NATIONAL WEATHER SERVICE, NEWPORT/MOREHEAD CITY, NC

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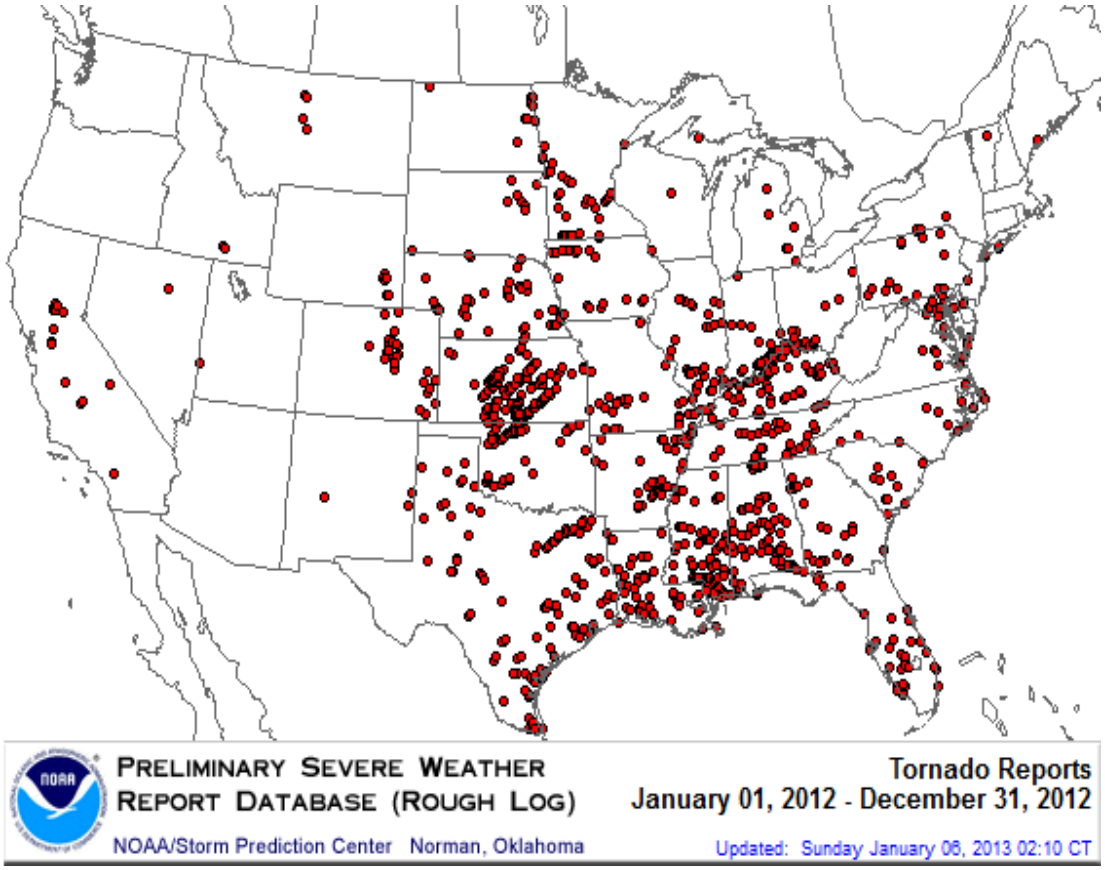
# CAROLINA SKY WATCHER

SPRING 2013 EDITION

## INACTIVE, BUT DEADLY TORNADO SEASON IN 2012

*by Chris Collins, Meteorologist*

On the heels of one of the most destructive tornado years on record for the country (2011), tornado activity during 2012 was below average. In fact, 2012 marks the slowest tornado year since 2002 when there were 934 tornadoes. Despite the slower-than-average year for tornadoes, there were still several large, destructive, and deadly tornado outbreaks during the year. Three tornado outbreaks caused at least one billion dollars in damage and there were 68 tornado-related fatalities. The last tornado-related fatality of 2012 in the U.S. occurred on June 24, 2012. The next tornado fatality occurred on January 30, 2013 in north Georgia, a total of 220 consecutive days without a tornado-related fatality. According to analysis by the Storm Prediction Center, this is longest consecutive day stretch with no tornado fatalities in the 1950-present official record. The lack of storm systems during the late spring and summer across the Great Plains was associated with a lack of tornadoes. May and June, which are typically the most active months of the year, both had less than 50 percent of average number of tornadoes confirmed. The tornadoes that did form during 2012 tended to be weak to moderate strength in nature. There were only four EF-4 tornadoes, with no confirmed EF-5 tornadoes during 2012.

