

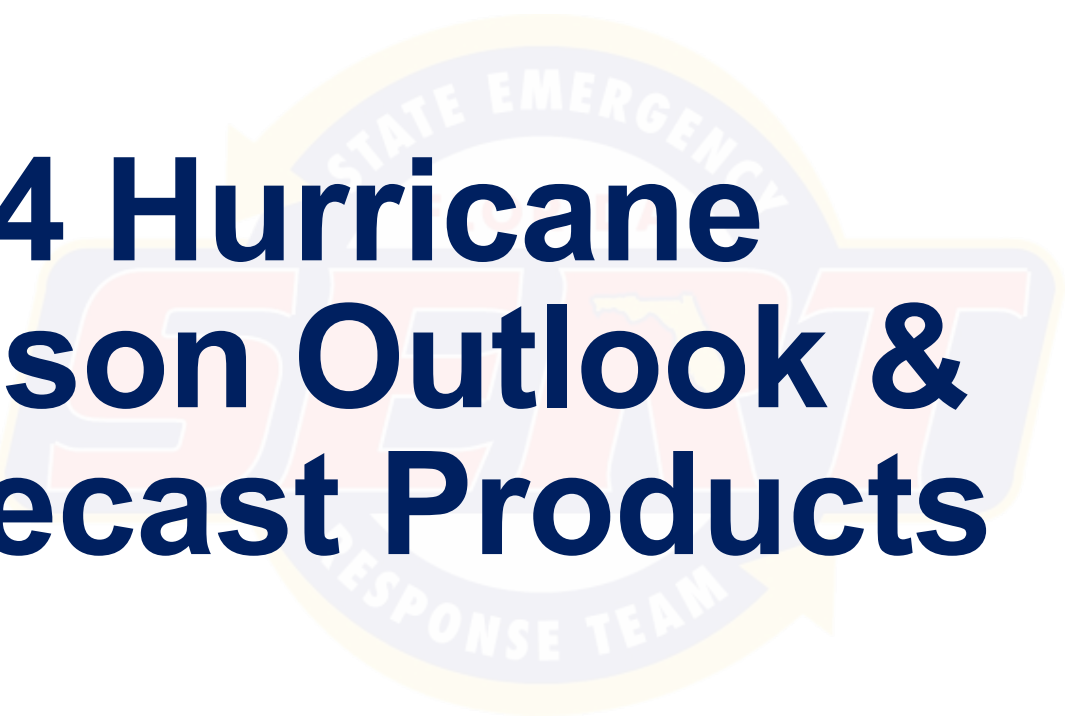
**FLORIDA DIVISION OF  
EMERGENCY  
MANAGEMENT**

*STATE  
METEOROLOGICAL  
SUPPORT UNIT*

*AMY GODSEY  
CHIEF  
METEOROLOGIST*



# **2024 Hurricane Season Outlook & Forecast Products**

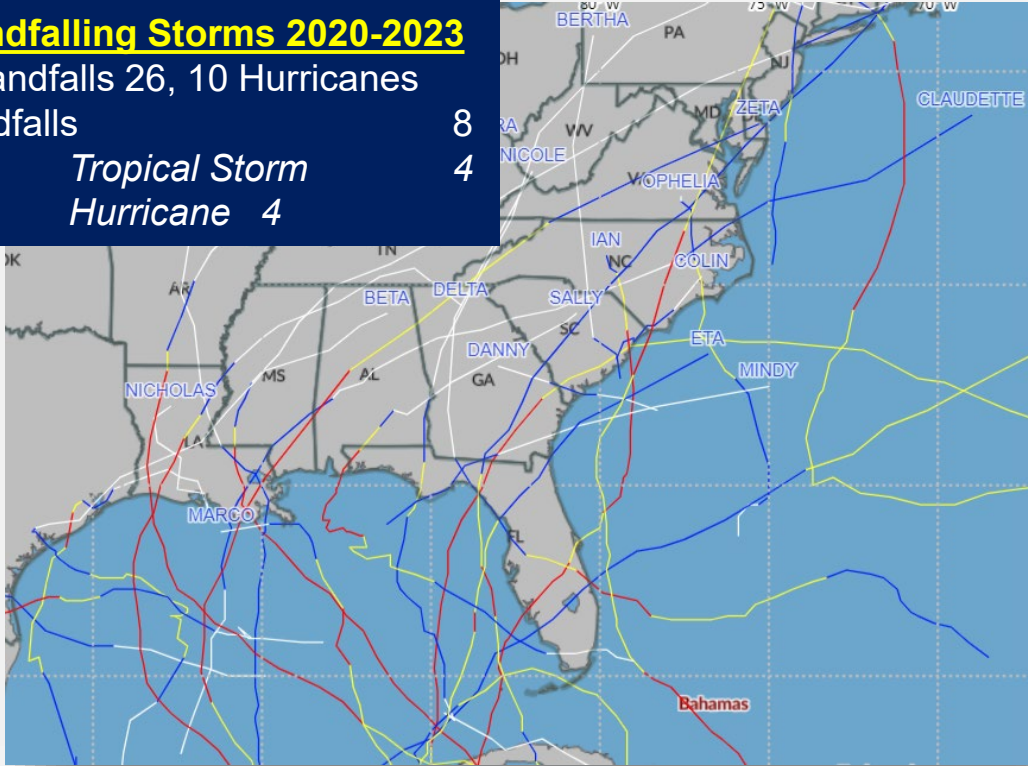


# Yes, It Has Been Busy

## US Landfalling Storms 2020-2023

Total Landfalls 26, 10 Hurricanes

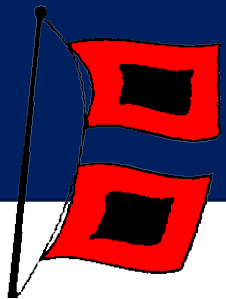
FL Landfalls	8
Tropical Storm	4
Hurricane	4



## 26 Landfalling Storms in the Past 4 Years!



- ◆ Average of 14 tropical storms each year; 7 of these become hurricanes, 3 of which become major hurricanes.
- ◆ Averages generated over 30 years
- ◆ Over past 10 years, “average” is more like 18 total storms, 8 hurricanes, 4 major
- ◆ About 5 hurricanes strike the U.S. coastline in an average three-year period. (9 from 2020-2022)
- ◆ More Category 4 and 5 landfalls in the U.S. since 2017 than from 1963-2016!



# Pre-Season Forecasts

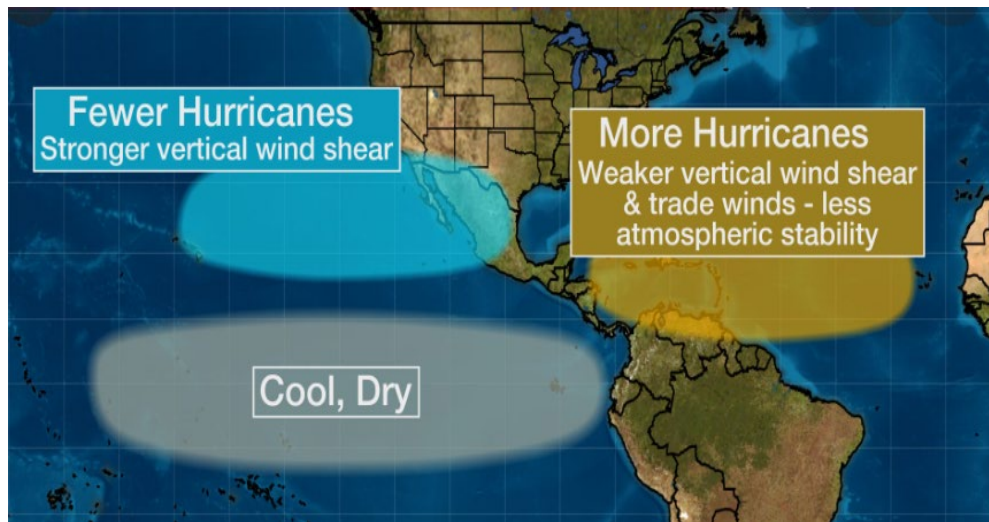
Entity	Total Named Storms	Hurricanes	Major Hurricanes
NOAA	Released NLT May 24		
Colorado State University (4/4/24)	23	11	5
The Weather Channel (4/18/24)	24	11	6
European Center for Weather Forecasts (5/5)	23	13	N/A
Accuweather (4/1/24)	20-25	8-12	4-7
University of Pennsylvania (4/24/24)	33	N/A	N/A
University of Arizona (4/8/24)	21	11	5
North Carolina State University (4/16/24)	15-20	10-12	3-4
University of Missouri (4/12/24)	26	11	5



