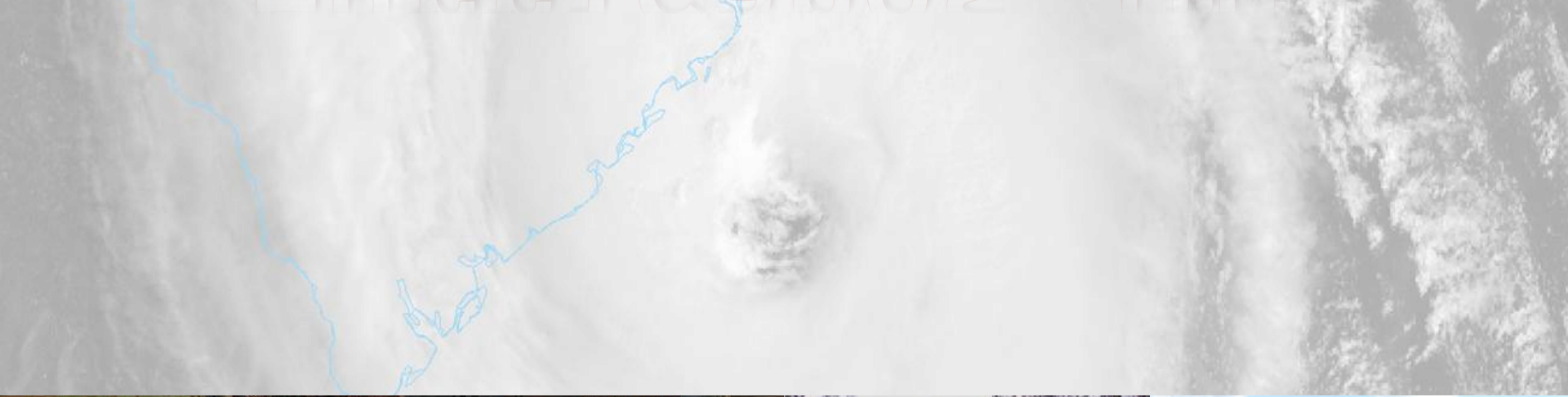




Hurricanes 101



NWS **Wilmington, NC**
serving southeast NC & northeast SC

Webinar Logistics

- ❖ Everyone is in Listen Only mode
- ❖ Feel free to enter any questions in the Questions pane in the GoTo Webinar control panel and we'll reply via email as soon as possible after the webinar
- ❖ A few poll questions will pop up during the presentation so please try to participate
- ❖ Please fill out the brief survey that will pop up after you exit the webinar
- ❖ Copy of the presentation is available now in the Handouts section of the GoTo Webinar control panel and will be added to our hurricane preparedness page: weather.gov/ilm/hurricaneprep

Outline

- ❖ Tropical Cyclone Formation/Classification/Structure/Season
- ❖ Tropical Cyclone Climatology & Local History
- ❖ Tropical Cyclone Hazards
- ❖ Tropical Cyclone Forecasts
- ❖ How to Stay Informed During Hurricane Season
- ❖ How to Get Prepared for Hurricane Season

Poll Question

Have you ever experienced a tropical cyclone (hurricane, tropical storm or tropical depression)???

How Do Tropical Cyclones Form?

❖ Tropical Cyclones

- General term for tropical depressions, tropical storms and hurricanes
 - Originate over tropical/subtropical waters
 - Not tied to any fronts
 - Contain organized areas of deep thunderstorms
 - Have surface winds moving counter-clockwise around a well-defined center
 - Have centers that are warmer than their surroundings



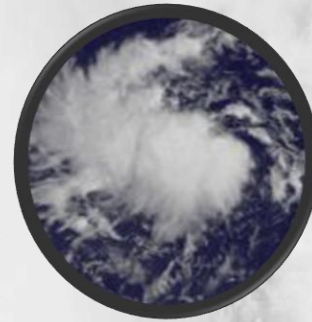
Ingredients:

- Pre-existing disturbance (e.g., African easterly wave, low pressure along dying front)
- Warm water (~80°F)
- Warm/moist air
- Weak vertical wind shear

How Do We Classify Tropical Cyclones?

❖ Tropical Depression

- Well-defined circular wind field
- Sustained winds <39 mph



❖ Tropical Storm

- Sustained winds of 39–73 mph
- Given a name at this stage

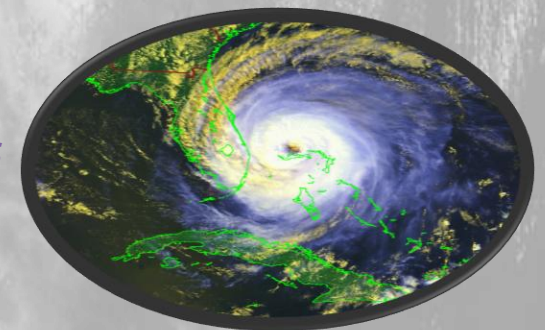


❖ Hurricane

- Sustained winds ≥ 74 mph
- Ranked according to the Saffir–Simpson Scale:
 - Cat 1: 74-95 mph
 - Cat 2: 96-110 mph
 - Cat 3: 111-129 mph
 - Cat 4: 130-156 mph
 - Cat 5: 157+ mph