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# TORNADO NEAR BEAUFORT (12/26/12)

*by Chris Collins, Meteorologist*

A tornado touched down north of Beaufort in Carteret County on December 26, 2012. The tornado caused tree destruction and minor house (window and roof) damage consistent with an EF1 tornado on the Enhanced Fujita Scale with winds estimated around 90 mph. The tornado was on the ground for approximately 1/4 mile with a maximum width of 100 yards.

While tornadoes are not common in the winter season, they can and do occur over Eastern North Carolina. The combination of an approaching upper level trough and a warm front surging north across eastern North Carolina, led to a favorable environment for severe weather during the afternoon hours. A strong 60 knot low-level jet helped transport a tongue of moisture north-northeastward across eastern North Carolina. The setup was typical for a winter time severe weather outbreak in the Carolinas, with strong wind fields, but only modest instability. The Storm Prediction Center had placed eastern North Carolina in a moderate risk of severe weather on the afternoon of December 26, with a 15% probability for tornadoes.

A circulation aloft moved onshore near Atlantic Beach with reports of straight line wind damage and wind gusts above 70 mph from Atlantic Beach and Fort Macon north through Downtown Morehead City. The circulation tightened and produced a tornado north of Beaufort, beginning at the intersection of Tuttles Grove Road and Madison Bay Drive and ending near Highway 101 with a path length of approximately one quarter mile. The maximum width of the tornado was estimated to be around 100 yards.

One of our lead forecasters was unfortunately impacted by the tornado with several tops of trees broken off and a few large downed pine trees. He was sleeping just prior to the tornado, resting from working the previous midnight shift, and awoke to his wife yelling “get in the hallway!” Thankfully no injuries or fatalities were observed with this tornado.

*Damage from EF-1 tornado north of Beaufort, NC on December 26, 2012.*

# COCORAHS NETWORK

*by David Glenn, Meteorologist*


Residents of North Carolina are encouraged to participate as volunteer weather observers by measuring rain, snow, hail, and rought through the CoCoRaHS Program.

**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 Coordinator, or Bel Melendez, Eastern North Carolina Regional Coordinators by phone at (252) 223-5737, or by e-mail at David.Glenn@noaa.gov , Belkys.Melendez@noaa.gov.

# NATIONAL SEVERE STORM PREPAREDNESS WEEK (MARCH 3-9)

*by Chris Collins, Meteorologist*

The week of March 3rd through the 9th, 2013 was declared National Severe Storm Preparedness Week. This week also coincides with North Carolina's Severe Weather Awareness Week, which includes the statewide tornado drill on Wednesday March 6. National Severe Weather Preparedness Week highlights the importance of planning and practicing how and where to take shelter before severe weather strikes. Being prepared to act quickly can be a matter of life and death. Being a force of nature goes beyond taking appropriate preparedness action. It's about inspiring others to do the same. People should not only to be prepared, but also encourage their social network to act by texting, tweeting, or posting a Facebook status update.

One focus of National Severe Storm Prepardness week is on things to do before severe weather arrives in your area. Here are some things you can do before a big storm arrives:

- Build an Emergency Supply Kit, which includes items like non-perishable food, water, a battery-powered or hand-crank radio, extra flashlights and batteries. You may want to prepare a portable kit and keep it in your car in case you are told to evacuate. This kit should also include a pair of goggles and disposable breathing masks for each member of the family.
- Make a Family Emergency Plan. Your family may not be together when disaster strikes, so it is important to know how you will contact one another, how you will get back together and what you will do in case of an emergency.
- Continually monitor the media – Be aware of storm's which could impact your area. Know how you will be warned in an emergency (NOAA Weather radios with a tone alert are a good option).
- Know if you live or work in a flood prone area. Check with your local emergency management for details.
- Know where to shelter (ie: basement, interior room/ hall, bathroom, closet, etc) if conditions warrant and where shelters in your area are located.
- Ensure your home is ready – Elevate items in the basement which could be flooded. Bring in outdoors items such as children's toys, patio furniture, garbage cans, etc. which could be blown around and damaged. Remove dead or rotting trees and branches that could fall and cause injury or damage.
- Know how to shut off utilities, including power, water and gas, to your home. Have proper tools (i.e.: wrench) ready and nearby.
- Find out what types of events and kinds of damages are covered by your insurance policy. Keep insurance policies, important documents and other valuables in a safe and secure location.

