



FAMOUSLY HOT

# FORECASTS



## Spring/Summer 2020

## Easter Tornado Outbreak

### Inside this issue:

Easter Tornado Outbreak	1
Drought Turns to Flood	4
SKYWARN Recognition	5
Office Activities	6
Summer Weather Hazards	7
COOP Corner	8
WRN Ambassador	11

by Whitney Smith - Meteorologist

**D**uring the early morning hours on Monday, April 13th, 2020 a strong storm system produced one EF-1, two EF-2, and five EF-3 tornadoes in central South Carolina and east-central Georgia. It was the most significant outbreak for the area since March 28, 1984. Numerous reports of damage were relayed to forecasters throughout the event including extensive tree damage and damage to a number of homes and businesses. Over the course of five days, NWS Columbia deployed storm survey teams to further investigate the reports and to determine the strength and path of the tornadoes.

The pattern driving the severe weather involved an upper level closed low shifting east-northeastward into the Ohio Valley Monday morning. A warm front had lifted north through the region on Sunday, but the main driver was a cold front moving through early Monday morning. The mesoscale environmental conditions favored damaging winds as the primary severe threat and supported strong (EF-2+) tornado development. The Storm Prediction Center (SPC) had included central South Carolina and east-central Georgia in an enhanced risk of severe weather. Strong instability and strong atmospheric shear were in place. The SPC 08Z mesoanalysis data showed the highest mixed layer convective available potential energy (MLCAPE) over the southeastern South Carolina Midlands and lower Central Savannah River Area (CSRA) of Georgia at 2000 J/kg. The SPC mesoanalysis showed 07Z 0-1 km bulk shear values of 45 to 50 knots and 08Z surface to 6 km shear of 80 knots across the forecast area. The probability of a supercell EF-0 or stronger tornado based on effective layer significant tornado parameter (STP) was 41%. A pre-frontal quasi-linear convective system (QLCS) began