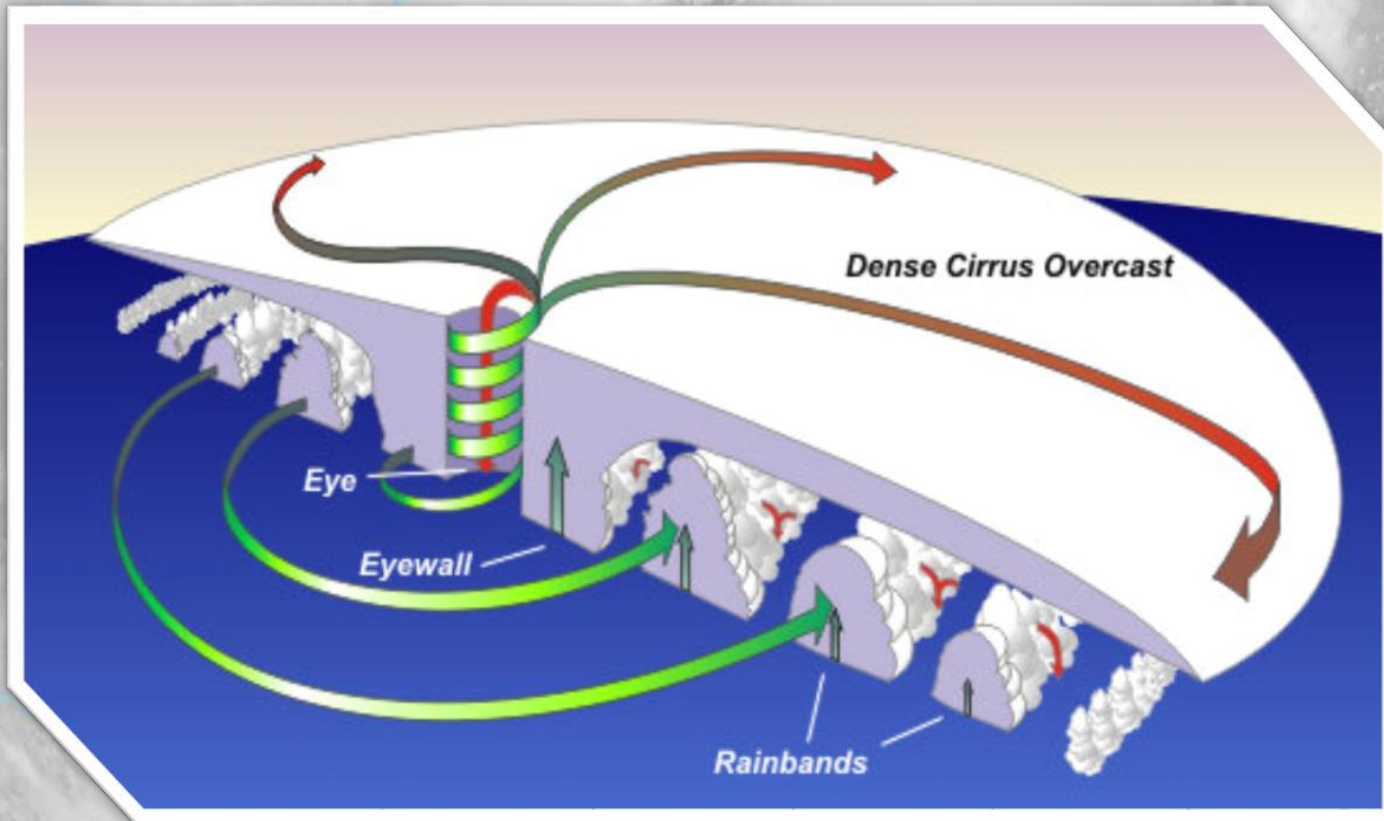


Major hurricanes produce most of the wind damage!



What Are the Parts of a Hurricane?

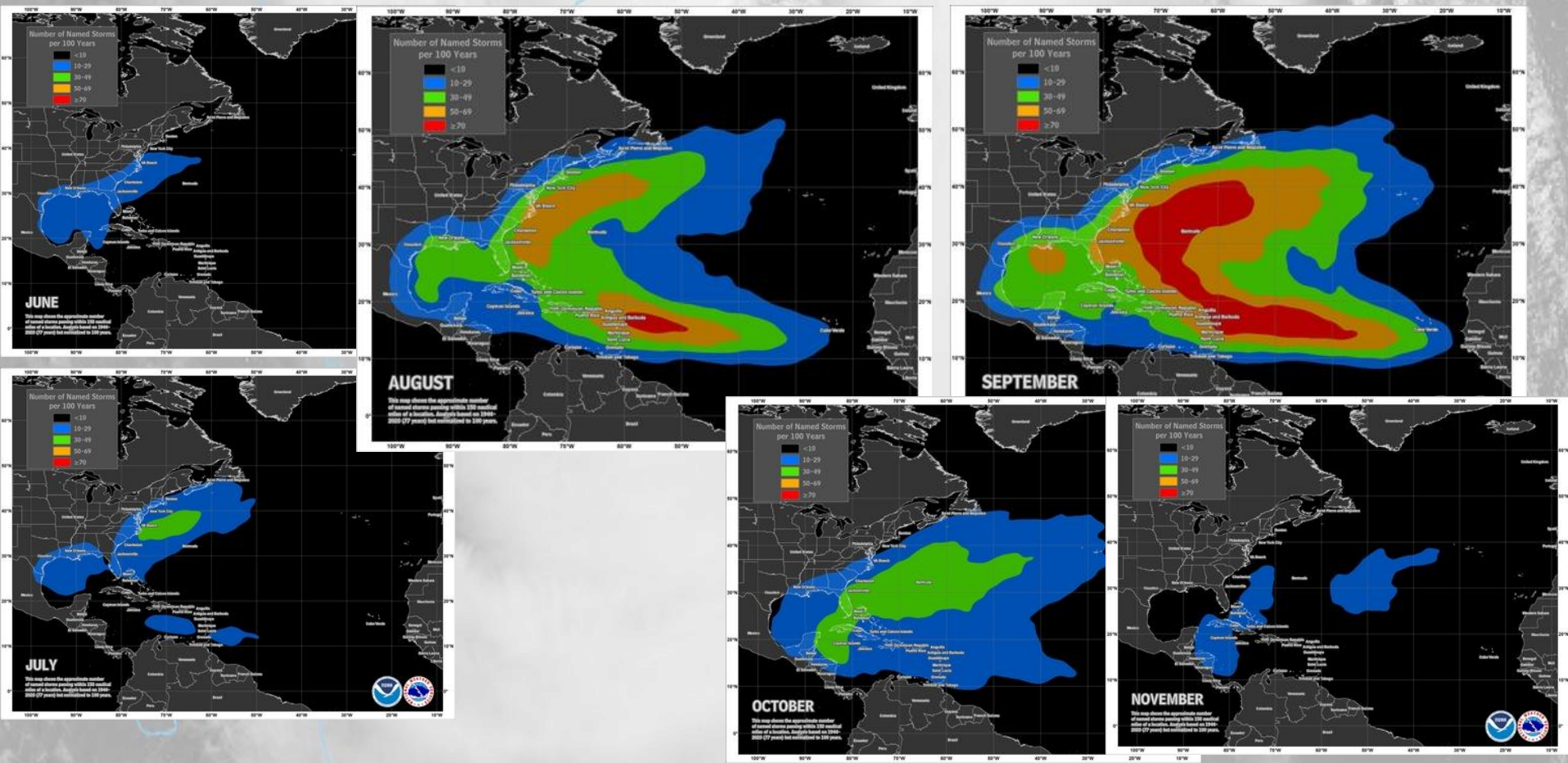
- ❖ **Eye:** warm center with little to no wind/clouds/rain due to sinking air
- ❖ **Eye Wall:** area surrounding the eye that usually contains the worst storms, strongest winds and possible tornadoes
- ❖ **Rain Bands:** lines of storms containing strong winds/heavy rain/tornadoes that rotate around the storm and can extend outward several hundred miles



When is Hurricane Season?

