



Hurricane Season 2023

Hazards and communication along with an in-depth look at what climatology tells us.



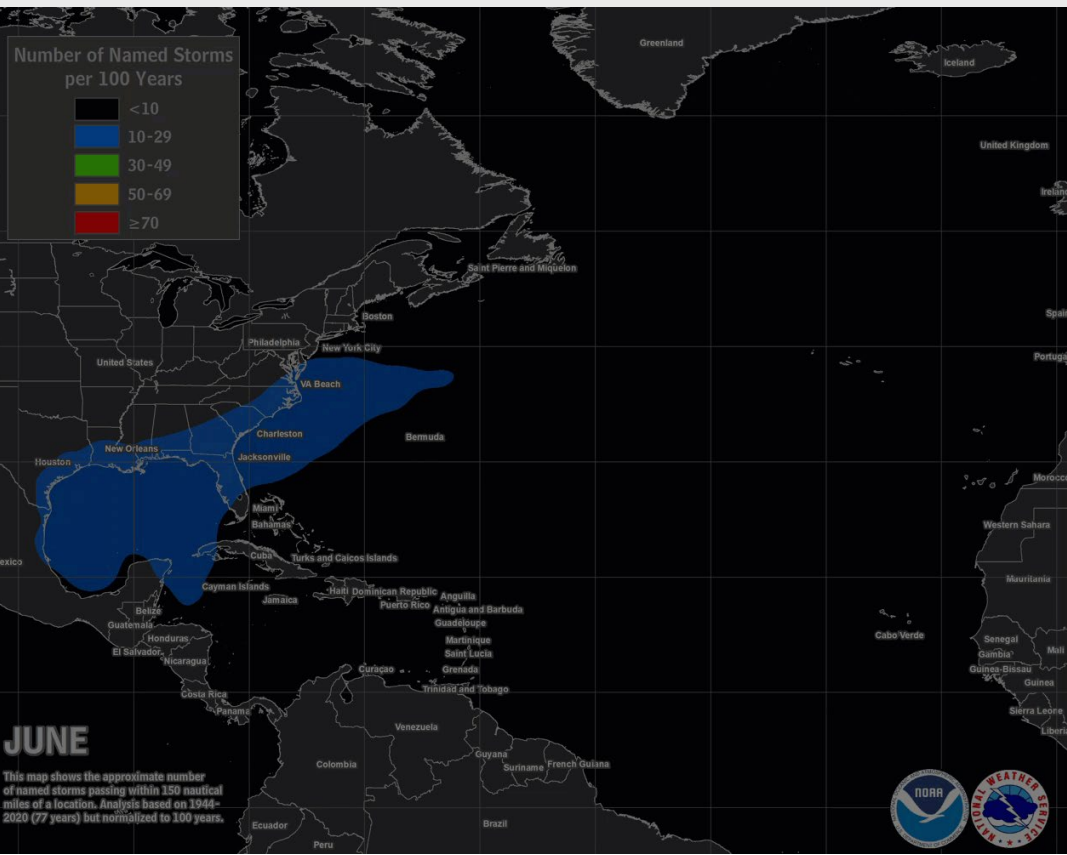
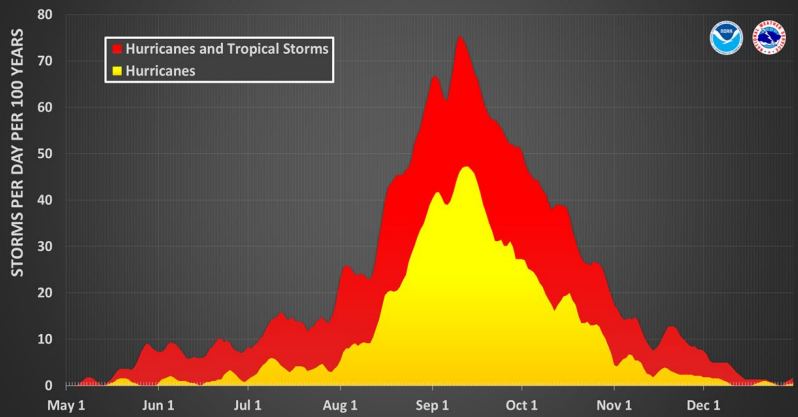


Named Storm Climatology

Monthly Climatology of Named Storms

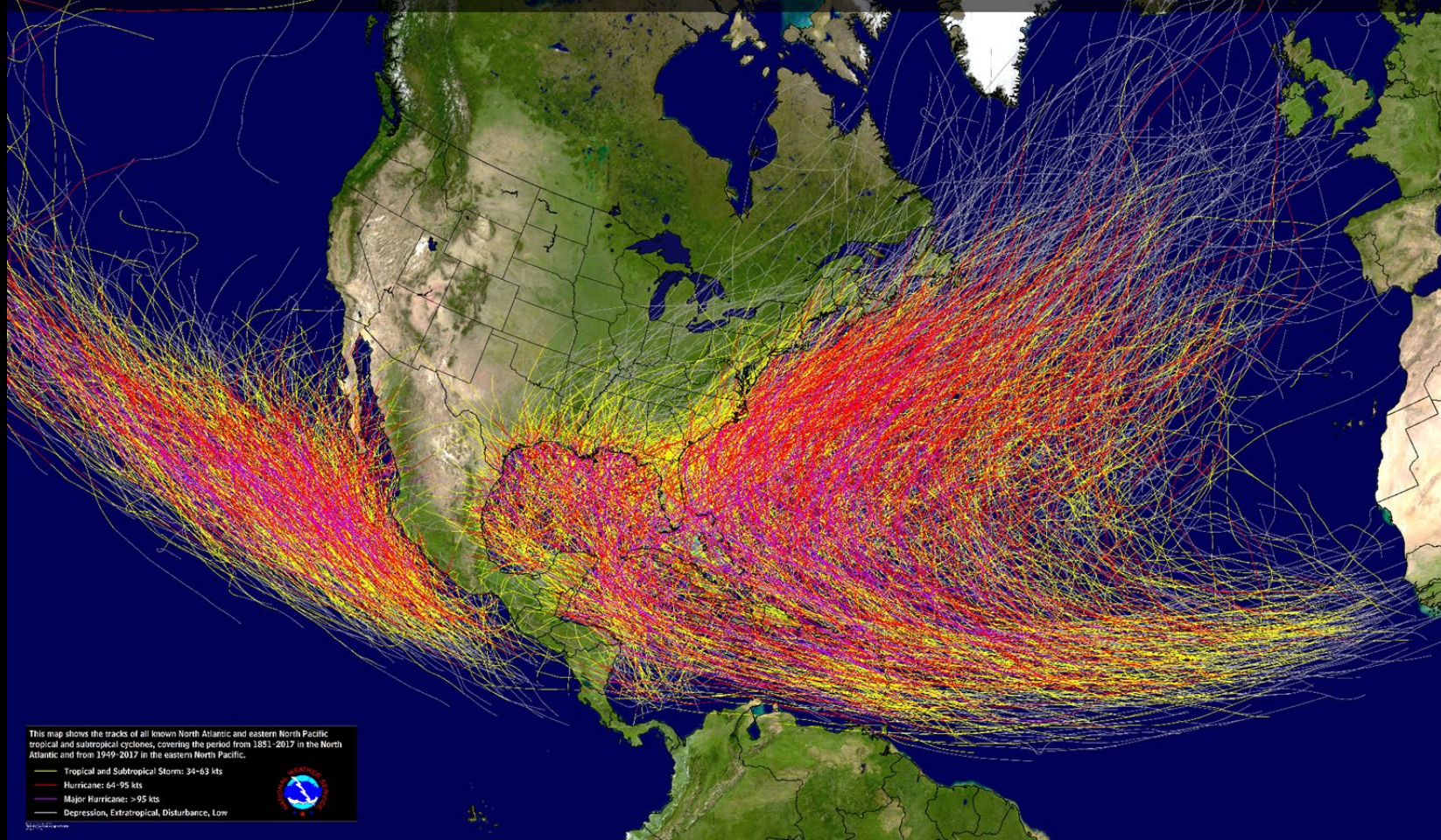
Atlantic Hurricane and Tropical Storm Activity

Based on Data from 1944 to 2020



Tropical Cyclone Tracks

Data from 1949 in the Pacific, from 1851 in the Atlantic



This map shows the tracks of all known North Atlantic and eastern North Pacific tropical and subtropical cyclones, covering the period from 1851-2017 in the North Atlantic and from 1949-2017 in the eastern North Pacific.

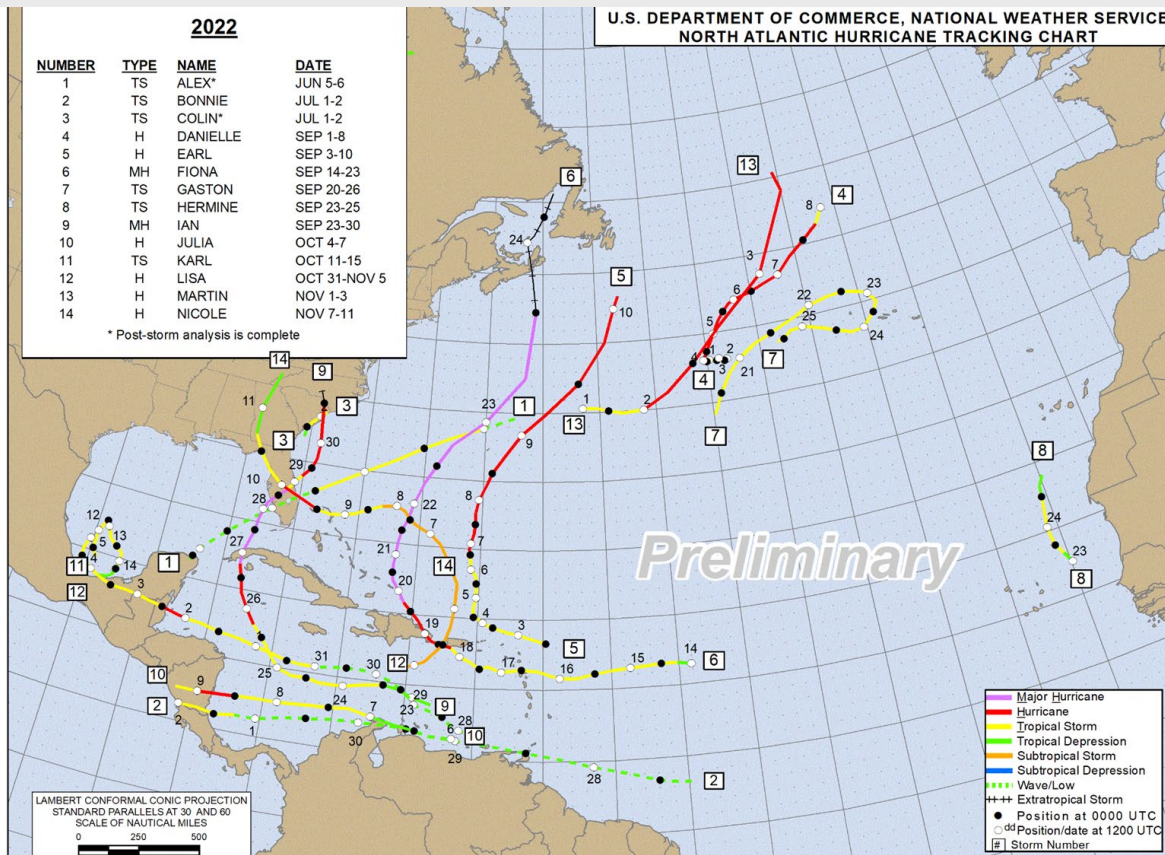
— Tropical and Subtropical Storm: 34-63 kts
— Hurricane: 64-95 kts
— Major Hurricane: >95 kts
— Depression, Extratropical, Disturbance, Low





