NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Columbia, SC
Weather Forecast Office

FAMOUSLY HOT

FORECASTS

Spring/Summer 2023

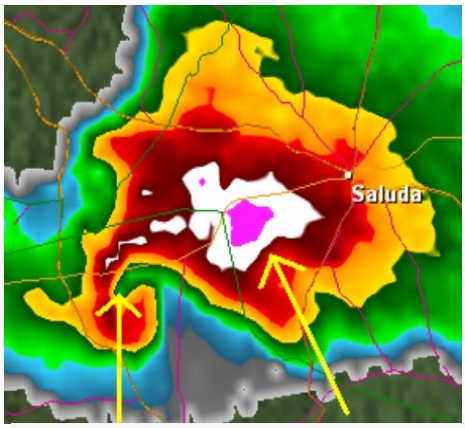
Inside this issue:

15th Anniversary of 2008 Tornado Outbreak

by Hunter Coleman - Lead Meteorologist

A significant tornado outbreak impacted the state of South Carolina and in particular the Midlands of South Carolina and Central Savannah River Area of east central Georgia on March 15th of 2008. Seven long lived supercells tracked across the region and spawned numerous minor tornadoes and several strong (EF2-EF3) tornadoes causing an estimated 40 million dollars in damage. Very large hail also accompanied these storms with multiple reports of golf ball size hail.

This was the first large scale, high impact severe weather event that I remember working since arriving in Columbia in 2006, and one I will never forget. I was one of two radar operators with warning responsibilities as another forecaster and myself sectorized our warning area due to the number of supercell thunderstorms that were going to move through our region. The environment was favorable for strong severe thunderstorms and the Storm Prediction Center had our area outlook in a moderate risk, including significant severe hazards (EF2 or stronger tornadoes, 2 inch or larger hail, and 75+ mph winds). This was ultimately upgraded to a high risk during the afternoon of the outbreak. This event was relatively short lived from around 3:30pm through 8:30pm but was devastating in the impacts. Despite the widespread damage that occurred, it was very fortunate that there were no fatalities in this event in our area.



