

Carolina SkyWatcher



NWS Morehead City

Fall/Winter 2023



In This Issue:

2023 Hurricane Season Review

North Carolina was impacted by both Tropical Storms Idalia and Ophelia in 2023. We take a closer look at their impacts.

Page 2

2023-2024 Seasonal Winter Outlook

La Nina is out, El Nino is in. Take a look at NOAA's Winter Outlook and what it means for eastern North Carolina.

Page 4

Other Articles

Winter Weather Preparedness 7

2023 Severe Weather Season Recap 9

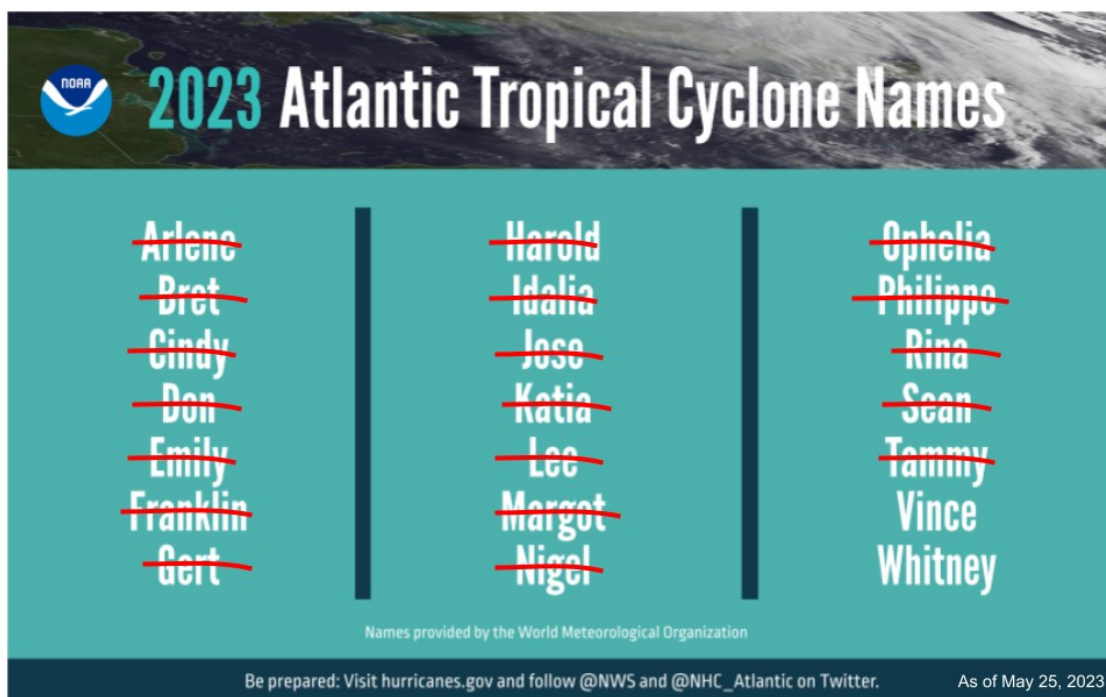
2023 Hurricane Season Review

By: Carl Barnes, Lead Meteorologist & Tropical Program Lead

As the 2023 Atlantic Hurricane Season winds down, it is time to reflect on the season.

Here is the 2023 Atlantic Hurricane Season by the numbers (as of November 11th):

Named Storms	Hurricanes	Major Hurricanes
19	7	3



Of all these systems, two in particular were the most impactful in eastern NC: Idalia and Ophelia.