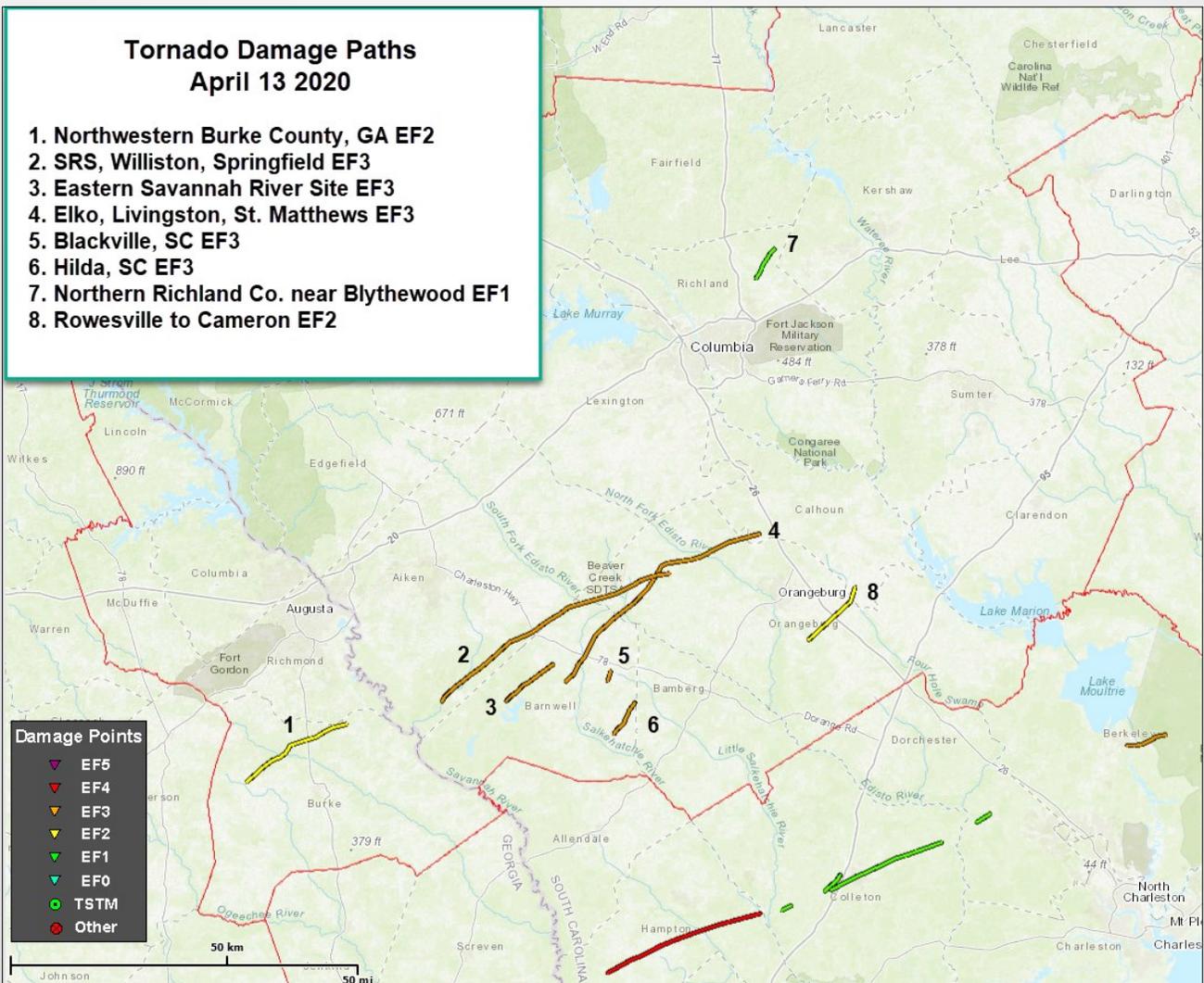


EF-2 tornado damage in Burke County, GA from the April 13, 2020 storms

# Easter Tornado Outbreak— Continued

moving into the CSRA around 4 am Monday morning. The first severe thunderstorm warning for the CSRA was issued at 4:08 am for Columbia, Lincoln, and McDuffie counties. A total of 25 warnings were issued before 7:00 am that morning including 16 severe thunderstorm and 9 tornado.

A survey team determined that the first tornado of the day occurred at 4:53 am north-east of Vidette in northern Burke County, Georgia and was an EF-2 in strength with maximum wind speeds of 125 mph. The tornado was responsible for numerous uprooted or downed trees, damage to several homes and buildings, and damage to a dairy farm. An EF-3 tornado then touched down in the Savannah River Site at 5:21 am and continued traveling in a general northeast direction for 33.5 miles through Williston and Springfield. Maximum wind speeds of 140 mph were reached which destroyed a few cinder block buildings, partially collapsed a brick wall of a home, snapped trees near their bases, moved a mobile home off of its foundation, and damaged roofs to several homes. The third tornado started at 5:33 am in the eastern Savannah River Site in Barnwell County with maximum wind speeds of 138 mph. This tornado knocked down a larger number of trees and also showed an impressive damage scar on Sentinel Satellite Data and debris on radar. A long-track tornado producing EF-3 damage began just south of the town of Elko in Barnwell County at 5:43 am. The tornado then moved in a general northeast direction through Orangeburg County, before dissipating southwest of St. Matthews in Calhoun County. Sadly, there were two confirmed fatalities



# Easter Tornado Outbreak— Continued

and seven injuries. In addition to tree damage, the tornado heavily damaged or destroyed several wood framed and manufactured homes, lifted a portion of a roof on a brick home, destroyed a fifth wheel camper, and knocked over a pivot irrigation system. The two fatalities occurred to residents in a double-wide manufactured home. The Blackville tornado began at 5:49 am and reached EF-3 strength with winds up to 140 mph. It damaged several chicken houses, collapsed a large segment of a warehouse twisting large steel support beams, and caused 30 cylindrical containers weighing up to 20- 25 thousand pounds to lift out of their saddles and roll through the facility. The EF-3 Hilda tornado in Barnwell County began at 5:50 am. A garage had its metal roofing peeled off, a metal building and tin tractor shed were completely destroyed, a home had part of its roof lifted off, a two story wood frame building was shifted off its foundation and destroyed, and a log cabin was destroyed. The EF-1 tornado that began at 5:52 am southeast of Blythewood in Richland County mainly caused tree damage or minor damage to roofs. The final tornado began near Rowesville in Orangeburg County at 6:25 am and reached EF-2 strength with maximum winds of 119 mph. The tornado snapped and downed numerous trees, damaged a tractor dealership, and damaged grain silos and outbuildings.