2022 Season: What Happened

Quiet Year for Louisiana and SE Texas



National Oceanic and
Atmospheric Administration

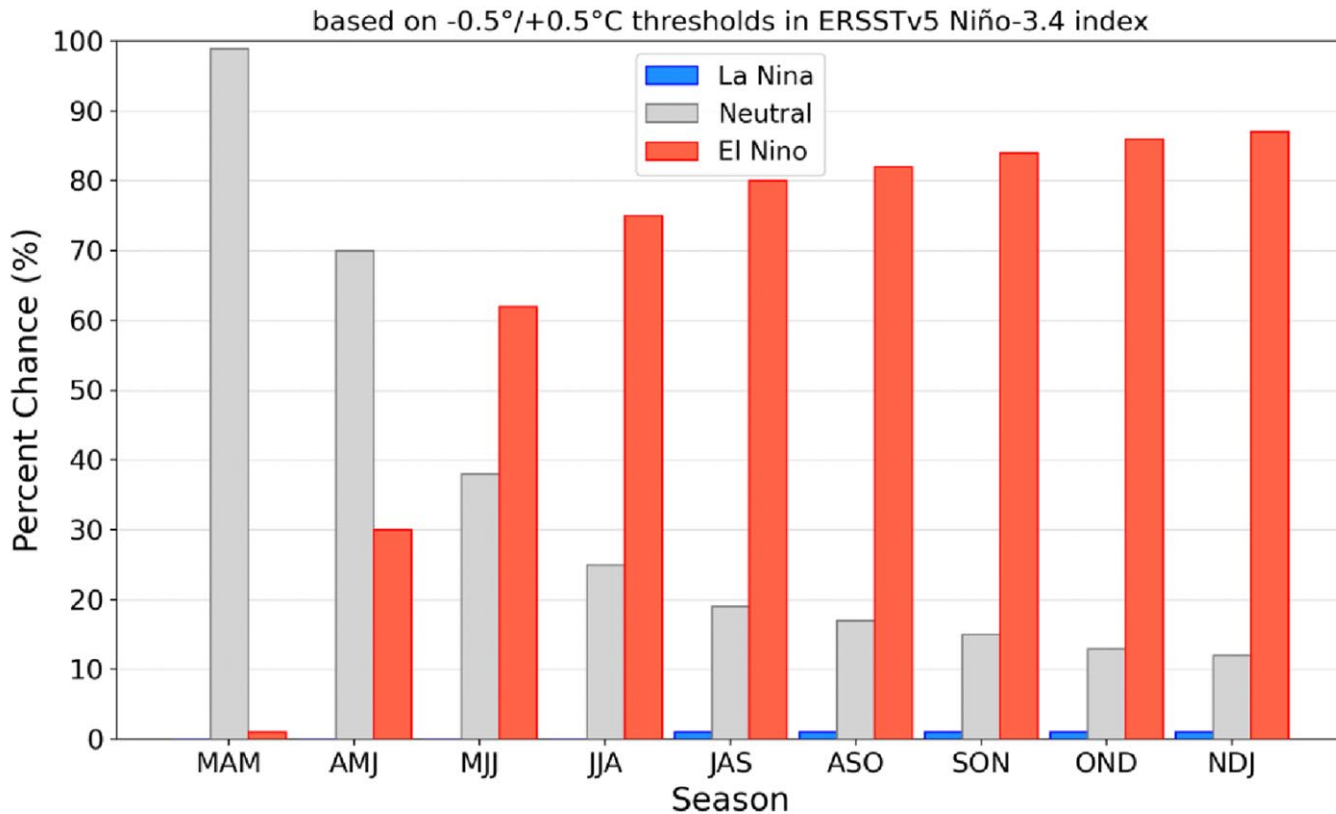
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Lake Charles, LA



An El Nino Watch has been Posted

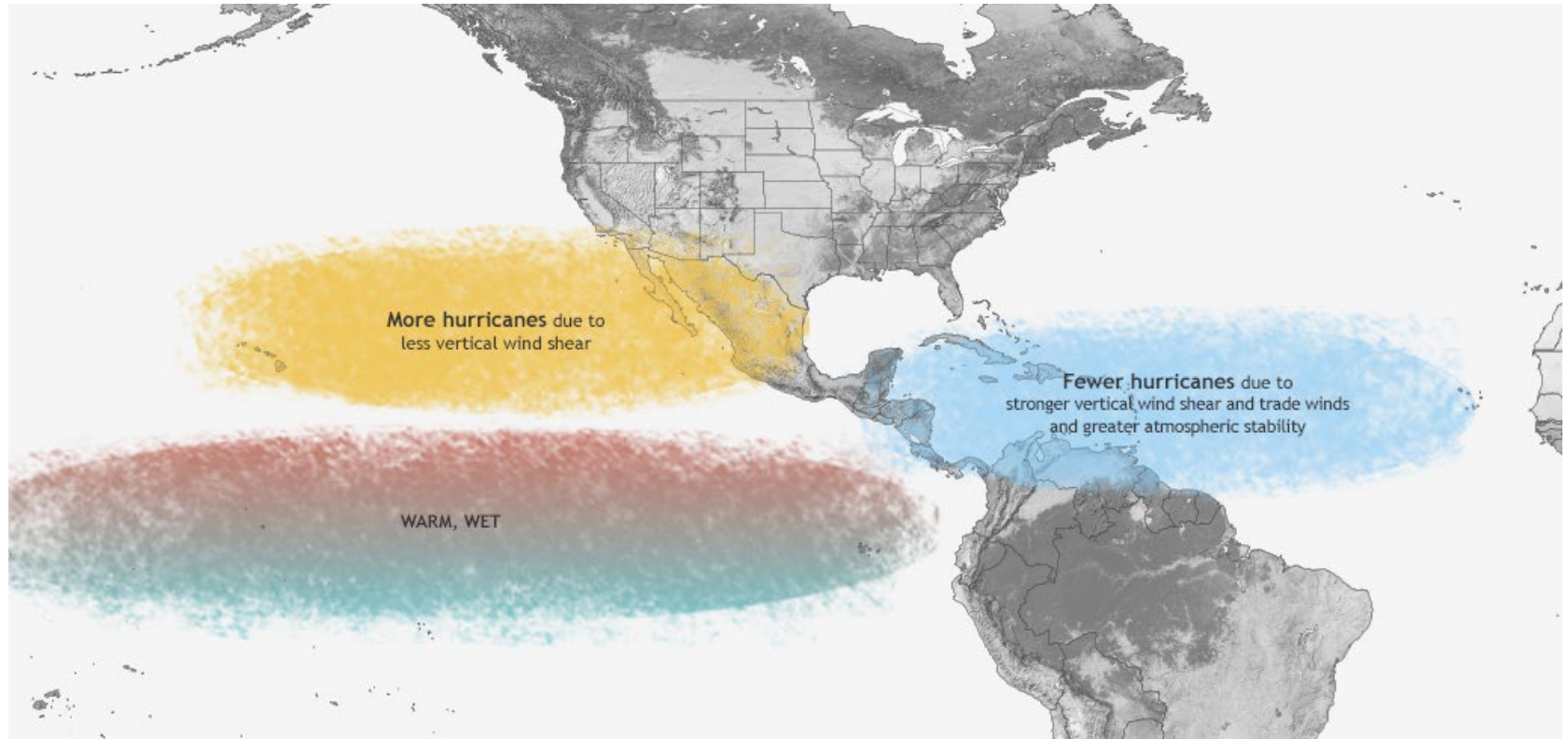
62% chance that El Nino develops by the end of July





El Nino's Tropical Influence

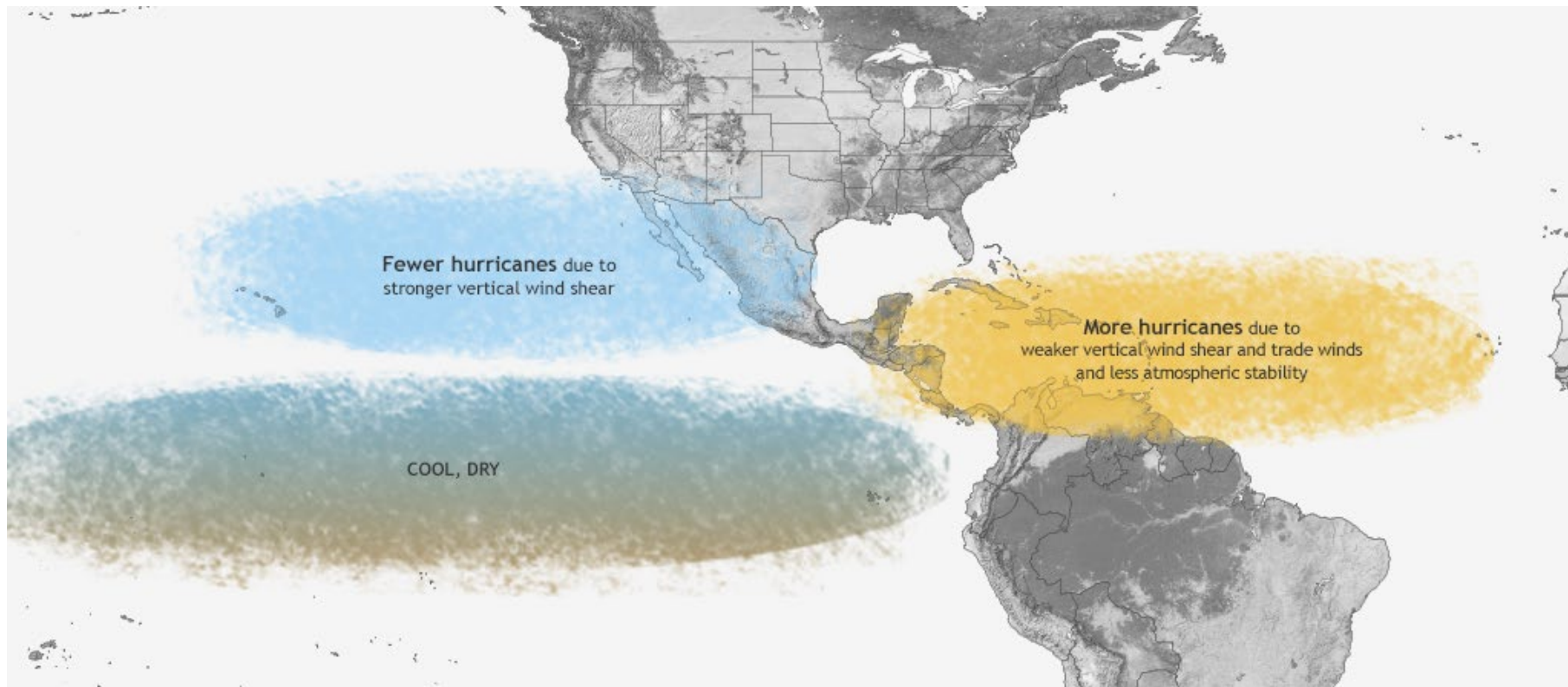
El Nino typically brings fewer hurricanes in the Atlantic Basin