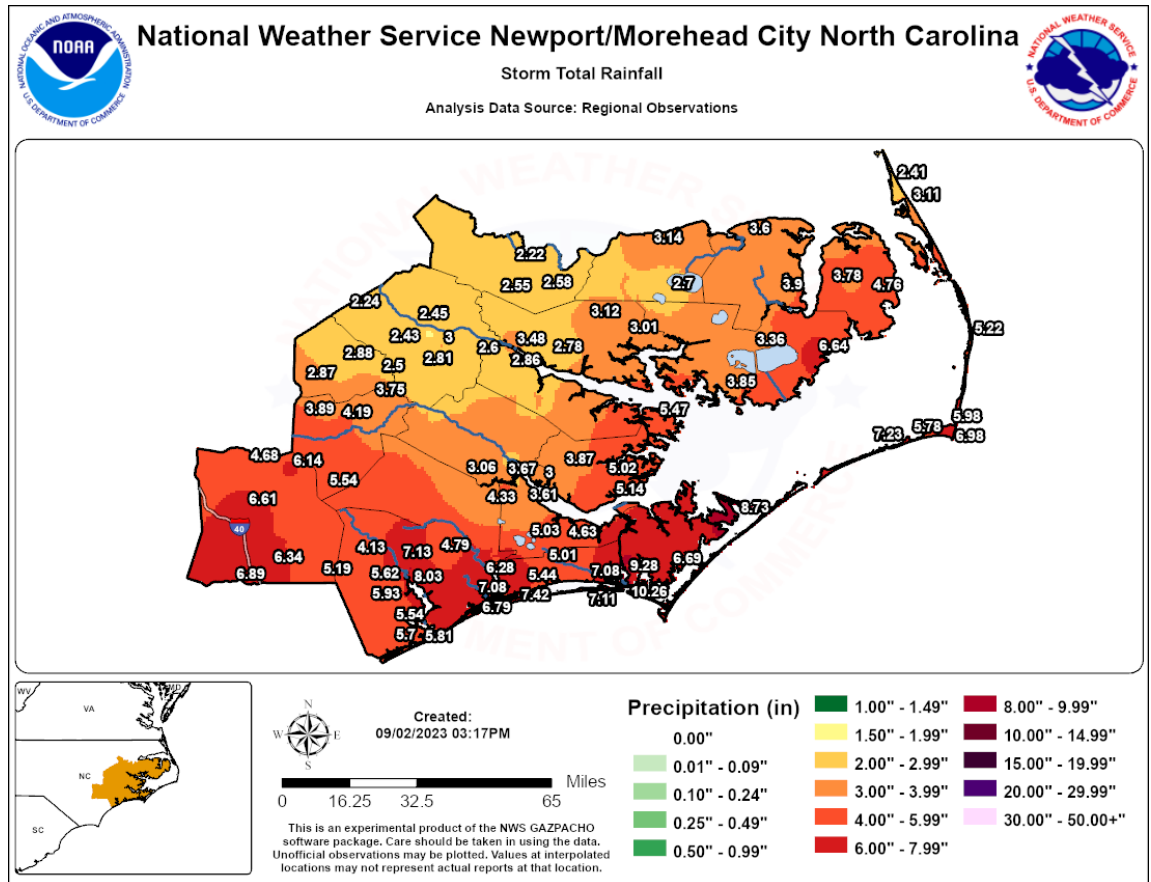
Major Hurricane Idalia made landfall in the Florida Big Bend as a category 3 hurricane with sustained winds near 125 mph on August 30th. It then weakened as it tracked across the southeast, reaching eastern North Carolina as a tropical storm on August 31st. Tropical storm force winds and heavy rainfall were experienced across most of the area, with storm total rainfall of 4-8 inches mainly along and south of the Neuse River, leading to localized flash flooding impacts. Some minor storm surge impacts were also felt along the Crystal Coast, Outer Banks, and Onslow County.

For more information on the local impacts from Tropical Storm Idalia visit www.weather.gov/mhx/IdaliaReview2023.

2023 Hurricane Season Review (cont.)

By: Carl Barnes, Lead Meteorologist & Tropical Program Lead

In stark contrast to Idalia weakening as it approached the area, Tropical Storm Ophelia quickly developed off the Southeast coast and was still intensifying into a strong tropical storm as it made landfall at Emerald Isle during the early morning hours on September 23rd, near the climatological heart of hurricane season. Strong winds and storm surge were the most significant impacts from Ophelia, with moderate to major storm surge impacts experienced along the Pamlico, Pungo, Neuse, and Bay Rivers and surrounding waterways, with pervasive flooding around the towns of Washington, Belhaven, and New Bern. The peak observed wind gust was 72 mph at Cape Lookout, with tropical storm force winds bringing scattered wind damage across much of eastern North Carolina.



Observed rainfall amounts associated with Tropical Storm Idalia.