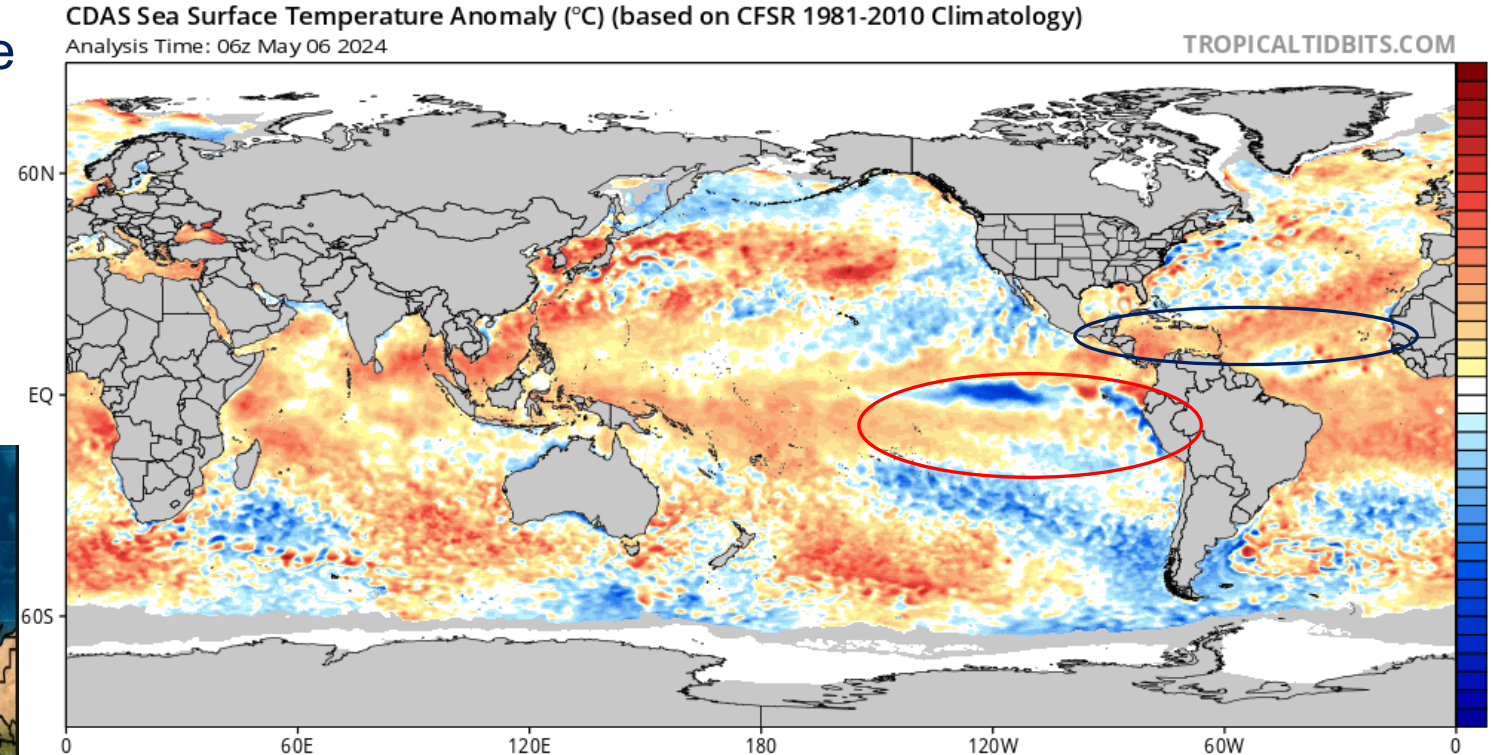
# “Well Above Normal” Season...Why?

Warmer than normal Atlantic sea-surface temperatures, especially in Caribbean, Gulf of Mexico and southern Atlantic.

La Nina developing in the eastern Pacific. This was also present for the 2020-2022 seasons.



Typical La Nina Impact on Hurricane Season





# Seasonal Outlooks

***Regardless of the numbers...tropical cyclones in the Atlantic Basin will always pose risks & preparedness is a must***

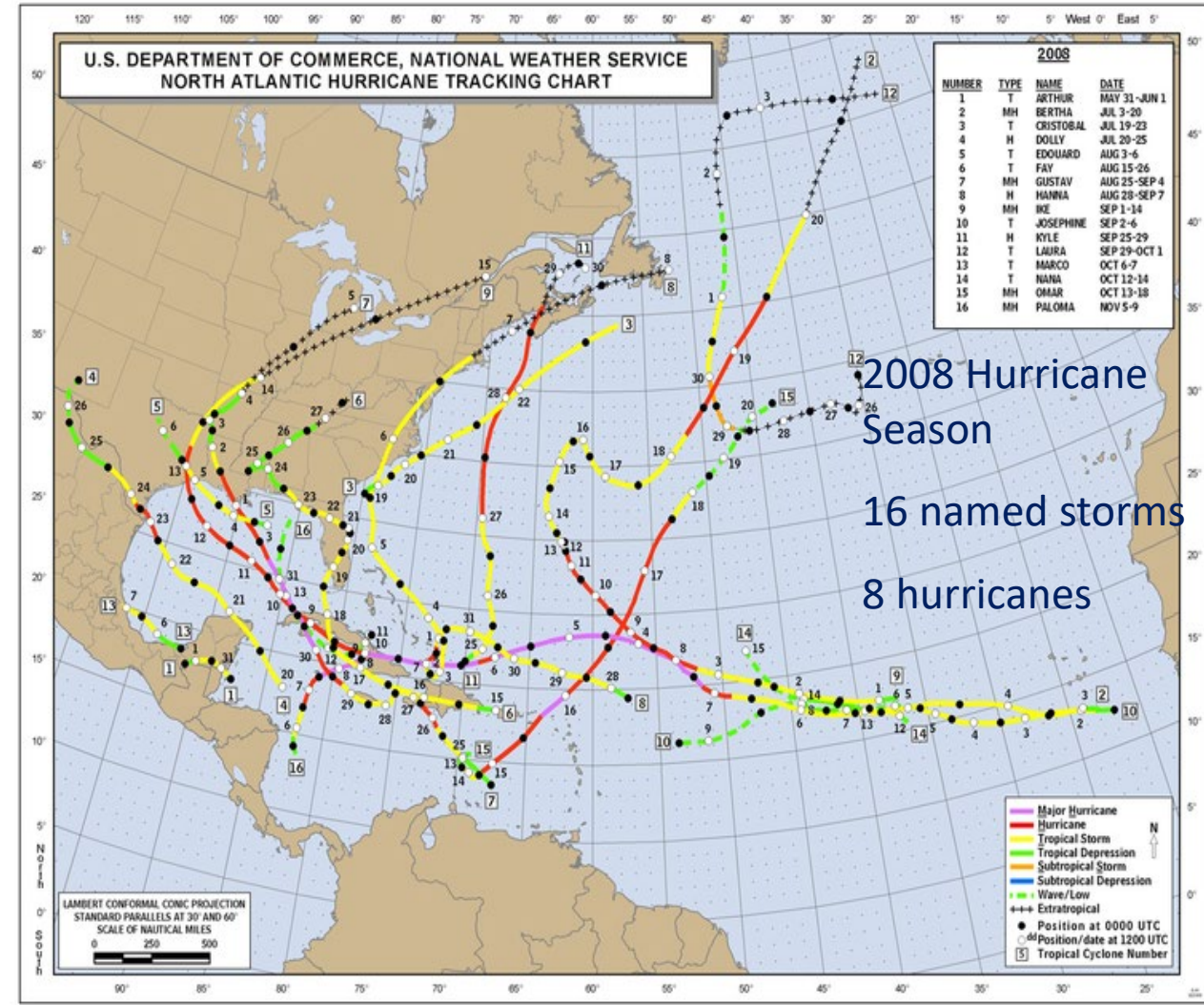
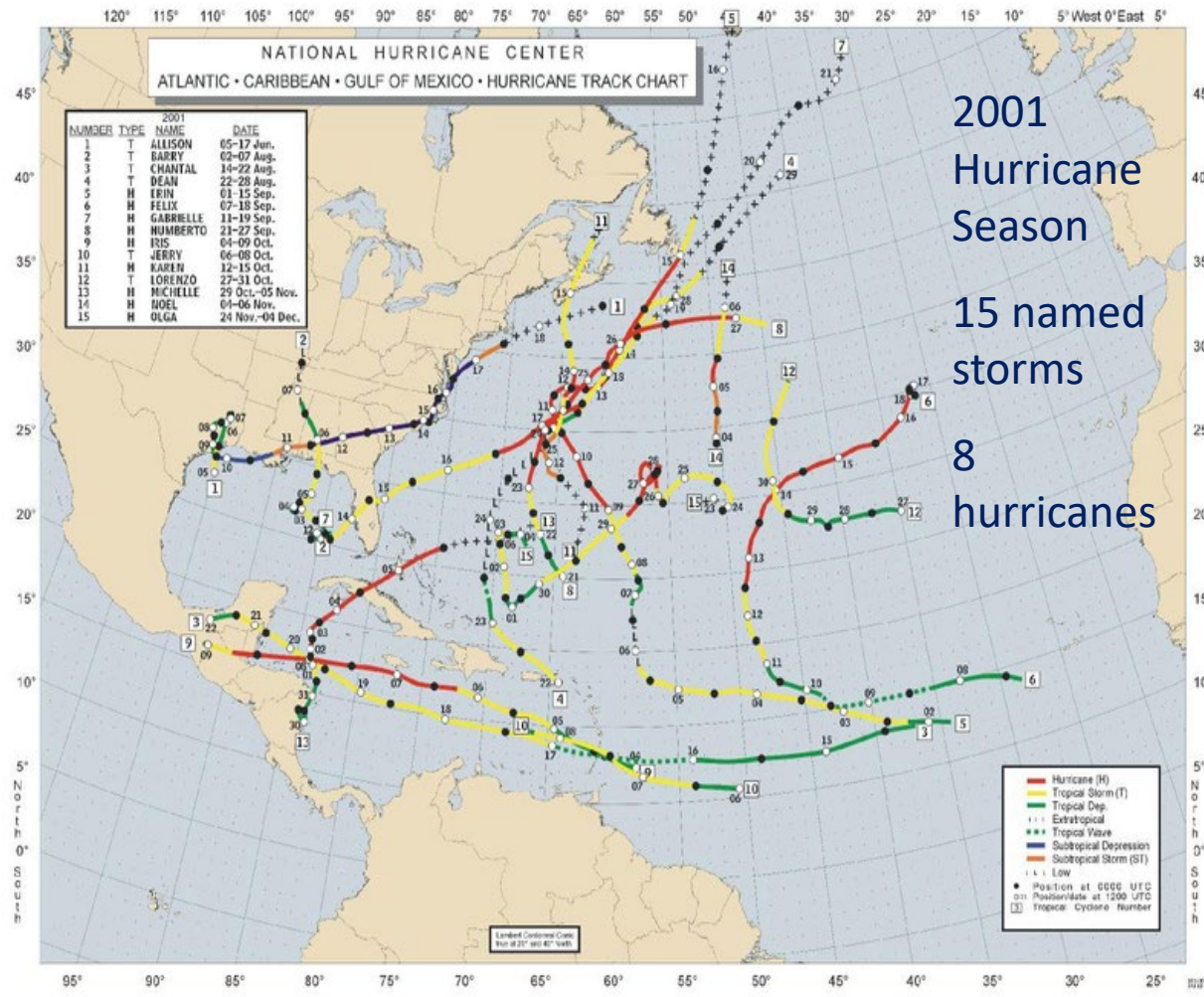
Seasonal forecast models look at similar years to make seasonal predictions

1998, 2010, and 2020 are 3 recent prior years that featured El Nino wintertime conditions transitioning to La Nina conditions in the Pacific during the summer coupled with above average Atlantic water temperatures.