# AVIATION FORECASTING

*by Casey Dail, Meteorologist*

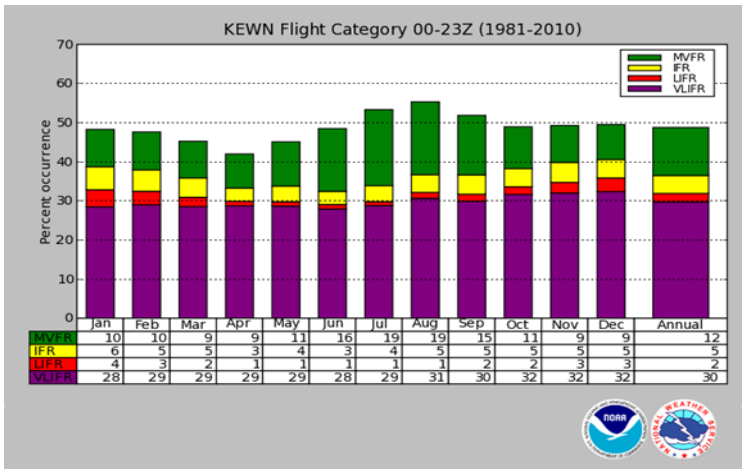
This December will mark the 110 year anniversary of the Wright brothers first flight in Kitty Hawk, NC. Since that first flight in 1903, the National Weather Service has expanded service to 4 million aviation forecasts covering more than 85,000 flights a day. Aircraft and aviation forecasts have both come a long way since then.

National Weather Service Forecast Offices are responsible for preparing Terminal Aerodrome Forecasts (TAF). TAFs are used heavily around the world. Everyone from general aviation pilots to commercial carriers utilize TAFs to anticipate weather conditions at takeoff and landing. Without question, the TAF content can have a strong impact on fuel loads, the need for alternates, and other aspects of aviation operations due to their stringent regulatory nature. The Newport/Morehead City WFO has the responsibility for preparing TAFs for four local terminals: Greenville (PGV), Kinston (ISO), New Bern (EWN), and Jacksonville (OAJ). A scheduled TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified period, normally 24 hours. Once issued, they are monitored continuously, and updated to reflect the forecasters latest thinking as conditions warrant. Scheduled TAFs are issued four times a day (every six hours) at 0000 UTC, 0600 UTC, 1200 UTC and 1800 UTC.

**So How Do We Forecast?**

Forecasters use many different tools and methods to create a TAF. We are always monitoring current conditions while utilizing other meteorological tools such as radar, satellite, pilot reports, computer model output and radiosonde (weather balloon) observations. National Weather Service forecasters use several models to aid in aviation forecasts. While these models produce good output, it is the understanding of local effects, weather patterns, and terrain that the forecasters use in conjunction with the models to provide quality TAFs for Eastern North Carolina. Statistics have shown that NWS Newport's TAF forecasts overall show significant improvements over model guidance.

Our office also writes an aviation forecast discussion, which is updated at least four times a day. In this discussion forecasters discuss the scientific reasoning and uncertainties regarding expected aviation-related conditions including ceiling heights, visibility restrictions, winds, and convection. We also like to include site specific information in the AFD when conditions warrant including potential crosswind impacts for a particular runway. Forecasters use the aviation discussion to describe details not permitted in a TAF. This has proved to be a very valuable resource for aviation professionals and enthusiasts. Aviation climate images are also produced for our airports in Eastern North Carolina, as well as the other terminals across the country. To access these images, check out: http://www.erh.noaa.gov/avnclimo.