For more information on the local impacts of Tropical Storm Ophelia, visit www.weather.gov/mhx/OpheliaReview2023.

Understanding eastern North Carolina’s hurricane vulnerability is critical to ensuring we are more prepared for what Mother Nature throws at us. As the seasons continue to change and people continue to move to eastern North Carolina, please bookmark and share the information available at weather.gov/moreheadcity/hurricaneprep with your friends, neighbors, and loved ones to help ensure that we are all ready by the time the 2024 hurricane season rolls around.

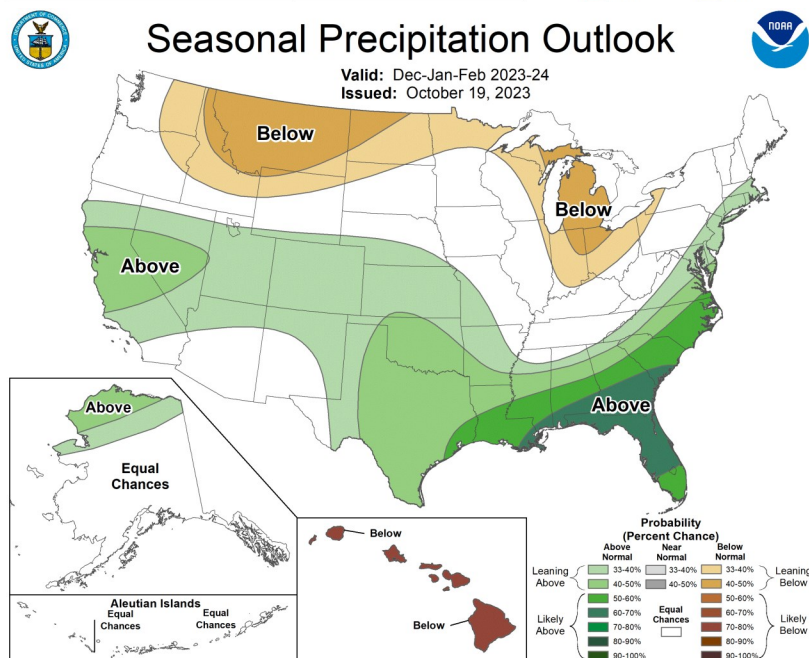
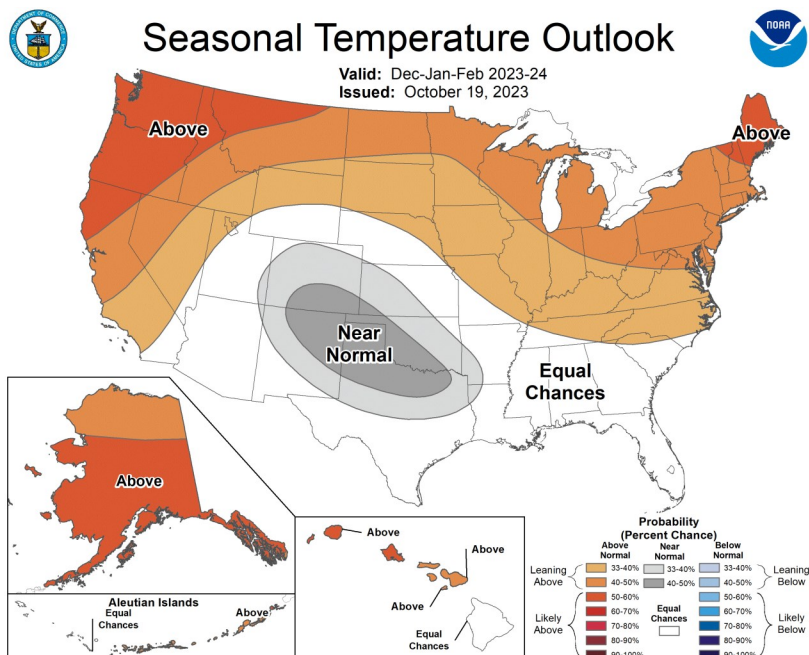
2023-24 Winter Weather Outlook

By: Morgan Simms, Meteorologist & Climate Program Lead

The National Oceanic and Atmospheric Administration (NOAA) released the 2023-2024 winter outlook in October. Above-average temperatures are slightly favored (33-40% chance) across eastern North Carolina for meteorological winter (December through February), and above-average precipitation is favored (50-60%) for the same time. The outlook follows a classic El Nino pattern, contrasting the past three La Nina winter seasons. For reference, normal highs and lows are in the upper 50s and upper 30s, respectively. Normal precipitation is around 12 inches. These are average values over 90 days, so plenty of significant variation can (and will!) happen within this period.