Radar Imagery of Supercell

A mobile home destroyed by an EF2 Tornado near Prosperity, SC

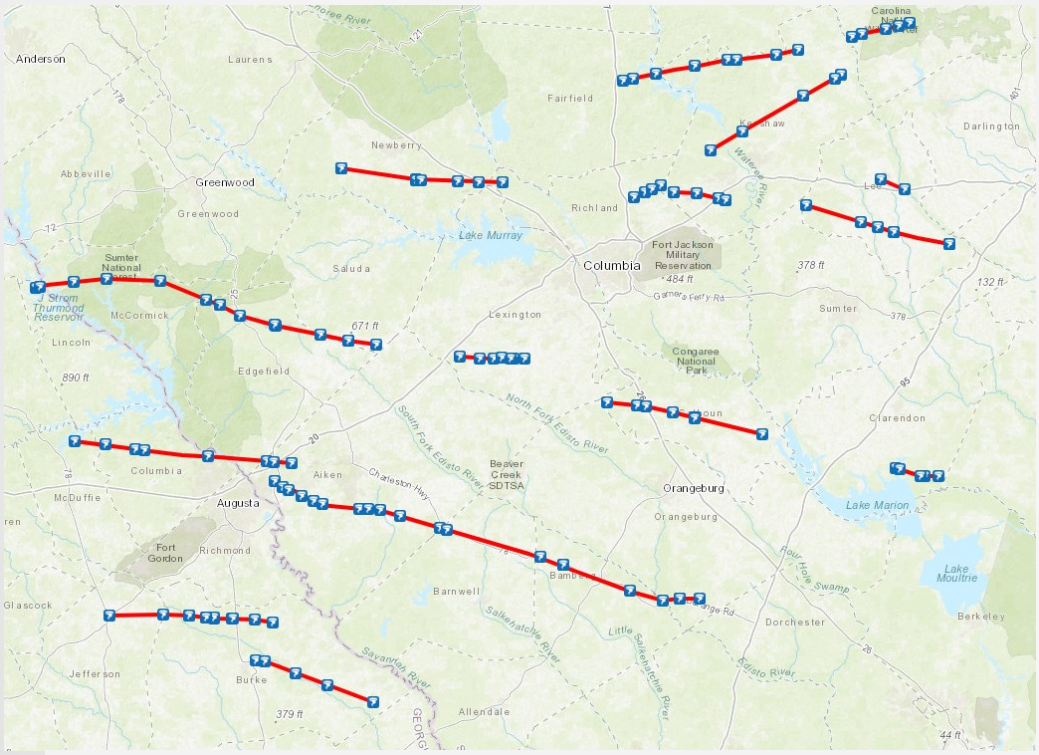
Tree trunks snapped near the base

Tornado Outbreak – Continued

EF2 damage to dairy farm in Burke County

EF3 damage to homes in Newberry County

These types of widespread significant severe events have historically been infrequent in our area, but we have seen an increase in the frequency of higher impact events in our region in the last decade or so. In fact, I happened to be the lead forecaster on duty and primary radar operator for the early morning historic tornado outbreak on April 13, 2020 which featured 8 tornadoes in our area (5 EF3, 2 EF2, 1 EF1) and unfortunately resulted in 2 fatalities and additional injuries. Find more information and a full review of the March 15, 2008 event here.

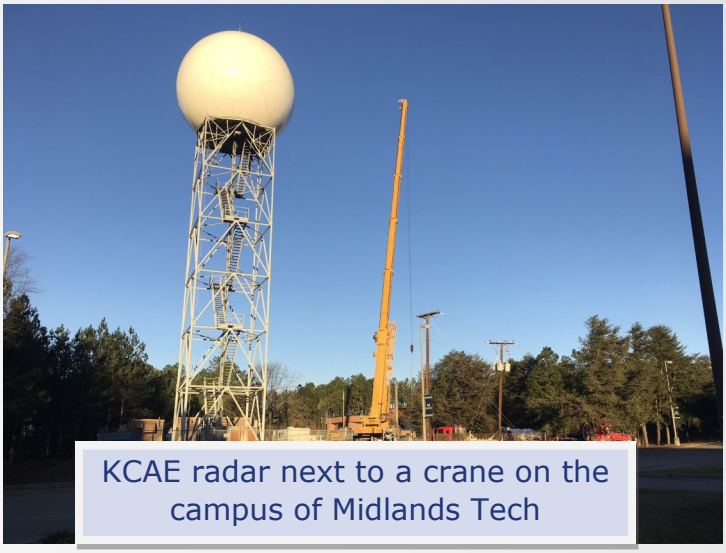


Map of all the tornadoes that occurred in central SC and east central GA on March 15th, 2008.

NWS Columbia Radar Undergoes the Service Life Extension Program Process

by Steve LaVoie - Meteorologist

Weather radar is one of the most important tools meteorologists have for diagnosing severe thunderstorms and tornadoes among other types of weather phenomena. Our current system, known as the next generation radar network or NEXRAD for short, became operational in the 1990s. Keeping these radars running at peak efficiency is crucial to the mission of the National Weather Service. As the radar ages, the chance of critical components malfunctioning increases. The loss of any part of the radar could leave it down for days or perhaps weeks. This is where the Service Life Extension Program (SLEP for short) comes into play. The SLEP process will upgrade radars across the country to keep them fully functioning until the year 2030 or beyond. The SLEP process involves replacing and refurbishing major components of each of the 159 radars in our network, the most significant of these parts being the pedestal which rotates the antenna. This is not the first time NEXRAD has been upgraded. About 10 years ago, the radars became capable of dual polarization which allows them to simultaneously transmit and receive data in the horizontal and the vertical vastly increasing our ability to analyze thunderstorm structure among other things. The SLEP process was completed for the NWS Columbia radar, located on the campus of Midlands Technical College, in February 2023. On a chilly Saturday morning, crews lifted the radar's protective dome off so that the pedestal could be replaced. While the radar was down for a couple weeks, the exchange of the pedestal was done in a few hours. As of the end of March 2023, 80% of the NEXRAD network has undergone the SLEP process including most of our neighboring radars.