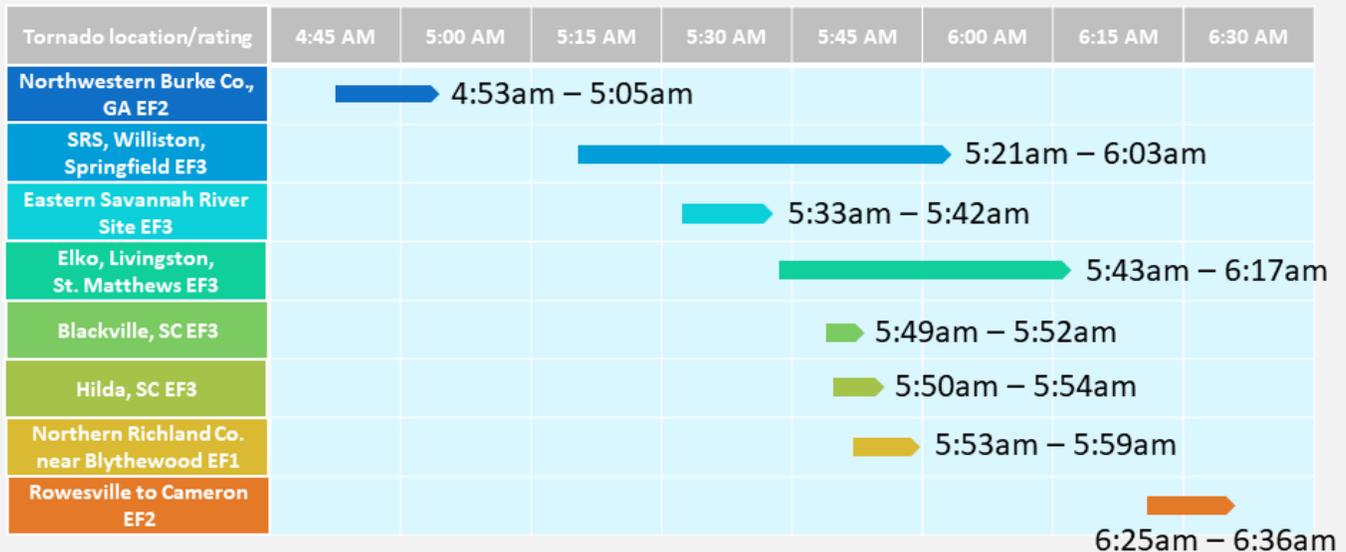


Columbia, SC



## TIMELINE OF EVENTS

April 13<sup>th</sup> 2020 Tornado Outbreak



An interesting finding that emerged from analyzing the damage survey data was that from 5:50 am to 5:54 am, there were four confirmed tornadoes on the ground simultaneously in central South Carolina. Four debris signatures were also evident in the correlation coefficient dual polarization radar product. Radar also indicated that two of the tornadoes got very close to one another between Springfield and Livingston and that some sort of interaction may have occurred. The storm surveys also showed that the damage paths crossed one another, but a detailed study is ongoing at NWS Columbia to determine whether the vortexes actually merged. The tornadoes from this outbreak were so powerful and lifted so much debris into the air, that even after some of the tornadoes were no longer making contact with the ground, the radar still indicated a distinct debris fallout signature for several miles.

