NATIONAL WEATHER SERVICE, NEWPORT/MOREHEAD CITY, NC

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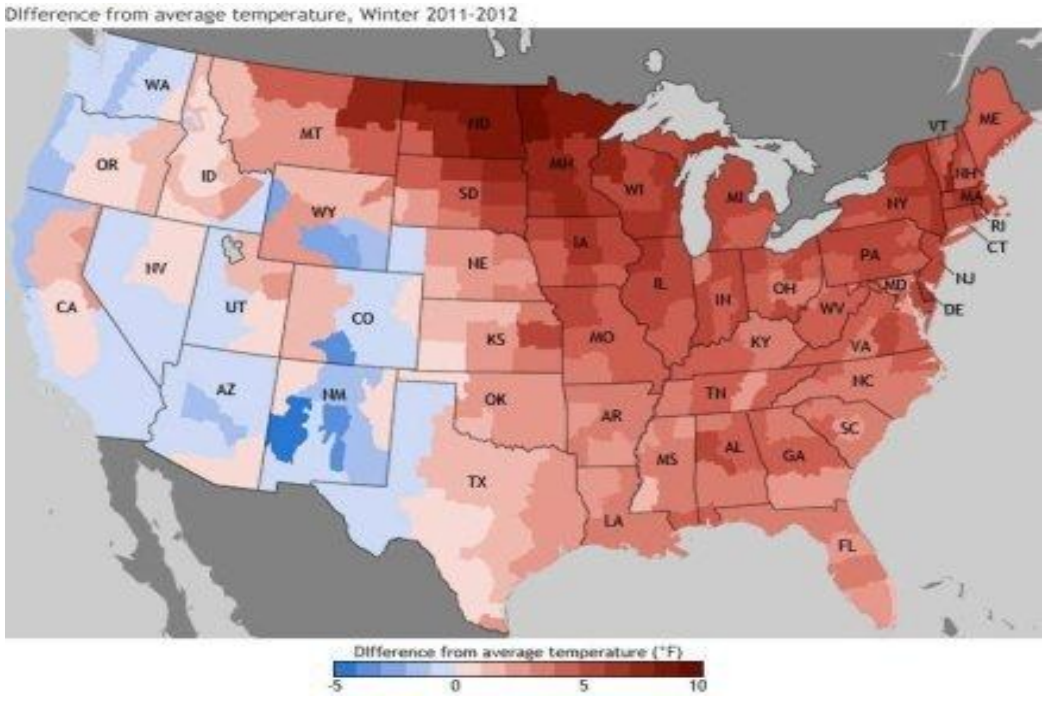
CAROLINA SKY WATCHER

FALL 2012 EDITION

WINTER 2012-13 PREVIEW *by Chris Collins, Meteorologist*

As we transition into the first crisp, cool nights of fall, we are reminded that winter is not very far away. Eastern North Carolina can experience periods of cold temperatures, coupled with a threat of snow and ice during any winter. A major snowstorm affected most of Eastern North Carolina on the evening of Friday February 12 and Saturday morning February 13, 2010, dumping as much as 9 inches of snow across the region, with the heaviest amounts near the coast. Just two winters ago (December 2010– March 2011), three separate snowstorms produced several inches of snow in the area and who can forget the March, 1980 storm that dropped up to 30 inches of snow on eastern North Carolina! The 2011-2012 winter was a mild one for the contiguous United States, with eastern North Carolina receiving minimal snow with mild temperatures. When NOAA's National Climatic Data Center crunched the numbers for December, January and February—"meteorological" winter for 2011-2012—it stacked up as the fourth warmest of the past 117 winters. The seasonal average temperature was 36.8 degrees Fahrenheit, which is 3.9 degrees above the 20th century average (see figure below).

See the next page for some big recent winter storms affecting eastern North Carolina. Regardless of the long-term forecast, eastern North Carolinians should always be prepared for cold temperatures and sudden snow or ice events during the winter months.