KCAE radar next to a crane on the campus of Midlands Tech

The crane lifts the dome protecting the radar to replace the pedestal.

Our office web series dedicated an episode to weather radar and the SLEP process. You can watch Episode 2 of "In the Field with NWS Columbia" here.

2022 NWS Columbia Summer Students

by Chris Rohrbach - Meteorologist

Each summer, NWS Columbia offers internships to college students as a part of our Student Volunteer Program. The program is structured to teach students about operational weather forecasting by learning from office staff both in the forecast office and through field work. Each student also participates in a guided research project that will help improve forecasts and warning operations. Many of our summer interns have gone on to find careers within NOAA including at NWS Weather Forecast Offices, River Forecast Centers and others.

We welcomed three student interns during the summer of 2022: Abby Grulick attending UNC Asheville for Atmospheric Science, Natalie Jones attending Mississippi State University for Meteorology and GIS, and Gabby Brown attending Northern Vermont University for Atmospheric Science. All of our students were extremely eager to learn the different responsibilities within the office. By shadowing the near term and long term forecast desks as well as aviation forecasting they were able to get experience with the daily duties of a Weather Forecast Office. There was no shortage of interesting weather for the Summer of 2022 either. Tropical Storm Colin formed just off the coast of GA/SC in July of 2022 and there were also a number of other severe thunderstorm days to give the students a taste of warning operations. In fact the students were able to join a NWS Columbia storm survey team into the field to survey damage from a microburst from a severe thunderstorm on June 3rd, 2022. There were also other opportunities for field work during their time with the office. All of our students were able to participate in trips to Cooperative Observer Program (COOP) stations, the KCAE WSR-88D radar, and the Automated Surface Observing Systems (ASOS) at the Columbia Metropolitan Airport.

Left to Right: Student Volunteer Abby, Natalie, Hydrologist Leonard Vaughan, and Volunteer Gabby

As mentioned, each student worked with a mentor to complete a research project that will help improve our forecasts or warning operations in the future. Gabby completed an investigation into tornadoes spawned by tropical systems and how the GOES-16 Geostationary Lightning Mapper (GLM) may provide advanced warning for tornadogenesis. Tornadoes spawned by tropical cyclones are more difficult to distinguish using typical radar interrogation techniques because they are shorter–lived with weaker signatures. Lightning data from the GLM may be useful to give additional warning signs that the storm is about to produce a tornado. We hope that Gabby's work will lead to improved lead time for tropical tornadoes. Abby conducted research into atmospheric parameters that may lead to rapid wildfire spread. Red flag conditions (environmental conditions where rapid fire spread is favorable) have traditionally been composed of relative humidity and wind speed, coordinated with assessment of fuels by state and federal forestry officials. By researching additional parameters we aim to find the environmental factors most favorable for red flag conditions and increase lead time for events.

2022 NWS Columbia Summer Students

by Chris Rohrbach - Meteorologist

Last but not least, Natalie compiled a variety of social media resources for central SC and the CSRA of GA. The NWS uses social media to help spread the word about impactful weather and to educate the local community about weather science and safety. For these situations, NWS Columbia has templates on hand which can be manipulated for the current weather threats and hazards. By creating an updated set of social media templates our office will be better able to communicate hazardous weather and increase weather awareness through our social media outlets.

Left to right: Natalie, Gabby, and Abby participate in a storm survey

The application for student volunteers typically opens in the beginning of the year, so if you are or someone you know is interested, keep an eye out in early 2024. Some more information on the program:

Requirements

- Must be a United States citizen
- Must be enrolled full-time in an undergraduate or graduate program
- Must be majoring or minoring in Meteorology, Atmospheric Sciences, or a related field
- Must pass a security screening to have access to the building and computers

Duties

- Volunteer approximately 16 hours per week from approximately late May through early August.
- Gain valuable experience by shadowing forecasters in operations.
- Work on a collaborative research project focusing on the local forecast area.
- Participate in professional development and training opportunities.

