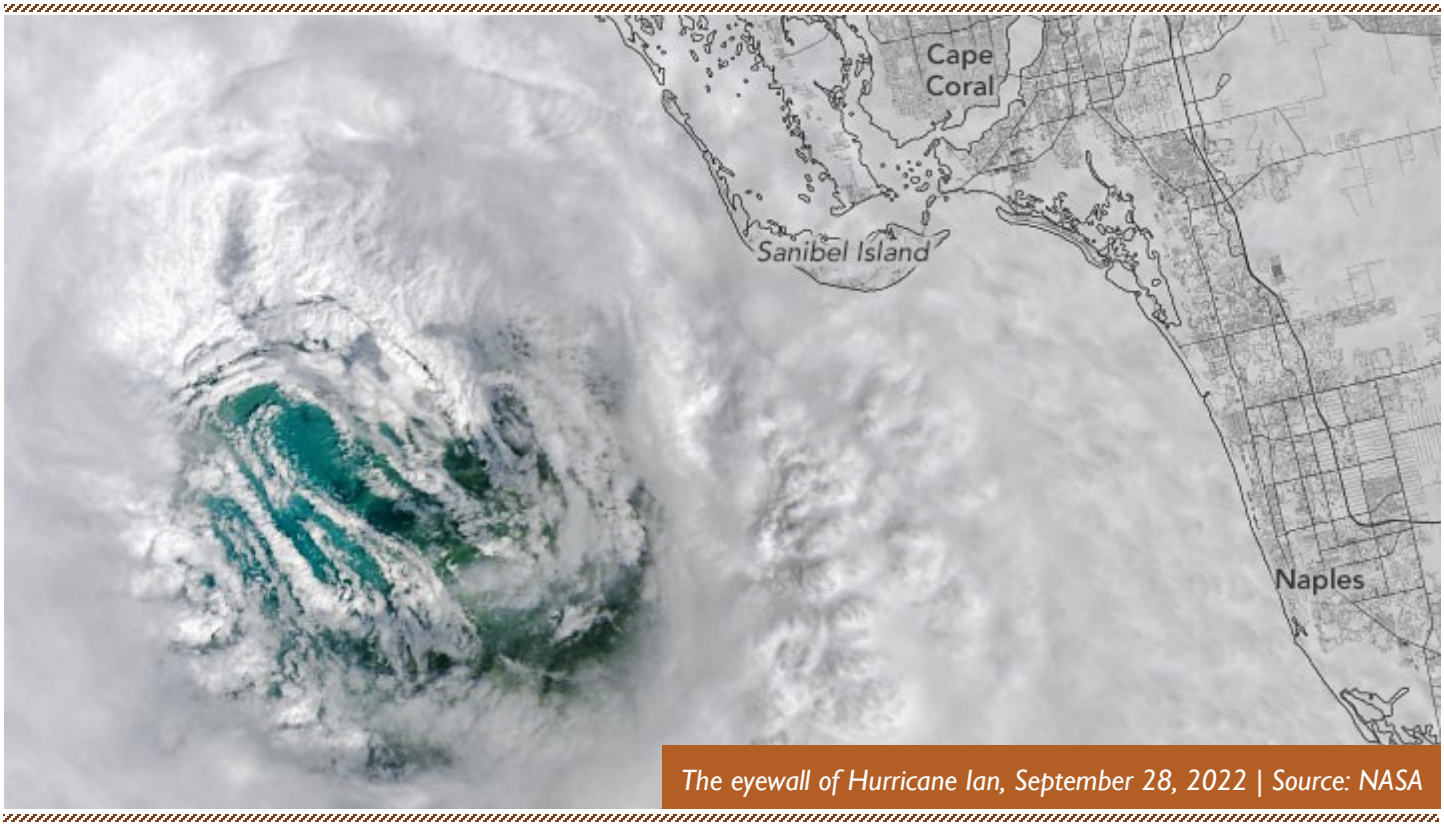
Carolina SkyWatcher

NWS Morehead City

Fall Edition, 2022



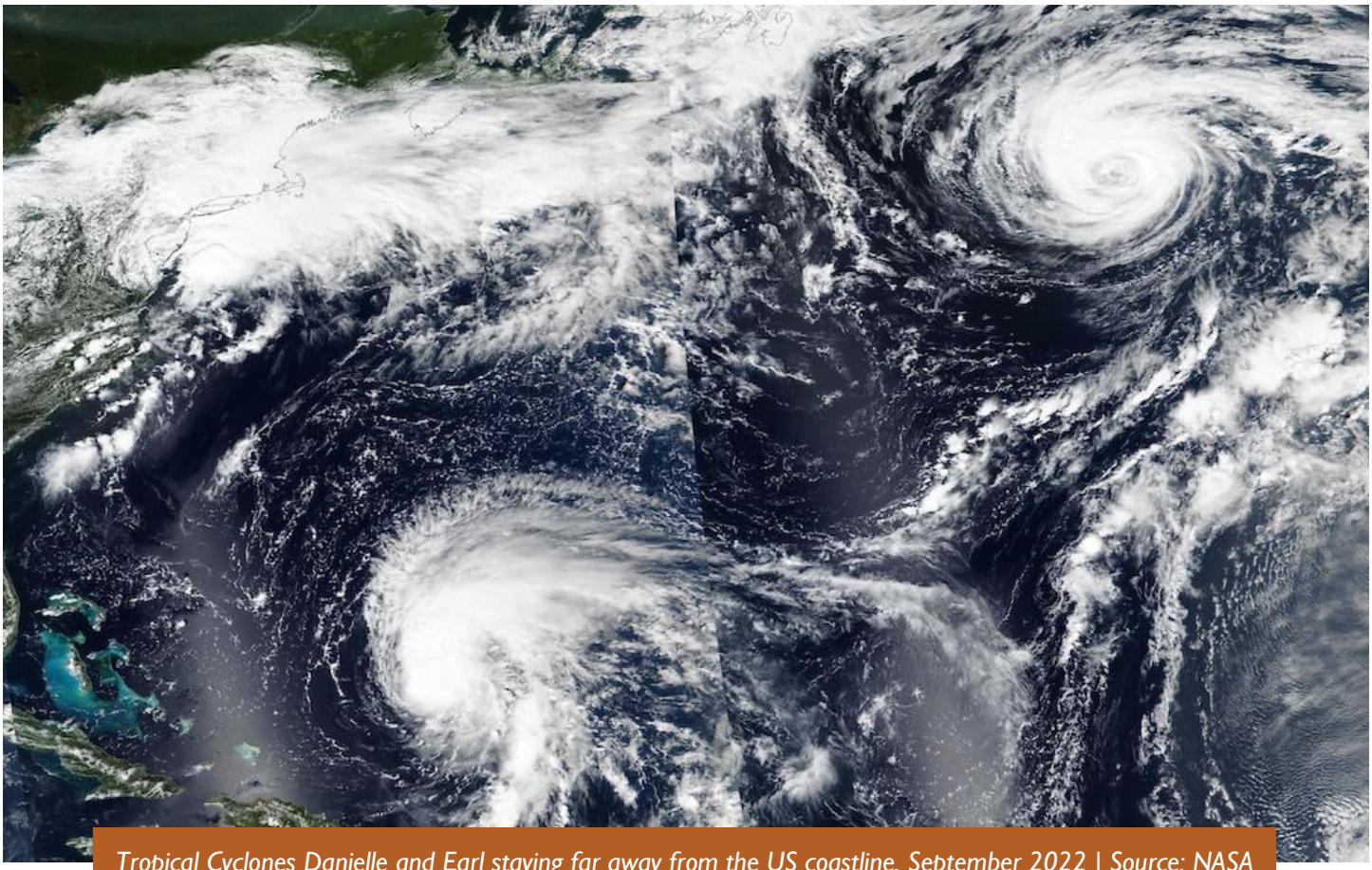
The eyewall of Hurricane Ian, September 28, 2022 | Source: NASA

In This Issue:

Tropics Becoming Active After Relatively Slow Start to Season

By: Carl Barnes, Lead Forecaster & Tropical Program Focal Point

This time of year, everyone in eastern North Carolina knows to keep an eye on the tropics. Fortunately, local impacts from tropical cyclones have been limited so far this season, despite Tropical Storm Colin passing just offshore. Instead, Hurricane Earl, which passed well offshore, produced the most substantial impacts - bringing increased rip current activity, minor beach erosion, and localized dune overwash to area beaches.