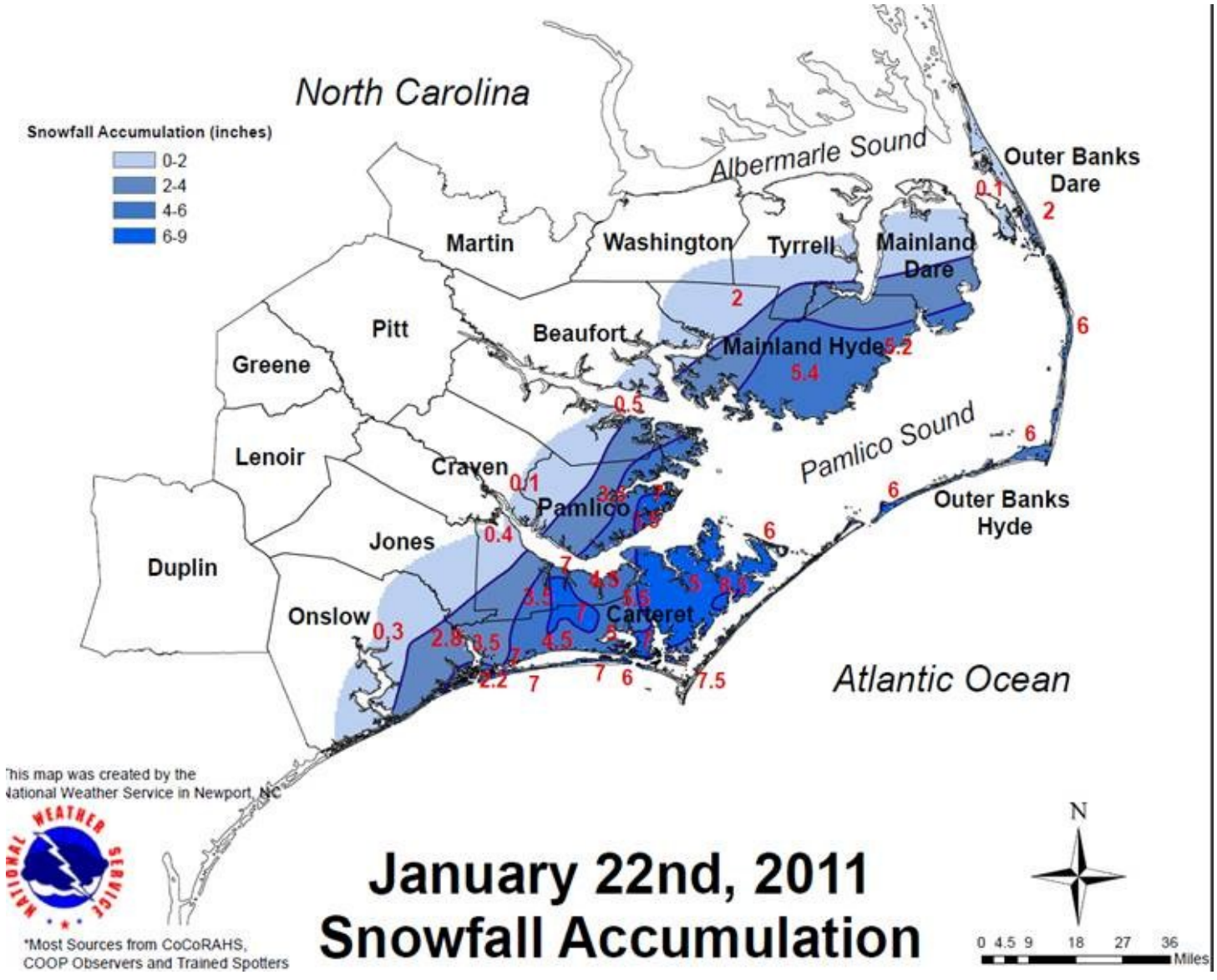
Difference from Average Temperature for Winter 2011-12. Red is above normal.