This is a volunteer program, Students will not get paid for their time in the office. It may be possible for the student to gain class credit for their time spent at the office, which will be determined by the student's academic advisor or department head.

Announcements for student volunteer opportunities will be on our website as well as announced on our office social media accounts.

Office Updates

by Matt Gropp, Steve LaVoie — Meteorologists

Visit to IBHS

The Columbia and Greenville-Spartanburg, SC, visited the Insurance Institute for Business & Home Safety (IBHS) on March 8 in Richburg, SC. IBHS is a non-profit research organization that studies the impact of severe weather on homes and businesses with a research lab and wind tunnel right on the border between the Columbia and GSP border.
The purpose of the trip was to collaborate over possible storm survey opportunities with several of IBHS's structural and wind engineers as well develop some new social media ideas for promoting public awareness and preparedness for severe weather. While at the research lab, IBHS demonstrated their hail cannon to simulate hail impacts on shingles as well as their large scale wind tunnel and structure simulations. Plans were drawn up on how to utilize IBHS's wind and structural experts for future storm surveys with both NWS offices, and IBHS signed up as a Weather Ready Nation Ambassador.

Outreach Activities

As we come out of the pandemic, NWS Columbia has been able to do more in person outreach activities. One of the most popular events we attend annually is the Palmetto Sportsmen's Classic held at the South Carolina State Fairgrounds. Staff from our office were at the event on Friday and Saturday this year doing weather demonstrations and answering questions. In addition to the Sportsmen's Classic, we had a booth at the Columbia County Public Safety Day in Evans, GA! We also recently visited several schools across our forecast area including Condor Elementary , Irmo Middle School, PACE Academy, and Joseph Keels Elementary where we participated in their career days.

If you would like meteorologists from our office to attend your event or give a talk at your school or organization, you can fill out the form at https://www.weather.gov/cae/outreach.html and we will do our best to accommodate.

Office Updates - Continued

by Pierce Larkin, Chris Landolfi — Meteorologists

NWS Columbia Launches a Podcast

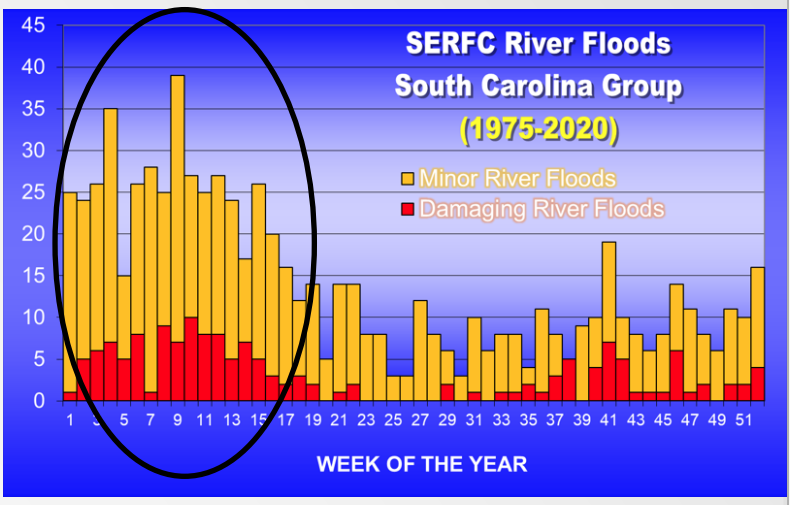
Back in February of this year, two NWS Columbia meteorologists came up with a new idea to serve the public and give them a behind the scenes look at our operations. That idea was starting a podcast! The name is pretty basic, "The NWS Columbia Podcast" but the content creation is anything but basic. Host Matt Gropp and Pierce Larkin discuss everything from a behind the scenes look at ops during severe events to our favorite weather events to hot takes on weather and everything in between. Five episodes have been released so far, in addition to a few Forecast Discussions detailing potential severe weather. Additionally, we outline what each major role in a local office does by interviewing someone holding that role. The podcast has a bright future as there are plenty of ideas being cooked up by the hosts. Check out the podcast by going to our YouTube Page!