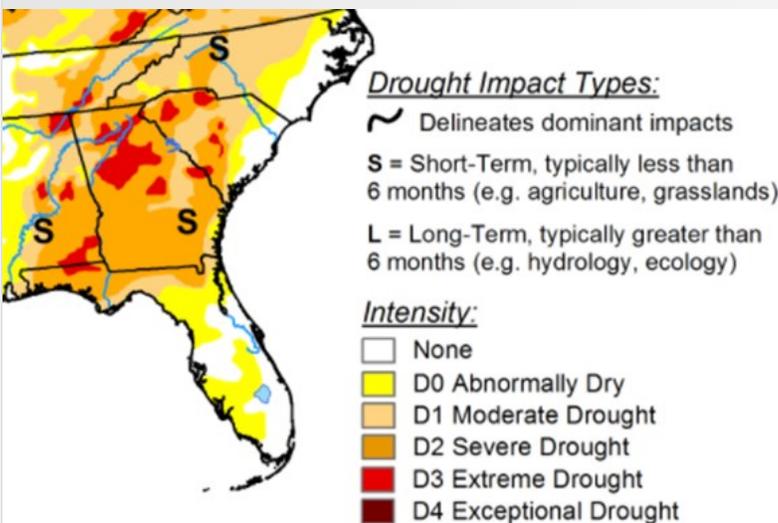
# Late Summer & Early Fall Drought Turns into Winter Flooding

by Hunter Coleman - Meteorologist

Just a few months ago much of the state of South Carolina and most of Georgia were experiencing moderate to extreme drought. Rainfall amounts across the southeastern states through the months of September and October were well below normal and this contributed to much of the increasing drought conditions during that time. It started in July when Columbia was nearly 1 inch below normal rainfall for the month. In August, Columbia received only 1.40" of rain which was nearly 4 inches below normal! In September, Augusta Bush Field received only 0.77" which was 2.45" below normal for the month. By the middle of October 2019, portions of SC and GA were in moderate to extreme drought (see graphic below). A lack of tropical storms impacting the region could explain some of the lower than normal rainfall during that period.

Columbia Metropolitan Airport			
Month	Rainfall	Normal	Departure
July	4.50	5.46	-0.96
August	1.40	5.26	-3.86
September	1.95	3.54	-1.59
October	2.36	3.17	-0.81
November	3.00	3.26	0.26
December	9.31	3.22	6.09
January	5.84	3.58	2.26
February	5.48	3.61	1.87

A shift in the upper flow pattern to a more active southern jet stream seemed to be the turning point from drought to flooding rains as every month since November Columbia has seen above normal precipitation. In December, Columbia received over 9 inches of rain, more than 6 inches above normal, with over 4 inches of that falling in a single day on December 13th. Augusta also received over 8 inches in December which was nearly 5 inches above normal. The final total winter rainfall for Columbia Metro Airport was 20.63", which broke the record for the wettest winter ever recorded. Augusta Bush Field had the 3rd wettest winter on record with a total of 19.85". The rainfall surplus was not confined to just our area as many states across the southeast had a top ten wettest winter with GA and AL having their wettest on record and SC was second wettest on record.



The excessive rainfall combining with vegetation going dormant for the winter resulted in significant river flooding during the month of December which continued through January and February. Mainstem rivers went into flood often and remained in flood for several days up to a week or more in some instances. Many rivers reached a top 10 crest in February flooding with the Congaree River at Gadsden recording a 2nd highest crest of 19.54 feet, Congaree River at Carolina Eastman recording a 3rd highest crest of 126.40 feet and Wateree River at Lake Wateree recording its 2nd highest pool elevation at 106.04 feet.

Drought monitor graphic from October 15, 2019

# 20th Annual SKYWARN Recognition Day

by Doug Anderson - Observations Program Leader

Every year on the first Saturday in December, NWS offices hold a special event to commemorate the critical contributions of our SKYWARN Storm Spotters. December 7, 2019 marked a special day – the 20<sup>th</sup> anniversary of the event. Back in 1999, the National Weather Service and the American Radio Relay League started SKYWARN Recognition Day, an annual event celebrating the SKYWARN Storm Spotter Program, reaching out across state and global borders to contact each other via amateur radio.



Don Zupon, W3MIF makes a ham radio contact with another station.

Here at the NWS Columbia Forecast Office, we also welcome our Cooperative Weather Observers, honoring them along with our SKYWARN volunteers. Both groups of citizen scientists directly contribute to our primary mission of issuing accurate forecasts and warnings in order to protect lives and property.

SKYWARN spotters and COOP Observers serve as our “eyes”, reporting significant weather events as they unfold. Most people don’t realize that our WSR-88D radar can’t tell us what’s actually happening on the ground.