La Nina's Tropical Influence

La Nina typically brings more hurricanes in the Atlantic Basin



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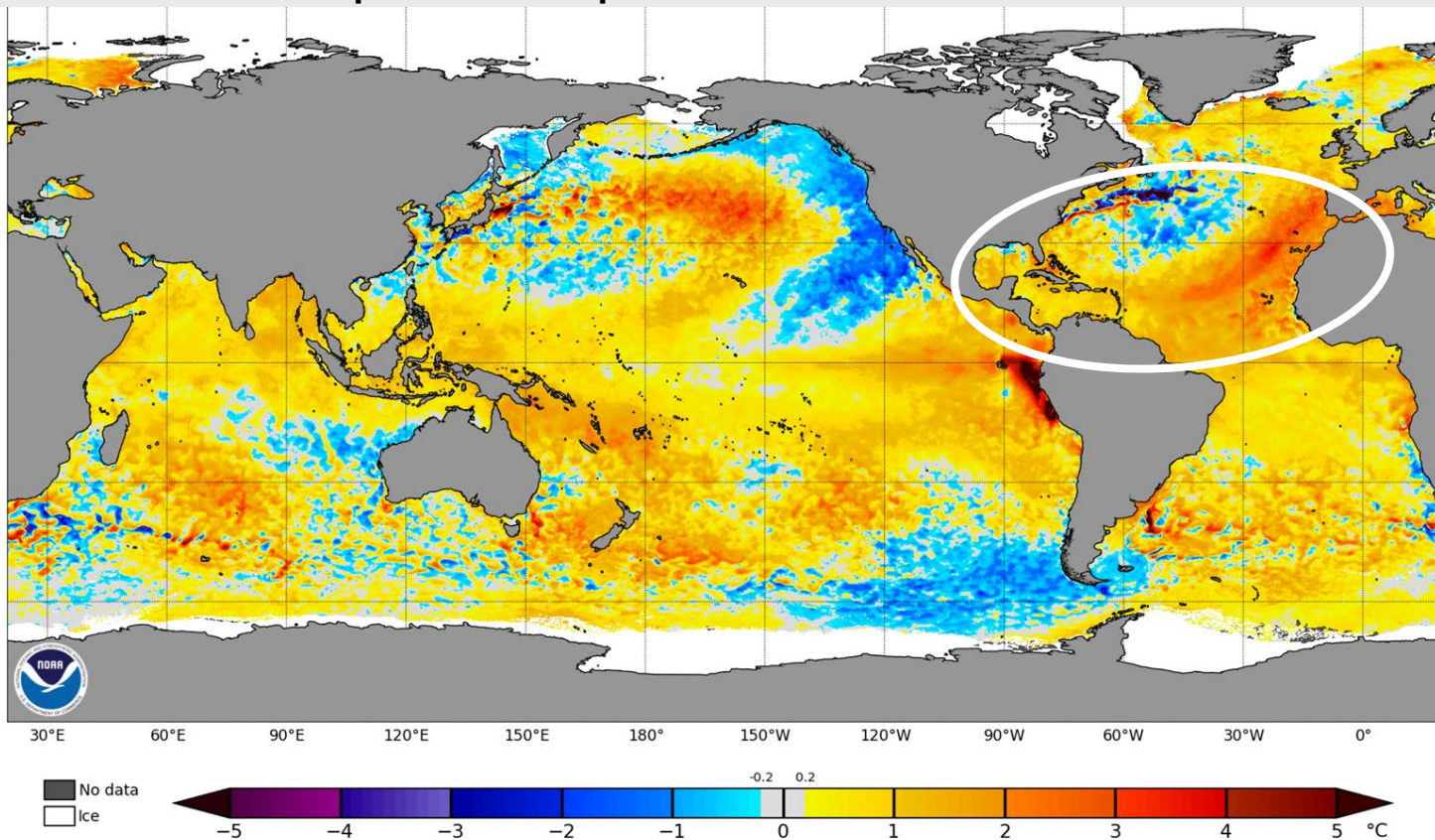
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Sea Surface Temperature Anomaly

Warmer than normal temperatures are present over the Atlantic and Gulf

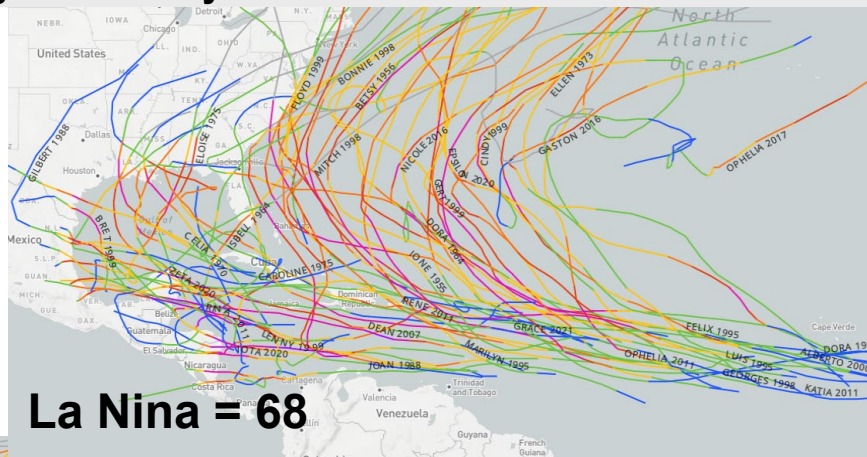
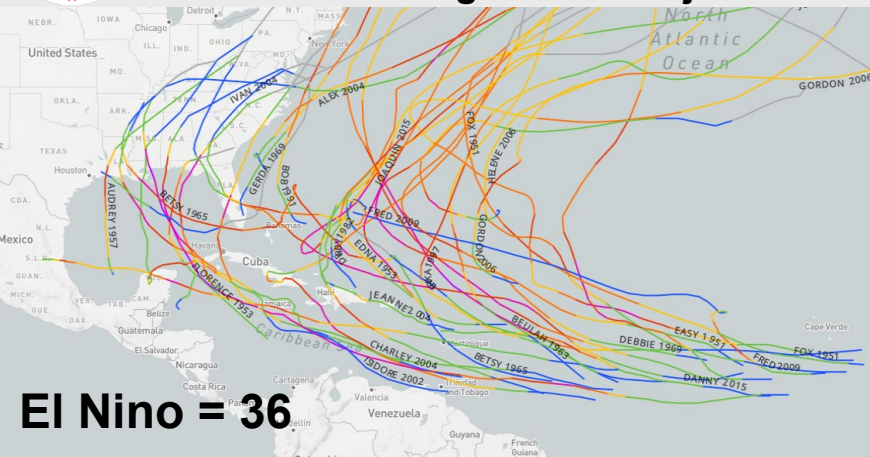


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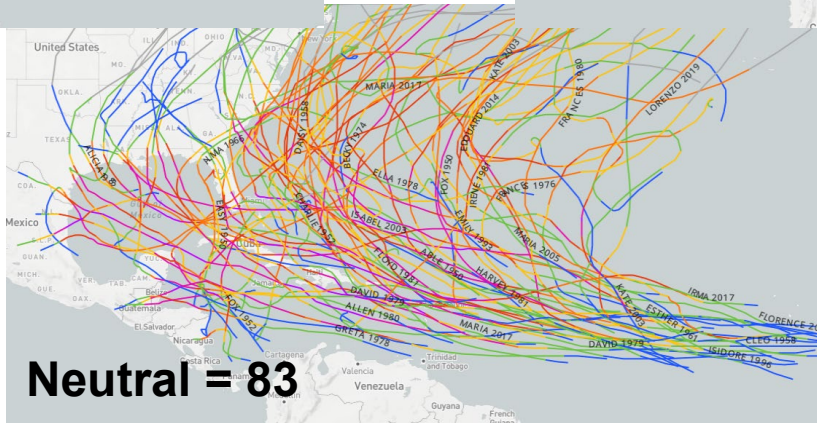


Major Hurricane Correlations

El Nino has brought fewer major hurricanes throughout history.



- Category 5
- Category 4
- Category 3
- Category 2
- Category 1
- Tropical Storm
- Tropical Depression
- Extratropical





The map displays the North Atlantic Ocean with the following features:

- Geographic Labels:** United States, Mexico, Gulf of Mexico, Caribbean Sea, North Atlantic Ocean, Sargasso Sea, and various countries including Cuba, Haiti, Dominican Republic, Puerto Rico, Jamaica, Bahamas, Guadeloupe, Martinique, Barbados, Trinidad and Tobago, Venezuela, Guyana, Panama, Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, Belize, and Central American countries.
- Hurricane Tracks:**
 - DANNY 1985:** A track starting in the Gulf of Mexico, moving north towards the United States.
 - DELTA 2020:** A track starting in the Gulf of Mexico, moving north towards the United States.
 - EDITH 1971:** A track starting in the Caribbean Sea, moving north towards the United States.
 - LAURA 2020:** A track starting in the Caribbean Sea, moving north towards the United States.
- Legend:**
 - Category 5 (Purple checkmark)
 - Category 4 (Pink checkmark)
 - Category 3 (Red checkmark)
 - Category 2 (Orange checkmark)
 - Category 1 (Yellow checkmark)
 - Tropical Storm (Green checkmark)
 - Tropical Depression (Blue checkmark)
 - Extratropical (Grey checkmark)



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ENSO Neutral Hurricanes



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Atmospheric Administration**