INSIDE THIS ISSUE

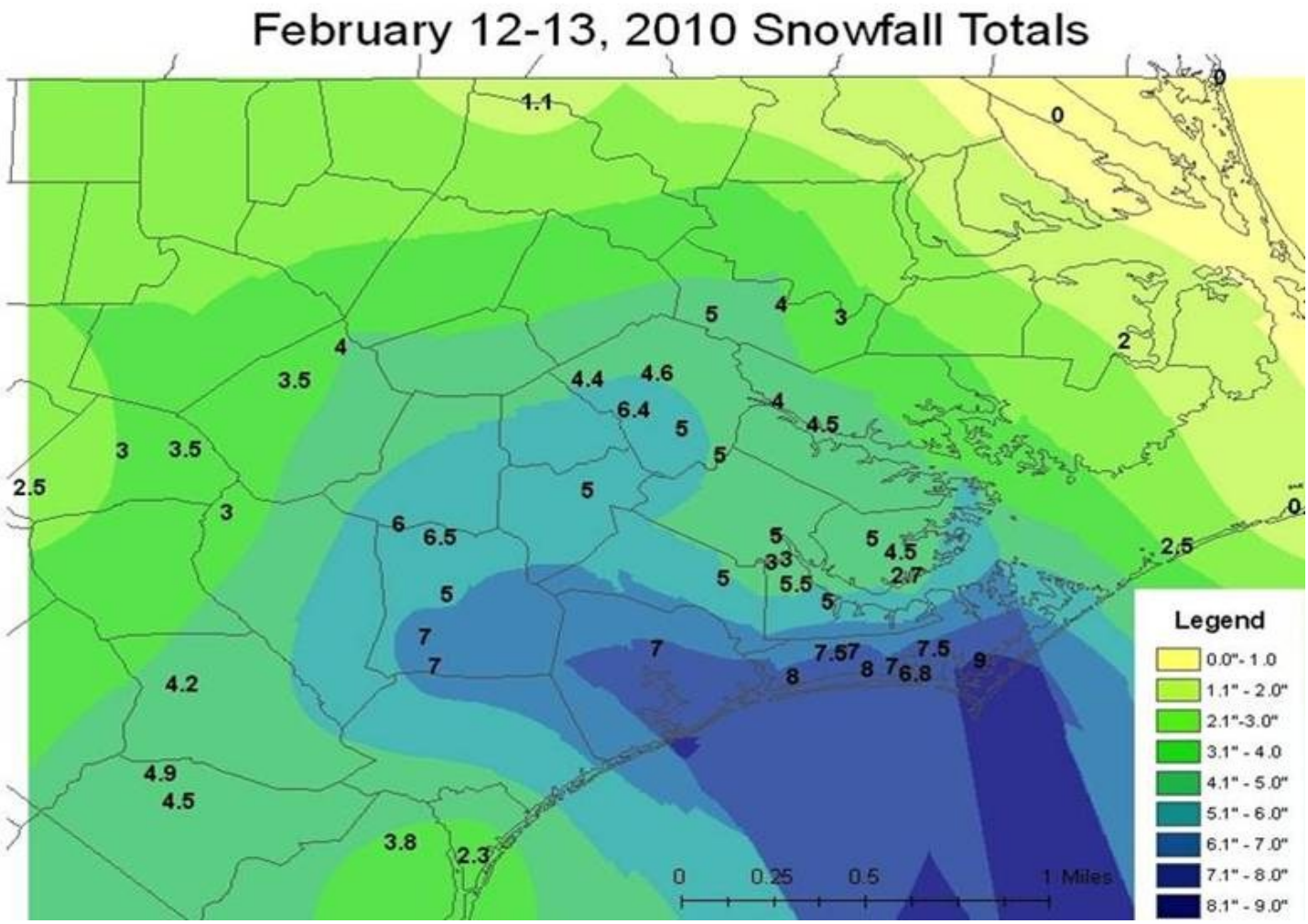
RECENT WINTER STORMS

by Chris Collins, Meteorologist

January 22, 2011: A strengthening area of low pressure, which developed off the northeast coast of Florida, then moved well offshore of the Carolina coast, produced a swath of heavy snowfall across mainly coastal sections of Eastern North Carolina during the late morning and afternoon hours of Saturday January 22, 2011. Areas from Carteret and southern Craven counties northeast across Mainland Hyde County and the southern Outer Banks received anywhere from 3 to as much as 7 inches of snowfall. Snowfall rates of 1 to 2 inches/hour were reported in the heavier bands. Frisco, on the southern Outer Banks, received 6 inches of snow, the most snowfall at that location since January 23, 2003.



February 12-13, 2010: A major snowstorm affected most of Eastern North Carolina on the evening of Friday February 12 and Saturday morning February 13, 2010, dumping as much as 9 inches of snow across the region, with the heaviest amounts near the coast. The storm was the result of a strong area of low pressure developing rapidly off the Florida coast and quickly strengthening as it moved off the North Carolina coast. The snowfall was the heaviest in the area since January 23, 2003. The storm produced a heavy wet snow, which produced many broken limbs across the eastern portion of North Carolina.

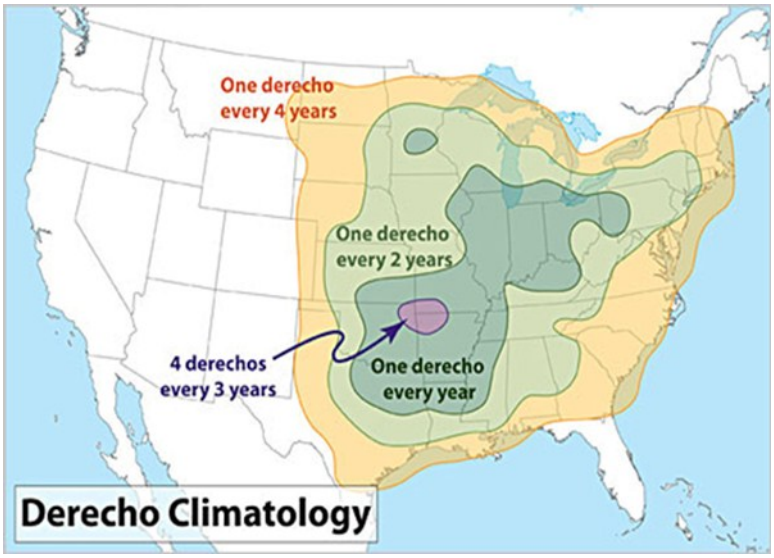


January 23, 2003: This was a large storm as all 100 counties in North Carolina received measurable snowfall. Low pressure tracked well offshore and with cold air in place, snow fell heavily at times, across all of eastern North Carolina. The snow was accompanied by gusty winds, leading to snow drifts as high as 3 to 4 feet across portions of the Outer Banks. Snowfall totals across eastern North Carolina ranged from around 2 inches in Kinston to around a foot over the Outer Banks. The snow was followed by very cold temperatures with minimum temperatures on the morning on January 24 falling into the single digits and teens over most of the region.

JULY 1 DERECHO

by Bob Frederick, Meteorologist

On July 1st 2012, an intense line of thunderstorms moved across Eastern North Carolina producing widespread damaging winds and 3 fatalities. These types of wind storms are often called derechos by meteorologists. As the image to the left indicates derechos are uncommon across eastern North Carolina with about one derecho occurring every 4 years. By definition a derecho is a long lived line of thunderstorms that produce widespread and almost continuous damaging winds. To be classified as a derecho the path of damaging winds normally needs to extend at least 240 miles…however for eastern North Carolina that can be hard to determine as once the storms reach the ocean it is difficult to monitor wind speeds given the lack of observations. Wind gusts in derechos are 60 mph or greater with gusts to 100 mph possible. Winds of this magnitude can produce significant damage often similar to an EF0 to EF1 tornado. The Storm Prediction Center describes why derechos are so dangerous:



"Because derechos are most common in the warm season, those involved in outdoor activities are most at risk. Campers or hikers in forested areas are vulnerable to being injured or killed by falling trees. People in boats risk injury or drowning from storm winds and high waves that can overturn boats.

Occupants of cars and trucks also are vulnerable to being hit by falling trees and utility poles. Further, high profile vehicles such as semi-trailer trucks, buses, and sport utility vehicles may be blown over. At outside events such as fairs and festivals, people may be killed or injured by collapsing tents and flying debris.

