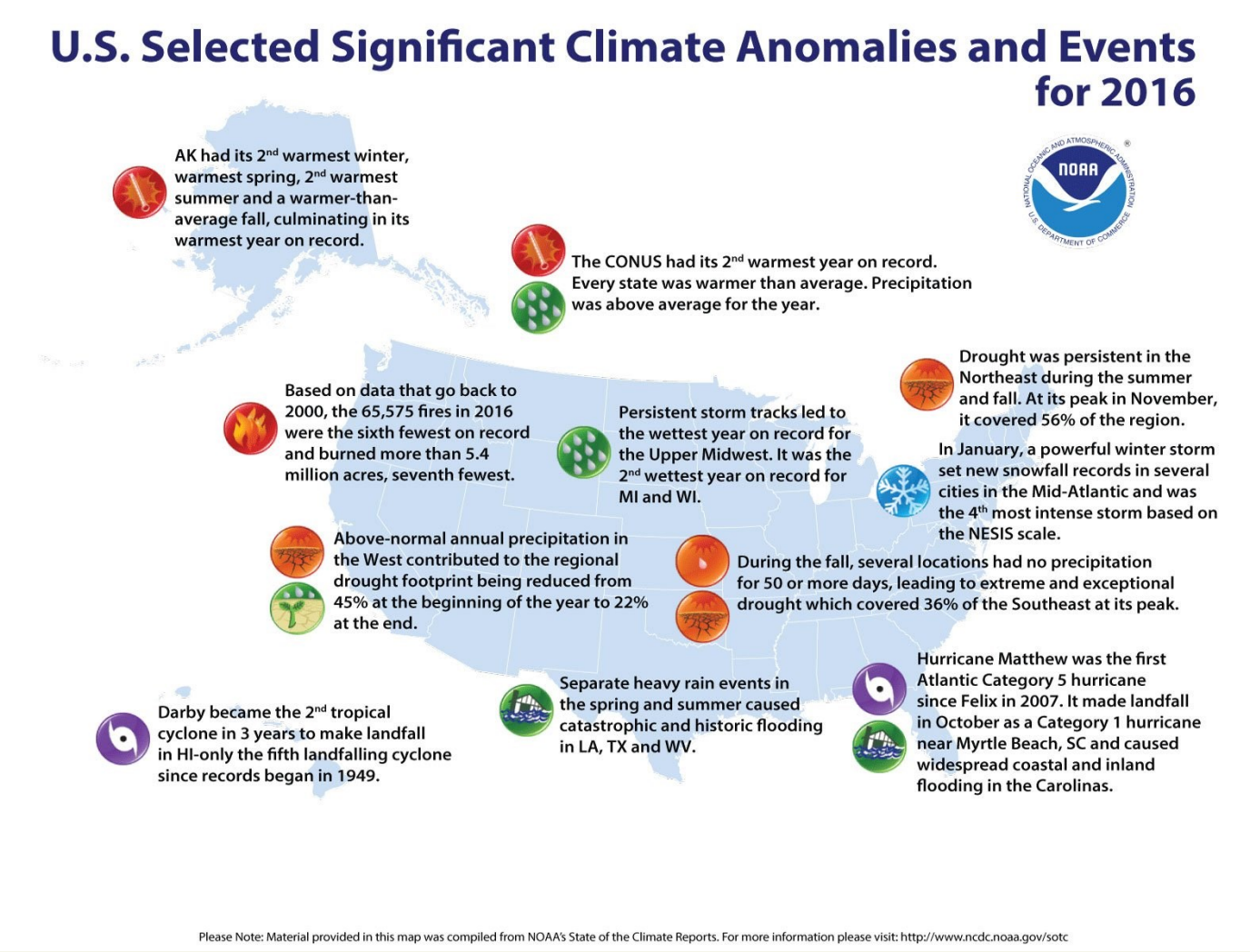


Image from National Climatic Data Center

In 2016, the contiguous United States average temperature was 54.9°F, or 2.9°F above the 20th century average. This was the second warmest year for the CONUS, behind 2012 when the annual average temperature was 55.3°F. This marks the 20th consecutive year that the annual average temperature for the CONUS was above the 20th century average. Nationally, the average minimum (low) temperature was 43.1°F, the warmest on record, exceeding the previous value (42.9°F in 2012) by about 0.2°F. Six states were warmest on record for minimum temperature. Nationally, it was the third warmest average maximum (high) temperature for the annual period, a full degree cooler than the record set in 2012. Precipitation averaged across the CONUS in 2016 was 31.70 inches, 1.76 inches above the 20th century average. This was the 24th wettest year on record.