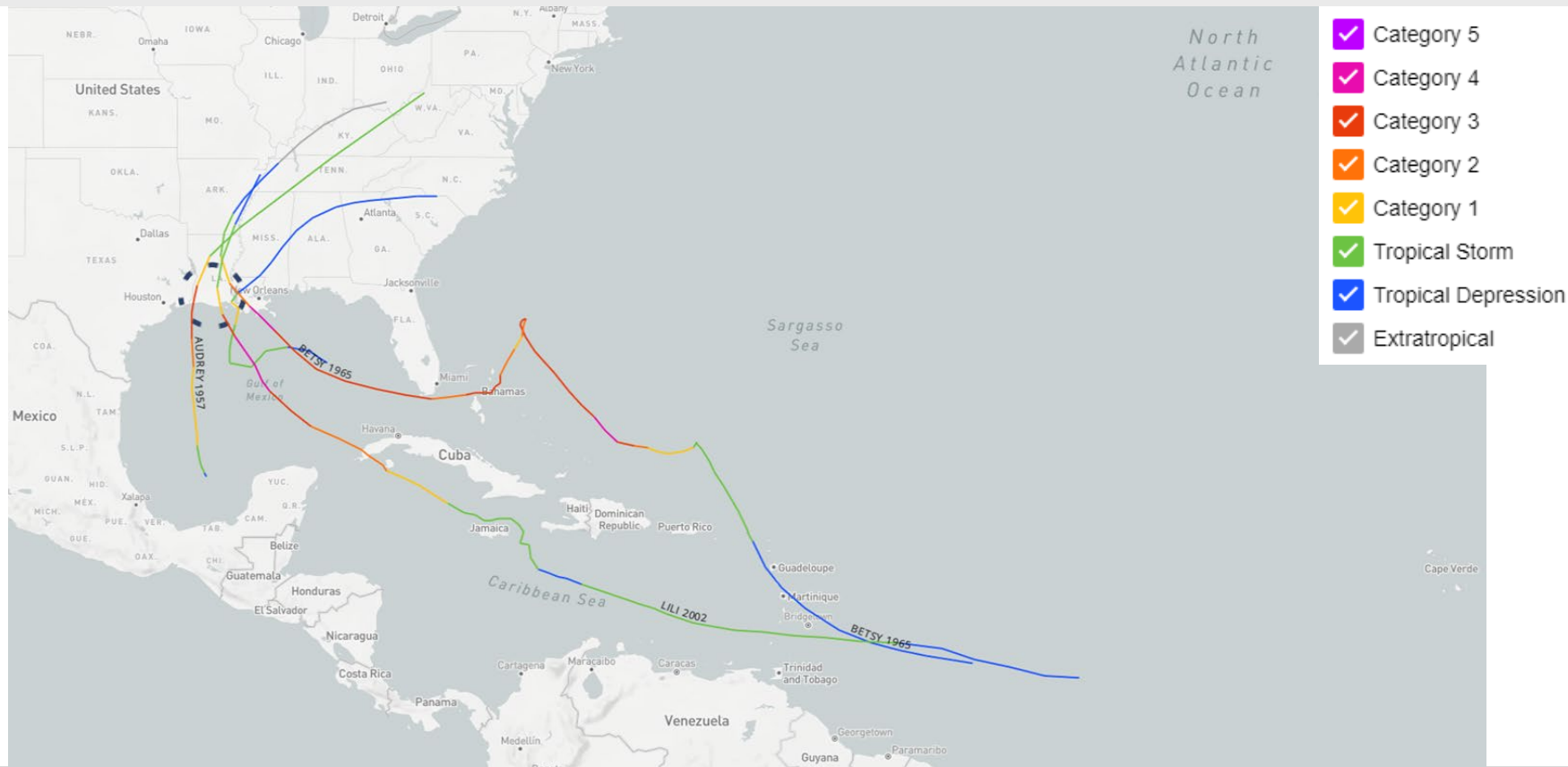
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Lake Charles Forecast Area Hurricane History

El Nino Hurricanes



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All Hurricanes through 1856



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Colorado State 2023 Forecast

Atlantic Basin Tropical Activity

| Forecast Parameter | Forecast | 1991 - 2020 Average |
|-------------------------|-----------|---------------------|
| Named Storms | 13 | 14.4 |
| Hurricanes | 6 | 7.2 |
| Major Hurricanes | 2 | 3.2 |





The Weather Channel 2023 Forecast

Atlantic Basin Tropical Activity

| Forecast Parameter | Forecast | 1991 - 2020 Average |
|-------------------------|-----------|---------------------|
| Named Storms | 15 | 14.4 |
| Hurricanes | 7 | 7.2 |
| Major Hurricanes | 3 | 3.2 |





University of Arizona 2023 Forecast

Atlantic Basin Tropical Activity

| Forecast Parameter | Forecast | 1991 - 2020 Average |
|-------------------------|-----------|---------------------|
| Named Storms | 19 | 14.4 |
| Hurricanes | 9 | 7.2 |
| Major Hurricanes | 5 | 3.2 |





Storm Surge

Hurricane Katrina

Before Katrina



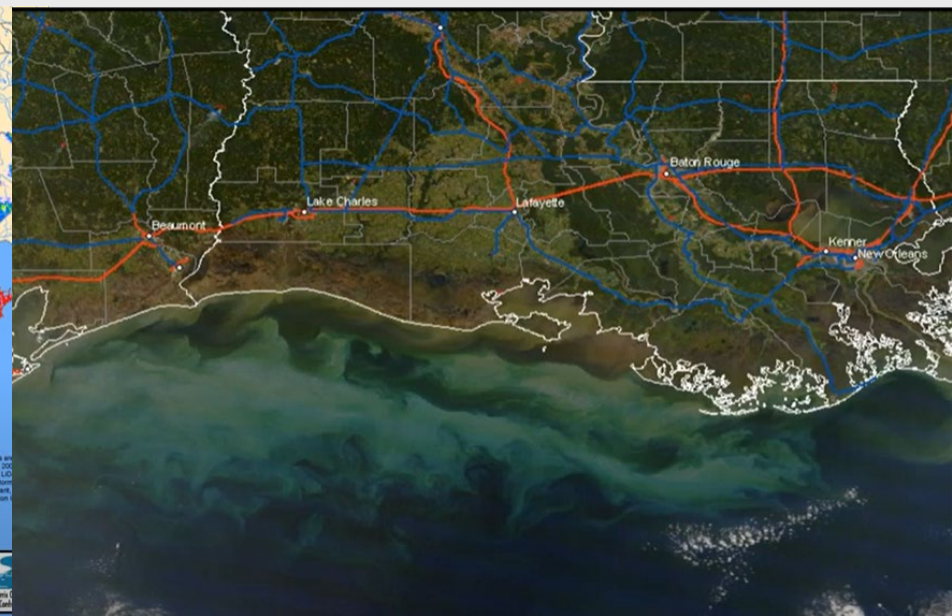
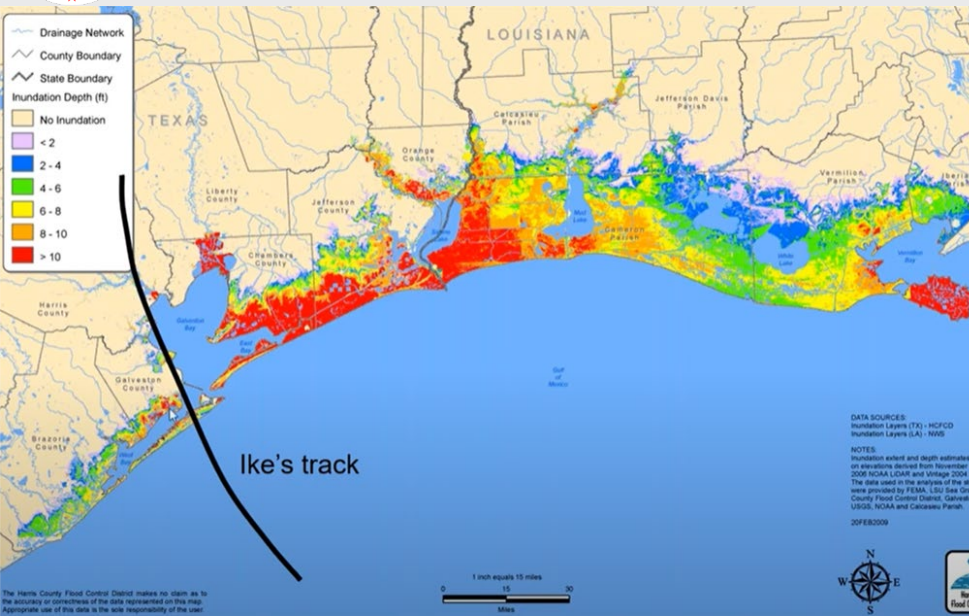
After Katrina





Saltwater Vegetation Burn

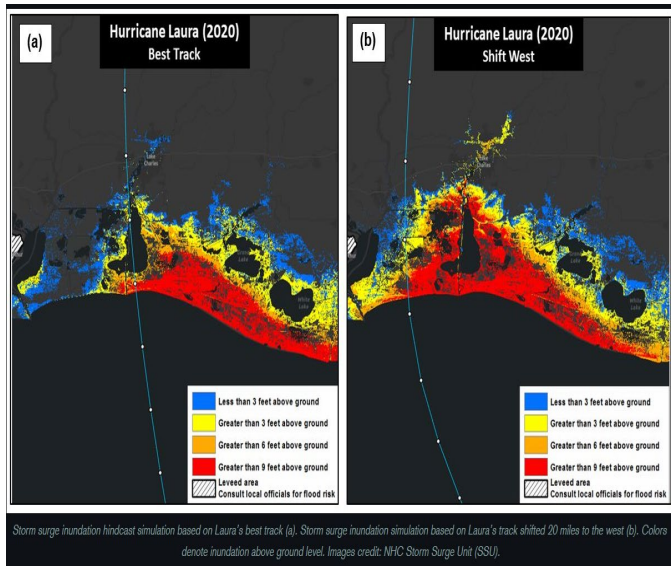
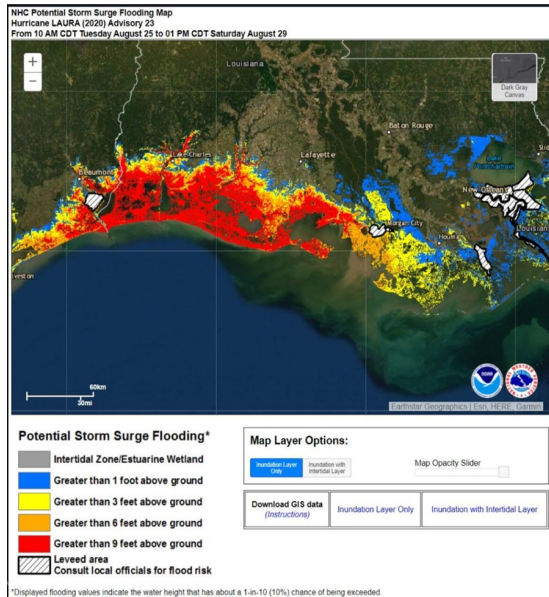
Post Hurricane Ike