Tropical Cyclones Danielle and Earl staying far away from the US coastline, September 2022 | Source: NASA

Still, it has been overall a less active season than normal, which especially contrasts the past couple of years, which have been well above normal. In the tropical Atlantic through September 20th, tropical cyclone activity has been below normal, with 7 named storms (normally 10 by this time of year), 3 hurricanes (normally 4), and 1 major hurricane (normally 2). Especially noteworthy is that there were no named storms in August, a rare feat that last occurred in 1997. Still, several environmental parameters continue to indicate the potential for above-normal activity, and we appear to be entering a much more active period through the second half of September into October, so remaining prepared and vigilant is critical.

Tropics Becoming Active After Relatively Slow Start to Season

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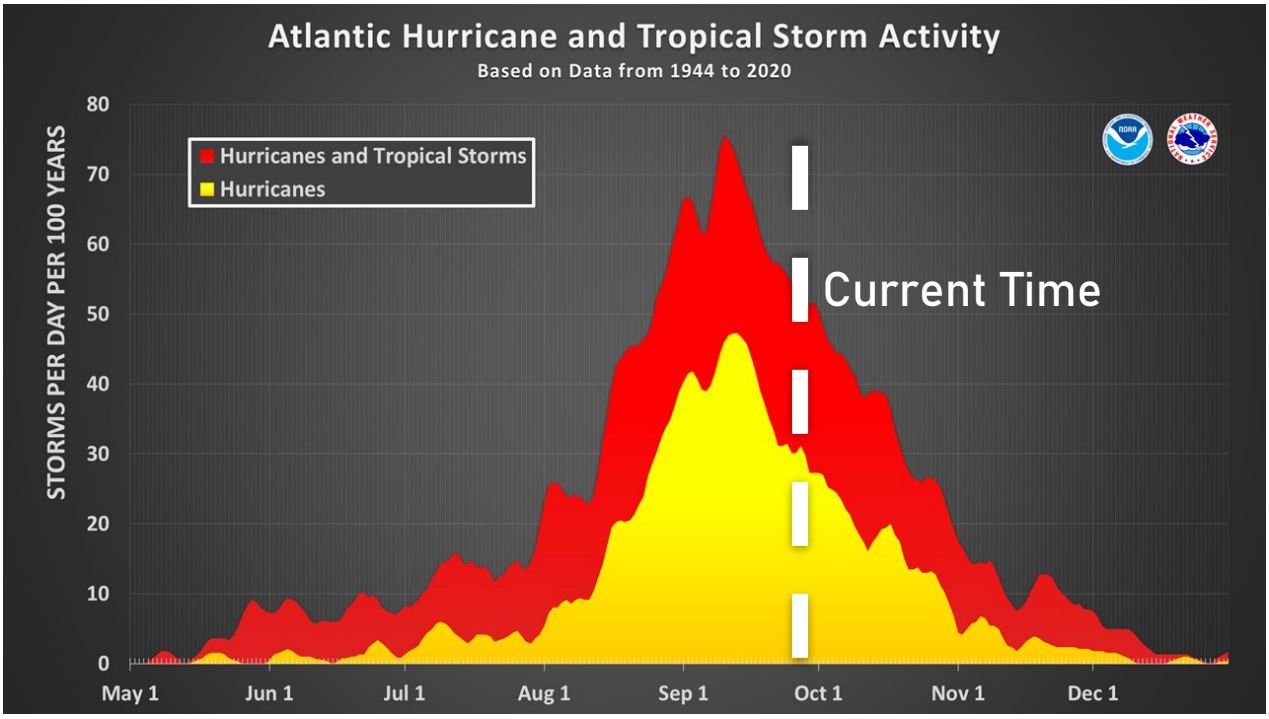
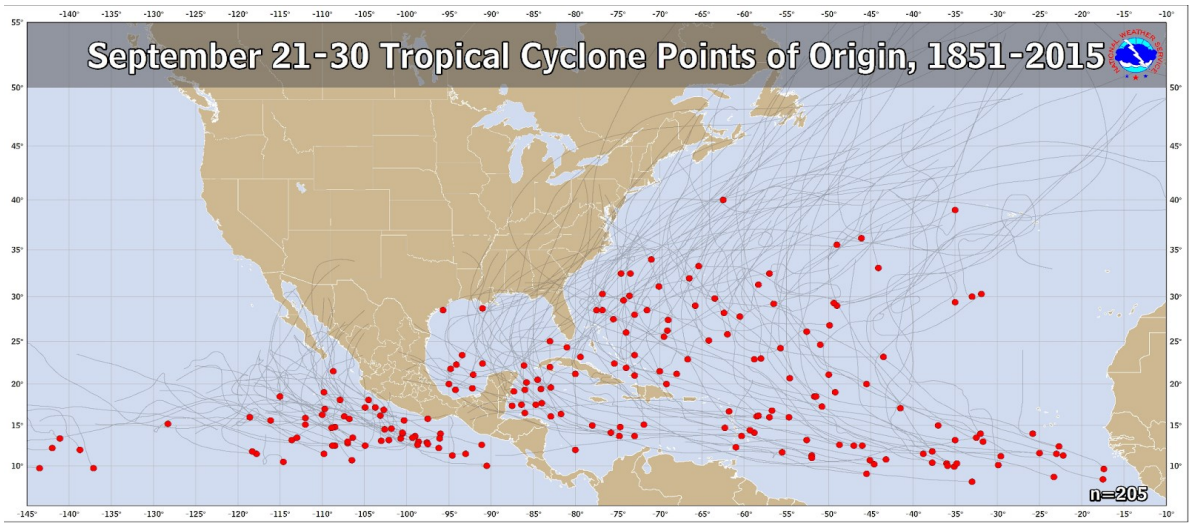


The above graphic shows the frequency of tropical cyclone formation, and illustrates how, even though we are past the peak of the hurricane season, tropical storm and hurricane formation remains relatively common through the end of October, with the official hurricane season continuing through the end of November. In fact, there have been several October storms in recent memory that have brought significant coastal and inland impacts to eastern North Carolina, including Matthew (2016) and Sandy (2012). The below graphic illustrates that not only are late season hurricanes common, but they can still form throughout much of the Atlantic Basin, owing largely to persistently warmer water within the development regions.



Tropics Becoming Active After Relatively Slow Start to Season

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So what can you do to make sure that you and your loved ones are prepared if a late season hurricane does head our way this year? Firstly, ensure that you understand your risk, have a disaster supply kit and evacuation plan, and prepare your home for potential impacts. Secondly, make sure that you are getting your information from reputable sources like local officials, local broadcast media, and the National Weather Service and National Hurricane Center.

Visit weather.gov/moreheadcity/hurricaneprep for more information on how to make sure you are prepared now, while there is still time to complete all of the tasks.

Hurricane Preparedness Begins Today!

Severe Weather in November? Fall is a Secondary Severe Season in North Carolina

By: Ryan Ellis, Science and Operations Officer

We all know the old adage “April showers bring May flowers” and we often associate severe weather with Spring, not just in North Carolina, but across the country. Typically, in these parts of the world, March, April, and May can give us some of our biggest severe weather events. This is because we are transitioning from primarily cold air masses in Winter to warm air masses in the summer.

Roof damage from an EF-2 tornado in Emerald Isle, November 24, 2018 | Source: NWS Morehead City

In the spring these air masses collide at boundaries we know as fronts. That difference in temperature and moisture content between air masses is what causes the warm air to rise up over the cold air and produce thunderstorms. Sometimes these differences in temperature and moisture can be so big that storms can become severe.