Changes to the River Flood Program After Hurricane Matthew

by Shane Kearns, Meteorologist

Hurricane Matthew was an extreme hydrological event across Eastern NC, which led to major and even record river flooding. Many of the river gages in Eastern NC have only observed 1 or 2 events to this magnitude (if at all), and this event offered a chance to reexamine our flood stages and impact statements for each of the river points. A few different resources were used to update the flood stages and impacts. The most important was surveying many of the locations impacted by river flooding, both during the flooding and after the waters receded. There was also excellent coordination between the NWS and Emergency Managers to direct us to the hardest hit locations within each county. Secondly, we relied on Rapid Response Flood Imagery taken by NOAA Remote Sensing Division. Finally, drone and helicopter footage posted by the news media and general public provided additional information to the extent of flooding in areas inaccessible to the survey teams. The Rapid Response Imagery and other aerial footage helped fill in the gaps for flooded areas which were too expansive or isolated to be completely surveyed on the ground.

Evacuated homes in Greenville surrounded by water from the flooding along the Tar River.

Changes to the River Flood Program (Continued)

Extent of the flooding in the town of Grifton and portions of Tick Bite, using the Rapid Response Flood Imagery. Images presented courtesy of NC OneMap.

Flooding along the Neuse River near River Rd. and Cow Pen Landing Rd. in Vanceboro. This image was taken from a drone video via the YouTube account of Jamie Hudson .

Changes to the River Flood Program (Continued)

As a result from the information gained from the river surveys, Rapid Flood Imagery, and aerial videos, Flood Stages were established for two river gages in our area. The first location, New River at Gum Branch, experienced moderate flooding during Hurricane Matthew, with the majority of impacts at the end of Forest Bluff Drive. Other homes and businesses near the river were only a few feet away from major problems, which increased confidence for establishing a Major Flood Stage as well.

The other location with brand new official flood stages was at the Trent River in Trenton. This location also experienced moderate flooding from Hurricane Matthew with water surrounding and inundating some homes along the river in Trenton. Water also spilled over and flooded NC 41 as one of the many creeks that flow into the Trent River became unable to flow forward into the river because of the immense amount of water flowing down the river and backed up. Again many locations were a foot or so away from major impacts which gave confidence for establishing a Major Flood Stage.

Changes to the River Flood Program (Continued)

To view the updated river gages, you can follow this link: https://water.weather.gov/ahps2/index.php?wfo=mhx , and click on the river gage near you, and then scroll down to view the impact statements. Flood stages at our forecast point locations were not changed (Neuse River at Kinston, Contentnea Creek at Hookerton, NE Cape Fear River at Chinquapin, and Roanoke River at Williamston), but Flood Impact Statements were updated for these sites except Williamston. Elsewhere, almost all our non-forecast points have either had their flood stages or impact statements updated. We hope these updated stages and statements provide a more robust set of impacts to help residents, businesses, and local officials better prepare for the next river flooding event.

A Very Warm, Dry February 2017

by Chris Collins, Meteorologist

With the jet stream providing very cold air and snow to northern New England in February, the southeast remained unseasonably warm with a persistent ridge of high pressure offshore keeping warm south to southwest winds across the region. Cape Hatteras recorded its warmest February ever with a mean temperature of 55.6 degrees, 8.8 degrees above normal. New Bern recorded its second warmest February ever with a mean temperature of 53.6, well above the normal of 47.0 degrees. Most other locations in eastern North Carolina recorded mean temperatures of 7 to 10 degrees above normal. In addition to the warm weather, February 2017 was quite dry across eastern North Carolina. Many area received less than 2 inches of rainfall, well under the normal values of 3 to 4 inches.

February 2017 Temperature Data for Eastern North Carolina

	Avg_ Max	Avg_Max Normal	Avg_ Min	Avg_Min Normal
Beaufort	64.0	55.4	44.7	38.7
Cape Hatteras	63.6	53.5	47.5	40.0
New Bern	67.6	57.9	39.6	36.1
Greenville	67.8	56.3	40.2	34.3
Kinston	65.7	56.1	37.0	32.9
Williamston	64.3	54.8	39.7	32.9
Plymouth	66.4	57.2	39.6	35.0
Bayboro	65.8	58.0	38.8	34.6

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