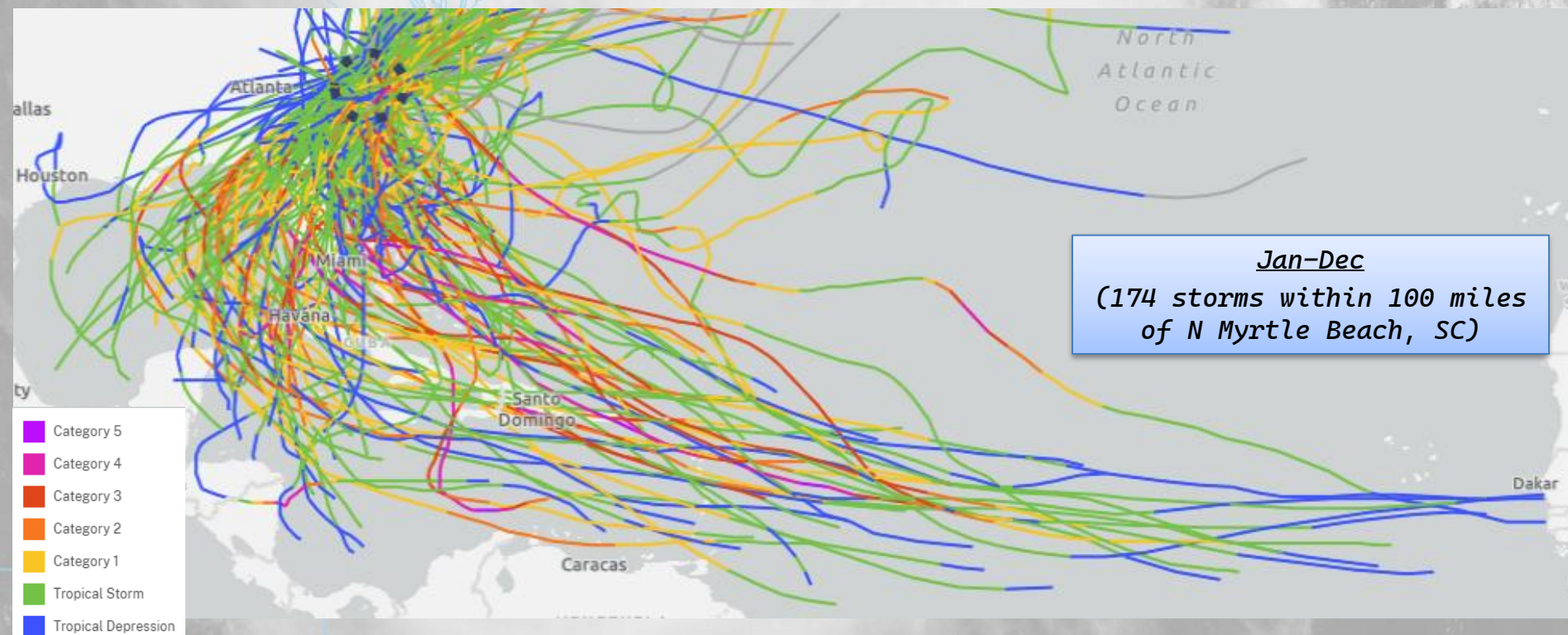
❖ Atlantic Basin: June 1 to November 30

- But ... storms do occur outside this period!
- Peak: August through October



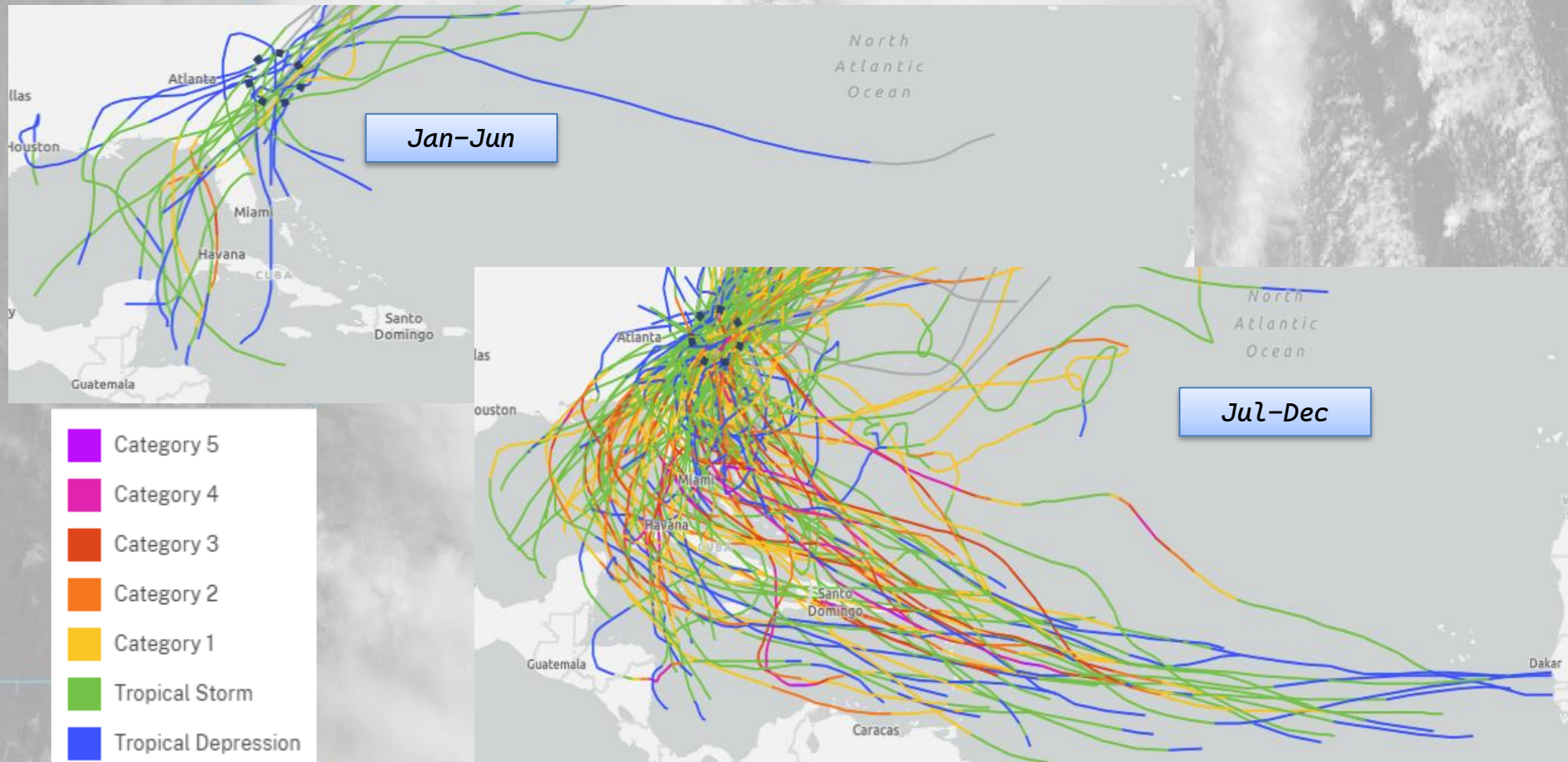
When Do Tropical Cyclones Impact Southeast NC & Northeast SC?

- ❖ Anytime from ~mid-May thru ~mid-Nov, but especially need to watch ~mid Aug thru ~mid Oct
- ❖ On average, we see a *hurricane* about every 7 years and a *major hurricane* about every 20 years



When Do Tropical Cyclones Impact Southeast NC & Northeast SC?