The El Nino-Southern Oscillation (ENSO) is a recurring climate pattern involving changes in the temperatures of waters in the central and eastern tropical Pacific Ocean. This area's water temperatures vary below and above average, anywhere from 1-3°C from normal. The pattern, referred to as the ENSO cycle, directly affects rainfall distribution in the tropics and can strongly influence weather patterns across the United States and the world.

During an El Nino, a strong and amplified Pacific jet extending across the southern U.S, coupled with a polar jet shifted farther north, generally favors above-average precipitation across the southern tier of the country (see more at <https://www.weather.gov/mhx/ensowhat>).

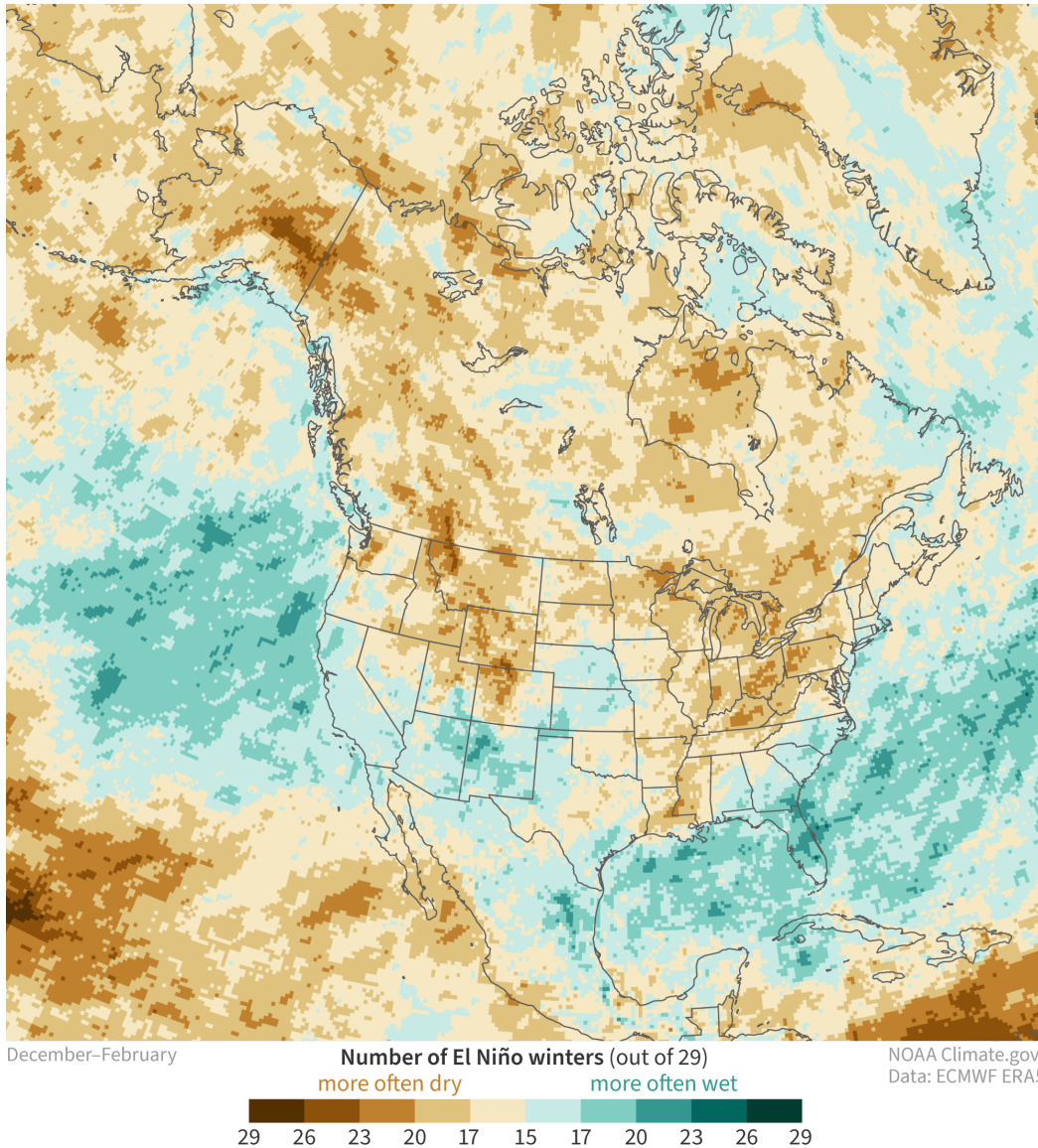


Temperature and precipitation outlooks for December 2023-February 2024. Source: Climate Prediction Center

2023-24 Winter Weather Outlook (cont.)

By: Morgan Simms, Meteorologist & Climate Program Lead

How often have El Niño winters been **drier than average** vs. **wetter than average**?