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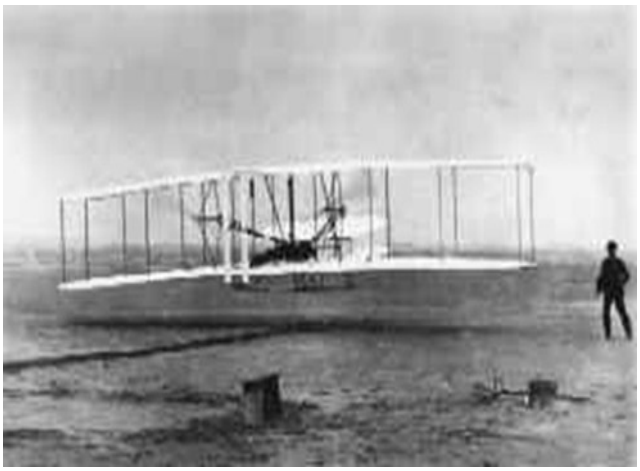
| MVFR | 10 | 10 | 9 | 9 | 11 | 16 | 19 | 19 | 15 | 11 | 9 | 9 | 12 |
| IFR | 6 | 5 | 5 | 3 | 4 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| LIFR | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 2 |
| VLIFR | 28 | 29 | 29 | 29 | 29 | 28 | 29 | 31 | 30 | 32 | 32 | 32 | 30 |

*Image of Aviation Climatology for New Bern (1981-2010).*



*The Wright Brothers First Flight, December 1903*

# RIP CURRENT HAZARDS

*by Tom Lonka, Meteorologist*

The National Weather Service in Newport/Morehead City began testing the Beach Hazards Statement last year. This new hazards statement was developed to warn beach-goers of other dangers at the beach and in the surf zone, in addition to rip currents. Dangerous shore break/rough surf and strong long shore currents are a couple of the hazards that we highlighted in the Beach Hazards Statement in 2012.

The Newport/Morehead City office worked closely with local Eastern North Carolina lifeguards to develop criteria when issuing the Beach Hazards Statement. The threat for serious injury or death is magnified when breakers in the surf zone reach a certain height. It was agreed upon to issue the statement when breaking waves, or shore break, reached an average of 5 feet (4 to 6 feet) in the surf zone, and/or there was a high threat of rip currents. The statement would also mention the threat of strong long shore currents if they were observed.

Among the beach hazards is shorebreak. Shorebreak is defined as the breaking of waves onto the shore or beach. The power of the surf can cause injuries to extremities and the cervical spine. Spinal cord injuries occur largely as the result of diving headfirst into the water or being tumbled in the waves by the force of the wave action. These injuries can and do result in complete paralysis or even death.

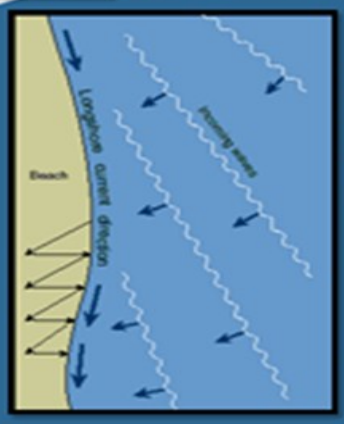
Safety rules for shorebreak include not running into the ocean or diving headfirst into the waves. Sandbars that cannot be seen from the surface may be present and/or the water may be too shallow. Do not dive into the water from a pier or rock jetty where water appears much deeper than it really is. What may look like 10 to 20 feet of water may only be 2 or 3 feet deep. Diving in this situation could be fatal. If you are boogie boarding, always keep your arms out in front of you to protect your head and neck.

The summer of 2012 was a deadly one for Eastern North Carolina beaches. Nine fatalities were documented in the surf zone, between Duck and North Topsail Beach. Four of those drownings were verified as rip current related. Two of those rip related drownings occurred on June 20th, one at Nags Head, and one at Bodie Island. There were 39 rip current related rescues this day alone. Rip currents were reported as strong all day, following an extended period of strong northeast winds and large long period northeasterly swells in the preceding days. Two other rip current fatalities occurred on July 25th, as a pregnant female and her unborn child lost their lives on Hatteras Island. On Bodie Island on May 24th, a man became the victim of a strong long shore-current as he was swept off the sand bar and into deeper water. On May 27th at Pine Knoll Shores, a man became the victim of strong shore break, as he suffered a broken neck, being the victim of a large wave and knocked down head first into the sand. A man on North Topsail Beach died of cardiac arrest while swimming, though a low rip current risk was in effect, and weak rip currents were observed on this day. On July 27th, a man became the victim of rough surf and drowned while swimming at Ocracoke Island. On August 11th, another rough surf related death occurred on Emerald Isle Beach.