- ❖ Most storms occur from mid-August through mid-October and are usually stronger and develop farther away



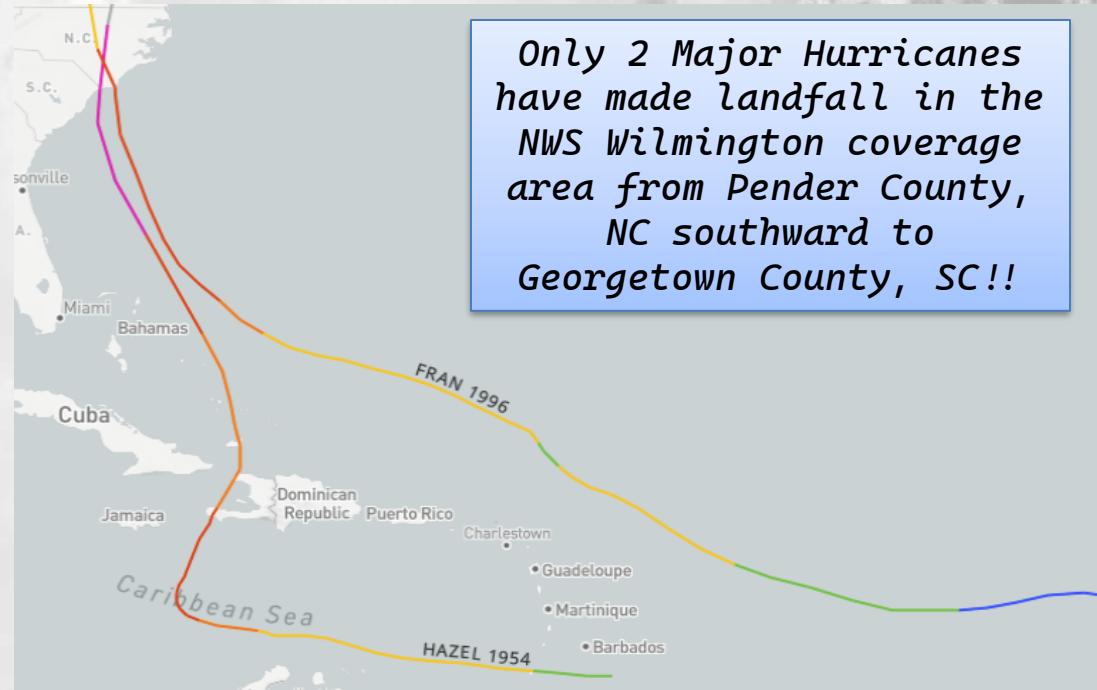
Tropical History for SE NC & NE SC

Local Storm Archive: weather.gov/ilm/SignificantLocalEvents

Past Tropical Cyclone Tracks: coast.noaa.gov/hurricanes

- ❖ Since the start of official records in 1851, 85 hurricanes passed within 100 mi of N. Myrtle Beach, including 11 Major (Cat 3–5) hurricanes:

- ❖ Unnamed (Aug 1879) – Cat 3
- ❖ Unnamed (Aug 1887) – Cat 3
- ❖ Unnamed (Oct 1893) – Cat 3
- ❖ Unnamed (Jul 1916) – Cat 3
- ❖ Hazel (Oct 1954) – Cat 4
- ❖ Helene (Sep 1958) – Cat 4
- ❖ Diana (Sep 1984) – Cat 4
 - ❖ Cat 1 at landfall
- ❖ Hugo (Sep 1989) – Cat 4
- ❖ Fran (Sep 1996) – Cat 3
- ❖ Bonnie (Aug 1998) – Cat 3
 - ❖ Cat 2 at landfall
- ❖ Dorian (Sep 2019) – Cat 3



- Only 2 Major Hurricanes have made landfall in the NWS Wilmington area of responsibility
- Hurricane Helene (1958) produced the strongest wind gust on record at Wilmington Airport (135 mph) even though it didn't even make landfall!

What Hazards Do Tropical Cyclones Produce?



Storm Surge



Rip Currents



High Winds

Tornadoes/Waterspouts



Flooding Rain

Poll Question

A satellite image of a tropical cyclone over the ocean, with a semi-transparent map overlay showing the cyclone's path. The map is in light blue and shows the coastline of the Americas and the Caribbean. The cyclone is a large, circular cloud system with a distinct eye in the center, moving from the upper left towards the lower right.

Do winds cause the most deaths in tropical cyclones???

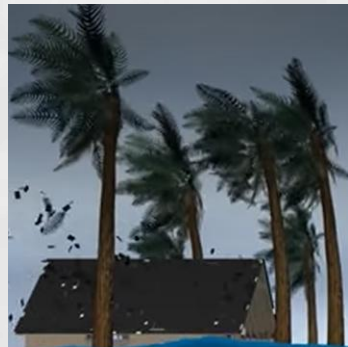
Tropical Cyclone Water Hazards

❖ **Flooding** from heavy rain and storm surge causes most deaths, especially flooding from heavy rainfall well inland from the coast!!

- Consider all sources of flooding (rain/surge/streams)
- Determine if you live in a flood-prone area, especially in an official evacuation zone
- Even if you don't live on the beach you can still be vulnerable to storm surge if you live near a tidal waterway
- Even if your location doesn't flood, nearby areas might so you could become cut off
- Strongly consider evacuating if advised to do so by officials
- Don't just focus on rainfall amounts as rates matter too
- Don't drive through flooded roads



Socastee, SC -
Hurricane Florence (2018)



NWS storm surge forecasts represent water depths above normally dry ground and do NOT account for higher waves or freshwater (rain/streams)

For example: NWS surge forecast of 4-7 ft means "4-7 ft of saltwater above the ground beneath you"