Hurricane Laura

Forecast and what happened



What we had to prepare for

Shift 20 miles to the east made a big difference

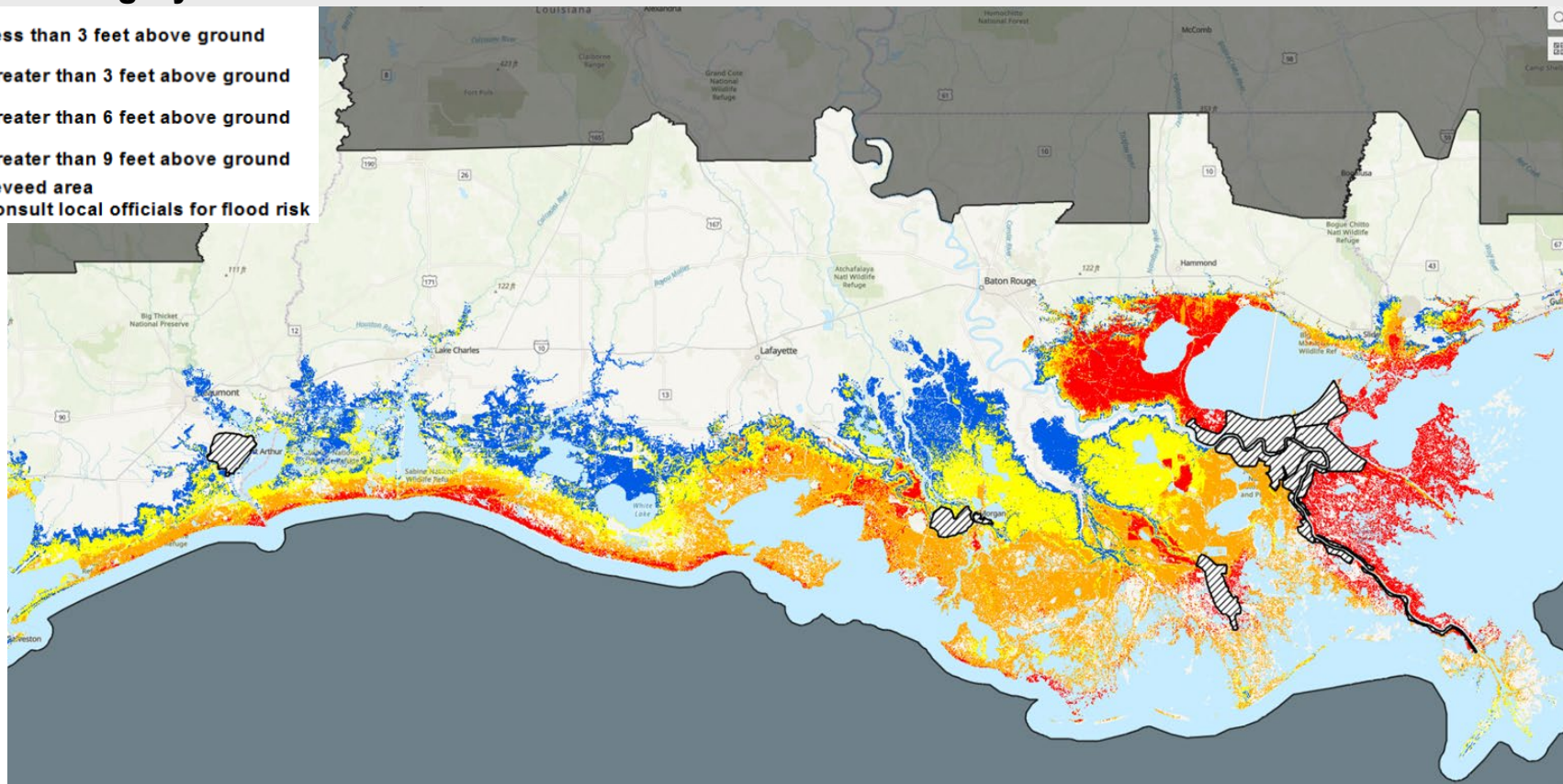
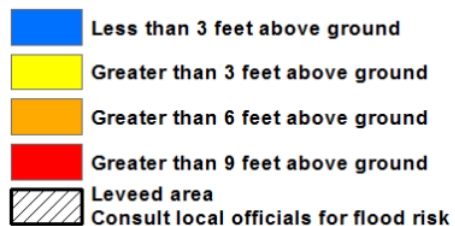
Record Louisiana Storm surge
20.8 feet NAVD88 or 17.1 feet
Above Ground in Creole.

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Lake Charles, LA

Storm Surge in Louisiana and SE Texas



Category 1



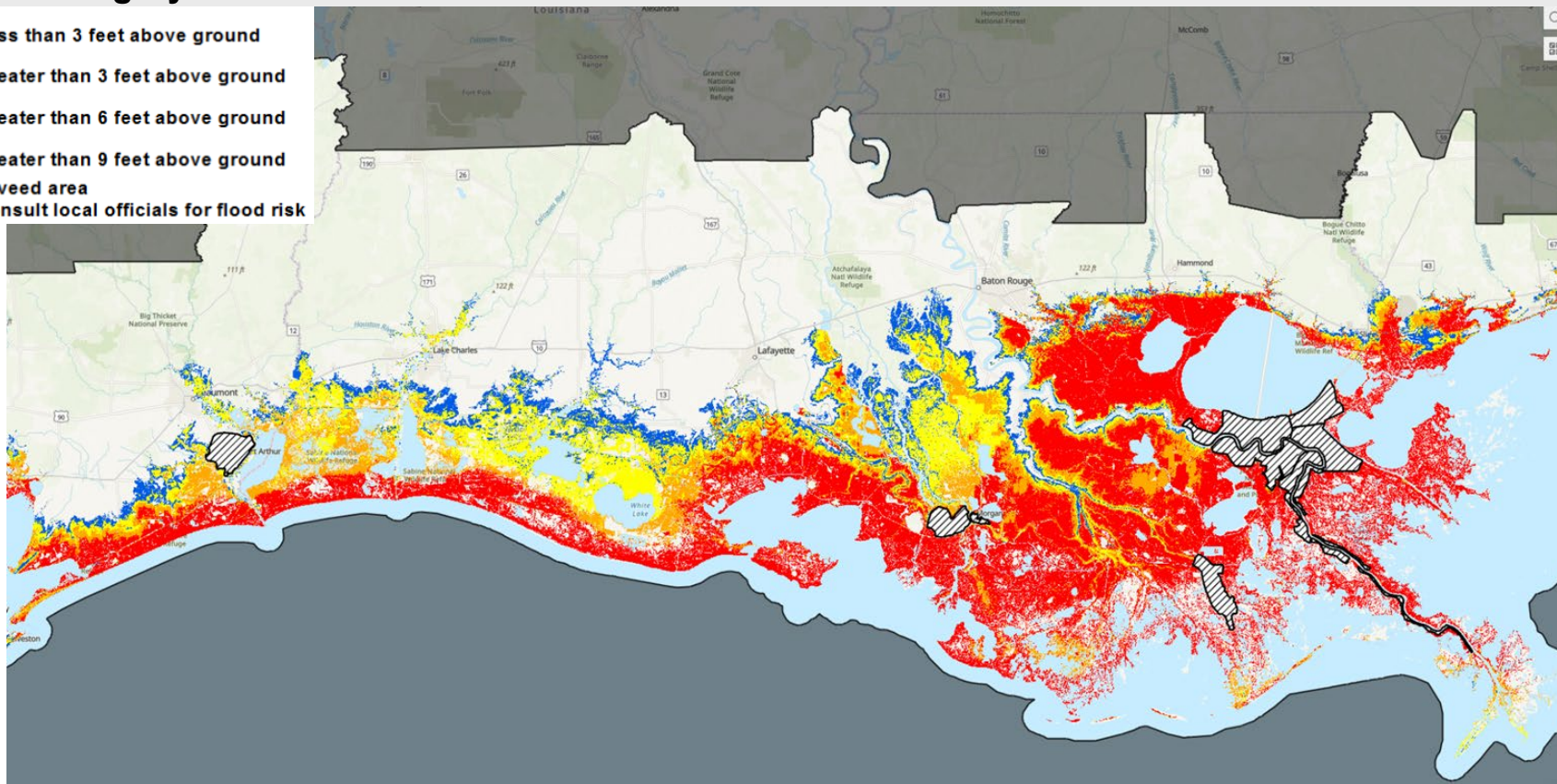
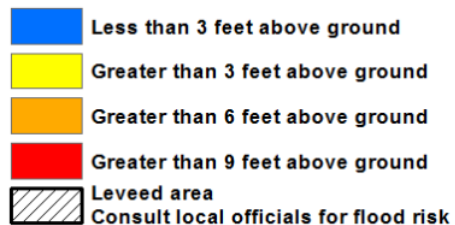
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Storm Surge in Louisiana and SE Texas



Category 2



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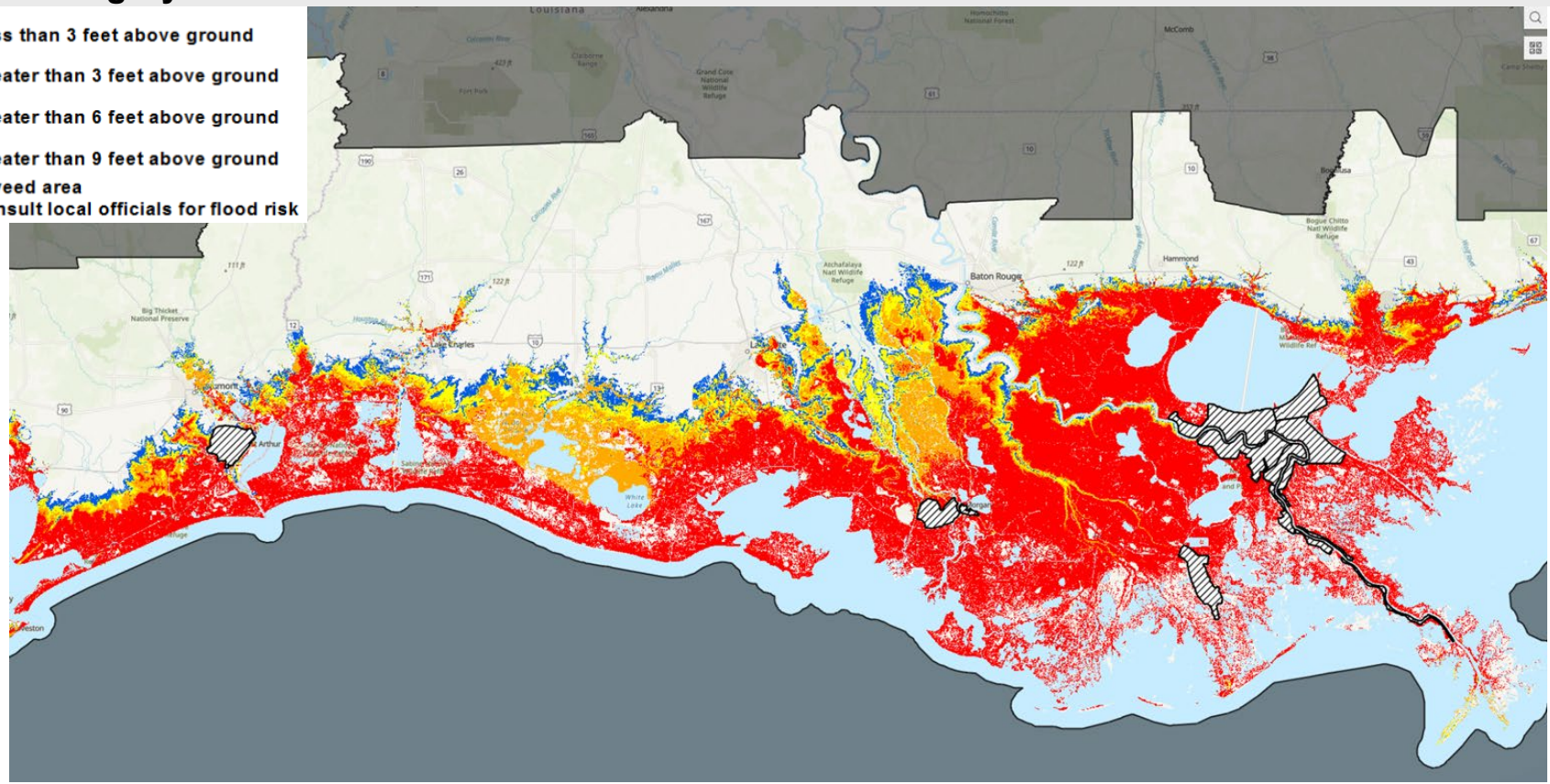
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Storm Surge in Louisiana and SE Texas