The "strength" of El Niño is determined by how strong the temperature anomalies are in the Eastern Pacific over a three-month period. From August to October, this was +1.5°C - considered a "strong" El Niño. Generally, the more robust an anomaly, the more confident we are in the associated weather pattern (but not necessarily the severity). However, there are more drivers to climate patterns than just ENSO (such as the PNA, AO, NAO, or other teleconnections you might have read about) that can result in patterns we may not easily anticipate.

To emphasize this, check out this graphic

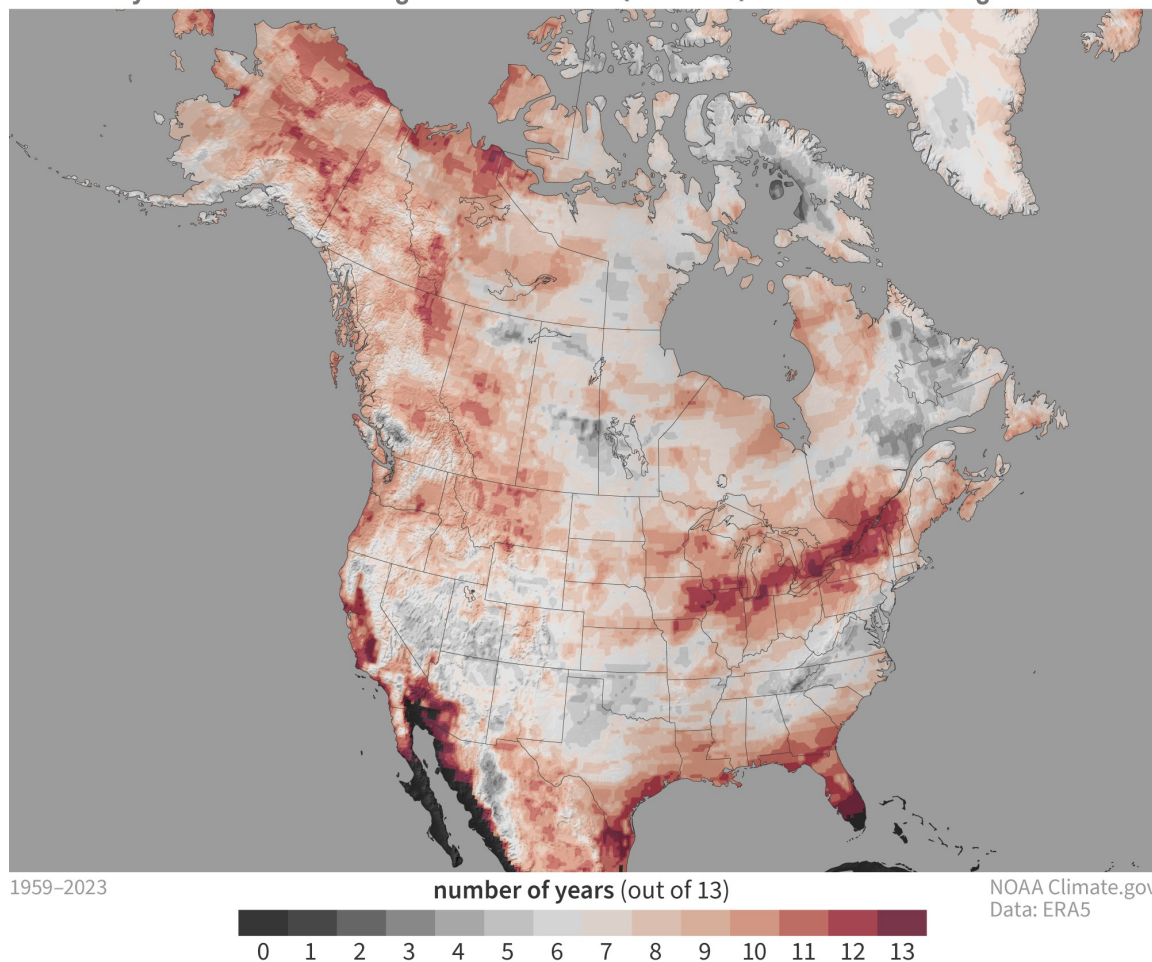
courtesy of NOAA's Brian Brettschneider. It displays the frequency of above or below-normal precipitation and temperatures for North America during all 29 El Niño events since 1940. For eastern North Carolina, barely more than half resulted in above-average precipitation and similarly so for below-average temperatures. Thus, the presence of El Niño does not guarantee a wetter and cooler than average winter.