SKYWARN and COOP real-time, ground-truth reports give forecasters critical information when decisions are being made on severe weather warnings and advisories. These observations include tornado locations on the ground; flooding that is occurring or imminent; precipitation amounts, and precipitation changes from rain to freezing rain or snow.



Radar Interpretation for SKYWARN Spotters Class Session

Every year, 30-60 volunteers arrive at our office, attending Spotter, Radar and Observing classes, operating a special event ham radio station, and enjoy lots of good food, fun and fellowship. Our radio station reached out to 34 other states and 12 countries across the world. We had a great time, and look forward to seeing you for this year’s SKYWARN Recognition Day on Dec 5<sup>th</sup> 2020!

# Office Activities Update

by Chris Rohrbach - Meteorologist

## Celebrating the careers of two long-time CAE employees

On Thursday February 27th 2020, current and former employees of the NWS Columbia Weather Forecast Office got together to celebrate the careers of two long-time employees. Jeff Linton and Al Moore both joined the National Weather Service in 1985 and retired during the late Winter/Spring of 2020. Jeff came to the Columbia, SC Weather Forecast Office in 1989 while Al moved to the office in 1995. At retirement, Al was a Hydro-Meteorological Technician and Jeff was a Lead Meteorologist. Both were well-respected and liked by everyone in the office. They helped pave the future of the Weather Service during the Modernization Era in the 1990s which involved adapting to new technologies and a new field structure. Personally, I will always remember Jeff's ability to code new programs lightning-fast and Al's diligence and attention to detail in every aspect of his job.



Jeff Linton (left) and Al Moore (right) at their retirement party on 02/27/2020

## Bidding farewell to one of our forecasters

On January 14<sup>th</sup> 2020, the office hosted a going away party for Rachel Cobb. Rachel will be joining the Weather Forecast Office (WFO) in Northern Indiana as a Lead Meteorologist. She arrived at NWS Columbia as a General Forecaster (Meteorologist) in November of 2016 from the Pendleton, OR WFO. During her time at our office Rachel led several teams including the office's Safety Team and the Satellite/Lightning Team which sought to improve forecasts and warnings using the latest GOES Satellite technology. She also served on the office's Fire Weather, Impact-Based Decision Support Services (IDSS) and Outreach teams. As an active member of the DSS team, Rachel provided outstanding on-site support to South Carolina State Emergency Management (SCEMD) and the Governor's Office during Hurricane Irma. She also provided weather briefings and support during "Operation Compassionate Care" which was a full scale exercise conducted by the U.S. Army with support from multiple federal, state, and local agencies and non-profit organizations. We wish her all the best at her new office!



Rachel Cobb at her farewell party on 1/14/2020

# Summer Weather Hazards

by Whitney Smith - Meteorologist



Severe weather in the United States causes numerous deaths and injuries and billions of dollars of damage. In a typical year, more than 1,200 tornadoes occur throughout the United States and nearly 12,000 reports of wind and hail are received from local law enforcement and the public. National Weather Service forecasters are the first line of defense in predicting severe weather.

Lightning is one of the most erratic and unpredictable characteristics of a thunderstorm. Because of this, no one can guarantee an individual or group absolute protection from lightning. However, knowing and following proven lightning safety guidelines can greatly reduce the risk of injury or death.

Most lightning victims are not struck during the worst of a thunderstorm, but rather before or after the storm reaches its greatest intensity. This is because many people are unaware that lightning can strike as far as 25 miles away from its parent thunderstorm, much farther out from the area of rainfall within the storm!

Therefore, if you can hear thunder, you are within striking distance. Seek safe shelter immediately. Remember this lightning safety rule: WHEN THUNDER ROARS, GO INDOORS...and stay there until 30 minutes after the last clap of thunder. Do not wait for the rain to start before you decide to seek shelter, and do not leave shelter just because the rain has ended.

## *Know your Risk, Take Action, Be a Force of Nature!*

Heat is one of the leading weather-related killers in the United States, resulting in hundreds of fatalities each year and even more heat-related illnesses. OSHA offers a free [OSHA Heat Safety App](#) for both Android and iPhone. It is **NEVER** safe to leave a toddler, disabled person or pet locked in a car, even in the winter. If you have a toddler in your household, lock your cars, even in your own driveway. Kids play in cars or wander outside and get into a car and can die in 10 minutes! A reported 51 young children died in hot cars in 2019! Cars can heat up quickly when left in the sun.