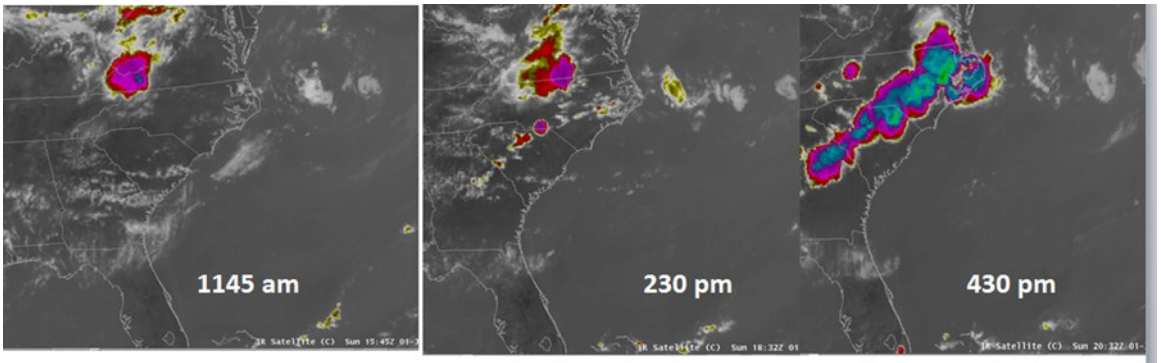
Even those indoors may be at risk for death or injury during derechos. Mobile homes, in particular, may be overturned or destroyed, while barns and similar buildings can collapse. People inside homes, businesses, and schools are sometimes victims of falling trees and branches that crash through walls and roofs; they also may be injured by flying glass from broken windows. Finally, structural damage to the building itself (for example, removal of a roof) could pose danger to those inside."

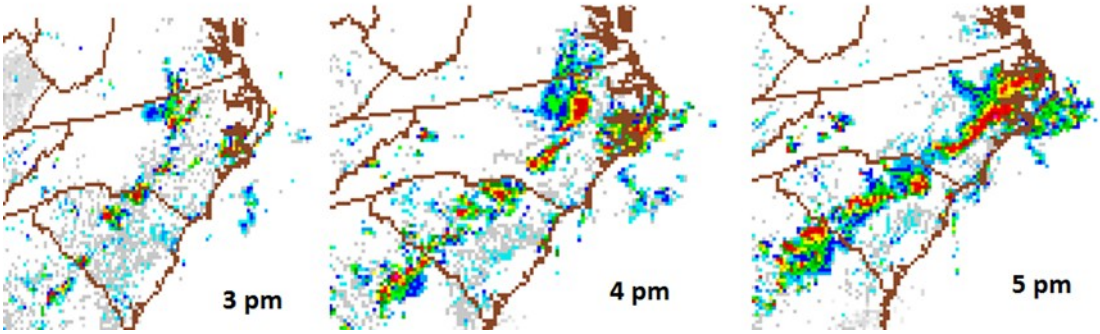
There were over 70 reports of severe weather across eastern North Carolina during the afternoon and evening of July 1st. A severe thunderstorm watch was issued by the Storm Prediction Center well before the storms reached the region. Numerous severe thunderstorms warnings were issued by this office with an average lead time of around 25 minutes. There was at least one possible gustnado that occurred in Beaufort County. Gustnadoes form due the interaction of the downdraft with the warm unstable air it is moving into. This interaction can lead to brief enhanced low level rotation that can cause considerable damage. Since these gustnadoes form on the gust front of the storm the damage they produce is considered straight line wind damage.

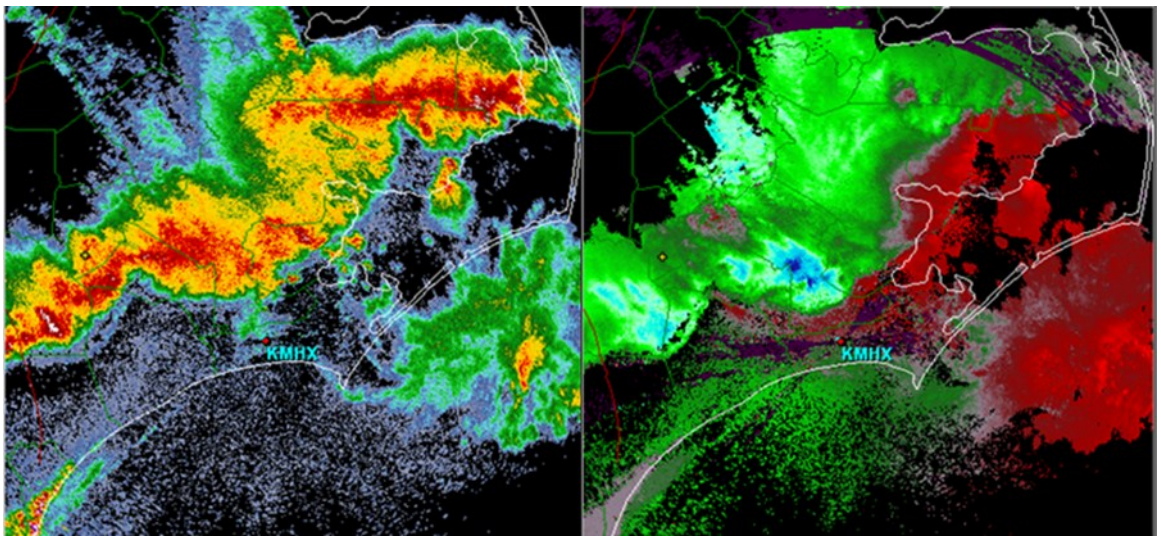
It is very important to take severe thunderstorm warnings seriously as they can produce significant damage and pose a threat to life and property. In this event the most of the damaging winds associated with the gust front were occurring well ahead of the actual thunderstorm. It is important to seek shelter in a safe place when thunder is heard or a warning is issued.