Category 3

- Less than 3 feet above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Leveed area
- Consult local officials for flood risk

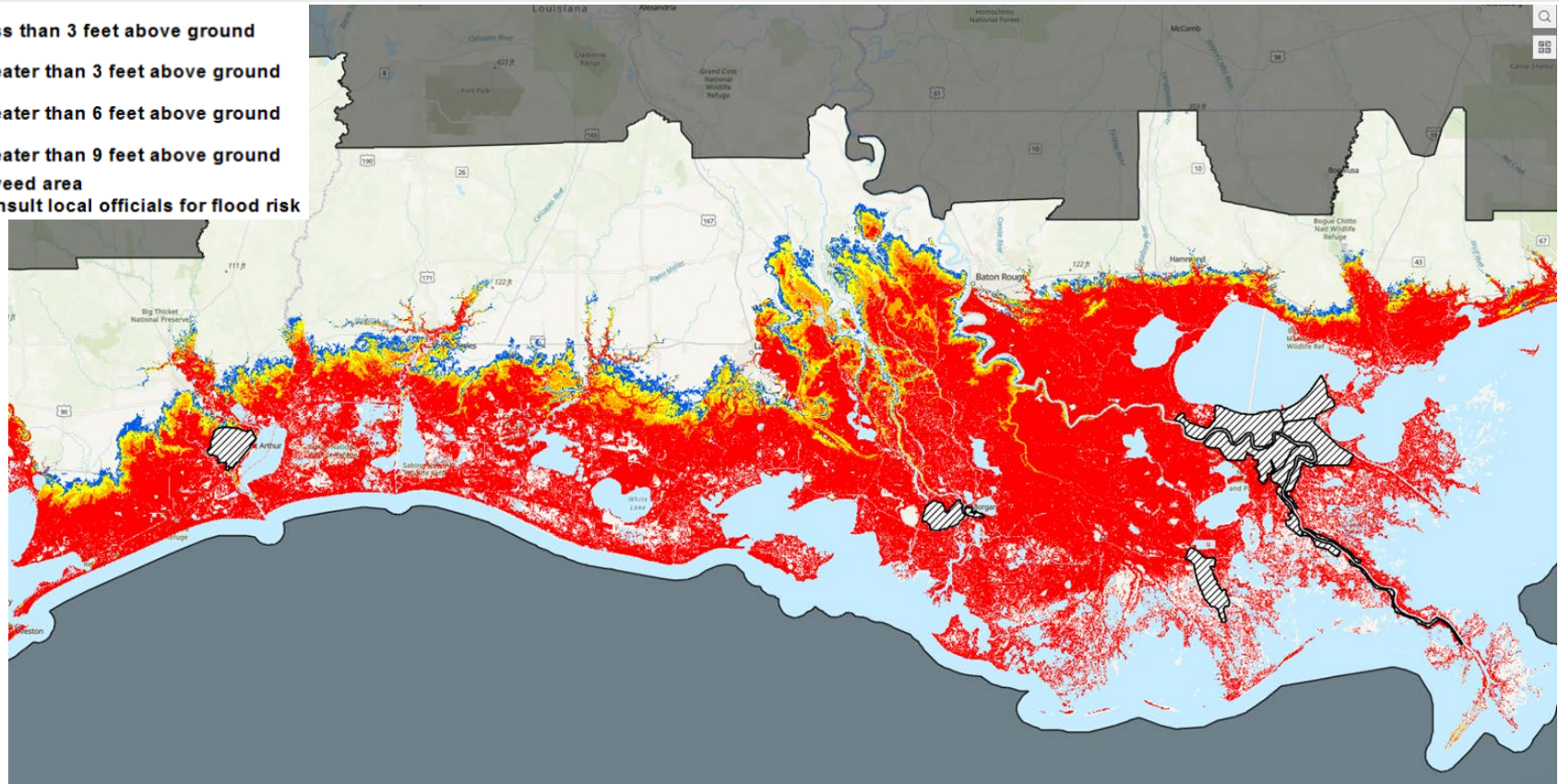




Storm Surge in Louisiana and SE Texas

Category 4

- Less than 3 feet above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Leveed area
- Consult local officials for flood risk

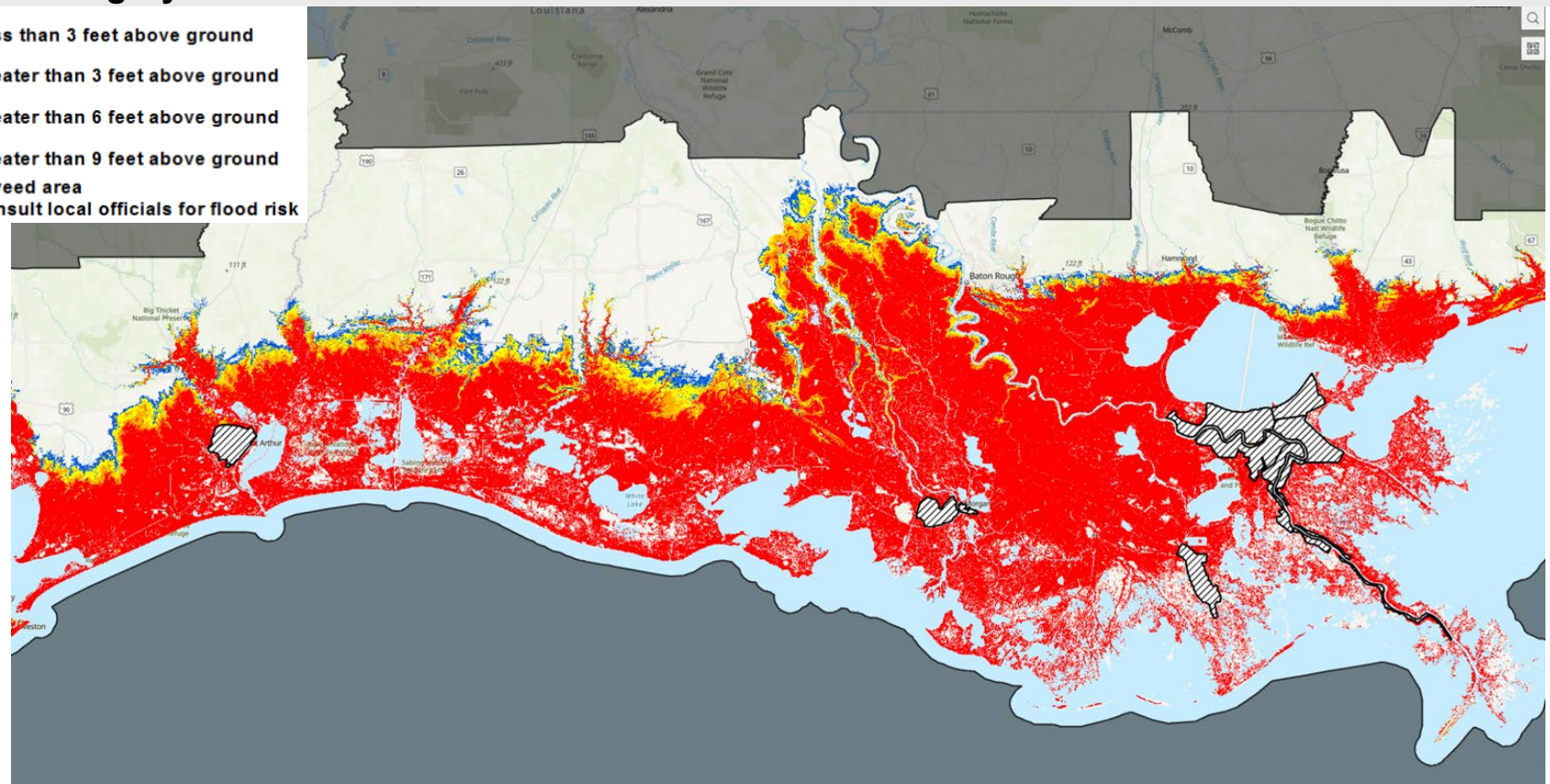




Storm Surge in Louisiana and SE Texas

Category 5

- Less than 3 feet above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Leveed area
- Consult local officials for flood risk



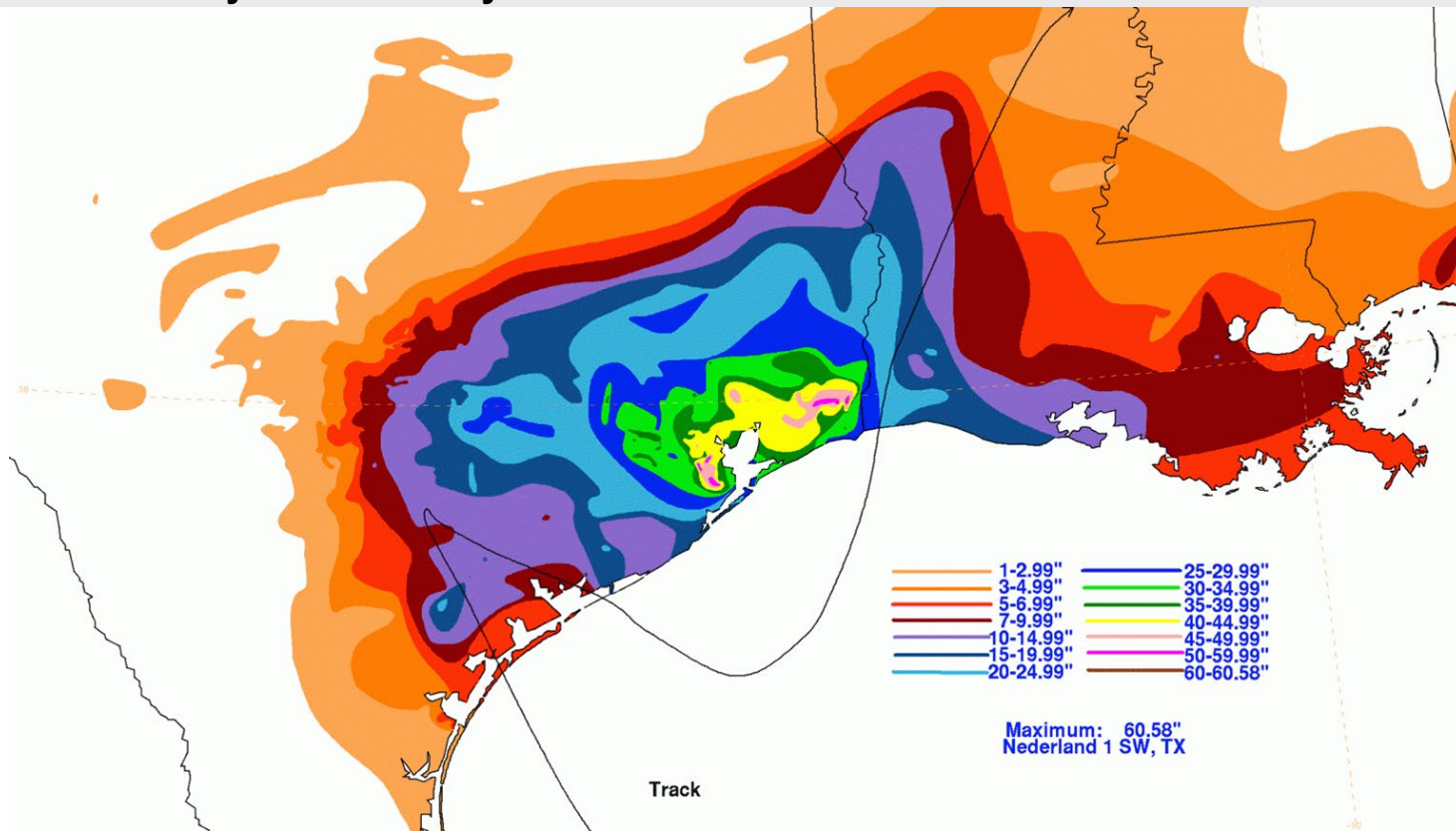
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Excessive Rainfall from Hurricanes