**#SummerSafety**



# COOP Corner

by Doug Anderson - Observations Program Leader

## Cooperative Weather Stations Serve Our Nation



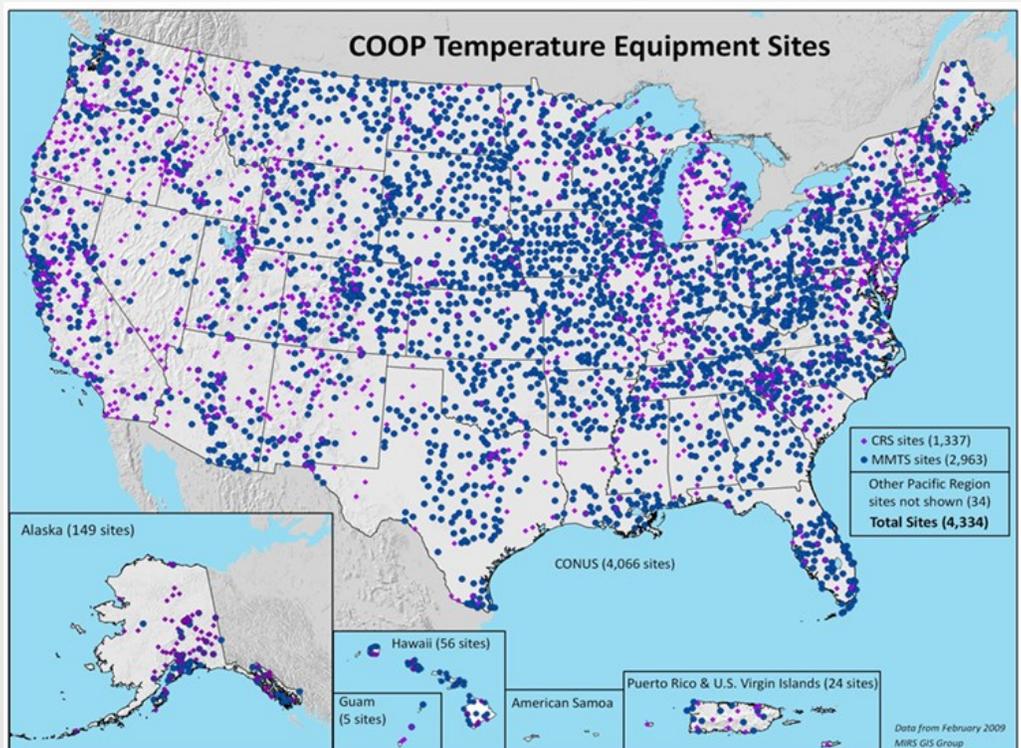
There are many locations across our country where volunteers take daily weather observations using NWS-supplied equipment. The cooperative observers (COOP) fill in gaps between other, more routine reporting locations, such as airports. The equipment meets NWS standards and is installed in accordance with strict guidelines to ensure accuracy and uniformity. About 10,000 volunteers around the country provide this valuable service. We are always looking for new observers that are willing to take observations over many years come to join the NWS CAE team . If you are interested in becoming an observer and live in one of the following communities in SC: Bishopville, Camden, Euataville, Kershaw, Lancaster, Pageland, Patrick, Jefferson, McBee, Rimini/Santee, Jackson, Springfield, or St. Matthews or in Hepzibah, GA, please contact [Doug Anderson](#).

## What Does a COOP Station Look Like?

Many people are surprised that NWS-issued COOP equipment isn't wireless, high-tech, or super fancy. The basic requirements of temperature, rain and snow measurements involve proven, accurate equipment, but they also require some human interaction to be quality-controlled so bad data does not slip through to the meteorologists.

First, where are COOP stations? Just about everywhere that Americans live, work and play. Our region has stations installed not only at our observers' homes, but also water plants, fire stations and many other locations.