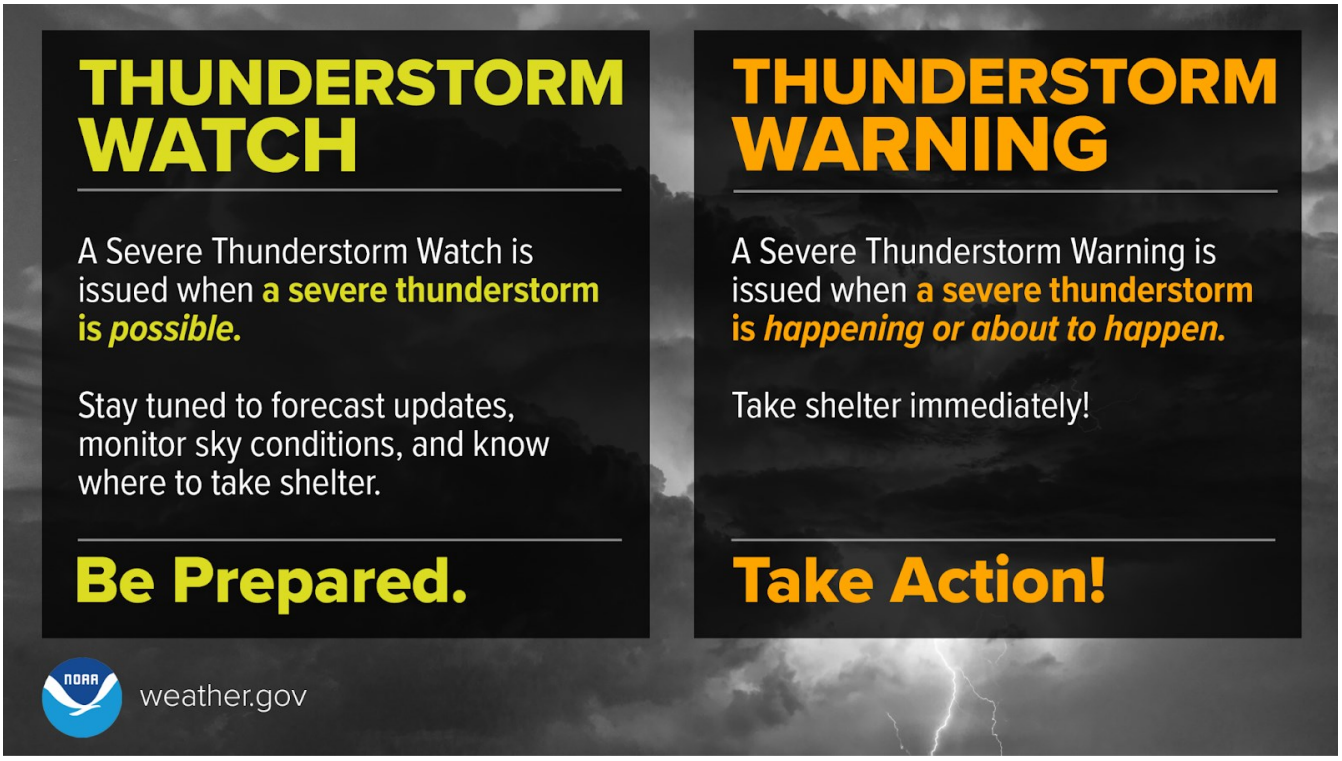
Not surprisingly, in the Fall, as we transition from predominantly warmer air masses to colder ones, a similar phenomenon occurs and severe thunderstorms become more prevalent once again. That's why it is important to still remain weather aware in the Fall, even though we tend to have very long stretches of quiet weather where high pressure remains in control.

While last year was a very quiet year for severe weather events for the months from September through December, the previous three years all had multiple severe weather events that included both severe thunderstorms and tornadoes. Not to be overlooked are tornadoes that can occur within tropical cyclones when they occur during these months as well.

Severe Weather in November? Fall is a Secondary Severe Season in North Carolina

(continued)

With that in mind it is important to of course be prepared for any severe weather event. The first recommendation is of course to brush up on the difference between a watch and a warning. Before we get to that however, it is important to know the definition of a severe thunderstorm and that is defined as a thunderstorm with hail greater than or equal to the size of a quarter, or one inch in diameter. A severe thunderstorm is also defined as having winds in excess of 58 mph (50 knots). Lightning is not used as part of the definition for a severe thunderstorm because by definition all thunderstorms have lightning, whether or not they are severe.



So, what does it mean when a severe thunderstorm watch or warning is issued? A watch means that all the ingredients are in place to potentially have severe weather. Kind of like if you went to the store and bought all the ingredients for chocolate chip cookies and brought them home and put them on the counter. Do you have cookies yet? No, there are still numerous things that need to happen, but if you wanted to make them, you could.

A warning on the other hand is when all of the ingredients for chocolate chip cookies are measured properly, mixed together in a bowl, measured into dough balls and put on a baking sheet and into the oven. In this case, we can watch the dough turn into cookies. The same is true for our thunderstorm when a warning is issued. It means that all of the ingredients have come together in the right way and we are able to see on radar that the storm is becoming severe and it is at that point that we will issue a severe thunderstorm warning.

Severe Weather in November? Fall is a Secondary Severe Season in North Carolina

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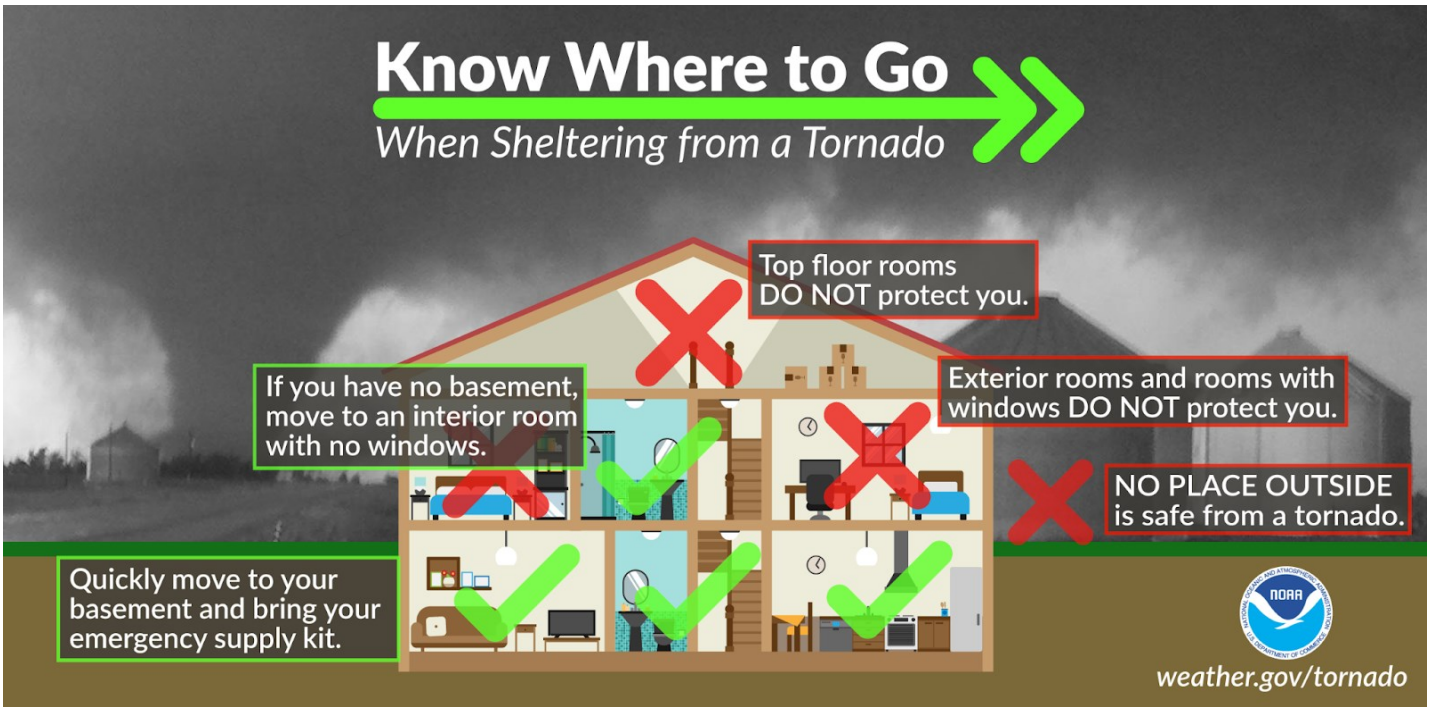


So what should you do in each of these cases? A watch is telling you to be more weather aware and know what you would do if severe weather were to occur in your area. This is where planning ahead of time comes in handy because you can think about that plan and what your next steps would be and safe places you could go should severe weather occur. A warning on the other hand is telling you to enact that plan, go to your safe place and take cover because a storm is imminent in your area.