Carolina NWS Offices Host Tropical Training

National Weather Service Offices that serve the Carolinas including Greenville-Spartanburg, Charleston, Raleigh, Morehead City, Wilmington, and Columbia came together to host a 2 and a half day tropical training and exercise meeting in early June at River Bluff High School in Lexington. In a joint effort with FEMA, North Carolina Emergency Management, the South Carolina Emergency Management Division, and the National Hurricane Center, we brought together emergency managers, media, and various other local, state and federal partners that have interests in public safety. The first day, FEMA taught a Hurricane Readiness Course both for inland and coastal communities. On the second day, attendees were divided into groups and walked through four advisories in a full scale exercise that included sample products created by the National Hurricane Center. At each advisory, group facilitators would ask what preparedness steps each individual representing their organization would take. The objective was for partners to learn from their counterparts as well as discuss products created by the National Hurricane Center and their local National Weather Service Forecast Office and how they use these in an operational setting. The third day featured presentations from the Weather Prediction Center, Southeast River Forecast Center, National Water Center, the NWS Social, Behavioral & Economic Sciences Program as well as a panel of experts from the various national centers. Nearly 150 partners attended from Georgia and the Carolinas and participated in our most successful partner meeting in recent years!

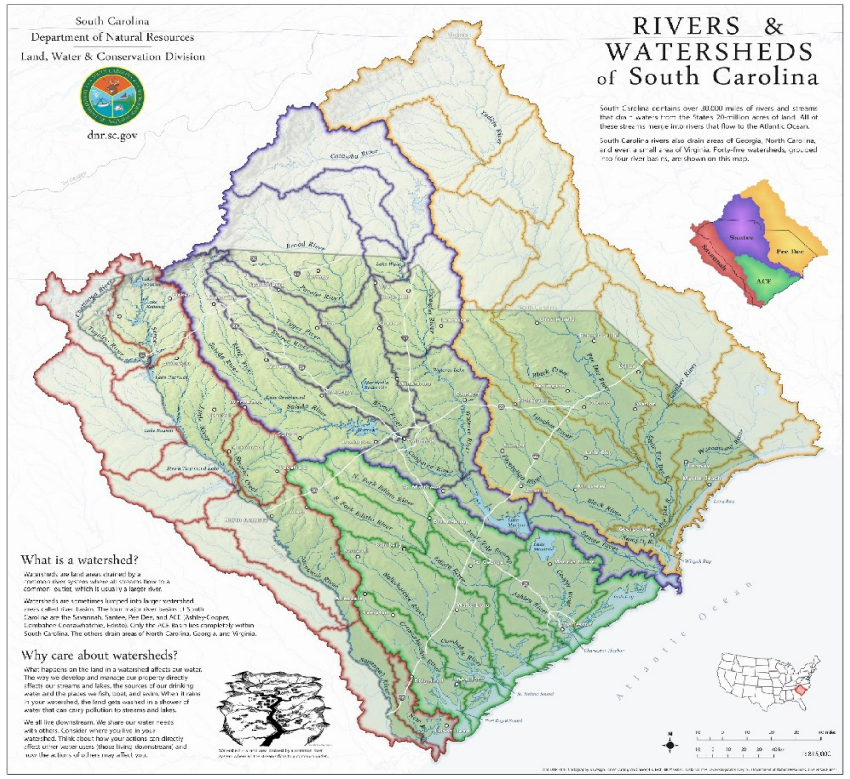
Winter Wetness Leads to River Flooding Across the Midlands and CSRA