The following graphics shows evolution of the derecho on satellite and radar:

JULY 1 DERECHO (CONTINUED)







DAD FIRE

by Scott Kennedy, Meteorologist

The Dad Wildfire burned 21,331 acres within the Croatan National Forest this past June. At the height of fire suppression efforts, over 100 firefighters from the U.S. Forest Service, N.C. Forest Service, U.S. Fish and Wildlife Service, Department of Defense, and other local and federal agencies worked to extinguish the fire. The National Weather Service in Newport provided decision support services in the way of issuing daily Fire Weather Spot Forecasts to fire officials, giving weather briefings to the crews each morning, issuing daily smoke plume forecasts using the Hysplit Dispersion Model, relaying Air Quality Alert information from the NC Department of Environment and Natural Resources, and maintaining a continuous weather watch for the safety of firefighters as well as the public impacted by the fire.

The Dad Fire started after a prescribed fire in the Croatan National Forest jumped a roadway on Saturday, June 16th. The US Forest Service had conducted the prescribed burns along South Little Road, from June 14th through the 16th. Once the fire jumped the roadway, northeast winds spread the fire to the southwest into the interior of the forest. Fire suppression efforts initially included conducting a burn out operation in the vicinity of Seaborn and Holdston Creek roads, a tactic to deplete the fire of fuel and discouraging it from spreading beyond desired containment lines. A majority of the final acreage burned was attributed to this burn out operation. The fire was eventually contained north of these roads as well as south of Black Swamp and Catfish Lake Roads. The burning of surface vegetation also ignited some peat-laden soils within the fire footprint, a problem often encountered with wildfires during dry years in pocosin fuels common to the coastal plain of the South and Southeastern states. Once ignited, these soils can burn until available fuels are consumed. For this reason, fire managers developed a suppression management plan that delivered water from Great Lake through existing canals to contain and suppress these ground fires. Water handling operations of this magnitude require large volume pump resources along with specialized earth moving equipment to prepare the canals for water delivery.

The fire burned into a non-populated area of the forest and the fire suppression efforts prevented the fire from threatening structures or private property. The primary impact of the fire to the general public came from the smoke that was produced. The most obvious impacts of the smoke is related to breathing and health issues, primarily to the very young, very old, and those with asthma related illnesses. The National Weather Service in Newport works closely with the NC Department of Environment and Natural Resources (DENR) Division of Air Quality during wildfires to forecast the concentration and impacts of the smoke to the public and relay Air Quality Alerts produced by NC DENR to affected Emergency Managers, media outlets and the general public.

Another lesser known hazard from the smoke is the potential for super fog. Super fog forms as smoke and ash from a fire creates abundant condensation nuclei for moisture to condense upon. Under light wind, high humidity and stable conditions, often found during the early morning hours across the Southeast, the combination of smoke and moisture can form very dense fog with visibilities near zero. This makes traveling along roadways extremely dangerous and many tragic accidents have occurred in the vicinity of wildfires and prescribed burns where visibilities rapidly drop to zero as drivers encounter super fog. To help minimize the impacts from a potential super fog event, the National Weather Service also worked closely with smoke and fire behavior analysts at the incident to predict the conditions and areas favorable for super fog formation and issued special weather statements as conditions warranted.

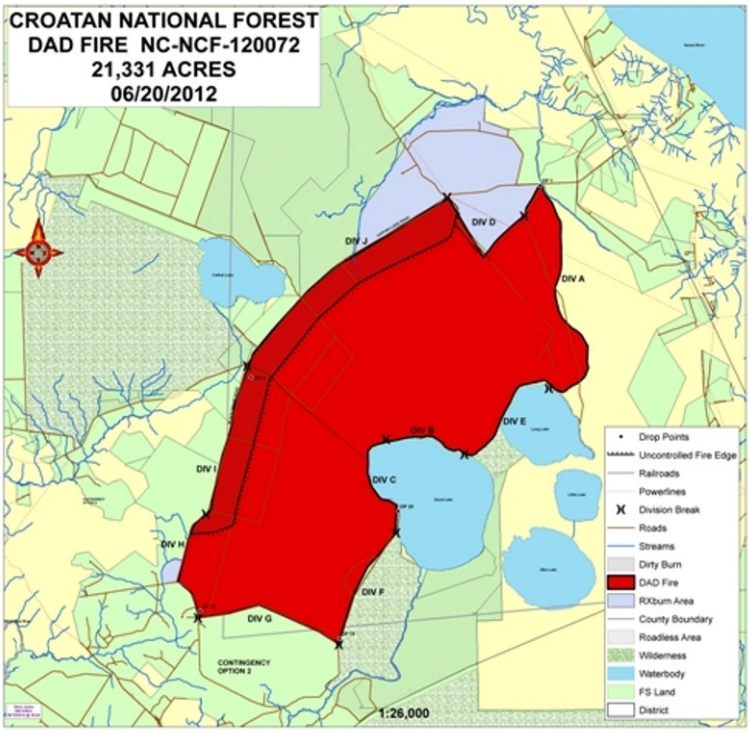
The fire suppression techniques, in addition to improving weather conditions with several rainfall events, helped to stop the progression of the fire as well as alleviate smoke impacts to the general public through the through the last week of June. The Dad Fire was contained around the 6th of July.