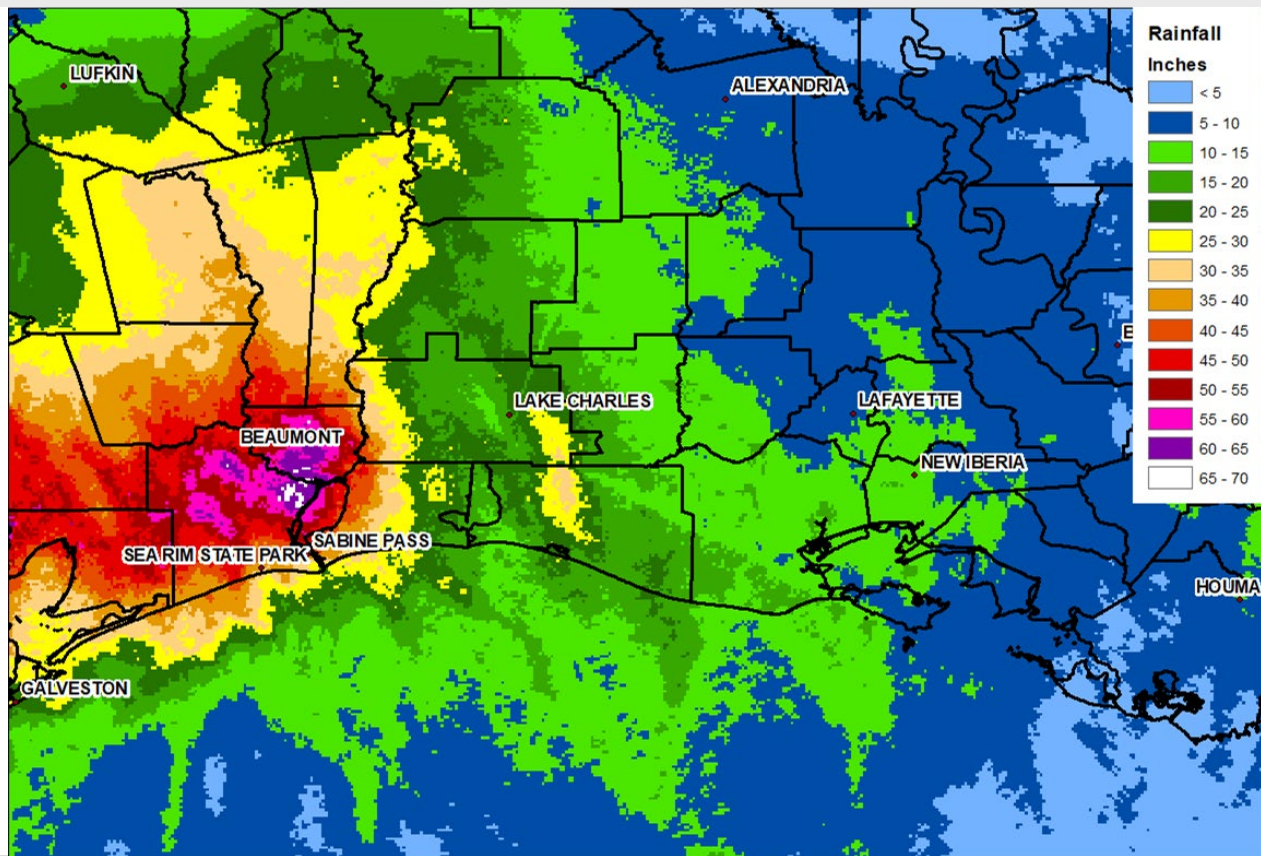
Hurricane Harvey Rainfall Analysis





Hurricane Harvey

Radar Derived Storm Total Rainfall



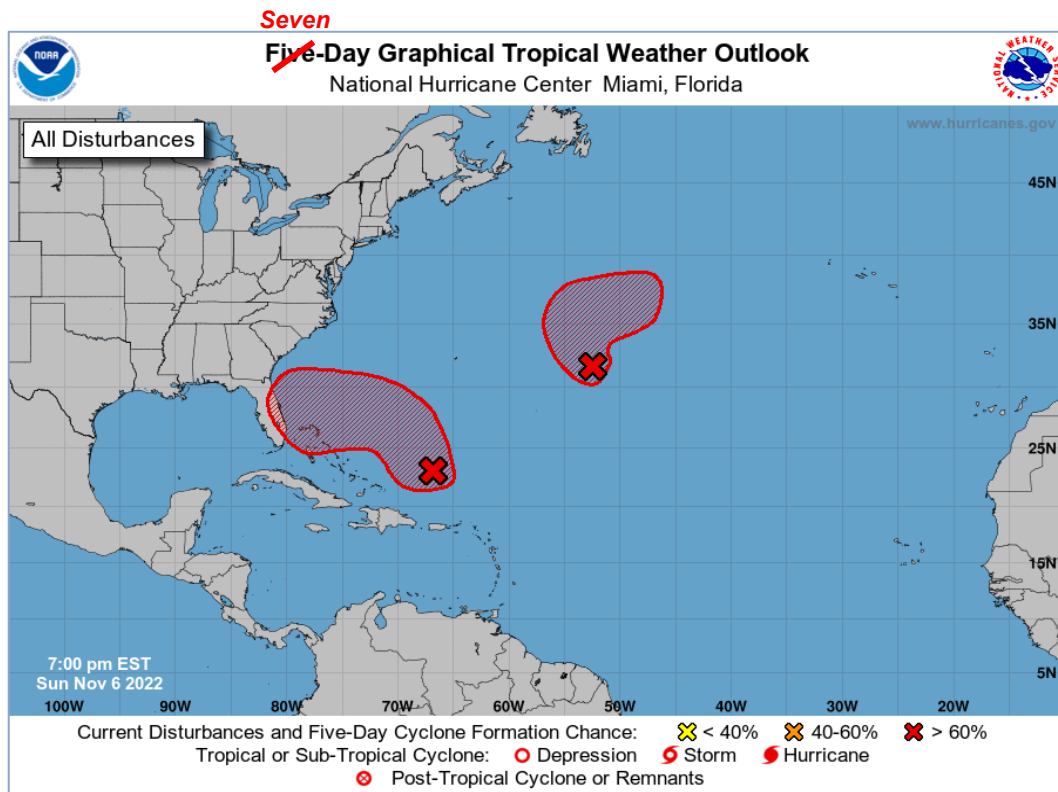
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Tropical Weather Outlook is now 7 Days

7 Day Tropical Weather Outlook



The 5-day Tropical Weather Outlook (TWO) and Graphical Tropical Weather Outlook (GTWO) will be extended to 7 days beginning May 15, 2023.

This product will now show the chance for tropical cyclone formation over the next 7 days.

New URL:

<https://www.nhc.noaa.gov/gtwo.php?basin=atl&fdays=7>



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Atmospheric Administration

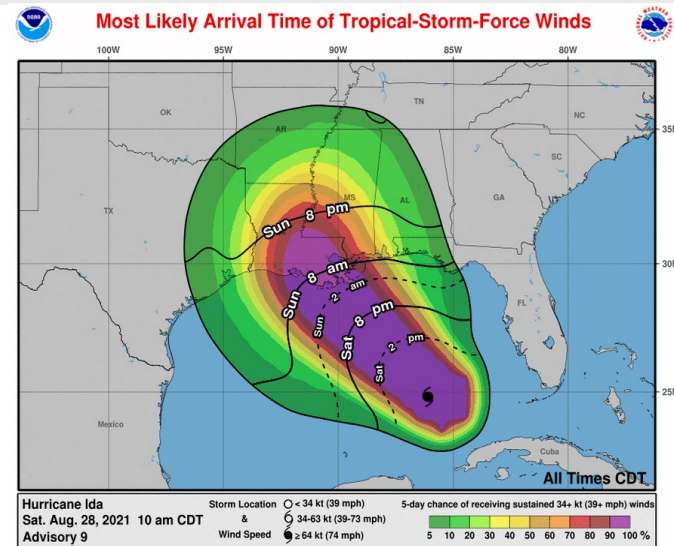
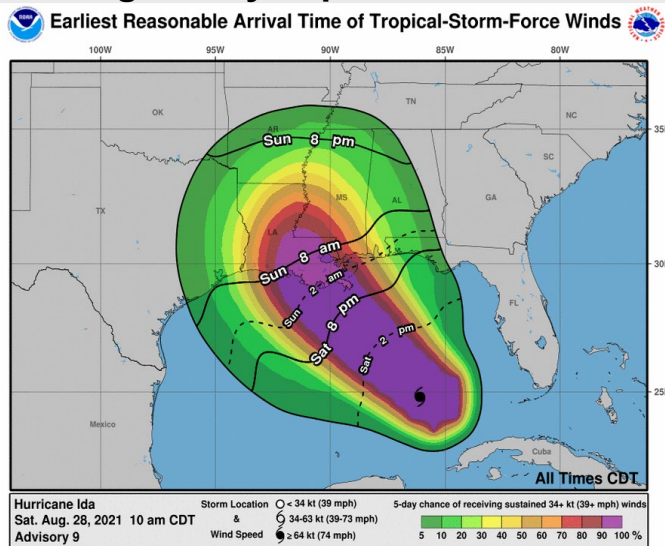
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Time of Arrival Graphics

Timing is very important !