With all that in mind it is very important to have multiple ways to get a warning. Having two ways minimum is best in case one line of communication is down. Possible ways to get warnings include having a weather radio turned on and set up properly, broadcast media over the TV or radio, our website, or through your smartphone. Now severe weather alerts will only automatically go to your phone if it is a Tornado or Flash Flood Warning, but you can sign up for alerts through the iNWS program at https://inws.ncep.noaa.gov.

Severe Weather in November? Fall is a Secondary Severe Season in North Carolina

(continued)

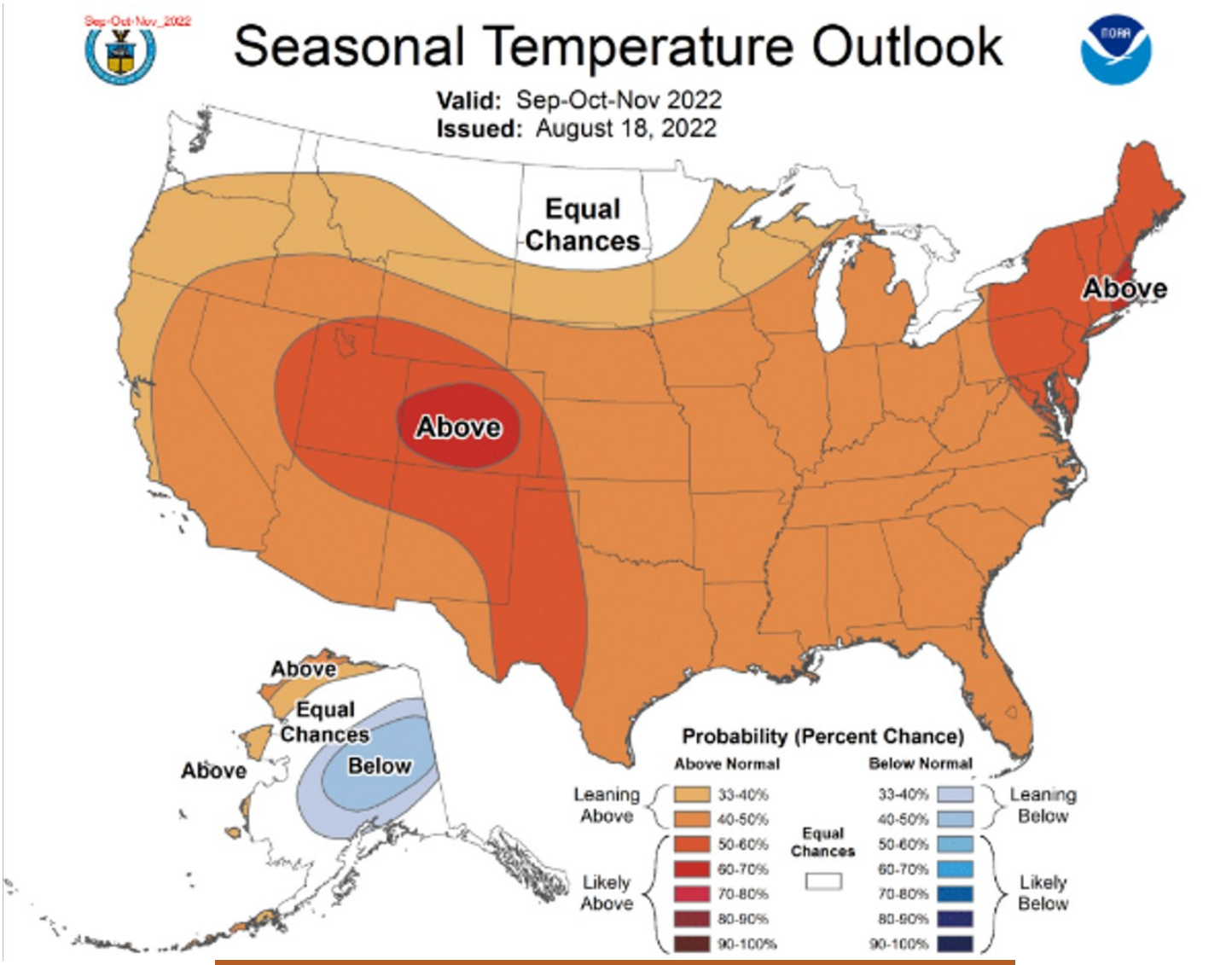
Speaking of flooding, if there is the potential for severe weather, there is often potential for flash flooding as well. Showers and thunderstorms producing heavy rain with very high rain rates, or those that "train" along behind a prior thunderstorm can cause situations where water rises very rapidly or covers roadways, making them impassable. In these situations it is very important not to drive through the flood waters even if you think you know the road and potentially how high the water is. The problem here is if you can't see the road through the flood waters, you have no idea whether or not the road has been washed away and therefore its best to turn around.

Whether it's flooding or severe weather, it's important to take it seriously and remember our slogans. If it's flooding you are worried about, "turn around and don't drown", and if it's severe weather that is on the horizon, "when thunder roars go indoors".