Seasonal predictions CAN'T tell you where landfalls are most likely. Note the differences between 2001 and 2008 AND 2010 and 2020...

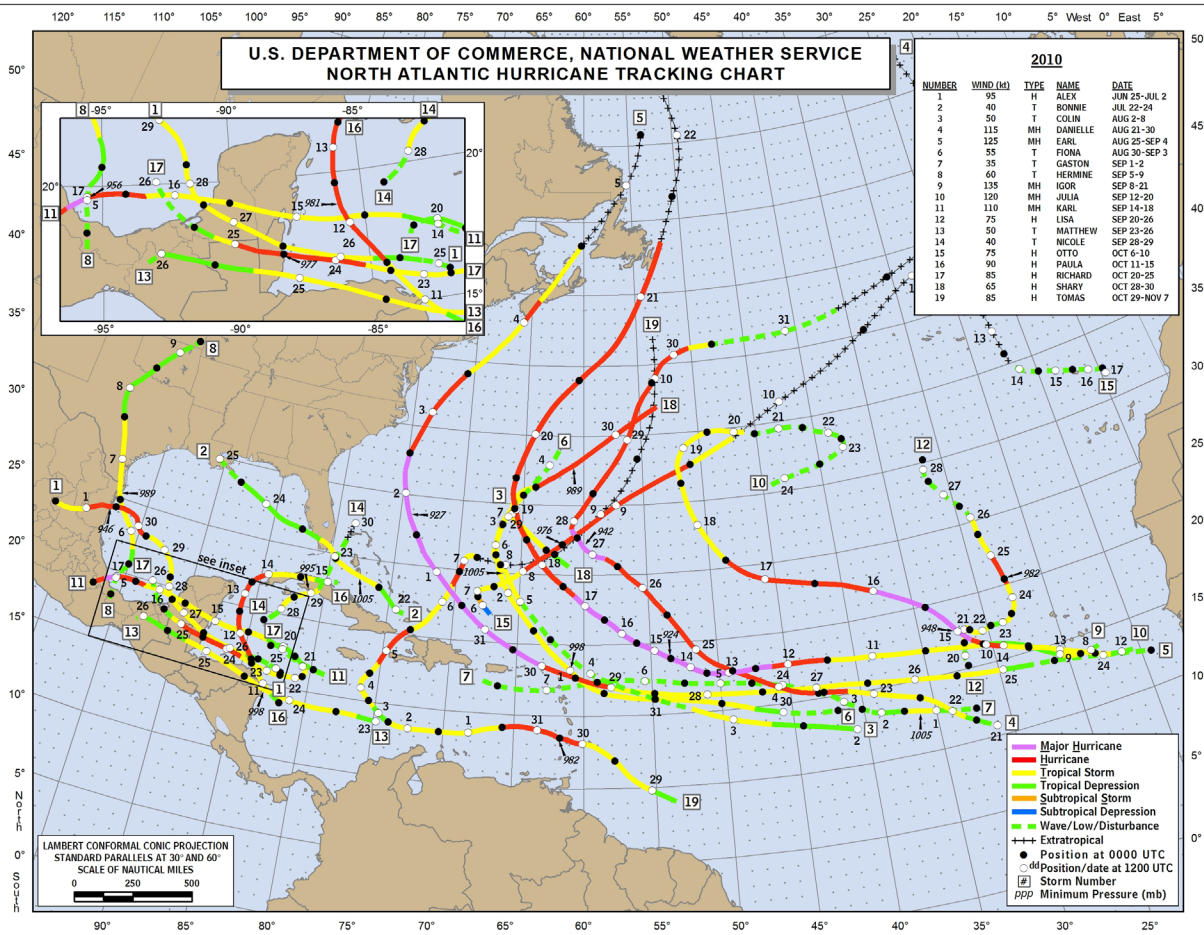


# Similar Number of Storms...Different Results





# Analog Years...Different Results



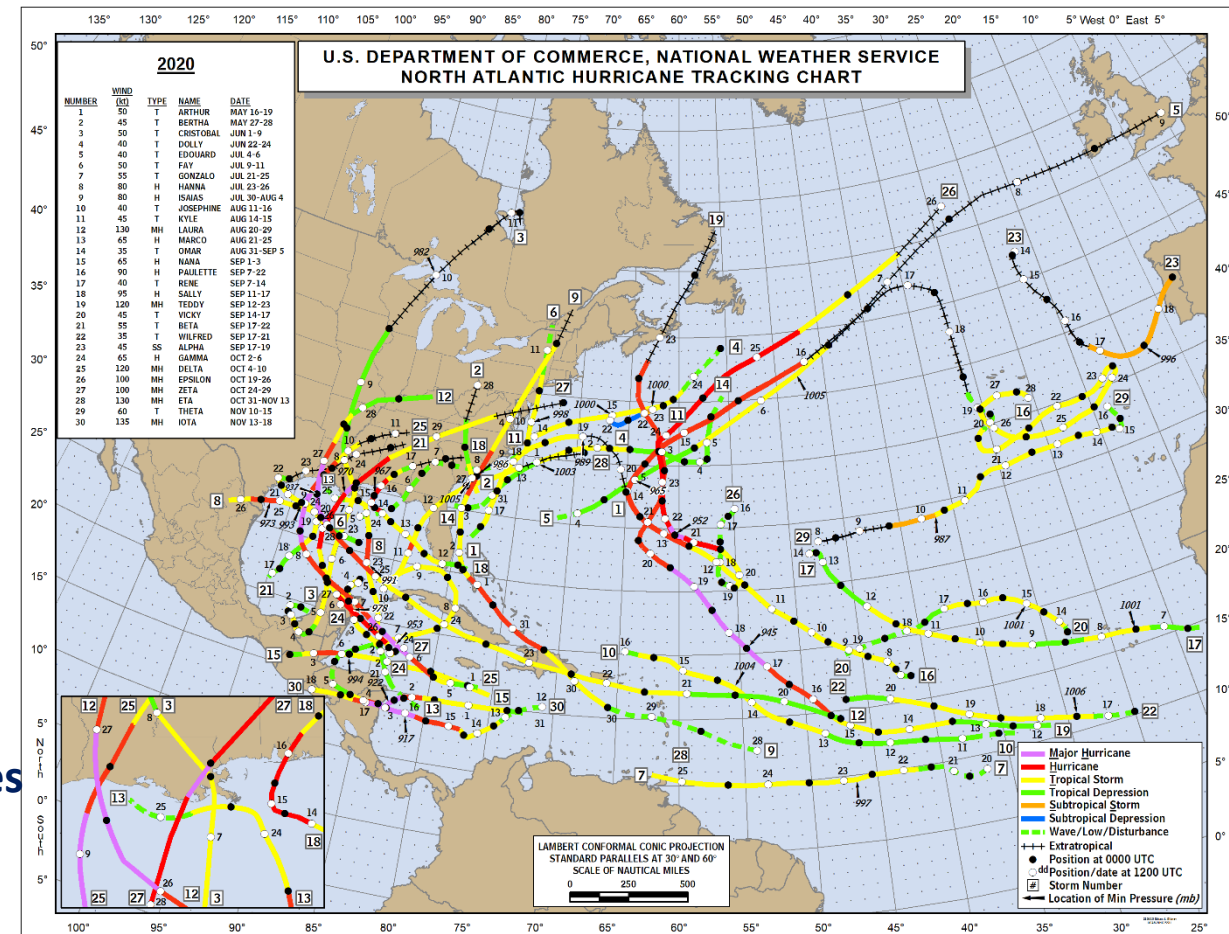
**2010 Hurricane Season**

**19 named storms, 12 hurricanes, 5 Major Hurricanes**



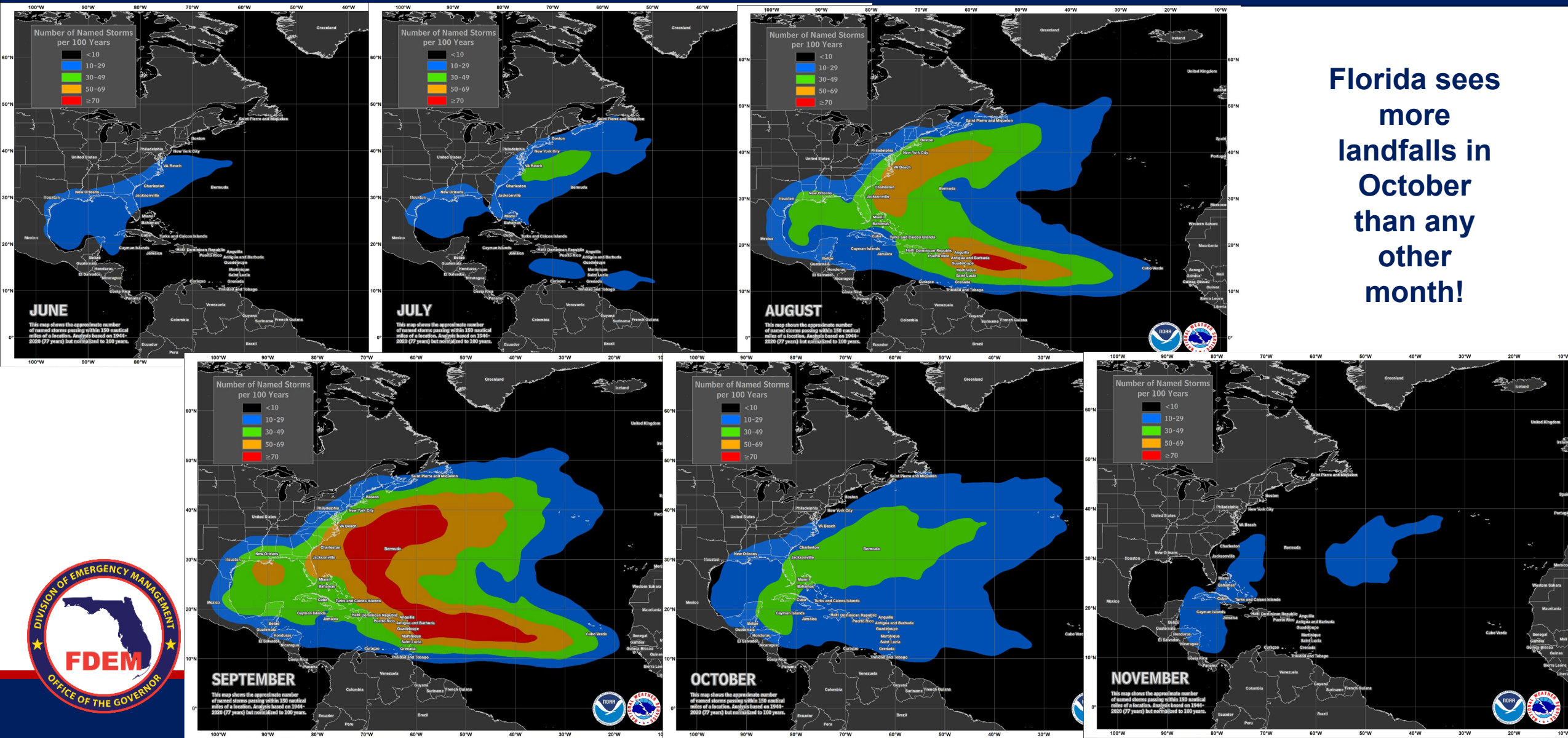
**2020 Hurricane Season**

**30 named storms, 14 hurricanes, 7 Major Hurricanes**



# Atlantic Hurricane Basin Climatology

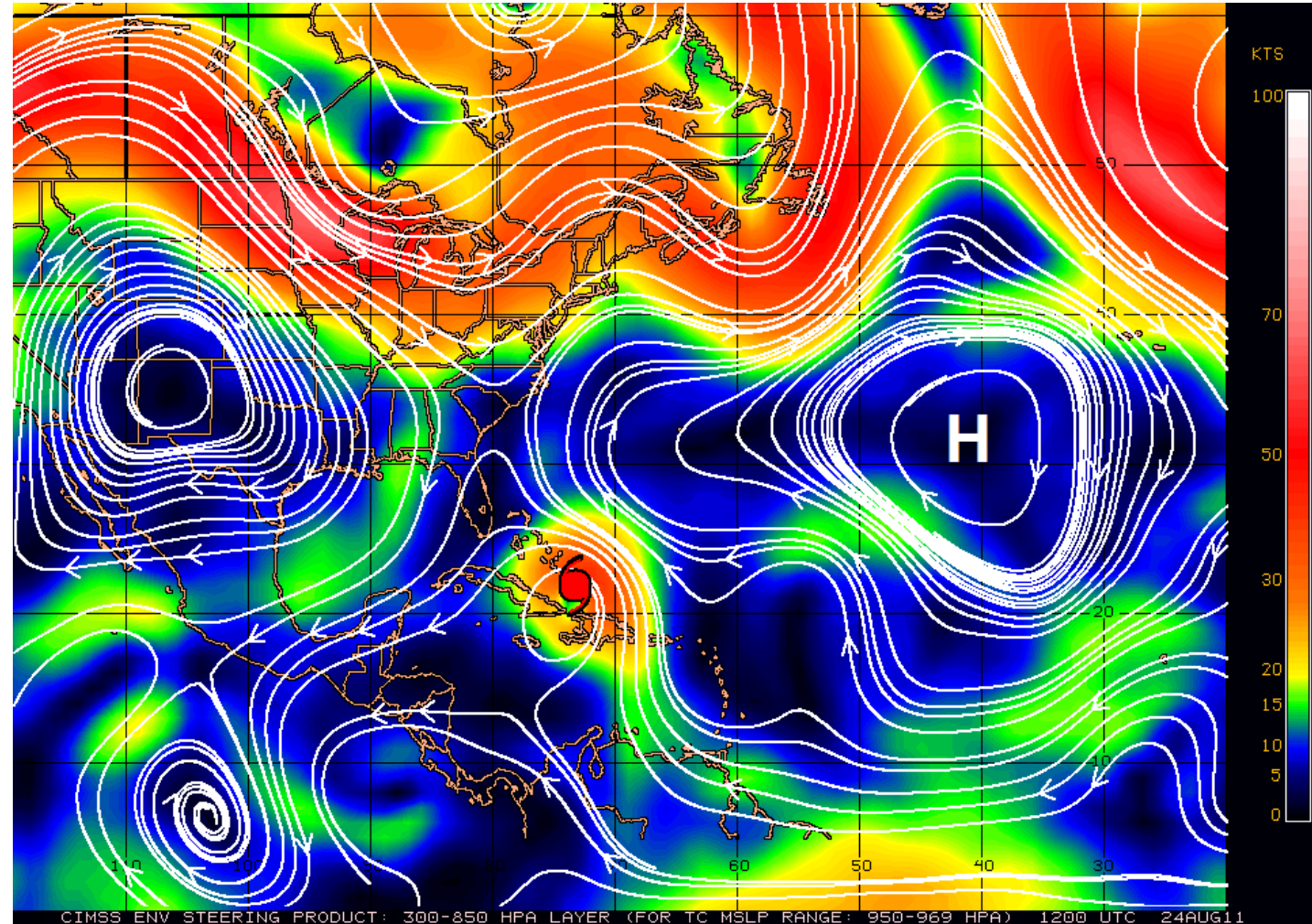
Florida sees  
more  
landfalls in  
October  
than any  
other  
month!