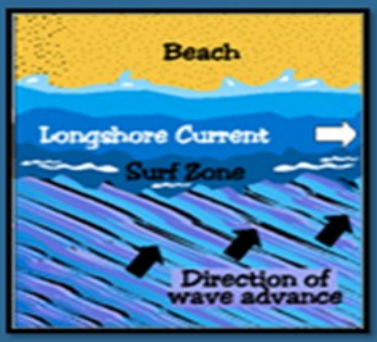
Let's strive to make 2013 a safe summer on North Carolina beaches! Swim only at lifeguard protected beach and never swim alone. Lifeguards are trained to identify potential hazards. Ask a lifeguard about the conditions before entering the water. Stay at least 100 feet away from piers and jetties. Permanent rip currents often exist near these structures. Pay attention to the daily surf zone forecast issued by your local National Weather Service office. If in doubt, don't go out.

# RIP CURRENT HAZARDS (CONTINUED)

## Surf Zone Hazards




A LONGSHORE CURRENT IS AN OCEAN CURRENT THAT MOVES PARALLEL TO SHORE. IT IS CAUSED BY SWELLS SWEEPING INTO THE SHORELINE AT AN ANGLE AND PUSHING WATER DOWN THE LENGTH OF THE BEACH IN ONE DIRECTION. THEY VARY DEPENDING ON THE SIZE, STRENGTH, AND DIRECTION OF THE APPROACHING SWELL AND LENGTH OF THE BEACH.




LONGSHORE CURRENTS SWEEP SWIMMERS AND SURFERS DOWN THE BEACH, SOMETIMES INTO RIP CURRENTS, PIERS AND JETTIES. IN MANY CASES, THE LONGSHORE CURRENT IS STRONG ENOUGH TO PREVENT SWIMMERS FROM BEING ABLE TO KEEP THEIR FEET ON THE BOTTOM, MAKING IT DIFFICULT TO RETURN TO SHORE.

## RIP Current Safety


THE NWS SURF ZONE FORECAST INCLUDES RIP CURRENT RISK FORECASTS FOR LOCAL BEACHES FOR UP TO 24 HOURS, INCLUDING OTHER ELEMENTS SUCH AS WEATHER, SURF HEIGHT, TIDE, UV INDEX, WIND AND LIGHTNING RISK. RIP CURRENT FORECASTS WILL HAVE THE QUALIFIERS - LOW, MODERATE, OR HIGH RISK- TO INDICATE THE RIP CURRENT RISK.

- LOW RISK -WIND AND WAVE CONDITIONS ARE NOT EXPECTED TO SUPPORT THE DEVELOPMENT OF STRONG OR FREQUENT RIP CURRENTS.
- MODERATE RISK- MEANS STRONGER OR MORE FREQUENT RIP CURRENTS ARE EXPECTED AND ONLY EXPERIENCED SWIMMERS SHOULD ENTER THE WATER.
- HIGH RISK- MEANS THAT DANGEROUS RIP CURRENTS ARE EXPECTED TO DEVELOP AND COULD BE LIFE THREATENING TO ANYONE ENTERING THE SURF. IT IS IMPORTANT TO NOTE THAT UNDER ANY CONDITIONS RIP CURRENTS CAN OCCUR.