2023-24 Winter Weather Outlook (cont.)

By: Morgan Simms, Meteorologist & Climate Program Lead

If we do end up with a wetter winter, it may not necessarily translate to a snowier one. The following graphic shows how many moderate-to-strong El Niño winters (from January to March, so not completely analogous to the December-February outlook period) saw below-average snowfall, out of 13 seasons. For eastern North Carolina, more

How many moderate-to-strong El Niño winters (Jan-Mar) had below-average snowfall?



than half met this criteria. For context, the 1991-2020 average snowfall across our area is no more than a few inches across the coastal plain and generally under an inch along the coast. This does not reflect an overall decline in snowfall in the long term owing to warming due to climate change.

This does not mean we won't see a snowstorm this season, but odds are low. Regardless of the outlook, it only takes one storm to make a difference. This is a great time to review winter weather preparedness, outlined in the next article. We put out a video overview of this outlook, which you can find [here](#). For more excellent climate-related information, check out the [Climate.gov blog](#). Many of the El Niño graphics in this article come from [this post](#). For the full snowfall post, click [here](#).

Winter Weather Preparedness: Not Just For The Birds!

By: Ryan Fuchek, Meteorologist & Winter Program Team Lead

We have come to that time of year when the birds have flown south for the winter or will be shortly. While we cannot go south for an entire winter, we can certainly prepare for all that winter has to offer to make it a comfortable one in Eastern North Carolina.

As we enter winter, our attention turns to bouts of extreme cold and winter storms. With this winter being an El Nino year, it is becoming increasingly likely eastern North Carolina will see a wetter-than-average winter. However, the latest temperature forecast for this winter is murkier, with just a slight chance of warmer-than-average temperatures. Our climatological winter pattern during an El Nino usually calls for a stronger Pacific Jet along the southern US, allowing the storm track to move right along the Carolinas at times. This brings the potential for Nor'Easters and winter storms, which can result in many hazards, including ice, snow, sleet, and extreme cold!

With most things, preparedness is critical, and there is always time to have a plan in case a winter storm hits. This year, we are putting some focus on the four P's. What might the four P's be, you might ask? They are People, Pets, Pipes, and Plants!

Protect People, Pets, Pipes, & Plants from cold weather

People	Pets	Pipes	Plants
<ul style="list-style-type: none"> Minimize time outdoors. Prepare for power outages. Check on elderly & other vulnerable people to make sure they're ok. 	<ul style="list-style-type: none"> Keep your pets warm, dry & indoors as much as possible. Ensure their food & water doesn't freeze. Limit outside time & keep them bundled up. 	<ul style="list-style-type: none"> Insulate pipes if possible. Open up sink cabinets to expose pipes to heated air. Disconnect hoses & turn off water to sprinklers. 	<ul style="list-style-type: none"> Know their temperature thresholds. If possible, cover them before the cold weather sets in to help retain some heat.

weather.gov

To keep everyone prepared for whatever winter may bring you can follow some of these examples. During and after winter storms impact the area, check up on your neighbors, grandparents, and those that are more vulnerable to winter storms when it is safe to do so to make sure they are ok. Make sure you protect any sensitive plants that may be outside as well as your furry friends too. If you are cold outside they are cold too!