by Leonard Vaughan - Senior Service Hydrologist



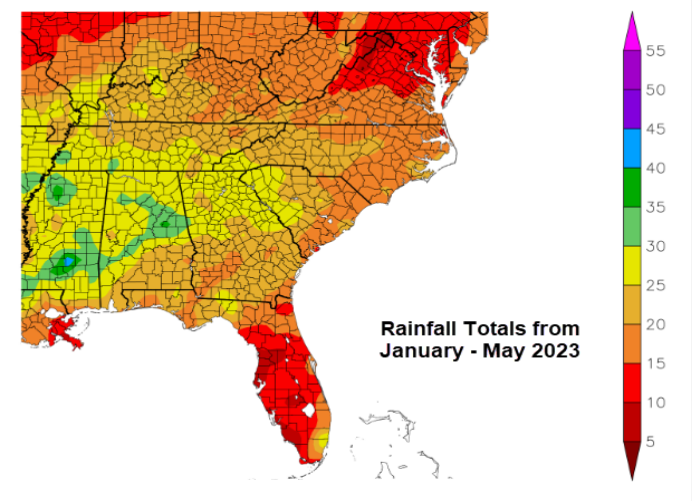
After fall got off to a dry start across the Midlands and Central Savannah River Area, the weather pattern began to become much more active and most locations received near or above normal rainfall from January through May. As you can see form the graph to the right, the winter season is climatologically the best time for river flooding across the southeast. There are a couple of reasons why this occurs each winter into spring. During the winter and early spring season, weather systems typically produce widespread rainfall events. This is much different than the summer season when afternoon and evening thunderstorms produce rainfall does not spatially cover the region as well. As we know, those pop-up showers and thunderstorms do not always "rain the same on all." Another reason for the increased runoff into streams and rivers is there is no leaf canopy which blocks rainfall and also increases the transpiration of water through the trees and leaves into the atmosphere. Temperatures are also cooler so there is less evaporation during the winter season.

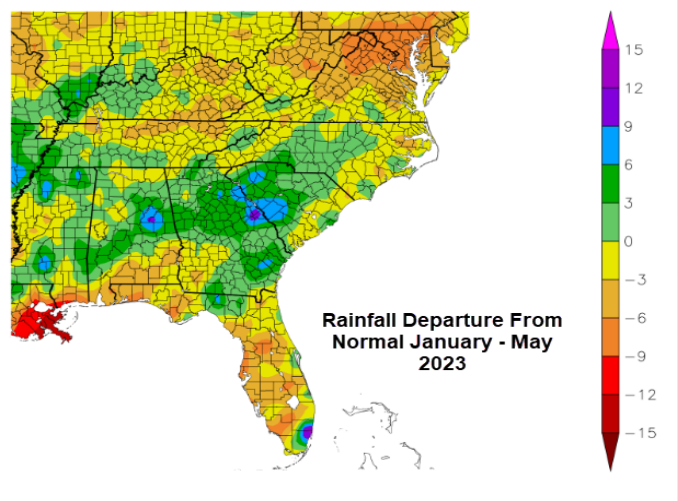
The reach of the rainfall and snowfall that effects the Palmetto State are not just located within South Carolina but reach into North Carolina, Georgia and even a small portion of Virginia. The map to the left shows the 4 major river basins that are a part of the watershed of South Carolina.



River Flooding - Continued

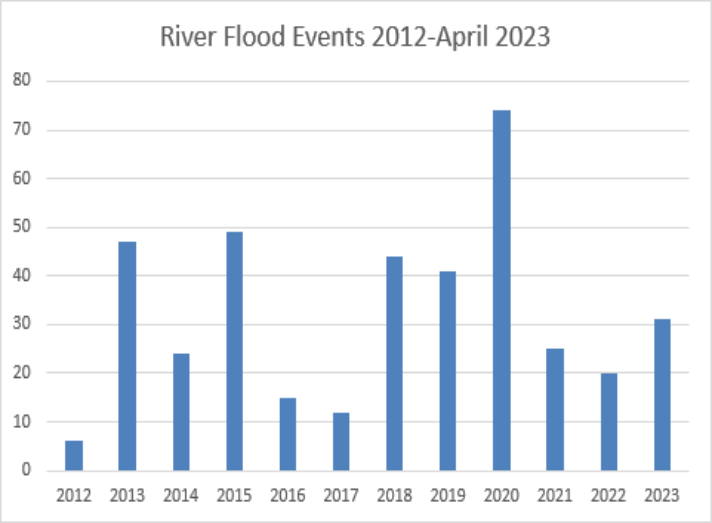
This map shows the rainfall totals from January 2023 through May 2023. Rainfall totals for the 5 month period show totals from 20 to 25 inches. On average rainfall was 2 to 7 inches above normal through the period. So, the region received above normal rainfall during the season called the "re-charge" season well how did all of this affect the rivers across the Midlands and Central Savannah River Area.