DAD FIRE (CONTINUED)

by Scott Kennedy, Meteorologist

Specific Dad Fire information and images (except as noted) were obtained from Inciweb: Incident Information System at: http://inciweb.org/incident/2925/ and US Forest Service press releases at: http://www.fs.usda.gov/alerts/nfsnc/alerts-notices.

Incident Meteorologist Scott Kennedy gives a weather briefing to the Dad Fire crew. Photo by David Glenn



Map of Dad Fire, Croatan National Forest, June 20, 2012

DAD FIRE (CONTINUED)

by Scott Kennedy, Meteorologist

Water pumping operations at the Dad Fire

Smoke plume from the Dad Fire.

Burn scar from the Dad Fire.

DAY AT THE DOCKS

by Andrew McKaughan, Meteorologist

Weather has always had a significant impact on the lives of the residents of the Outer Banks of North Carolina. Whether the impacts come in the form of hurricanes, nor'easters, or summertime thunderstorms, the economy of the area thrives on tourism from beachgoers and that of the local fisherman. The Day at the Docks was started to celebrate the "Spirit of Hatteras" when the village recovered from Hurricane Isabel in 2003 as an intact community, anchored by the commercial and charter fisherman. Staff from the NWS Newport/ Morehead City, NC office had planned on attending the event at Hatteras last year however Hurricane Irene had different plans. The Hurricane caused devastating impacts along the Outer Banks which caused the event to be cancelled. However, in the true spirit of Hatteras, the community once again came together and to put on the 2012 Day at the Docks Celebration.

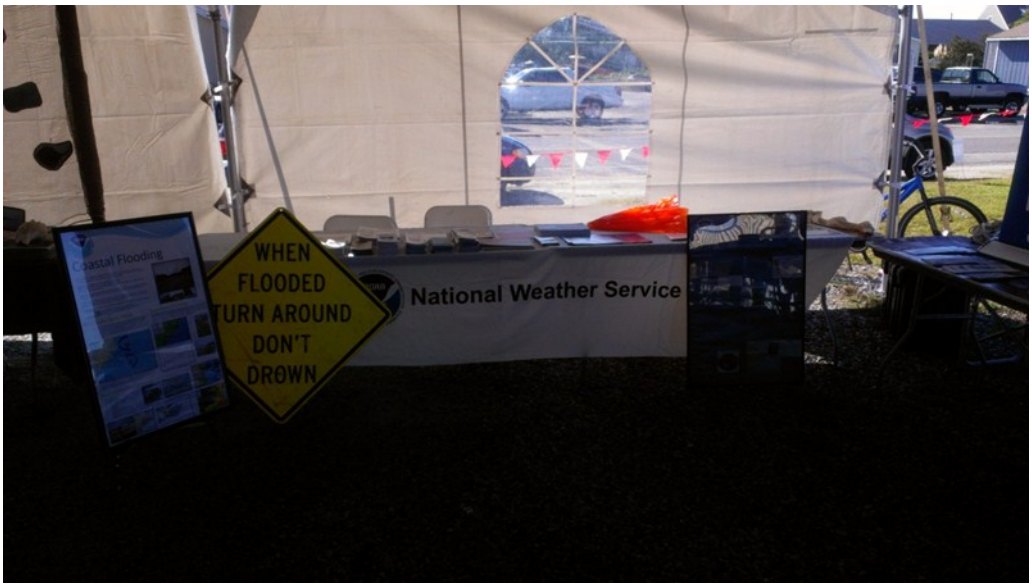
The event spanned four days from Thursday, September 13th to Sunday, September 16, 2012. Three members of the Newport/Morehead City staff travelled to Cape Hatteras early Friday morning to participate in a Town Hall Event at the Graveyard of the Atlantic Museum in Hatteras, NC. John Cole (WCM), David Glenn (General Forecaster) and Andrew McKaughan (Meteorologist Intern) spoke to the crowd about lessons learned from Hurricane Irene, NHC/NWS products, hurricane climatology, as well as hurricane preparedness and safety. The event was well attended by Dare County Emergency Managers, residents and local media.

Meteorologist Intern, Andrew McKaughan, presenting on hurricane climatology at the Graveyard of the Atlantic Museum in Hatteras. Photo taken by: David Glenn

For the main celebration on Saturday, David Glenn and Andrew McKaughan manned a booth at the Hatteras Docks. Approximately two thousand people were in attendance throughout the day on Saturday along the Hatteras Waterfront, many of whom stopped by the NWS booth to obtain informative handouts, ask questions, and give feedback on how we can improve our products and services for the Outer Banks. The NWS Newport/Morehead City team also received numerous requests from area schools, businesses and local research facilities to collaborate and engage in future events in the area.

DAY AT THE DOCKS (CONTINUED)

by Andrew ***McKaughan, Meteorologist***



The NWS Outreach Table at the Day at the Docks. Photo taken by: David Glenn

The Day at the Docks weekend in Hatteras proved to be an excellent way for NWS Newport/Morehead City, NC to build on an already close connection to those living along the Outer Banks and to address the importance of building a Weather Ready Nation in one of our nation's most vulnerable locations.

SKYWARN RECOGNITION DAY

by Hal Austin, Meteorologist

The 14th Annual Skywarn Recognition Day (SRD) Special Event will take place from 7pm Friday, December 7, to 7pm Saturday, December 8, 2012 here at National Weather Service Newport.