Fall 2022 Seasonal Outlook For Eastern North Carolina

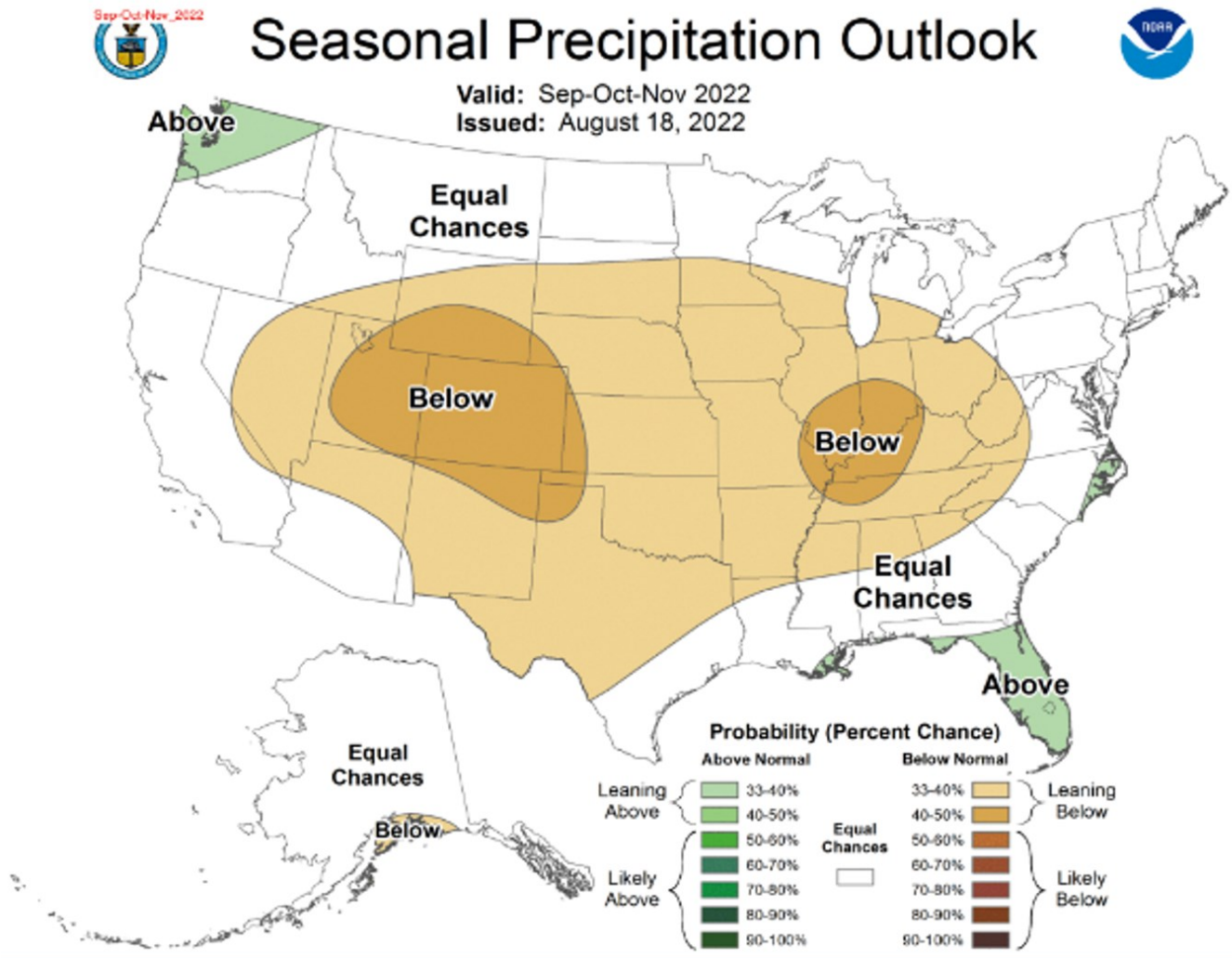
By: Morgan Simms, Meteorologist & Climate Program Focal Point

Warmer and wetter conditions than average are slightly favored across eastern North Carolina for the meteorological fall of 2022, running from September through November. Seasonal outlooks from the NWS Climate Prediction Center (CPC) suggest above average temperatures are slightly favored (40-50%) chance across our area and much of the eastern United States. This would continue the above average trend from summer - temperatures across North Carolina from June to August were around 1.5°F above average, making for its 13th warmest summer since record keeping began.

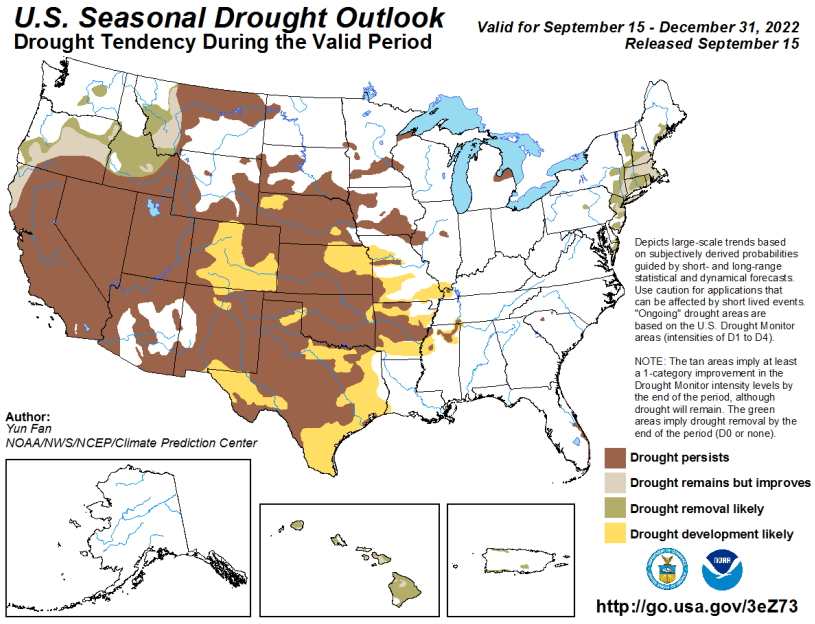


The Fall 2022 Seasonal Temperature Outlook | Source: Climate Prediction Center

Fall 2022 Seasonal Outlook For Eastern North Carolina (continued)

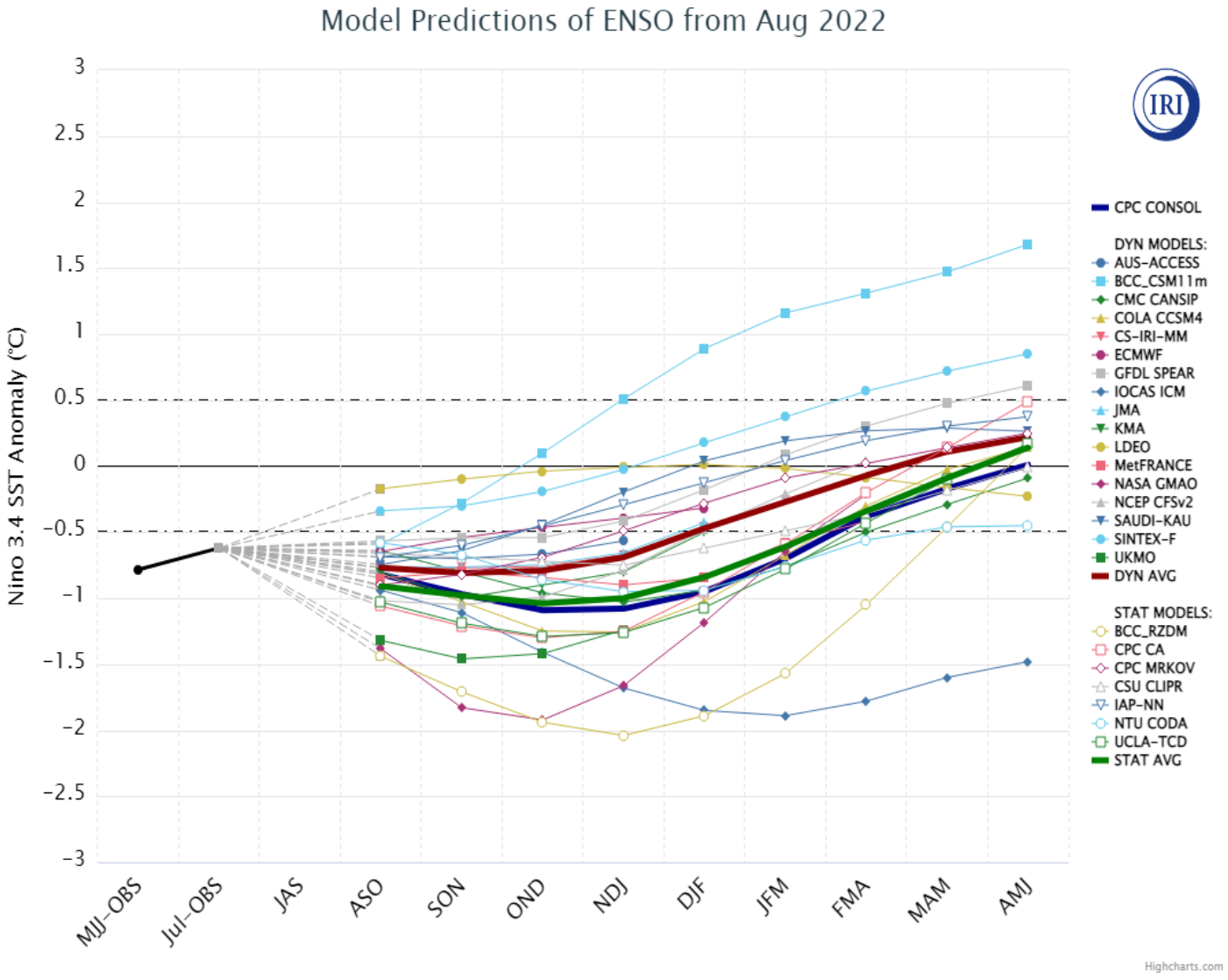


Above average precipitation is slightly favored along the immediate coast of North Carolina (33-40% chance), with equal chances of below, near, or above normal precipitation for the rest of the region. Despite a soaking July, North Carolina still endured a drier than normal summer with precipitation averaging nearly 2.6 inches below average - its 28th driest on record. Still, drought conditions drastically improved over the summer. Seasonal drought outlooks from CPC suggest no drought redevelopment through the fall.