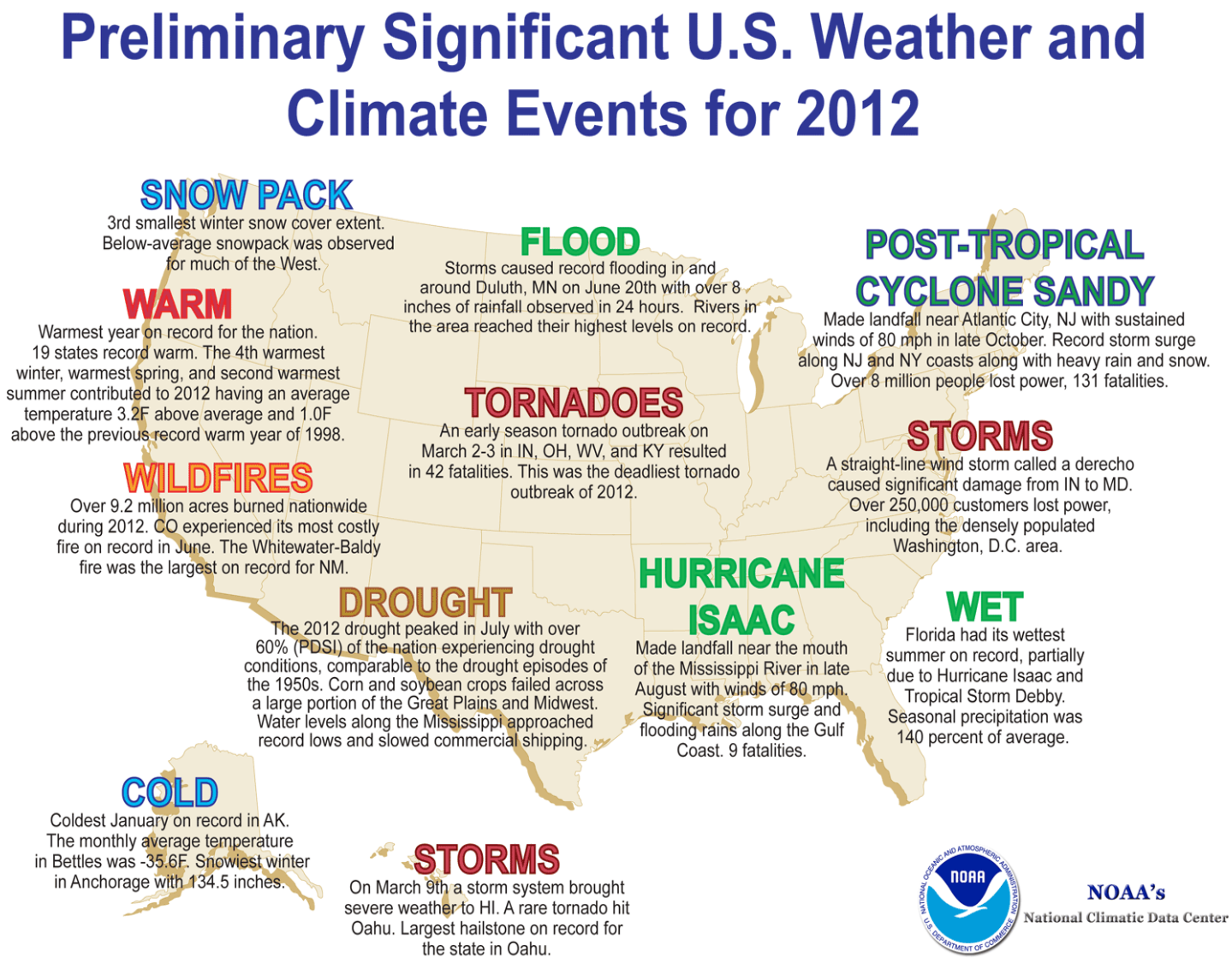
http://www.erh.noaa.gov/mhx/RipHazard.html

# 2012 GLOBAL TEMPERATURES HIGHEST ON RECORD

*by Chris Collins, Meteorologist*

The globally-averaged temperature for 2012 marked the 10th warmest year since record keeping began in 1880. It also marked the 36th consecutive year with a global temperature above the 20th century average. The last below-average annual temperature was 1976. Including 2012, all 12 years to date in the 21st century (2001–2012) rank among the 14 warmest in the 133-year period of record. Only one year during the 20st century (1998) was warmer than 2012.

Most areas of the world experienced higher-than-average annual temperatures, including most of North and South America, most of Europe and Africa, and western, southern, and far northeastern Asia. Meanwhile, most of Alaska, far western Canada, central Asia, parts of the eastern and equatorial Pacific, southern Atlantic, and parts of the Southern Ocean were notably cooler than average. Additionally, the Arctic experienced a record-breaking ice melt season while the Antarctic ice extent was above average. The contiguous United States had its warmest year since national records began in 1895, surpassing the previous record set in 1998 by 1 degree Fahrenheit.