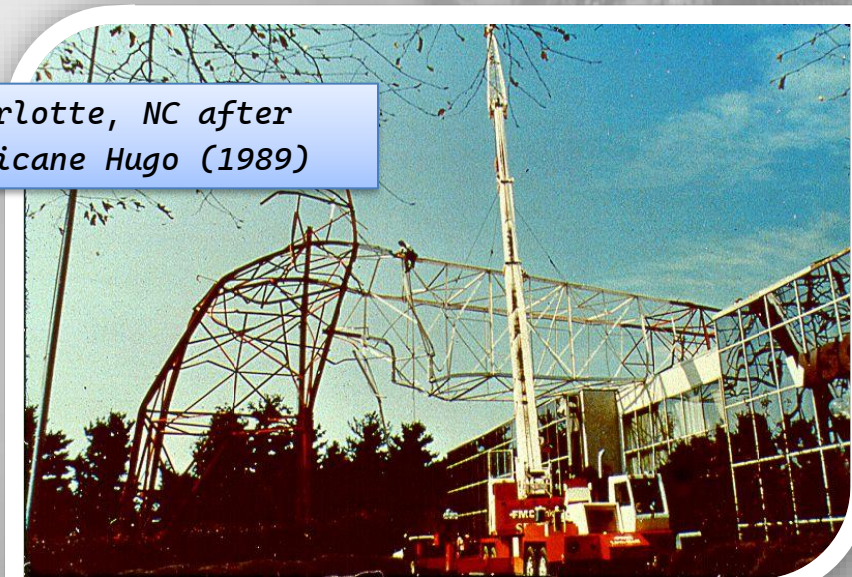
Shallow continental shelf

Tropical Cyclone Wind Hazards

- ❖ **Strong winds (especially gusts) can occur hundreds of miles from the coast!**
 - Strongest winds usually in the eye wall and in elevated/exposed areas
 - Tornadoes in the outer rain bands and eye wall can cause locally higher winds
 - Best to use plywood or shutters on windows
 - Garage doors can be weak points
 - Be prepared to be without power for many days, possibly weeks!
 - Strongly consider evacuating if you live in a less well-built home and/or near a lot of trees
 - During a storm, especially if a Tornado Warning and/or Extreme Wind Warning is issued for your area, go to interior room on lowest level not prone to flooding, protect your head and remain alert for falling trees and flying debris



*Oak Island, NC after
Hurricane Matthew (2016)*



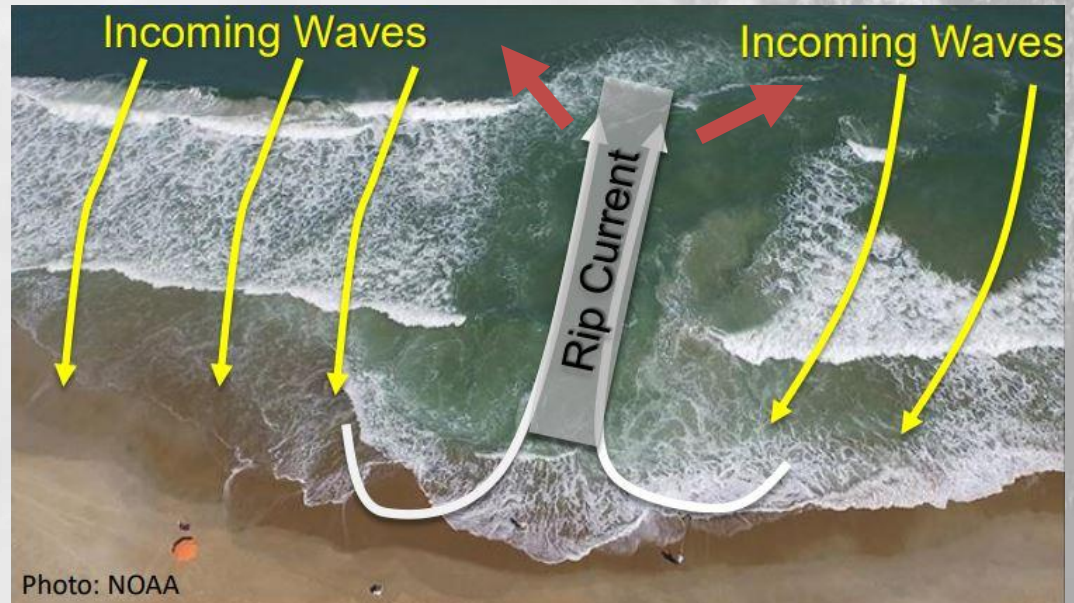
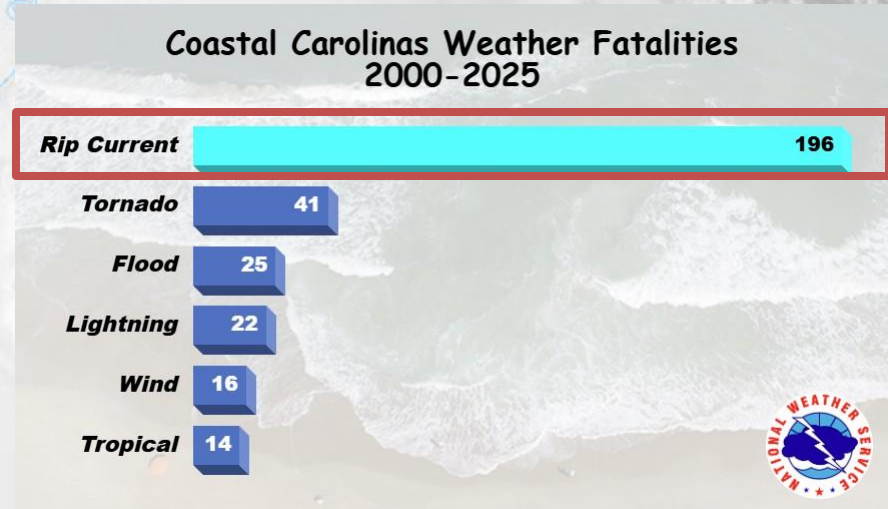
*Charlotte, NC after
Hurricane Hugo (1989)*

Tropical Cyclone Beach Hazards

Rip Current Awareness: [weather.gov/ilm/ripcurrents](https://www.weather.gov/ilm/ripcurrents)

❖ Dangerous surf, including life-threatening rip currents, can occur along the beaches even if a storm is 1000+ miles away!

- Heed our rip current alerts and lifeguard flags/warnings
- If caught in a rip current:
 - Try not to panic!
 - Swim parallel to shore to get out of the current, then swim back to the beach
 - If you can't escape the rip, float or tread water and get the attention of someone else to help



How Does the NWS Make Tropical Cyclone Forecasts?

- ❖ National Hurricane Center – [hurricanes.gov](https://www.hurricanes.gov)
 - issue “big picture” storm track/intensity forecasts and coastal tropical wind and surge watches/warnings
- ❖ NWS Forecast Offices – [weather.gov/ilm](https://www.weather.gov/ilm)
 - issue localized forecasts for southeast NC & northeast SC



NHC: Miami, FL



NWS: Wilmington, NC

What Does NWS Wilmington, NC Do?

Open 24/7/365 !!



- ❖ Located at the Wilmington Airport
- ❖ Building designed to withstand most storms
- ❖ Main responsibilities:
 - ❖ hazardous weather warnings
 - ❖ Providing decision support services for emergency management/public safety officials

What Area Does NWS Wilmington, NC Cover?