The WFO Columbia County Warning Area (CWA) has 11 points along the rivers that river forecast are issued. During the first for months of 2023, there were 31 flood events. This is more river flood events in just four months than for each of the past 2 years. In 2021, there were 25 events and in 2022, there were 20 flood events. It was the most active start to a year since 2020.

2023	Jan	Feb	Mar	Apr
AUGG1	0	0	0	0
CEAS1	3	1	0	2
CHAS1	3	0	0	2
CHES1	0	1	0	1
CMDS1	0	0	0	0
COLS1	0	0	0	1
GADS1	2	1	0	2
MODS1	3	1	1	1
ORBS1	0	1	1	2
WATS1	0	0	0	0
WHMS1	1	0	0	1
	12	5	2	12



COOP Corner

by Doug Anderson - Observation Program Leader

Cooperative Weather Stations Serve Our Nation

The Cooperative Weather Observing Program's roots can be traced back to 1797 when Thomas Jefferson envisioned a nationwide network of weather observers. The program itself was created in 1890 under the Organic Act passed by Congress. Its mission is two -fold:

- To provide climatological records, usually consisting of daily high and low temperatures, snowfall and precipitation totals. This data is essential to defining U.S. Climate and measure long-term climate trends.
- To supply observational meteorological data in near real-time to support forecast, warning and other public service programs (drought, agricultural, fire weather, etc.) programs of the NWS.

Cooperative stations (COOP) are locations at which volunteers take daily weather observations using NWS-supplied equipment, filling in the gaps between other types of stations such as airports, mesonets, etc. COOP equipment meets stringent standards and is installed in accordance with strict standards to ensure uniformity. About 10,000 volunteers around the country from all walks of life provide this valuable service. We are always looking for new observers to join the NWS CAE team and are willing to take observations over many years to come. On the web: https://www.weather.gov/coop/

Help Expand Our Network!

We're looking for interested volunteers to report daily weather, and to bring our COOP network to over 50 stations across the Midlands & CSRA. We especially need stations in or near **Kershaw, Eastover, Pinewood, and McBee SC**. Contact Doug at douglas.anderson@noaa.gov if you're interested in doing this long term. Thanks!

Celebrating Our Volunteers

We can't thank our volunteer COOP Observers enough. Not only do their daily weather observations give us a baseline for weather warnings and daily forecasts, the climate records they keep are used across the world by a myriad of private industry, academia and government organizations.

COOP Corner - Continued

To help say thank you and recognize how special each and every observer is, we decided to start holding an annual COOP Observer Recognition Day. This Open House is designed to bring everyone together, learn from each other, share food and fellowship and recognize special achievements. We're planning to hold it every year in Mid-April. A VERY special thanks is in order to Billy Tholborn, our Graniteville, SC COOP Observer. He cooked up an incredible Jambalaya lunch for all of us, and also to Melissa Griffin, SC Assistant Climatologist for her outstanding presentation and support.

Welcome To Our Newest Observers!