- Provides probabilistic time of arrival of 34 KT/39 MPH winds
- Earliest reasonable is based on 10% threshold- 90% chance that the storm will arrive AFTER the time on the graphic.
- Most likely is based on 50% threshold



How Hurricane Forecasts are Made

Uses model spread for track uncertainty.

Based on 1,000 realistic alternative scenarios created using:

- Official NHC track and intensity forecast
- Historical NHC track and intensity forecast errors
- Climatology and persistence wind radii model

Uses model spread to account for track uncertainty.





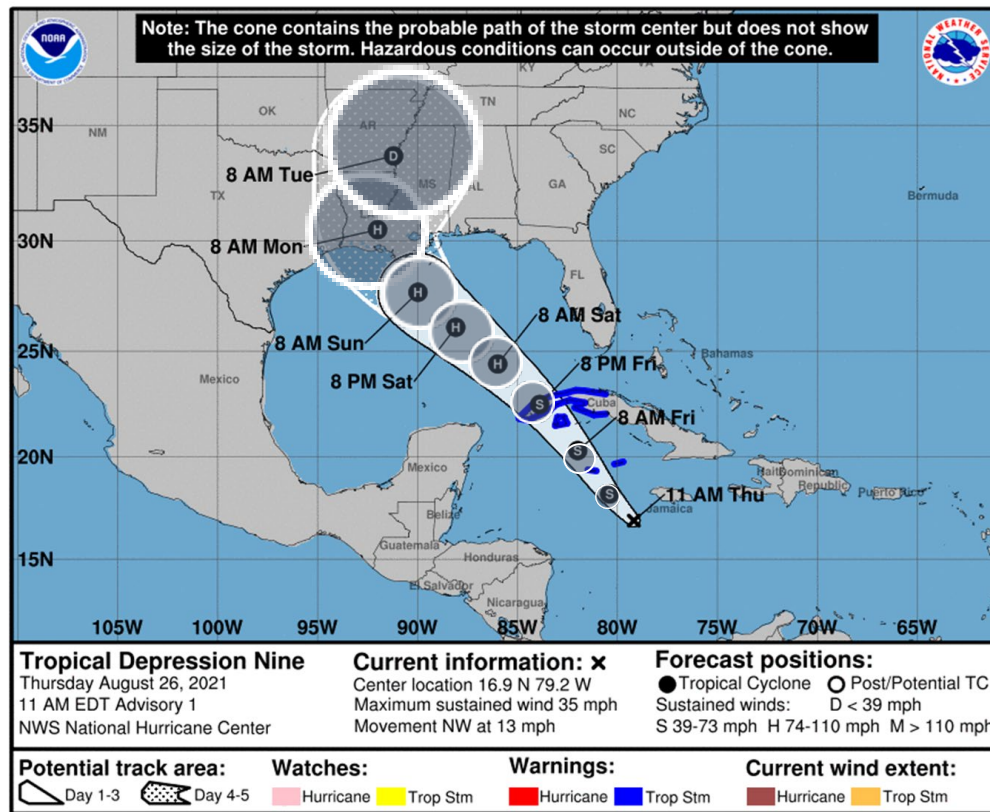
How the Cone is Made

Made from circles based on 67th percentile of NHC error over last 5 years.

Circles are “drawn” around each forecast point (12, 24, 36 h, etc.) based on the 67th percentile of the NHC track forecast error over the past 5 years at that forecast lead time

A cone is drawn based on those circles

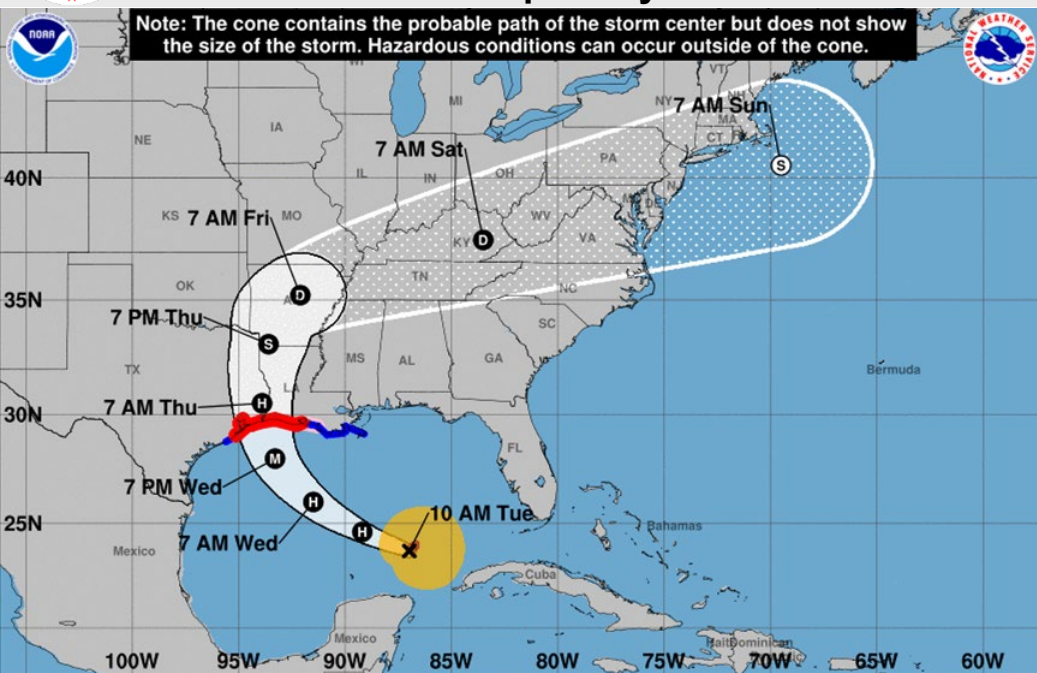
The cone size does not change through the season and does not change for each storm.





Cone of Uncertainty

Probable track of tropical cyclone center.



Hurricane Laura
Tuesday August 25, 2020
10 AM CDT Advisory 23
NWS National Hurricane Center

Current information: x
Center location 23.7 N 87.0 W
Maximum sustained wind 75 mph
Movement WNW at 16 mph

Forecast positions:
● Tropical Cyclone ○ Post/Potential TC
Sustained winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110 mph

Potential track area: Day 1-3 Day 4-5
Watches: Hurricane Trop Stm
Warnings: Hurricane Trop Stm
Current wind extent: Hurricane Trop Stm



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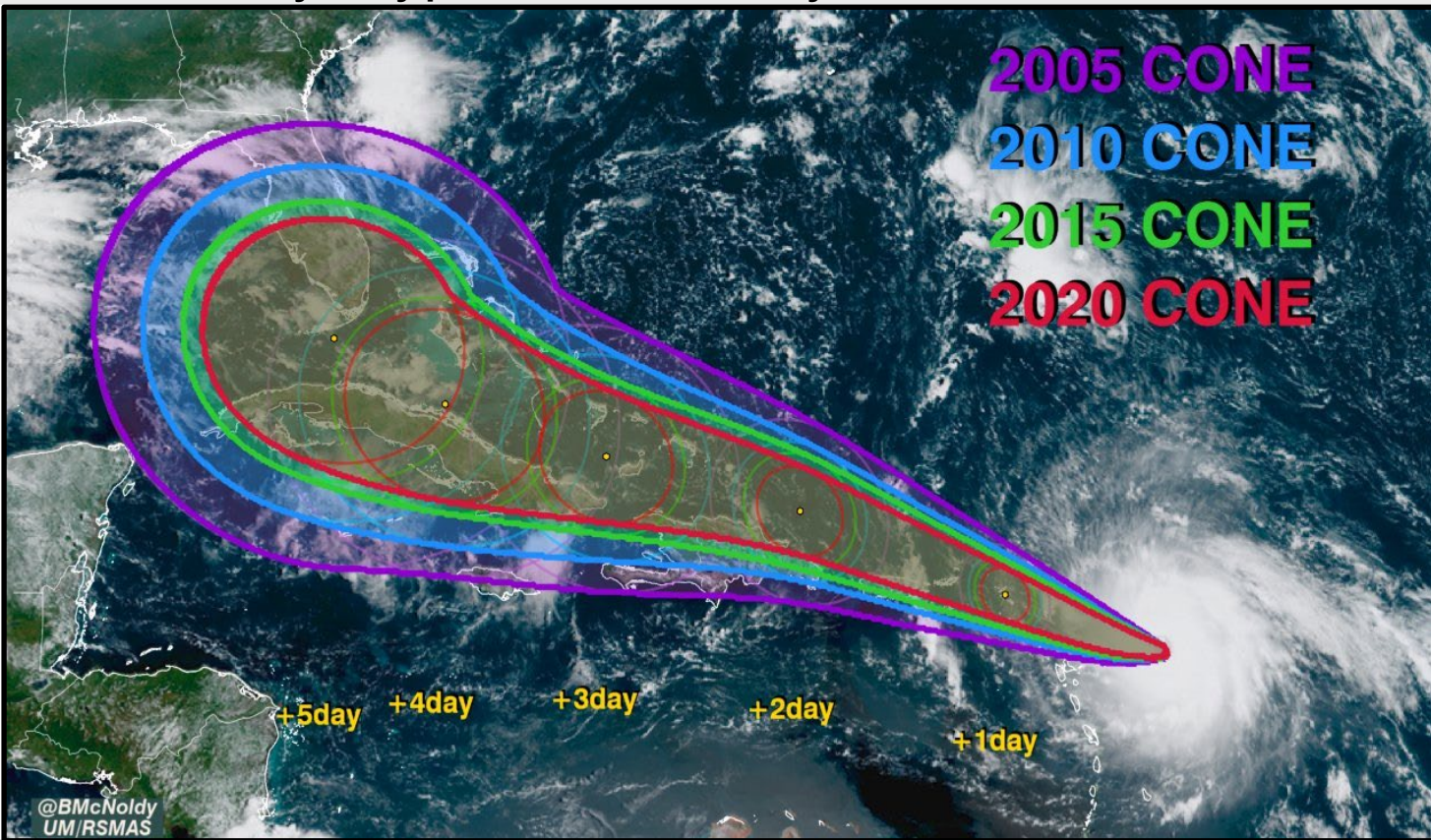
Keep in mind that impacts could occur away from the cyclone center, and outside of the cone area.

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What the Cone Actually is

Represents the mostly likely path of the center of cyclone.



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Forecast Cycle to Briefings

Timeline of Forecast Cycle and Updated Briefings

- 7am - Hurricane Forecaster Begins Observation Analysis
- 7:45 am - Once cyclone center, storm speed/direction, and intensity are determined, the hurricane models are then initiated.
- 9am Forecast Track is internally finalized.
- 9:15am Hurricane Center Collaborates with NWS Field Offices
- 9:30am to 10am Cone of Uncertainty, Timing and Probability Products are Issued
- 10:15am NWS Lake Charles Brief Emergency Management Directors
- 10:45am NWS Lake Charles Brief all other Partner Groups