Area of Responsibility:

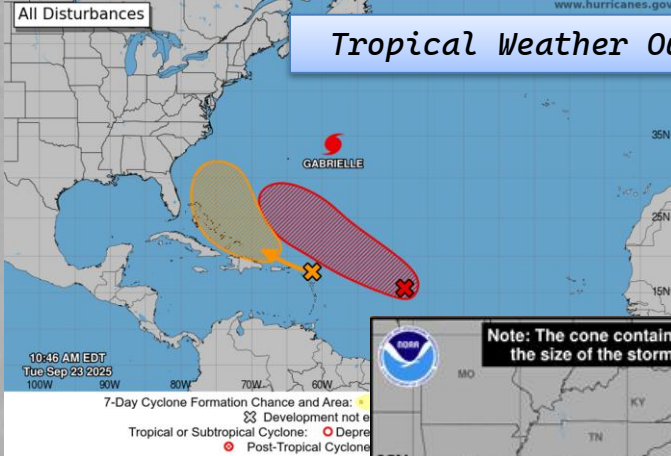
- ❖ 14 counties in southeast NC/northeast SC
- ❖ Adjacent Atlantic waters out 60 nm

Doppler Radar:

- ❖ Shallote, NC (Brunswick County)

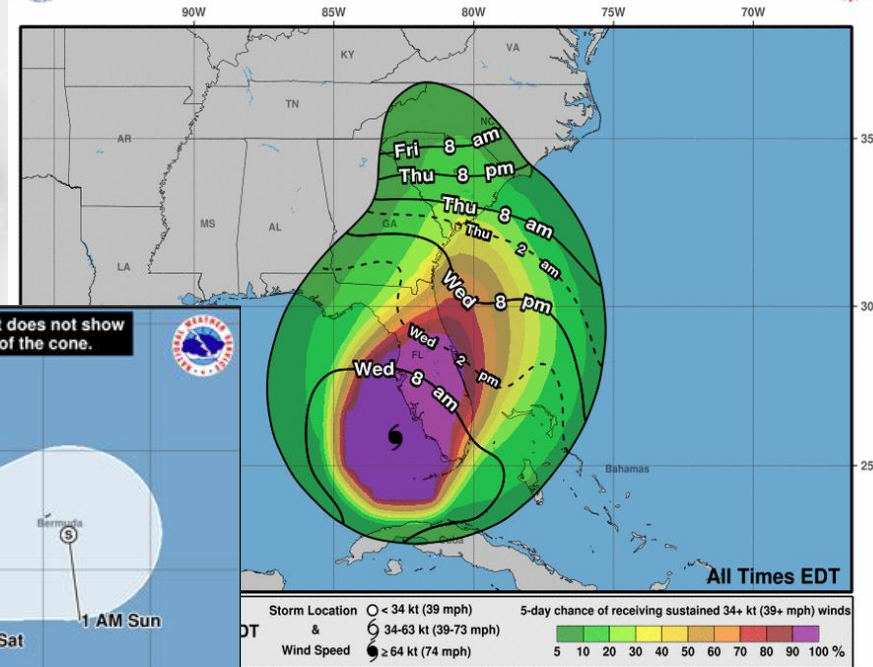
What Products Does the National Hurricane Center Issue?

Seven-Day Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida
www.hurricanes.gov

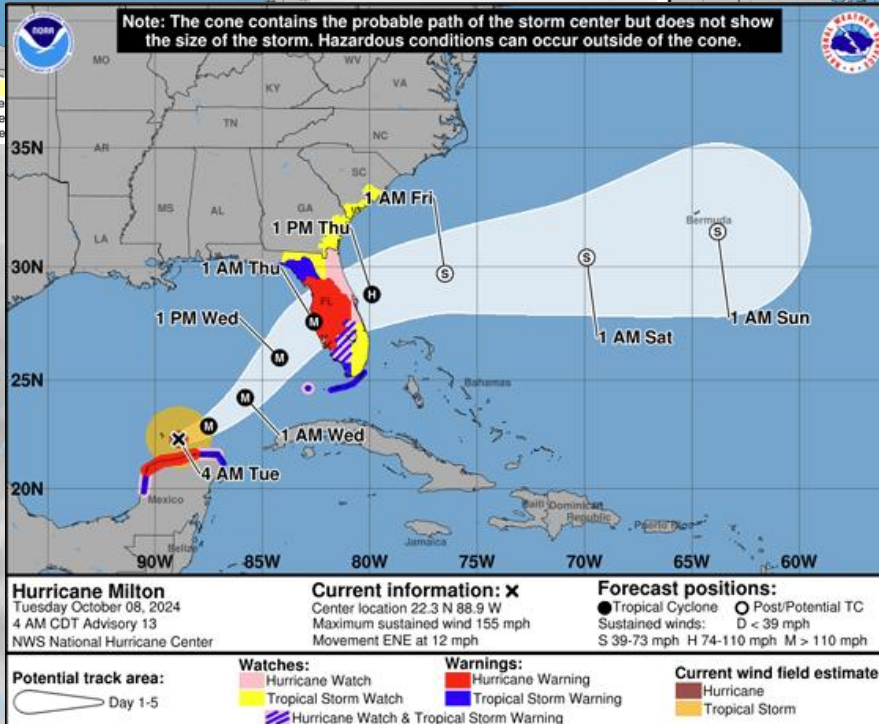


Tropical Weather Outlook

Earliest Reasonable Arrival Time of Tropical-Storm-Force Winds



Wind Speed Probabilities and TS Arrival Times

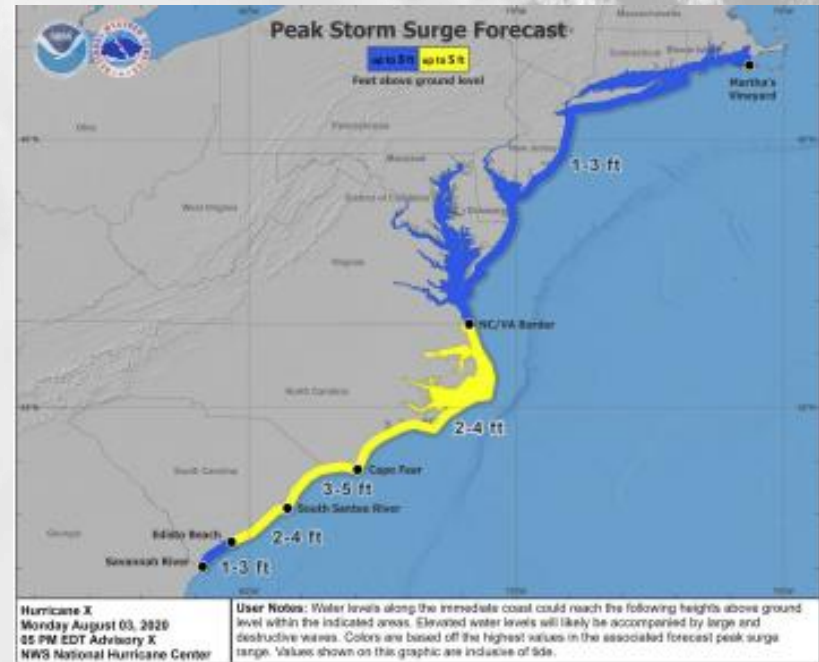
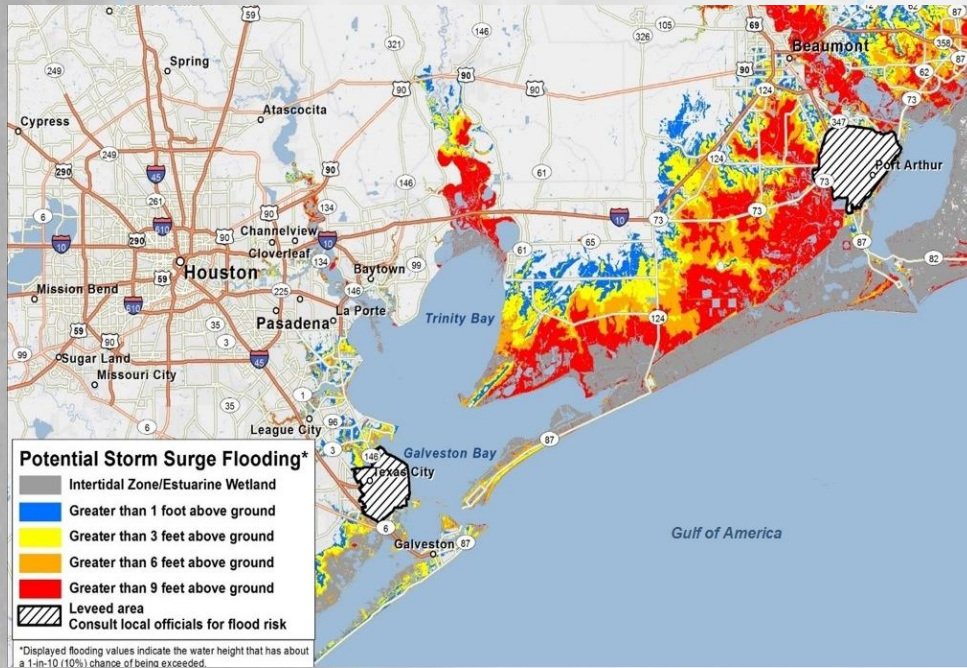