Fall 2022 Seasonal Outlook For Eastern North Carolina (continued)

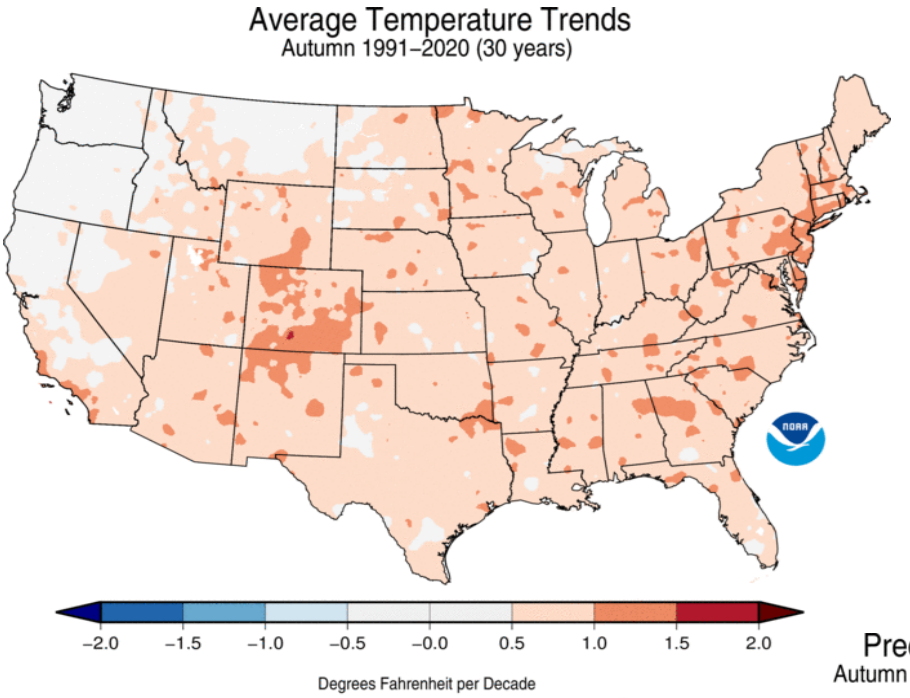
There are multiple drivers of climate patterns across the United States, but the El Nino-Southern Oscillation (ENSO) is focused on most for climate outlooks because of its impacts on precipitation patterns on the tropics, weather patterns across the contiguous United States, and its predictability compared to other global circulations. Its correlation to temperature and precipitation patterns become slightly more pronounced in the cooler season, although autumnal patterns are still very weak.

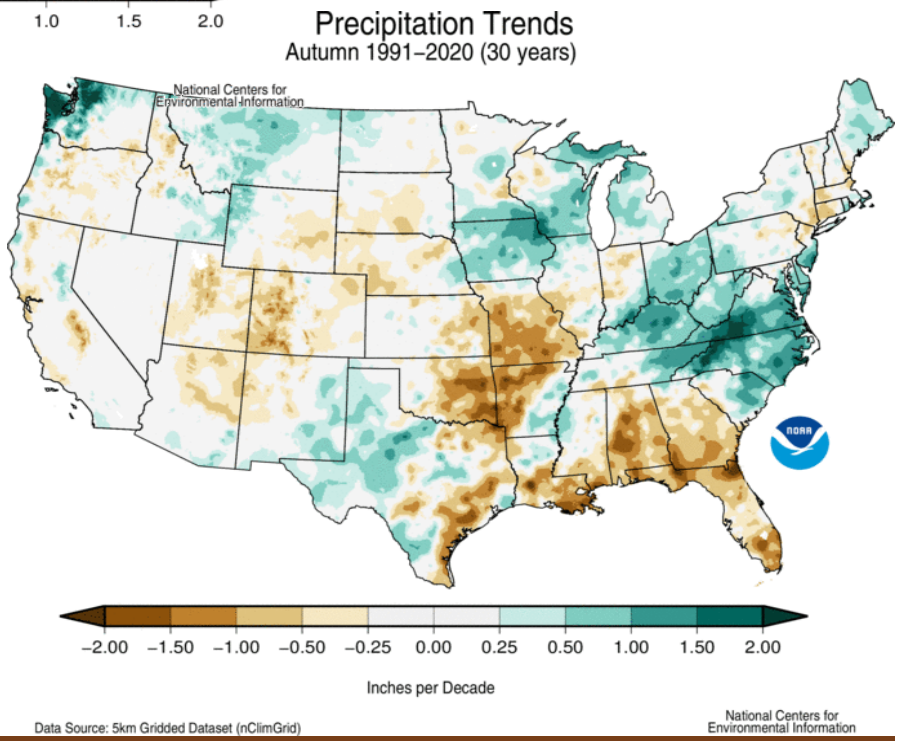


La Nina conditions (cooler than average sea surface temperatures) are currently ongoing across the central and eastern Pacific basin, and are likely to continue through the fall season. Neutral ENSO conditions (around average temperatures) become more favored to occur for the upcoming winter season.

Fall 2022 Seasonal Outlook For Eastern North Carolina (continued)

National trends across the past 30 years indicate a steady rise in average temperatures across the United States during the fall season, including the Carolinas. Analysis from the National Centers for Environmental Information (NCEI) shows temperatures have risen between a half a degree to a full degree per decade across our area during this time. A lot of this is due to rising minimum temperatures, which have climbed between one and one-and-a-half degrees per decade. Most of the Carolinas have also trended wetter, with rainfall increasing on average between a half and one-and-a-half inches per decade.





Breaking the Ice: Getting to Know Our New Forecasters

By: Michael Lee, Meteorologist

This past year, NWS Morehead City has welcomed two new member to our forecast team: Roger Martin and Oliva Cahill. We took a moment to ask both of them a few questions so folks around can get to know eastern North Carolina's newest NWS meteorologists! I first talked with Roger Martin, our newest Lead Forecaster at the Morehead City office.

Tell us a bit about where you are from?

I was born in Tennessee so I lived most of my life in the South. I spent a little bit of time in New England but I consider the South home. But with being in the weather service that's brought me to pretty much both sides of the country which has been a neat experience, but my roots would be tied to the Southeast.

Roger Martin, Lead Forecaster, NWS Morehead City

What got you into the weather and how early did you know you wanted to be a meteorologist?

So that's really interesting question because I think as a kid I probably, like a lot of boys, wanted to be a policeman or a fireman or something and I actually thought that would be an interest. But right around that time, The Weather Channel started doing this this program every afternoon called *Weather in the Classroom* and I think it was on like 3:30 or 4:00pm. So it was something that everyday coming home from school when my family got cable for the first time, I just stumbled upon this on The Weather Channel. This *Weather in the Classroom* show was geared for kids so it was like "oh this is really interesting!" and it's just piqued my interest and I've been pretty much hooked ever since. So I want to say it was like elementary maybe 3rd or 4th grade—somewhere around then—when that started and then really from that, I started watching The Weather Channel on a regular basis, not just for that program because it was still a one day, 30 minute show, but I just started being interested in all of it. At that time too, they're almost exclusively doing coverage of big events so it was a tropical event or a severe weather event, you could pretty much sit there and then kind of learn things that way. That really kicked it off and the rest is much history. As a kid, I didn't think "oh I want to do this as a job," but then that interest just carried on as I got older and older. And of course I'm watching The Weather Channel and you hear a lot about whether service products, so that's probably where I first started hearing about the weather service and then it kind of started the ball rolling on "hey, you know the weather service actually sounds like that could be an interesting place to work!" The interest started early and I had no idea about the weather service until a little bit later and then that that kind of became my goal.