Winter Weather Preparedness: Not Just For The Birds! (cont.)

By: Ryan Fuchek, Meteorologist & Winter Program Team Lead



You can follow some of these examples to keep everyone prepared for whatever winter may bring. During and after winter storms impact the area, check up on your neighbors, grandparents, and those more vulnerable to winter storms when it is safe to do so to ensure they are ok. Ensure you protect any sensitive plants that may be

outside and your furry friends. If you are cold outside, they are, too!

Winterize your home to protect your pipes by insulating them, disconnect outdoor hoses, and turn off your sprinklers to protect your house from potential water damage. In addition, if you have a chimney, inspect it as well as all windows, doors, and your attic to make sure they are properly insulated, keeping your house warm when winter strikes.

Severe winter storms can produce conditions that can isolate you and your family in your home for several days. With this in mind, always ensure you stock an emergency supply of food and water before the onset of a winter storm. Include food items that require no cooking, such as canned meats, peanut butter, and other non-perishables. Also, remember to have necessary medicines and baby items on hand. A three to five-day supply of food and medicine is generally sufficient. Many of these items may already be in your home hurricane kit.



Finally, continue to get your weather information from trusted sources such as your local National Weather Service office to keep current on the latest forecast. For additional tips and tricks for this winter, visit [weather.gov/mhx/winterprep](https://www.weather.gov/mhx/winterprep)!

2023 Severe Weather Season Recap

By: Tom Lonka, Meteorologist & Severe Weather Team Lead

The first severe weather episode of the year kicked off on January 4, 2023. A very unstable air mass for early January developed and, with plentiful shear in place, produced a line of thunderstorms ahead of a fast-moving cold front. With this line of storms, widespread damaging wind gusts of an estimated 60-70 mph impacted Eastern NC.

Significant damage to the gym roof of South Lenoir High School in Kinston occurred, along with reports of other structural damage arising in Martin, Duplin, Pitt, and Craven Counties.

A tornado touched down in Bayview within this broken line of severe storms and was rated as an EF-1 with winds of up to 105 mph. The tin roof of a shed was tossed about 25 yards, and several large cedar trees were snapped along with shingles torn off of several homes.

NATIONAL WEATHER SERVICE
OCEANIC AND ATMOSPHERIC ADMINISTRATION

**Preliminary
Damage Survey**

Beaufort County Tornado

Start- Bayview, NC

End- Bayview, NC

Date- 01/04/2023

Estimated time- 2:49 PM – 2:50 PM EST

Maximum EF- Scale Rating- EF1

Estimated maximum wind speed- 100-105 MPH

Maximum path width- 125 yards

Path length- 0.33 Miles / 575 yards



An EF1 tornado touched down in Bayview, NC embedded within a line of severe thunderstorms that moved through on January, 4, 2023. Image courtesy NWS Newport, NC.



Wind-driven hail damage to vinyl siding in Ayden, NC on May 9, 2023. Image courtesy Joan Avilez.

The season's most widespread and significant severe episode affected Eastern NC on May 9. May is typically the peak of severe weather season in this region, and this severe weather outbreak was right on cue. During the afternoon, a wavy frontal boundary sagged slowly south through Eastern North Carolina. Scattered to numerous severe thunderstorms developed along and ahead of the front and moved southeast across much of Eastern North Carolina, eventually making it to the