# Steering a Hurricane

- Track dictated by steering currents
- Some semi-permanent features
- Difficult to predict beyond 7-10 days



# Tropical Cyclone Naming

- Rotating list of names every 6 years
- World Meteorological Organization votes on retirement of names and replacement name
- No more Greek alphabet (effective 2021)
- Alphabetical primary and supplemental list of names



★ New names for 2024, replacing Florence and Michael from 2018

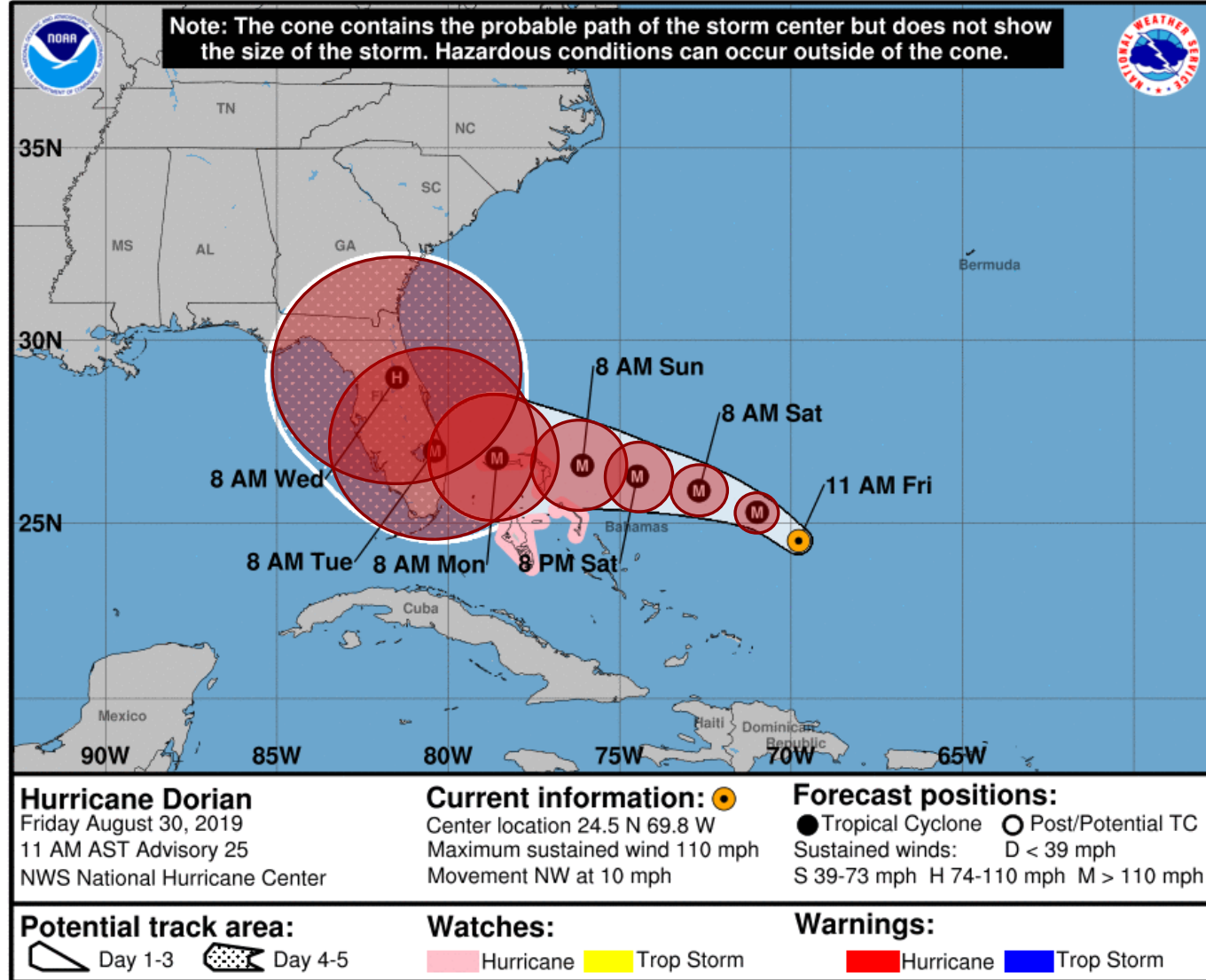
## 2024 ATLANTIC TROPICAL NAMES

ALBERTO	HELENE	OSCAR
BERYL	ISAAC	PATTY
CHRIS	JOYCE	RAFAEL
DEBBY	KIRK	SARA
ERNESTO	LESLIE	TONY
FRANCINE ★	MILTON ★	VALERIE
GORDON	NADINE	WILLIAM