Track Forecast Cone

❖ Cone only represents "most likely" track of the center of the storm, NOT area of impacts!

- ❖ **Earliest Reasonable:**
 - ❖ Best for low risk tolerances
- ❖ **Most Likely:**
 - ❖ Best for high risk tolerances
 - ❖ Preparations should be completed by these times

How Can I Find Out if I'm at Risk for Flooding from Storm Surge?



❖ Potential Storm Surge Flooding Map

- ❖ “Reasonable worst case” (only 10% chance of higher) depths of storm surge inundation to be used for planning purposes

❖ Peak Storm Surge Forecast

- ❖ Max storm surge inundation depths expected in immediate tidal areas along broad stretches of coast

How Can I Find Out if I'm at Risk for Flooding from Storm Surge?



❖ Storm Surge Watches/Warnings

- ❖ Watch: possibility of 3+ ft of inundation within ~48 hours
- ❖ Warning: danger of 3+ ft of inundation within ~36 hours

What Tropical Products Does NWS Wilmington Issue?

❖ Hurricane Threats/Impacts Graphics

- Potential impacts from wind, storm surge, rain, and tornadoes you should prepare for

❖ Hurricane Local Statement (HLS)

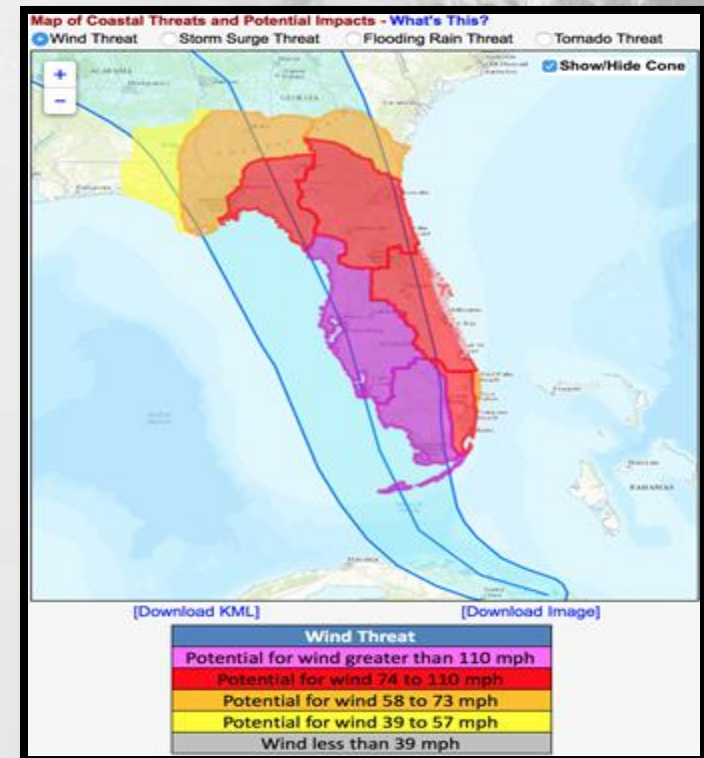
- “Big picture” regional overview

❖ Tropical Local Watch/Warning Statement (TCV)

- County-level forecast details

❖ Post Storm Report (PSH)

- Summary of local peak surge/wind/rainfall reports, tornadoes and impacts



How Do I Stay Informed of Tropical Threats?

weather.gov/ilm

❖ Local Tropical Forecasts:

➤ weather.gov/ilm/tropical



❖ Local “One-stop” Briefing:

➤ weather.gov/ilm/briefing

❖ National Hurricane Center:

➤ hurricanes.gov

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FOR

Local forecast by "City, St" or ZIP code

Key Messages for Hurricane Ian
Advisory 23: 7:00 AM EDT Wed Sep 28, 2022

1. Catastrophic storm surge inundation of 12 to 16 feet above ground level along with destructive waves are expected somewhere along the southwest Florida coastline from Englewood to Bonita Beach, including Charlotte Harbor. Residents in these areas should urgently follow any evacuation orders in effect.
2. Catastrophic wind damage is expected along the southwestern coast of Florida beginning in the next few hours where the core of Ian makes landfall. Preparations to protect life and property should be urgently rushed to completion.
3. Heavy rainfall will spread across the Florida peninsula through Thursday and reach portions of the Southeast U.S. later this week and this weekend. Widespread, life-threatening catastrophic flooding is expected across portions of central Florida with considerable flooding in southern Florida, northern Florida, southeastern Georgia and coastal South Carolina. Widespread, prolonged major and record river flooding expected across central Florida.

For more information go to hurricanes.gov

Partly Cloudy
Low: 74°F

Last Map Update: Fri, Jul. 21, 2023 at 10:55:31 pm EDT

How Do I Stay Informed of Tropical Threats?

weather.gov/ilm

❖ Social Media

- X/Facebook/Instagram
 - @NWSwilmingtonNC

❖ Mobile Devices



- Wireless Emergency Alerts (WEA) for the following Warnings: Hurricane / Storm Surge / Tornado / Extreme Wind / Flash Flood

❖ NOAA Weather Radio

- Observations/forecasts/watches and warnings



Poll Question

Should you prepare for hurricane season based solely on the seasonal forecast???