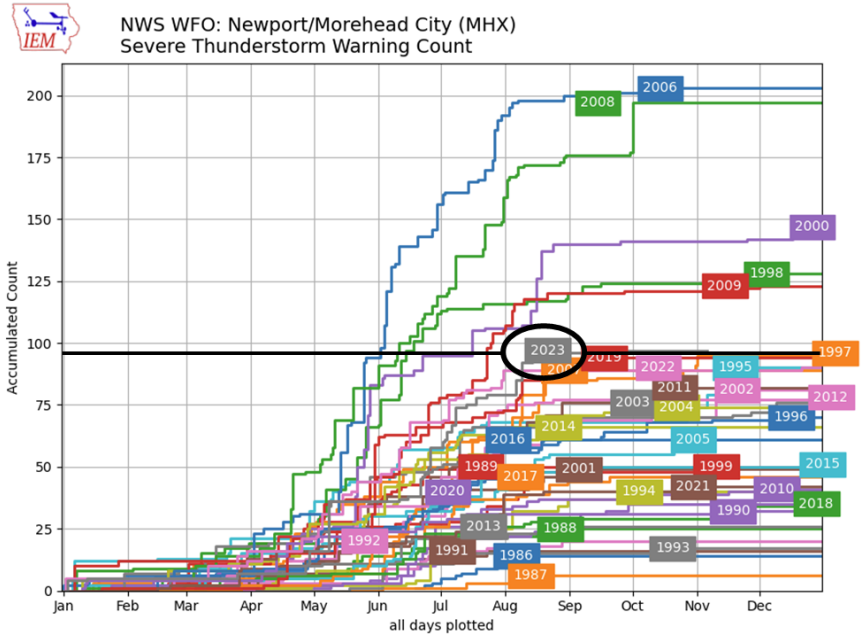
coast. The magnitude of severe weather was widespread, producing rare hail up to 2" in diameter and wind gusts in excess of 70 mph. The large hail was also observed on the coast, making this outbreak unique.

2023 Severe Weather Season Recap (cont.)

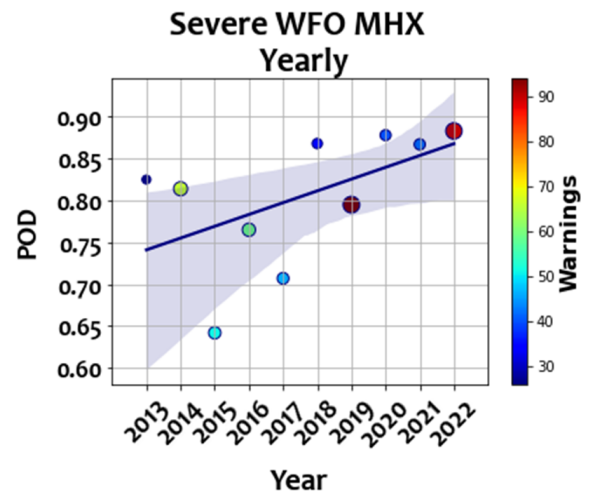
By: Tom Lonka, Meteorologist & Severe Weather Team Lead

Several other significant severe weather episodes occurred in late June and the second week of July. Sporadic severe thunderstorms also happened during the latter part of July and through August, thereby putting the number of severe thunderstorm warnings issued by the National Weather Service office in Newport above the average in a calendar year (see figure below). However, the number of tornado warnings issued was well below the average.

Where do we stand in the overall predictability of severe weather across Eastern NC over the years? To answer some of those questions, the National Weather Service keeps track of GPRA goals, which stands for The Government Performance and Results Act. The GPRA requires agencies to perform performance management tasks such as setting goals, measuring results, and reporting progress. Each severe weather season, the NWS measures severe weather verification for each office. Looking back through the last ten years, NWS Newport/Morehead City, NC, has shown a general increasing trend in severe weather predictability. This is partly due to advancements in technology, such as improvements to Doppler radar, the progress of the GOES satellite series, and the advancement of severe weather research to operations over the years. Although we have some great tools to detect severe weather, we rely on severe weather spotters, volunteers like you in the communities around Eastern NC, to send in reports when severe weather strikes. Please visit our [Skywarn Spotter](#) page if you would like to help us verify severe weather storm reports!



Through calendar year 2023, 97 severe thunderstorm warnings have been issued for Eastern NC. This is above the normal number of 68.5 severe thunderstorm warnings for a calendar year. The period of record is from 1986 to 2023.



The POD (Probability of Detection) values for severe thunderstorms have shown a general improving trend over the last 10 years.



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