## ATLANTIC SUPPLEMENTAL NAMES

ADRIA	HEATH	ORLANDA
BRAYLEN	ISLA	PAX
CARIDAD	JACOBUS	RONIN
DESHAWN	KENZIE	SOPHIE
EMERY	LUCIO	TAYSHAUN
FOSTER	MAKAYLA	VIVIANA
GEMMA	NOLAN	WILL

# The Forecast Cone of Uncertainty



## It's not an impact cone!

Represents the probable track of the cyclone **center**

Formed by connecting circles on each forecast point (12hr, 24, 36, etc.). Size based on previous years error!

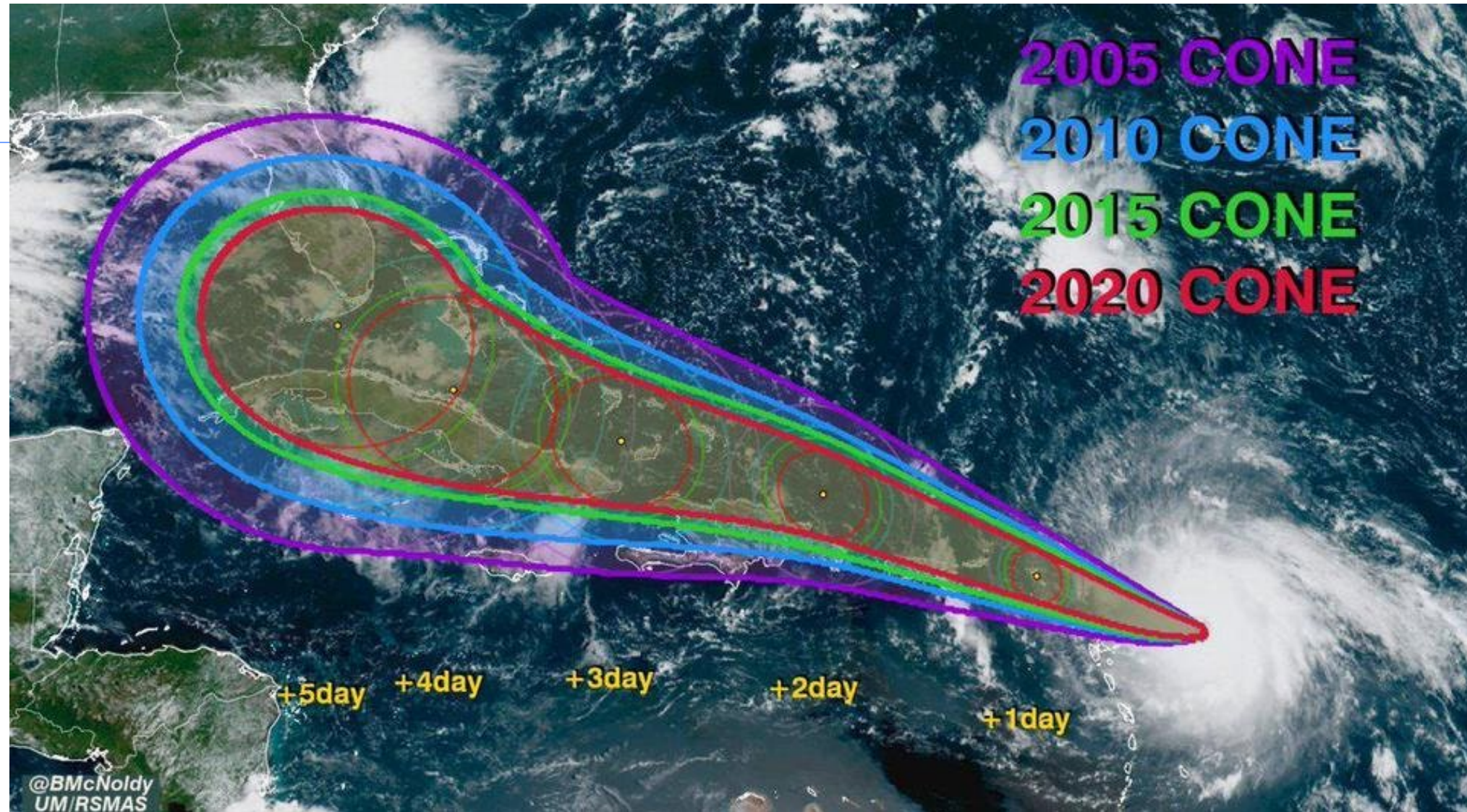
1/3 of the time the center ends up outside of the cone!

Cone continues to shrink as forecast error gets smaller. More and more locations outside of the cone will see more significant impacts!



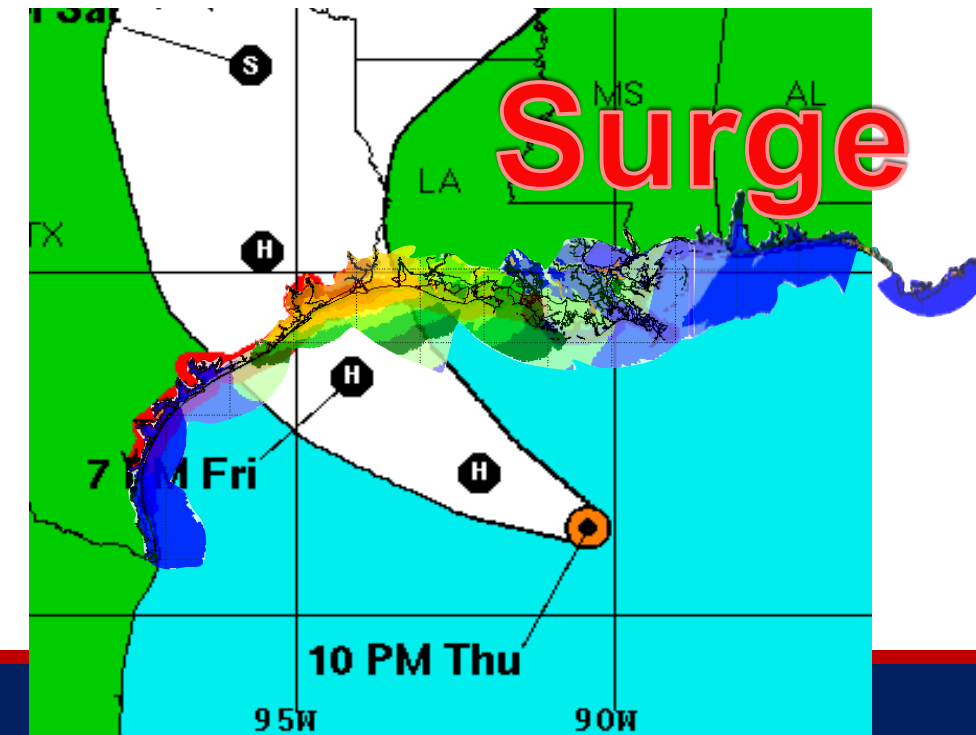
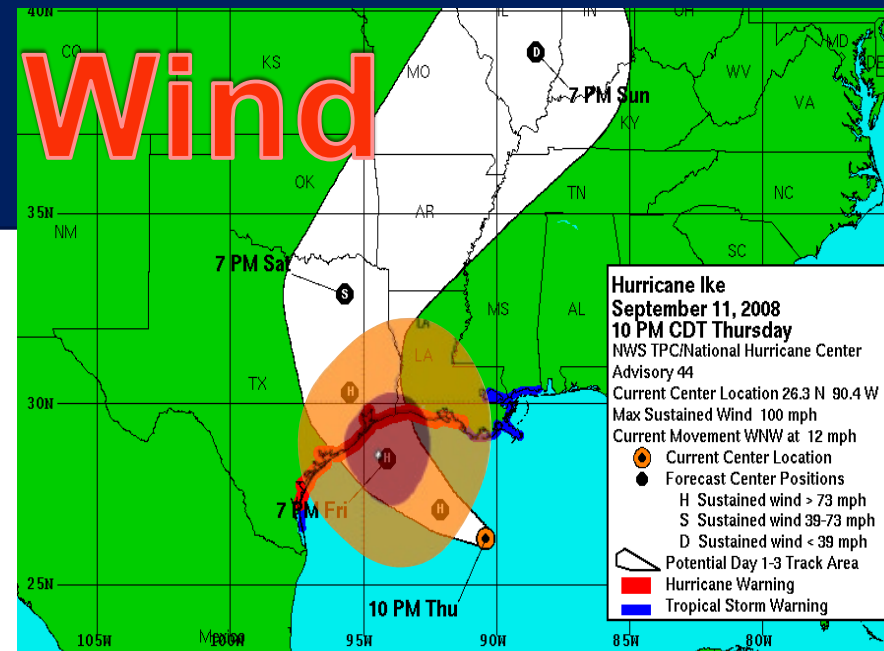
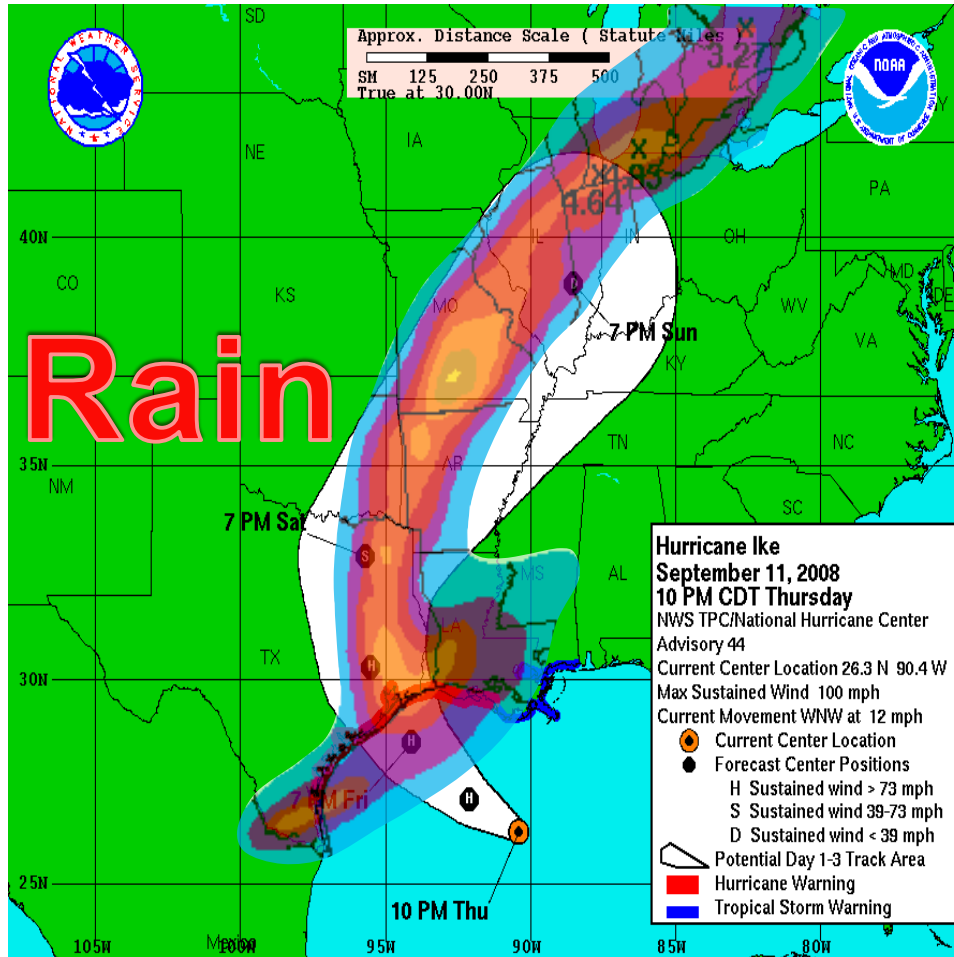