How Do I Prepare for Hurricane Season?

weather.gov/ilm/hurricaneprep



- ❖ Lots of resources, including our local hurricane guide for SE NC and NE SC
- ❖ State Emergency Management Agencies
 - NC: ncdps.gov – readync.gov
 - SC: scemd.org – hurricane.sc
- ❖ County Emergency Management Offices

Hurricane Preparedness

Take Action Today



Determine your risk from water & wind



Begin preparing now, before a storm



Learn how to understand hurricane forecasts and alerts



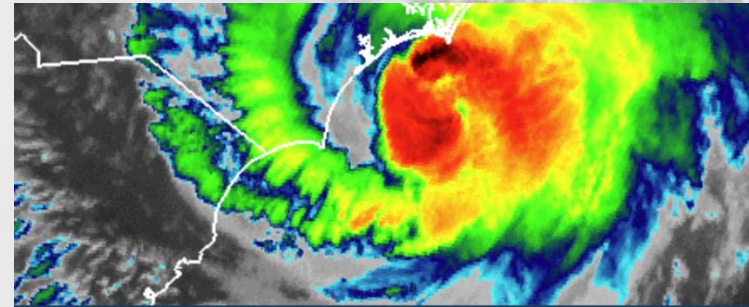
Learn what to do before, during, and after a storm



weather.gov/hurricane



NOAA



Hurricane Guide for Southeast NC & Northeast SC

Plan, Act, Survive!

NWS Wilmington, NC
April 20, 2026

How Does NWS Wilmington Prepare for Hurricane Season?

- ❖ Pre-season:
 - ❖ Community outreach and education
 - ❖ Assist partners with their training/exercises
- ❖ During a storm:
 - ❖ NWS briefs local/state/federal partners and other public safety officials to help guide their critical public safety decisions

An aerial photograph of a river with a person's face superimposed on the water. The face is centered in the upper half of the image, with its features clearly visible against the water's texture. The river flows from the top left towards the bottom right. The background is a light, hazy blue-grey color.

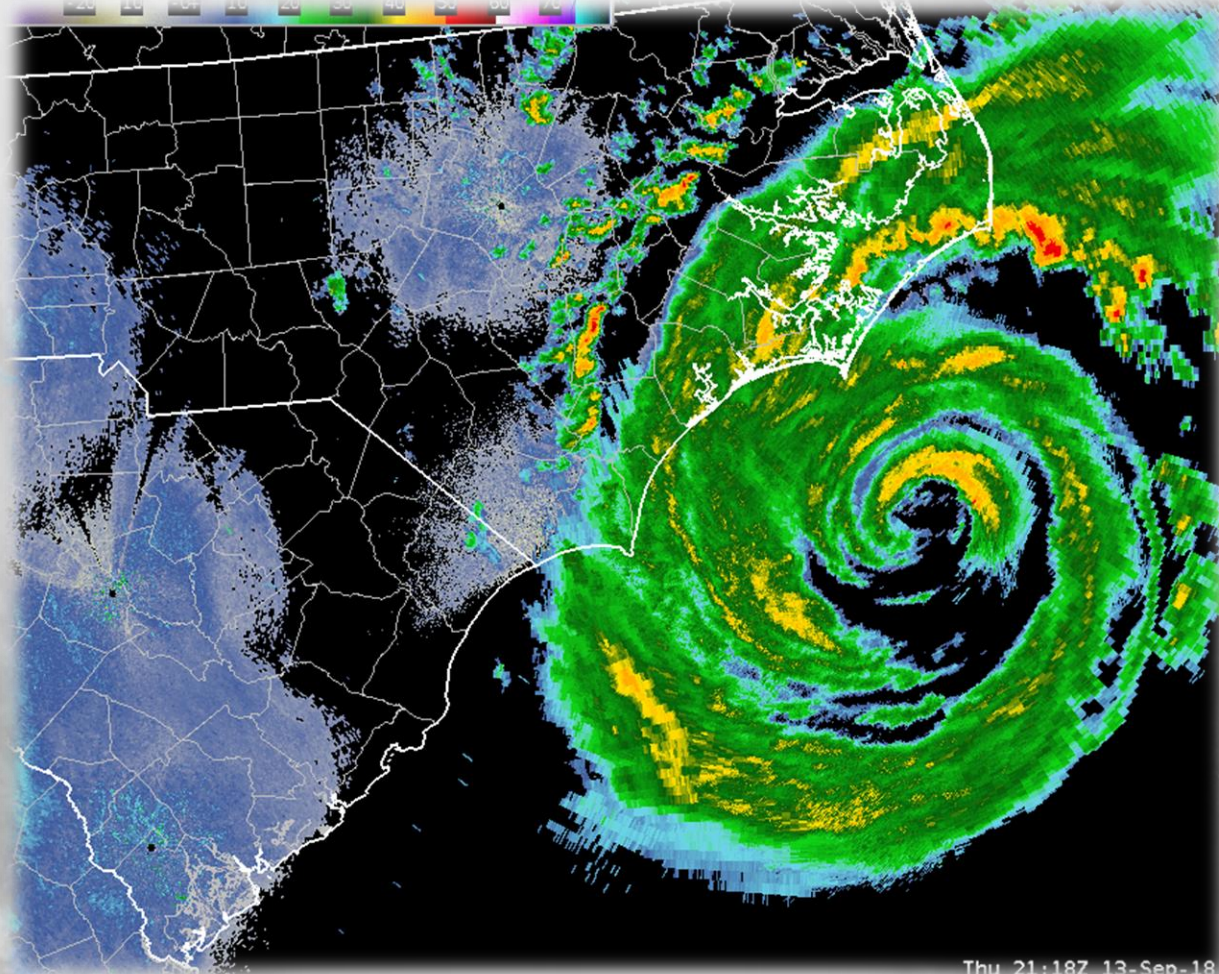
Welcome Our Special Guest!

Steven Still – New Hanover County, NC EM Director

Key Takeaways

- ❖ When you think “hurricane”, think “water” and “flooding”
 - ❖ Most tropical cyclone deaths are caused by rain and storm surge
- ❖ Every storm is unique
 - ❖ Don’t compare current storm to previous storms
 - ❖ Don’t just focus on the storm’s intensity (peak wind speed)
 - ❖ Focus on all POTENTIAL IMPACTS and remember each hazard doesn’t occur in a vacuum
- ❖ Beware of misinfo – stick to reputable sources:
 - ❖ [NOAA/NWS/NHC](#)
 - ❖ [Local/State Officials](#)
 - ❖ [Local Media](#)
- ❖ Remain cautious after a storm as many hazards (heat, flooding, etc.) can lead to additional fatalities, especially with generators
- ❖ Preparedness goes a long way in dealing with the storm and its aftermath
 - ❖ Learn your local risks
 - ❖ Prepare the same every year as it only takes 1 storm to make it a bad year!

Have a Safe Hurricane Season!



Thu 21:18Z 13-Sep-18



weather.gov/ilm

@NWSwilmingtonNC