# LIGHTNING SAFETY

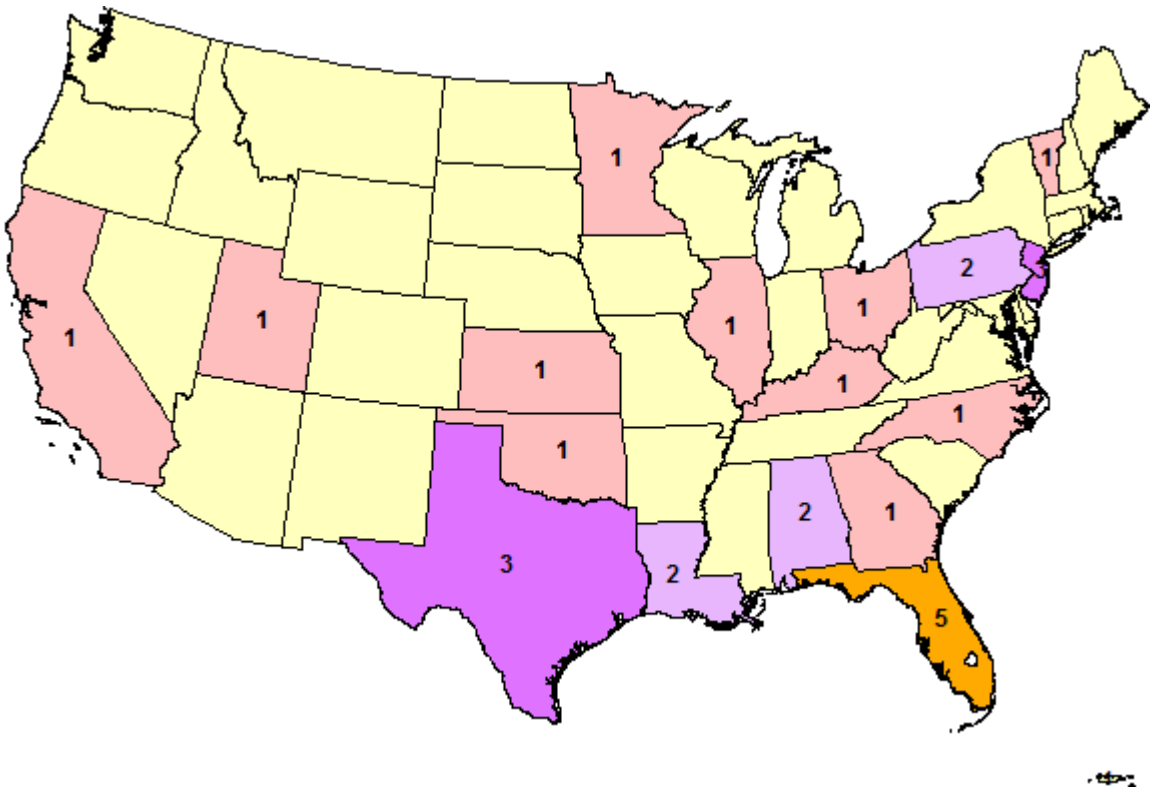
*by Chris Collins, Meteorologist*

Lightning is fascinating to watch but also extremely dangerous. In the United States, there are about 25 million lightning flashes every year. Each of those 25 million flashes is a potential killer. While lightning fatalities have decreased over the past 30 years, lightning continues to be one of the top three storm-related killers in the United States. In addition, lightning injures many more people than it kills and leaves some victims with life-long health problems.

From 2001 to 2010, North Carolina ranked 5th in the nation for lightning fatalities. Most lightning fatalities occur when people are caught outside working, playing, boating or golfing. Because of the abundance of out-door activities in North Carolina, we are especially vulnerable to lighning. If outside, move inside as soon as thunder is heard. If caught outdoors, stay away from trees, telephone poles, and other tall objects. A hard-topped vehicle will offer good protection from lightning. When boating, try to seek safe shelter well before the storm approaches.

When indoors, do not use corded telephones and stay away from windows. Also stay away from plumbing and water sources such as the sink, tub or shower. In many cases, lightning finds its way into your home through the utilities. When sheltering away from lightning, stay indoors for at least 30 minutes after hearing the last clap of thunder. This should ensure your safety.

## Lightning Fatalities for 2012 by State



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