# The Forecast Cone of Uncertainty





# Impacts often occur outside the cone



# Tropical Cyclones are Multi-Hazard Events



**Wind**



**Waves / Rip Currents**



**Tornadoes**



**Storm Surge**

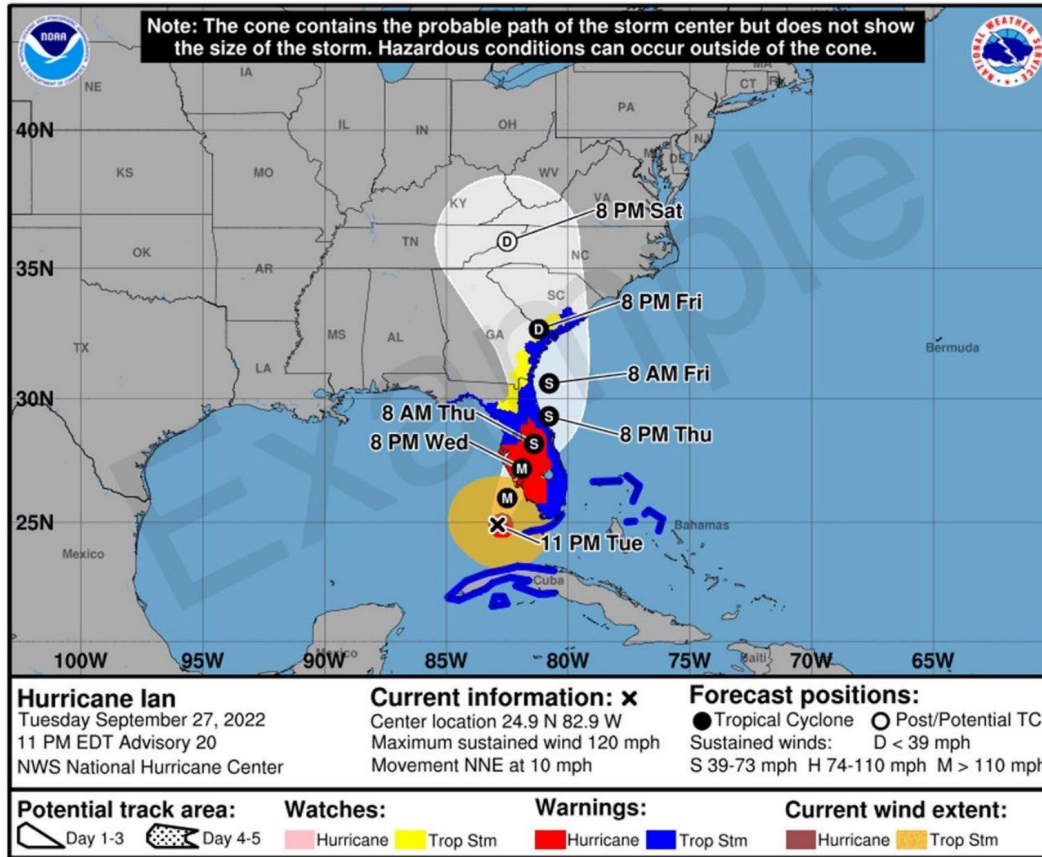


**Rainfall / Inland Flooding**



# Experimental NEW Product for 2024

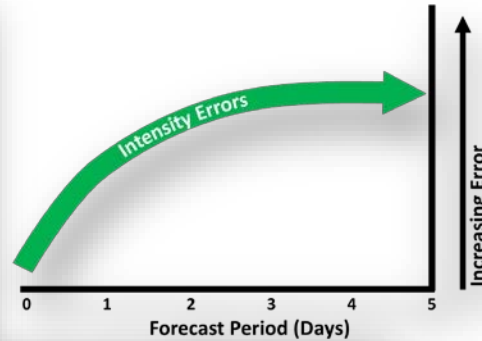
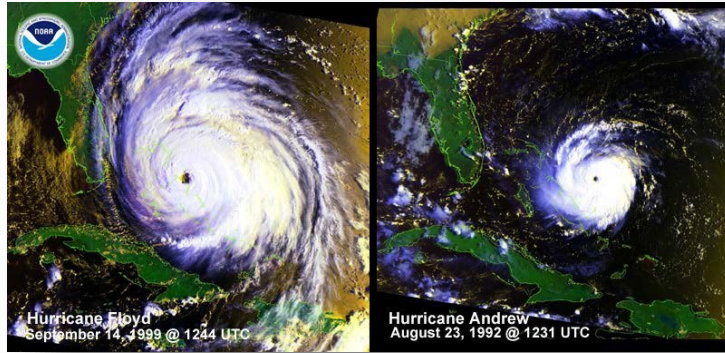
## Depicting Inland Watches/Warnings on Cone



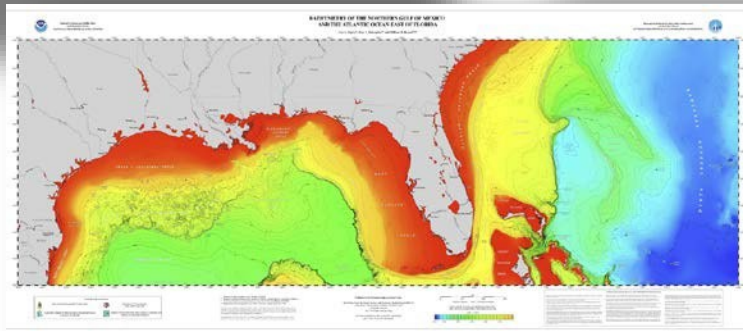
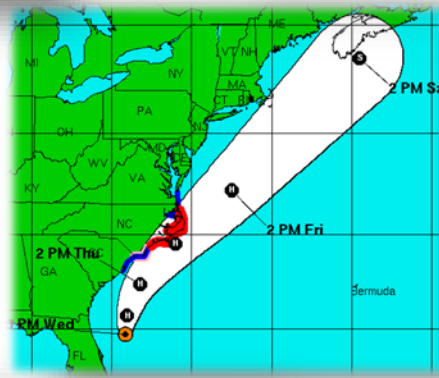
- New experimental cone graphic depicting inland U.S. tropical storm and hurricane watches and warnings will become available in 2024
- Will help convey wind hazard risk
- Graphic may not be available as soon as the current cone graphic due to the time need to compile complete inland watch and warning information
- Will be available beginning on or around August 15, 2024