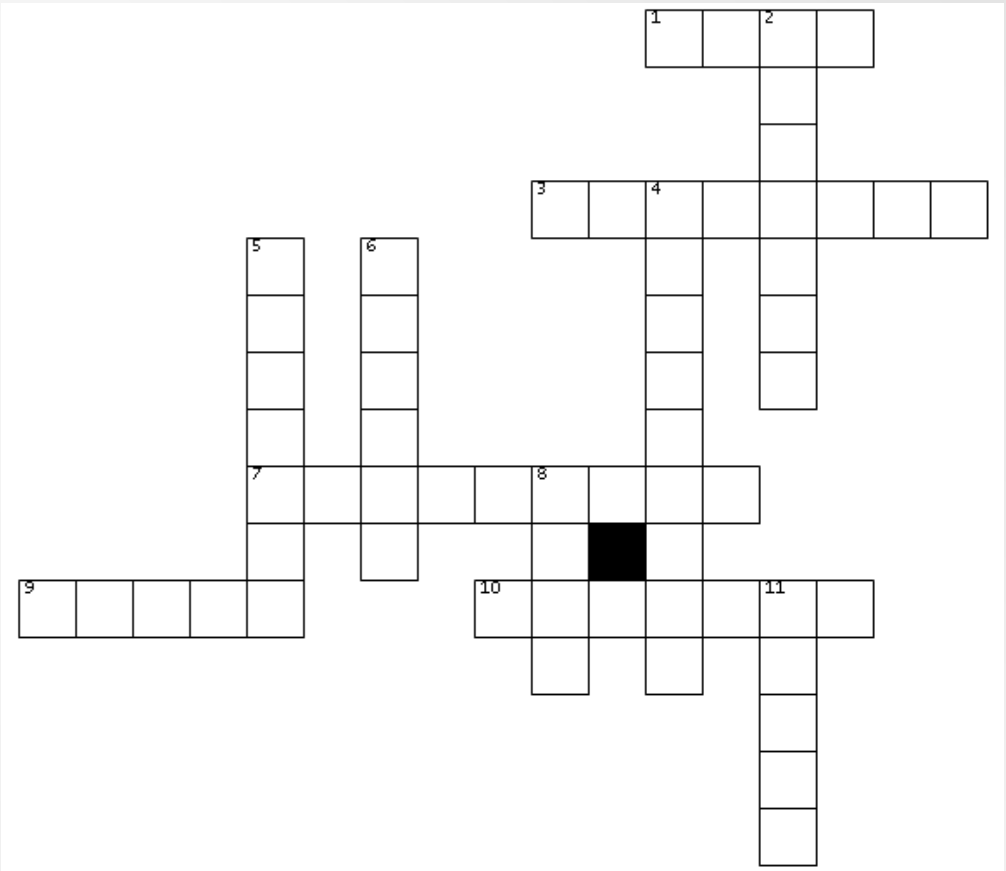
Since our last newsletter, we're honored to have 3 new stations and volunteer observers join our team!

Darren Bean, Pontiac, SC: Darren is a retired US Army CSM, and currently also volunteers with Team Rubicon, an international non-government organization specializing in disaster response. When we lost a nearby station, Darren stepped up to help fill the gap. Thank you Darren!

Tedd Clayton, Indian Land, SC: Over the last 200+ years, there has never been any established weather records for the Indian Land community. A community leader, Tedd is a telecommunications engineer who is passionate about meteorology. Also an Extra-Class Amateur Radio Operator, he is an integral part of our SKYWARN Storm Spotter program. We are excited he's on our team!

Rafael Hernandez and the Staff of the Bishopville Wastewater Treatment Plant: 5 years ago, our long-serving Bishopville Observer and WAGS Radio moved away from the community. We can't say thank you enough to the City of Bishopville and Lead COOP Observer Rafael Hernandez for reactivating the station. After a long and hard search, we now have weather and climate data restarted, continuing a record for Bishopville that originally started back in 1933!

Weather Crossword



ACROSS
1. Ice that falls from a thunderstorm
3. NWS Offices across the country launch weather _____ twice a day to get observations from above the surface.
7. A tropical cyclone with winds greater than 74 mph.
9. The most effective tool for detecting precipitation.
10. Violently rotating column of air extending from a thunderstorm to the ground

DOWN
2. When Thunder Roars, Go _____
4. All thunderstorms produce _____
5. NWS forecast information can be found on the web at _____.gov
6. Thunderstorm that produces inch or greater hail or 58 mph winds or greater is considered _____
8. Stations that have volunteers take daily weather observations.
11. Turn Around, Don't _____

Answers in next edition

National Weather Service
Columbia Weather Forecast Office
2909 Aviation Way
West Columbia, SC 29170
(803) 822-8135

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Is there a topic you'd in the next edition?

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