Breaking the Ice: Getting to Know Our New Forecasters (continued)

Where did you end up going to school and what was your favorite thing to study?

I went to college at the University of South Alabama in Mobile. I think would have to pick meteorology. I really, really enjoyed synoptic because I felt like that's the thing you're building up to. So when you're in your senior year in synoptic class, that was kind of the culmination of everything you've learned the three years prior and now you're digging in and actually making a forecast; I just remember that being really fun. We had a forecast contest we did within the class and it was fun because it was like "OK, now we're actually getting down and doing [the forecast]"

What is your favorite type of weather to forecast?

Definitely convection. I've always been drawn to convection, but I think since I've been in the weather service and now there's the recent push for mesoanalysis—I really, really, *really* like it. I might even say even more than just convection; I just really enjoy mesoscale meteorology. So figuring out that, even if it's a winter storm or a tropical event figuring out how far inland the tornado threat going to be. I like to figure out the that short term period, like "hey, what's going to happen in the next couple of days?"

What was your career path like on the road to coming to NWS Newport?

I was a student volunteer at the mobile office when I was in college, so that kind of got my initial foot in the door. I did that for about a year and a half. They were still trying to spin up the student program there, so they actually had us do a forecasting, which I thought was kind of neat, and answering phones instead of just sitting there watching people. That kind of solidified that this was definitely something I wanted to do. I think that's kind of the beauty of doing it as a student; it's being able to figure out a figure out if this is environment I want to work in. Is it something that I really want to do? And for me, it was a "yes." But after I graduated, there was a hiring freeze for a while, so that put that on hold for about five years or so. I kept applying at that time, but there were there were only a handful of openings here and there, but I think a lot of those were pretty competitive. So my wife and I moved to Huntsville and I worked at an airport as a contract observer and then remotely for a private weather company that was actually based out of North Carolina. I did that for about five years and having that experience helped boost my resume for the weather service. So after the hiring freeze lifted, there was a massive opening, and I was able to get in on that. That took me to the Great Falls, MT, my first office in a paid capacity and I spent about three and a half years there as a an intern. Then I got hired as a meteorologist at the Wichita office for about 3 to 4 years, and then came here [to Morehead City].

> ***"I just really enjoy mesoscale meteorology. So figuring out that, even if it's a winter storm or a tropical event figuring out how far inland the tornado threat going to be."***
>
> ***-Roger Martin***

Breaking the Ice: Getting to Know Our New Forecasters

(continued)

What would you say is the most memorable weather event that you covered in your career?

So there's a lot of interesting events and I've been able to work. I think the one that probably sticks out the most right now was one that I experienced while I was a volunteer in Mobile which was Katrina, that was that was pretty remarkable. I think that will probably be one of my top events. But as far as in my weather service career, right after I started at Wichita, I had only been there about a week. So the first few days, you're just on training shifts, trying to get all your stuff moved over from your previous office and just getting some admin stuff done, bunch of documentation and things, but one of my first forecast shifts there, we had we had a severe weather event and so I was forecasting and doing the mesoscale stuff that I really enjoyed, but also still trying to learn an office you're, still trying to learn you know how do we handle things. So I'm feeling good that we would have severe weather and I was forecasting that, but it was a day out there where there was a stronger cap, so it was kind of one of those conditions where if the cap breaks, bad things are going to happen, but if it doesn't, it's just going to be a hot Spring day or a hot early summer day. Well, the cap did break and it literally went from 0 to 60. We saw towers going up out our window and it was just like BOOM! So I wasn't on radar that day but, the guy who was putting out warnings before storms even fully developed. We were seeing some elevated echoes, but we just knew because of the environment, it was just going to be a bad day. So, it was kind of a "welcome to The Plains" moment. Then the lead forecaster was like, "Roger hey, we need to get a social media graph out right away" and I was like great, I was fine with that, but I had no idea where the social media folder was or where all the templates were! And the lead was actually the one doing radar and it was very chaotic, but it was interesting an event and we ended up having an EF3 tornado that day that touched down in one of our population centers. I remember getting a call from the Emergency Manager—one of the only times this has happened--but we got a call from the EM saying "hey we have a tornado on the ground in town doing damage right now!" and so I looked over at the guy who doing radar and said "hey there's a confirmed tornado on the ground," so of course then we're switching to the confirmed tags on the warning. But anyways, that was just an interesting event taking that phone call, seeing a debris signature on radar as it is going through a town. You know, I had heard all these stories of other offices dealing with that thinking "who knows what's in that debris and are people losing their lives" and things like that, but then to actually work an event like that and since it was one of my first events there, it was very interesting for me. Thankfully and fortunately, nobody lost their lives, so that part it is great, but they had a lot of damage obviously. That one that sticks out the most since I've been in the weather service, I would say. Again there's been some other interesting events, but just because it's a combination of a big event and the first event that I worked at that office and being new the office, that's the most memorable one.

Last question I have for you: outside of work what do you like to do in your free time?

I love football. Just watching football in the the fall, that is one of my favorite things, just to relax, watch football on the weekends. But now where we live too, taking the kids to the beach or just doing outdoor things, our family really likes to do like to do outdoor hikes or going to the park or anything like that.

Breaking the Ice: Getting to Know Our New Forecasters (continued)

Next up, I chatted with Olivia Cahill, our newest Meteorologist at the Morehead City office.

Tell us a bit about where you are from?

I am from Dry Ridge, KY. It's just funny because it's like two weather-related words. I grew up there all the way until I went to college so, I've lived there my entire life and then I moved to Bowling Green, KY—that's where I went to undergrad—and then I moved to Athens, GA for grad school and then here [in Morehead City]!

Olivia Cahill, Meteorologist, NWS Morehead City

What got you into the weather and how early did you know you wanted to be a meteorologist?

I knew I wanted to be a meteorologist when I was 8. I feel like most people have a weather event that really got them into it and I never had that. There was never some large scale event that—I don't know, I just always was fascinated by it. I didn't have a severe weather event or a lot of snow or anything. My mom would just always say that I would want to stay outside, I wanted to look up, and I was just always curious and asked a lot of questions.

Where did you go to school for meteorology?

I went to Western Kentucky University and I got my bachelors in meteorology and then I had minors in GIS and ASL-American Sign Language. I want incorporate to that somehow here once I get a lot of training under my belt. My vision is to teach all of you basic weather related signs—that's what I did at the Louisville office for my volunteer program—anything to try to make that connection with the deaf community. Even if you know a few signs, there's that interesting connection that's more of a partnership with an untouched market. Then I went to grad school at University of Georgia and got my masters in geography. My research was focused on exertional heat illnesses in high school football players, specifically in Georgia.

Out of all that, what was your favorite thing that you studied?

Out of undergrad, my favorite thing that I studied was anything mesoscale because severe weather is my favorite topic. Then in grad school my favorite thing—it's kind of a weird answer—but I took a lot of epidemiology classes because of the health side of my thesis, so it was actually really cool! I had never taken an epidemiology class and I didn't know anything about it and I took it during the pandemic, so a lot of it was applicable, so that was very, very interesting for sure.

Breaking the Ice: Getting to Know Our New Forecasters (continued)

What is your favorite type of weather to forecast?