Regardless of what equipment is used, it has to be installed and sited correctly for measurements to be accurate. That's why NWS prefers to use the same type of equipment all across the country. That way, the equipment is calibrated and maintained at every station as much as possible. Putting the equipment in the right spot is also very important. For example, if a temperature sensor is installed next to a heat pump, building, on a roof, on or near a concrete or asphalt parking lot, the temperature readings would be inaccurate.



# COOP Corner— Continued

Rain gauge placement is also very important. Gauges should be placed in an open area with no obstructions like trees, bushes and buildings that may interfere with the gauge “catching” all the rain that falls. Many people ask why we don’t use fancy electronic systems. The biggest reason is that in heavy rain, the mechanical and electronic “tipping bucket” inside cannot keep up to count the number of “tips” that the little cup inside makes to count each increment of 0.01 inches. Our 8-inch and 4-inch rain gauges trap and keep everything that falls into them.



8-inch and 4-inch rain gauges

As a general rule, if there is a tree or something else near the gauge, the gauge should be placed at least twice as far from it than the obstruction’s height. That’s the bare minimum...it’s best to shoot for at least 4 times as far away than its height (e.g. 20-foot tree, rain gauge placed 80 feet away).

Being a COOP observer does require some manual reading and resetting of the equipment that we provide. There are newer systems being tested that will hopefully make the job easier, but even now, each weather observation only takes a few minutes each day.



Snow board, snow stick, and evaporation pan



Palmer Soil Thermometer



Maximum-Minimum Temperature System (MMTS)



# COOP Corner— Continued

## Holm Award Presentations

Two of our observers were selected for the prestigious John Campanius Holm Award. This is the second highest honor NOAA can bestow on volunteer observers. We are pleased to report that the awards were recently presented to Darwin Morris of Appling, Georgia and Tom Jones of Chesterfield, SC.

The history of the Appling weather station began in 1957, when Darwin's grandfather, Roy Tankersly, started recording COOP weather data for the U.S. Weather Bureau. 20 years later, Darwin took over his family's legacy of volunteer service, and is still reporting daily weather observations to us here at the National Weather Service. Over the past 43-plus years, Darwin has observed record 24-hour rainfall of 9.5 inches (Oct 12, 1990), snowfall of 6 inches (Mar 25, 1983), record temperatures of 107F (Jul 1, 2012) and -4F (Jan 21, 1985).



Darwin Morris accepts his John Campanius Holm Award



Tom and Frances Jones accept their 35-Year Service Award

Mr. Tom Jones volunteered to establish a new station in Chesterfield, SC and started recording COOP weather observations for the program in 1989. No weather records were available for the Chesterfield area until he stepped up, with the nearest long-term records existing in Pageland and Cheraw. Together with his wife Frances, the Jones's have observed record 24-hour rainfall of 10.82 inches (Sep 16, 2018), snowfall of 7 inches (Jan 25, 2000), and temperatures of 108F (Aug 9-11, 2007) along with 6F (Jan 7, 2018 & Jan 30, 2014).

Winning a Holm Award is a significant milestone for any COOP Weather Observer. Every year, National Weather Service Offices across the country nominate observers

with exemplary weather records, community involvement and significant contributions to the NWS mission. From a pool of thousands of eligible observers, no more than 25 Holm Awards are given by NOAA each year. The award is named after and is in the tradition of John Campanius Holm, a Lutheran minister who is the first known person to have taken systematic weather observations in the American Colonies (1644-1645). Congratulations to Darwin and Tom! We can't thank you both enough for your faithful and outstanding service.

## Welcome to our New Observer: Allen Johnson

After winning service awards of up to 40 years and the Holm Award, Mr. Olin Berry of Johnston, SC decided it was time to pass the torch to a new generation. We are excited and very thankful that Allen Johnson volunteered to keep the Johnston, SC COOP station alive. Welcome to the team, Allen, and thank you for your service.



Allen Johnson at his station in Johnston, SC

# Weather Ready Nation Ambassador Initiative

by John Quagliariello - Warning Coordination Meteorologist



The [Weather-Ready Nation](#) (WRN) Ambassador initiative is the National Weather Service's (NWS) effort to formally recognize NWS partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water and climate events. The WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards.