Skywarn Recognition Day was developed in 1999 by the National Weather Service (NWS) and the American Radio Relay League (ARRL). It celebrates the contributions that volunteer Skywarn amateur radio operators make to the NWS. On SRD, Skywarn amateur radio operators visit NWS offices and contact other radio operators across the nation and around the world. In the past, NWS offices have contacted all 50 states and more than 40 countries during the 24 hour event.

The NWS and the ARRL both recognize the importance that amateur radio provides during severe weather. Many NWS offices acquire real time weather information from amateur radio operators in the field. These operators, for example, may report the position of a tornado, the height of flood waters, or damaging wind speeds during hurricanes. All of this information is critical to the mission of the NWS which is to preserve life and property. The special event celebrates this special contribution by amateur radio operators.

Here at NWS Newport, in previous years for SRD, operators from ham radio clubs in Carteret County, New Bern, Jacksonville, Oriental, Greenville and Kinston have participated. Some even bring their own equipment and set up a "special event" station and operate from our office! We typically operate on the 2 meter, 440 mHz, 20 meter, 40 meter, and 80 meter bands as well as PSK 31. Our callsign is WX4MHX. The amateur radio station here at NWS Newport has radios that operate on all these frequencies (except PSK 31).

On any given day, we have a pool of radio operators we can call on to come to our office and operate our radios to help gather reports during a weather event. They have been a big help to us in gathering reports during severe thunderstorm outbreaks, as well as "high impact" events like Hurricane Irene and the large tornado outbreak in April 2011. We very much appreciate them giving of their time to help us and the citizens here in central eastern North Carolina!

To learn more about SRD, go to http://hamradio.noaa.gov.

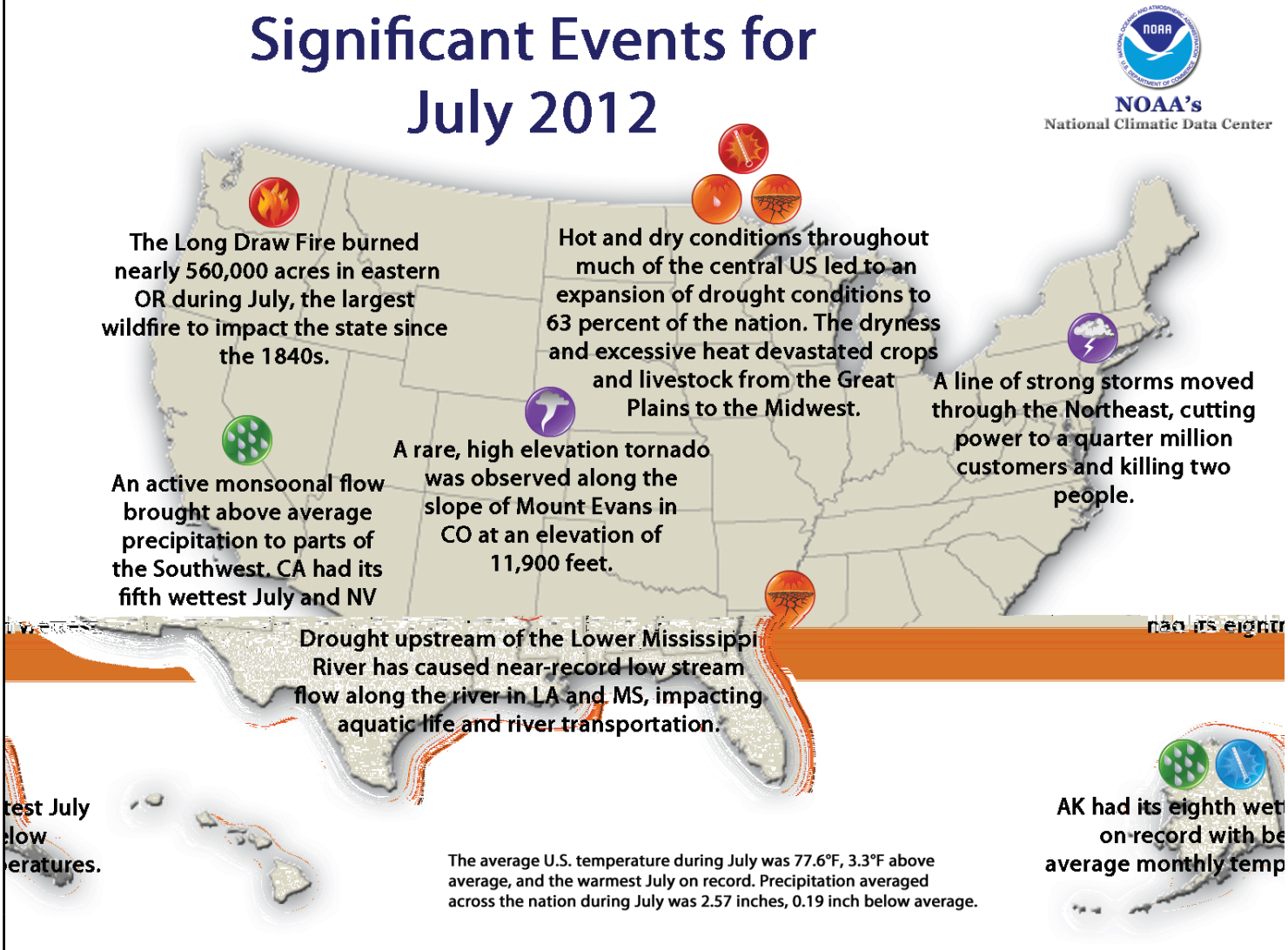
JULY 2012 WAS FOURTH WARMEST GLOBALLY

by Chris Collins, Meteorologist

The globally-averaged temperature for July 2012 marked the fourth warmest July since record keeping began in 1880. July 2012 also marks the 36th consecutive July and 329th consecutive month with a global temperature above the 20th century average. The last below-average temperature July was July 1976 and the last below-average temperature month was February 1985. Higher-than-average monthly temperatures were most notable across southeastern Europe and most the United States and Canada, while temperatures were much cooler than average in Australia, northern and western Europe, eastern Russia, Alaska, and southern South America.