# Storm Surge Forecasting



**Storm surge is NOT purely dependent on the maximum sustained winds of the storm!**

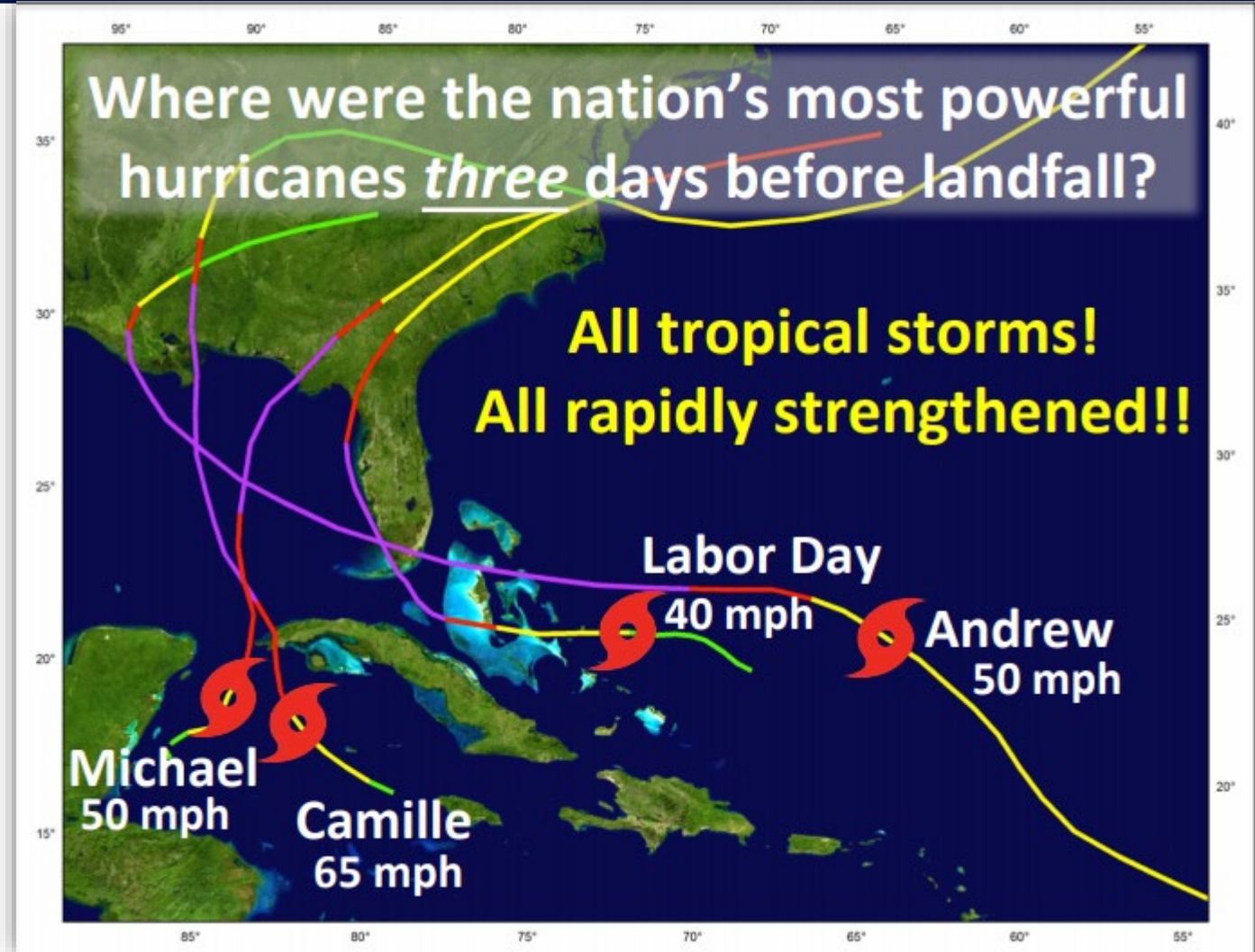


- Intensity (wind speed)
- Forward Speed
- Angle of Approach
- Size - Radius of Maximum Winds
- Width and Slope of Shelf
- Local features – concavity of coastlines, bays, rivers, headlands, or islands



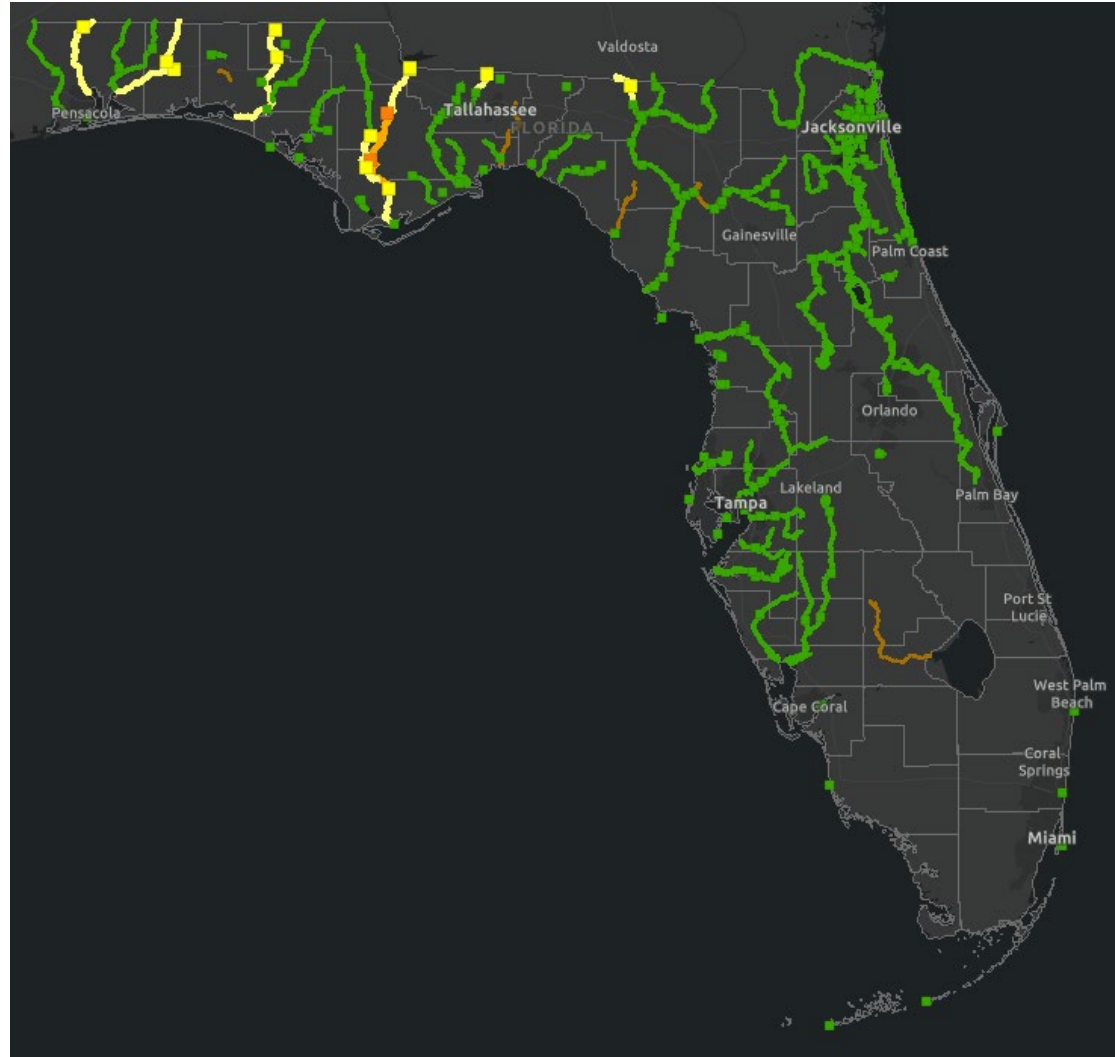
# Rapid Intensification

- Definition - maximum sustained winds of a tropical cyclone increase at least 30 knots in a 24-hour period
- Difficult to predict
- Typically occurred in high-end hurricanes that reach Category 3 or above, but is becoming increasingly common amongst weaker systems