Severe weather and my answer for that comes from the field methods courses that I got to go on when I was in undergrad and then I also went on when I was in grad school. I went with my undergrad people, but when I was in grad school. So, each of those courses were two weeks in the plains forecasting. Everyday, there was a different lead forecaster and you had to make the decision on what the target for that day was, so those were the times I was put most in the hot seat, I guess you could say, and it really forced me to learn under the gun. It's not like being here of course and you have to issue warnings and everything, but it was big decisions on driving hundreds of miles one way or the other, so I feel like I learned the most in that environment and that's why it's my favorite!

What was your path like on the road to coming to the Weather Service Office in Morehead City?

I knew I wanted to be a meteorologist like all of us do. But it's funny, when I was an undergraduate, I actually changed my major the night before the first day of classes my freshman year because I was so afraid of all the math since I didn't take calculus in high school, I took statistics. I was like "there's no way I can get all the way through calculus 4, that's impossible!" So, I actually changed to biology, then I was elementary education for a minute, and then I finally switched back to meteorology. That delayed my graduation by 2 years just because of the curriculum's in-house courses were only offered once every year. But, I got through all the math, did fine with all that, and then I had no idea what I wanted to do when I was almost done with undergrad! But, I really wanted to do something that was on the human impact side of things, so that's why I went to grad school to learn about heat illnesses. My grad school adviser was a mutual friend of my undergrad advisor. He knew that he did a lot of human impact based research, so that's why I went to school there. Then when I was finishing up at UGA, I was in this big debate between a PhD and the weather service. And I had a reflection and I was trying to view my life from the 50,000 foot view: 5 years from now, which of these will have made me grow the most personally, spiritually, and intellectually? And I knew it was the weather service because it's hands on, I'm going to apply everything I've learned up until now, and I felt like if I got a PhD, someone would *maybe* read a paper that I wrote one day. But I still wanted to do something that was on the human impact type of things and I felt like this was a good way to be connected with the community and have an impact that way. So that's how I ended up here, a very roundabout way, so I did not know that this is what I wanted to do initially. It took me a long time to figure out what I wanted to do, I was definitely not someone who knew from day one that I wanted to do broadcast or weather service or whatever. I knew I wanted to do "weather", but I didn't know what that was going look like—I figured it out along way.

Breaking the Ice: Getting to Know Our New Forecasters (continued)

What is the most memorable weather event you have experienced in your life?

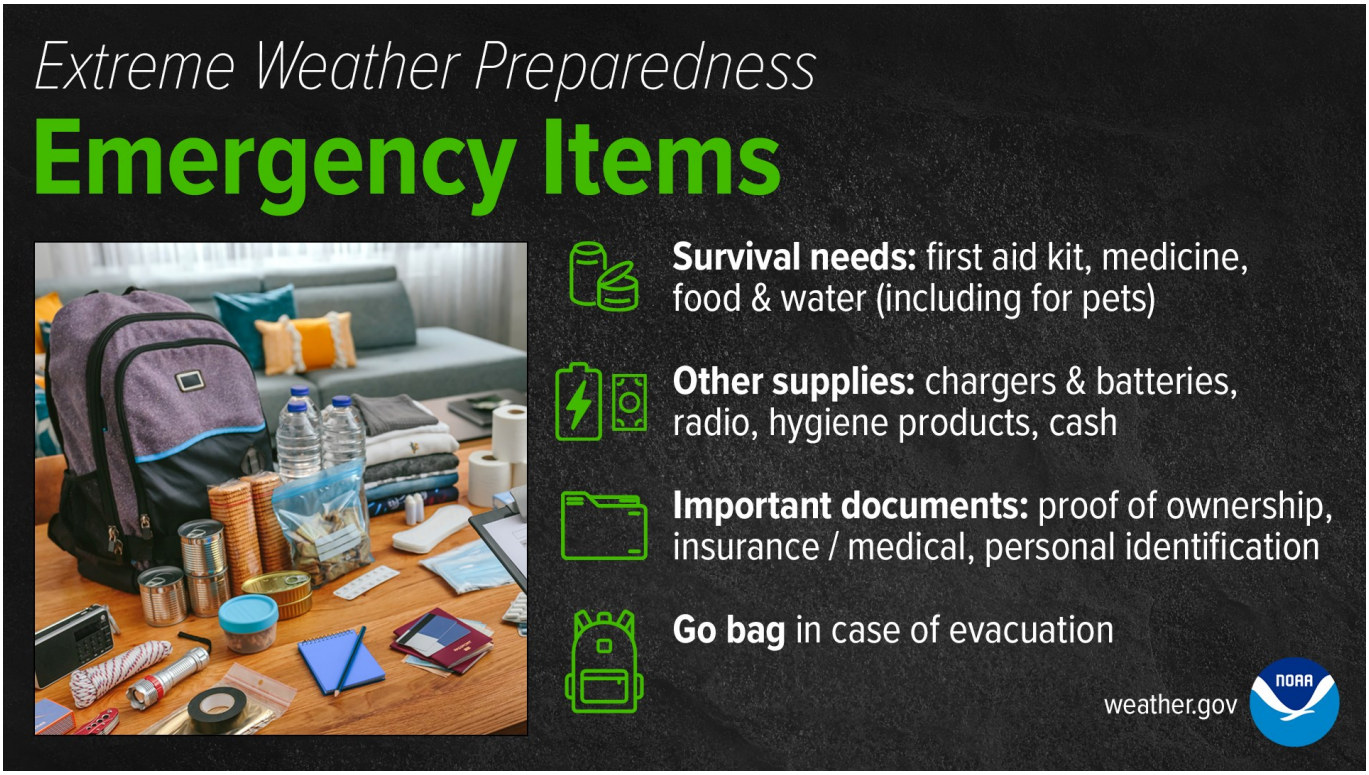
I was debating between two answers on this and my answer would be the 1st tornado that I ever saw when I was in one of my field methods courses. It was in Waldo, KS and it was such a frustrating storm to forecast for and when I finally saw it, I got tears in my eyes! Because by that point, I had finished school and I had such an appreciation for what it takes in the atmosphere to make that happen and to know how many things have to lineup perfectly in order for a tornado to form—it's like you have such a greater appreciation for it. So yeah I got tears in my eyes and I'm like "I've studied for years to know what makes that happen" and to see it and to have driven so many miles to just get a glimpse of something that lasted seconds was incredible. I think it was maybe like an EF-0 or EF-1? It was a very, very minor tornado, but to me it was super special because I felt like it was a very full circle moment for me.

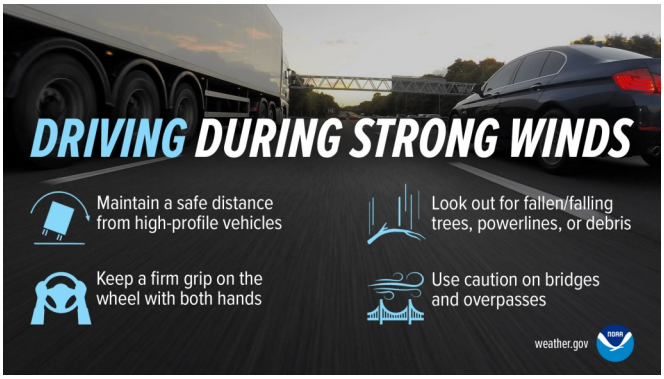
> ***"...I was trying to view my life from the 50,000 foot view: 5 years from now, which of these will have made me grow the most personally, spiritually, and intellectually? And I knew it was the weather service because it's hands on, I'm going to apply everything I've learned up until now..."***
>
> ***-Olivia Cahill***

The final question I have for you is what do you like to do in your spare time?

I love to cook and bake! I love to go and walks; I'm like the 28 something year old going on to 80 year old grandma! And I also love to thrift-I love to go to vintage stores and antique stores. I love to thrift clothes; it's like one of my favorite things to do. And puzzles! I love puzzles too.

A BIG thanks to Roger and Olivia for taking the time out of their busy work schedule to help us get to know them better! Look out for Roger and Olivia in the future at outreach events, SKYWARN trainings, community forums, and on our Facebook, Twitter, YouTube, and Instagram social media pages.





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