The average temperature for the contiguous U.S. during July was 3.3°F (1.8°C) above the 20th century average, marking the warmest July and all-time warmest month since national records began in 1895. The previous warmest month for the nation was July 1936 when the average U.S. temperature was 77.4°F (25.2°C) .

It was not only hot in July but dry as well. According to the U.S. Drought Monitor, as of July 31st, 62.9 percent of the contiguous U.S. was experiencing moderate to exceptional drought. The maximum value of 63.9 percent reached on July 24th is a record in the 13-year history of the USDM. The percent area of the country in the worst drought categories (extreme to exceptional drought) doubled, from 10 percent last month to 22 percent this month. The extreme dryness and above-average evapotranspiration due to excessive heat devastated crops and livestock from the Great Plains to Midwest. Fortunately, ample rainfall greatly improved drought conditions across eastern North Carolina in July, and the situation improved drastically with a rather wet August.



THE STORM READY PROGRAM

by John Cole, Meteorologist

We live in the most severe weather-prone country on Earth. Each year we have an average of 10,000 thunderstorms, 5,000 floods, 1,000 tornadoes, and an average of 2 landfalling deadly hurricanes. And this on top of winter storms, intense summer heat, high winds, wild fires and other deadly weather impacts.

Some 90% of all presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly $14 billion in damage. StormReady, a program started in 1999 in Tulsa, OK, helps arm America's communities with the communication and safety skills needed to save lives and property--before and during the event. StormReady helps community leaders and emergency managers strengthen local safety programs.

We deal with a multitude of severe weather events in eastern North Carolina. On April 16, 2011, an outbreak of tornadoes occurred across the area including several strong tornadoes which resulted in millions of dollars in damages and numerous injuries. Hurricane Irene in late August of 2011 devastated areas adjacent to the Pamlico Sound with a major storm surge, and caused 2 direct fatalities in Pitt Co. On July 1st of this year a thunderstorm complex raked the area with winds of 70 to 85 mph causing the deaths of three individuals.

StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. No community is storm proof, but StormReady can help communities save lives. To be recognized as StormReady a community must have a 24 hour warning point and emergency operations center, have more than one way to receive severe weather warnings and forecasts and to alert the public, have a system which monitors local weather conditions, promote the importance of public readiness through community seminars, and develop a formal hazardous weather plan which includes training severe weather spotters and holding emergency exercises.

Currently, there are 10 counties in NOAA/NWS Newport/Morehead City 15 county warning area which are StormReady. They are: Carteret, Craven, Dare, Duplin, Lenoir, Martin, Onslow, Pamlico, Pitt, and Washington counties. Camp Lejeune and East Carolina University is StormReady as well. The newest addition to our StormReady ranks is the town of Pine Knoll Shores deemed StormReady on 8/24/12. A recognition ceremony will be held on September 13th at the Town Hall. More information on StormReady can be found at the following website: http://www.stormready.noaa.gov/

WEATHER READY NATION

by John Cole, Meteorologist

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Last year, NOAA launched a comprehensive initiative to build a "Weather-ready" nation. The purpose of the Weather-Ready Nation initiative is first and foremost to save more lives and livelihoods. By increasing the nation's weather-readiness, the country will be prepared to protect, mitigate, respond to and recover from weather-related disasters. In the past 30 years, the United States has experienced a total of 108 weather-related disasters that have caused more than $1 billion dollars in damages. Overall, these disasters have resulted in three-quarters of $1 trillion in standardized losses since 1980, according to NOAA records.

Society's ability to prepare for natural disasters requires a societal response equal to the risk. Government cannot do this alone, which is why the NWS is leveraging its vast nationwide network of partners, and incorporating new partners who are beginning to share the vision of building a Weather-Ready Nation. Partners include other government agencies and emergency managers, researchers, the media, insurance industry, non-profits, the private sector and more.

The National Weather Service is charting a path to a weather-ready nation through:

- Improved precision of weather and water forecasts and effective communication of risk to local authorities
- Improved weather decision support services with new initiatives such as the development of mobile-ready emergency response specialist teams
- Innovative science and technological solutions such as the nationwide implementation of Dual Pol radar technology, Integrated Water Resources Science and Services, and the Joint Polar Satellite System
- Strengthening joint partnerships to enhance community preparedness
- Working with weather enterprise partners and the emergency management community to enhance safety and economic output and effectively manage environmental resources.

Because a truly Weather-Ready Nation requires the action of each person and community, NOAA's National Weather Service is calling on all of us to Be a Force of Nature when it comes to extreme weather. Being a force of nature means never bowing to extreme weather. It means taking appropriate actions before, during and after extreme weather. Even more than that, being a force of nature means inspiring others to do the same through setting an example in your community and social networks. For more information on "Weather Ready" nation see the following website: http://www.nws.noaa.gov/com/weatherreadynation/

National Weather Service

Wind Chill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

1-800-889-6889