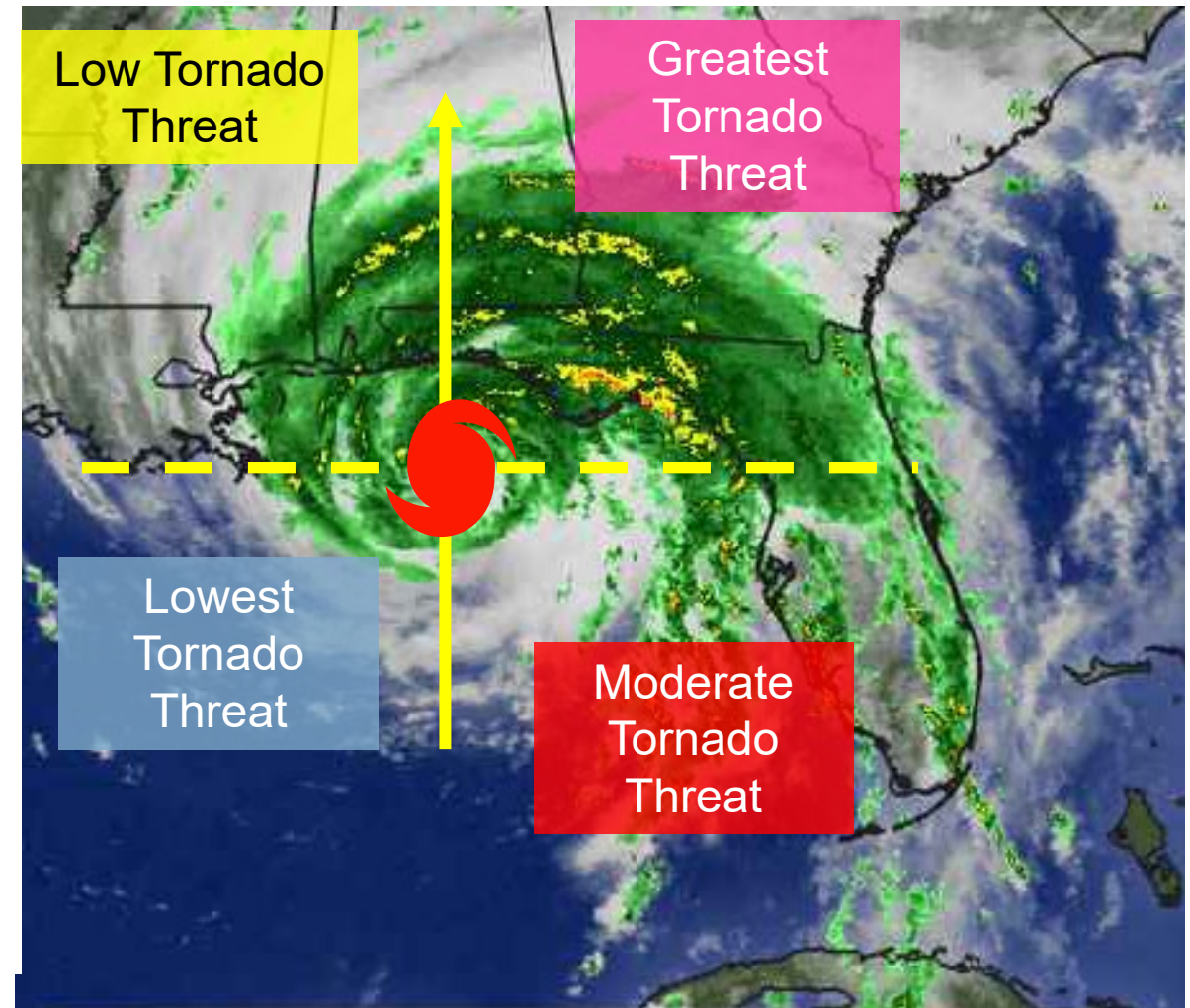
# Post-Landfall Flooding

- River flooding across North and West Central Florida
- Canal and Street Flooding in Southeast Florida
- Flash Flooding in North Florida and Urban areas



# Tornadoes

- Nearly 70% of landfalling hurricanes (1948-2000) spawned at least 1 tornado
- 40% of landfalling hurricanes spawn more than 3 tornadoes
- More than 90% of all tornadoes occur in the right front quadrant of the storm relative to the storm motion
- Most develop more than 100 miles away from the center of the storm

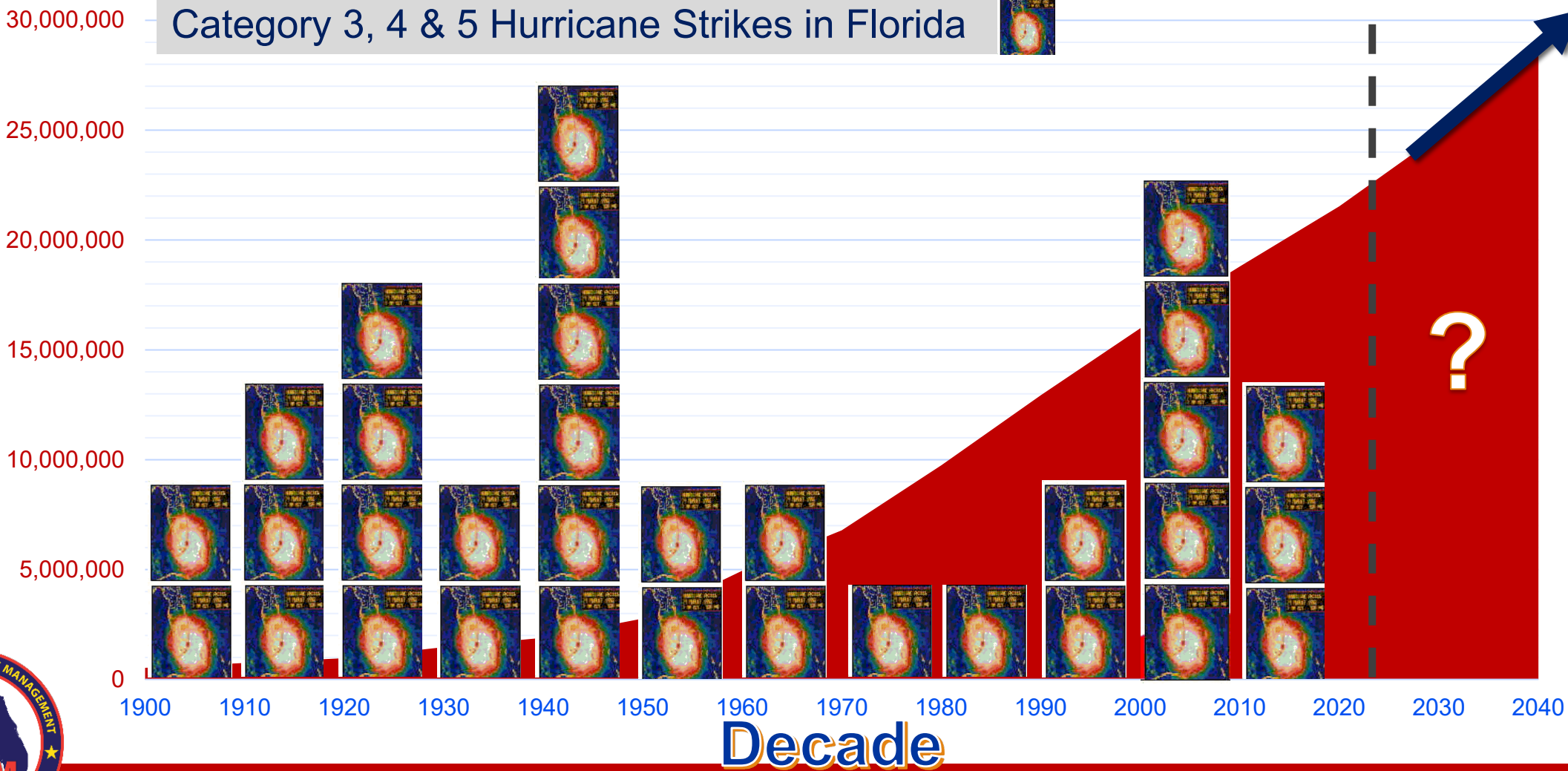




# Florida Population and Major Hurricane Landfalls

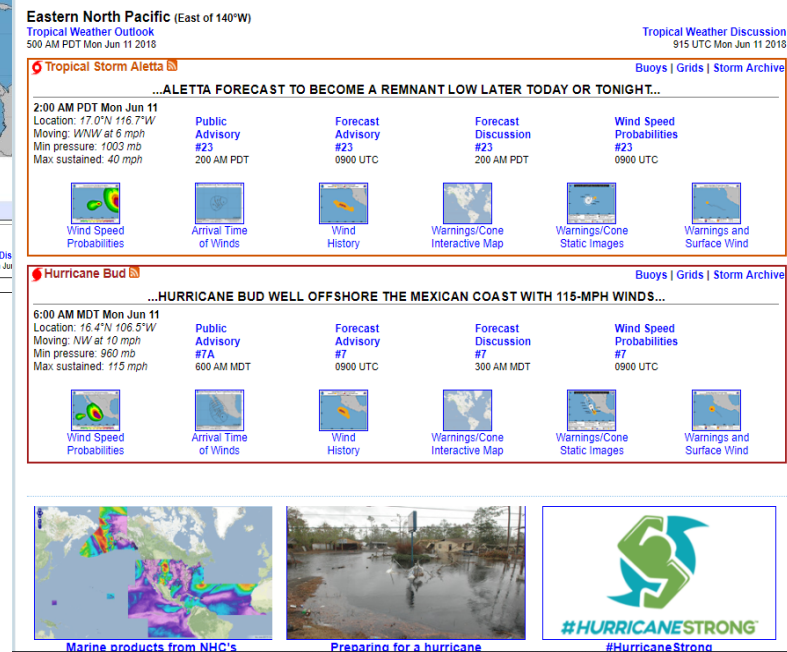
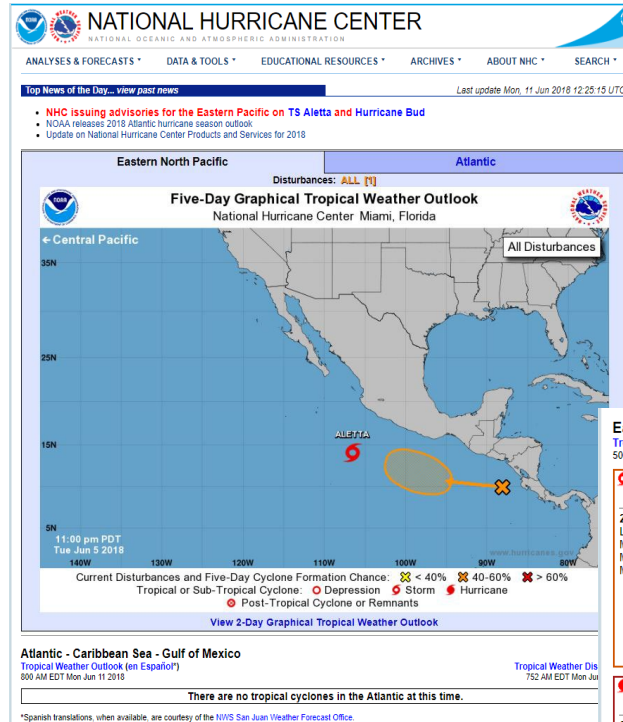
Residents

Category 3, 4 & 5 Hurricane Strikes in Florida





# NHC Product Timeline



Hurricanes.gov