## To be recognized as a WRN Ambassador, an organization must commit to:

- ⇒ Promoting Weather-Ready Nation messages and themes to their stakeholders
- ⇒ Engaging with NWS personnel on potential collaboration opportunities
- ⇒ Sharing their success stories of preparedness and resiliency
- ⇒ Serving as an example by educating employees on workplace preparedness

## To support the efforts of WRN Ambassadors, the NWS can:

- ⇒ Provide outreach content about creating a Weather-Ready Nation
- ⇒ Explore innovative approaches for collaboration with your organization
- ⇒ Assist with [StormReady](#) opportunities for communities
- ⇒ Recognize your organization as a WRN Ambassador
- ⇒ Share the WRN Ambassador logo for your use



We must involve everyone in an effort to move people, and society, toward heeding warnings, taking action, and influencing their circles of family, friends, and social network to act appropriately. The WRN Ambassador initiative is the connecting hub of a vast network of federal, state, and local government agencies; emergency managers and city planners; researchers; the media; the insurance industry; nonprofit organizations; the private sector; and many others who are working together to address the impacts of extreme weather on daily life.

## How to Become a WRN Ambassador:

Any organization across all levels of government, businesses large and small, non-profit and non-governmental organizations, and academia can become a WRN Ambassador by submitting a short online [application](#).



# WRN Ambassador– Continued

## 2019 WRN Ambassador of Excellence Award: Richland Library



Richland Library stands out as a WRN Ambassador with their ongoing efforts to educate the public about weather preparedness. They have hosted a hurricane preparedness panel discussion that included NWS, state, media, and non-profit partners, and featured a weather forecasting activity during their annual Learn Freely Fest. Additionally, Richland Library regularly promotes NWS Preparedness Weeks and Campaigns, and provides severe weather



information on their website, social media, and digital signage.

### NWS Columbia would like to recognize all of our WRN Ambassadors:

- 28th Operational Weather Squadron Shaw AFB
- Aiken County Emergency Management Division
- Aiken Regional Medical Centers
- Augusta-Richmond County EMA
- Augusta University
- Bamberg County Emergency Services
- Barnwell County Emergency Management
- Buford Fire & Rescue
- Burke County EMA
- Calhoun County Emergency Management Agency
- Carolinas Integrated Sciences & Assessments (CISA)
- Challenger Learning Center of Richland District One
- Chris Wolfe SC Weather
- City of Columbia Police Department
- City of Sumter
- Columbia County Emergency Management Agency
- Columbia Metropolitan Airport
- CSRA East Central District Amateur Radio
- CSRA Weather
- District Five of Lexington and Richland Counties
- Dominion Energy SC
- Edgefield County EMA
- GA Dept. of Public Health - East Central District
- Gold Cross EMS
- Kershaw County Amateur Radio Club, Inc.
- Kershaw County Emergency Management
- Lady Starr Radio
- Lancaster County Emergency Management
- Lee County Emergency Management
- Lexington County Emergency Management Division
- Livingston Insurance
- McCormick County Emergency Services
- McDuffie County Fire Rescue Service
- Michelin Tire North America - Lexington, SC
- @Midlands\_Wx
- Montmorenci Volunteer FD
- Newberry County Emergency Services Alliance
- Orangeburg County Emergency Services
- Orangeburg County Fire District
- Palmetto Chapter - American Meteorological Society
- Pantagraph.online
- Pee Dee Ice & Fuel, Inc.
- Richland County Emergency Services
- Richland Library
- Robert Bryant & Son, Inc.
- SC DOT- Traffic Management
- SC State Fire
- Simply Flood LLC
- South Carolina Emergency Management Division
- South Carolina Farm Bureau Insurance
- South Carolina State Climatology Office
- The Times and Democrat
- University of South Carolina Emergency Management
- USGS South Atlantic Water Science Center
- US Postal Service (National Preparedness)
- WAGT (Augusta, GA)
- Wilbur's Last Ride
- WFXG FOX 54 NEWS NOW (Augusta, GA)
- WIS-TV (Columbia, SC)
- WJBF-TV (Augusta, GA)
- WLTX-TV (Columbia, SC)

National Weather Service

Columbia Weather Forecast Office

2909 Aviation Way West Columbia, SC 29170-2102

(803) 822-8135

[www.weather.gov/cae](http://www.weather.gov/cae)

