

# Hurricanes in Florida



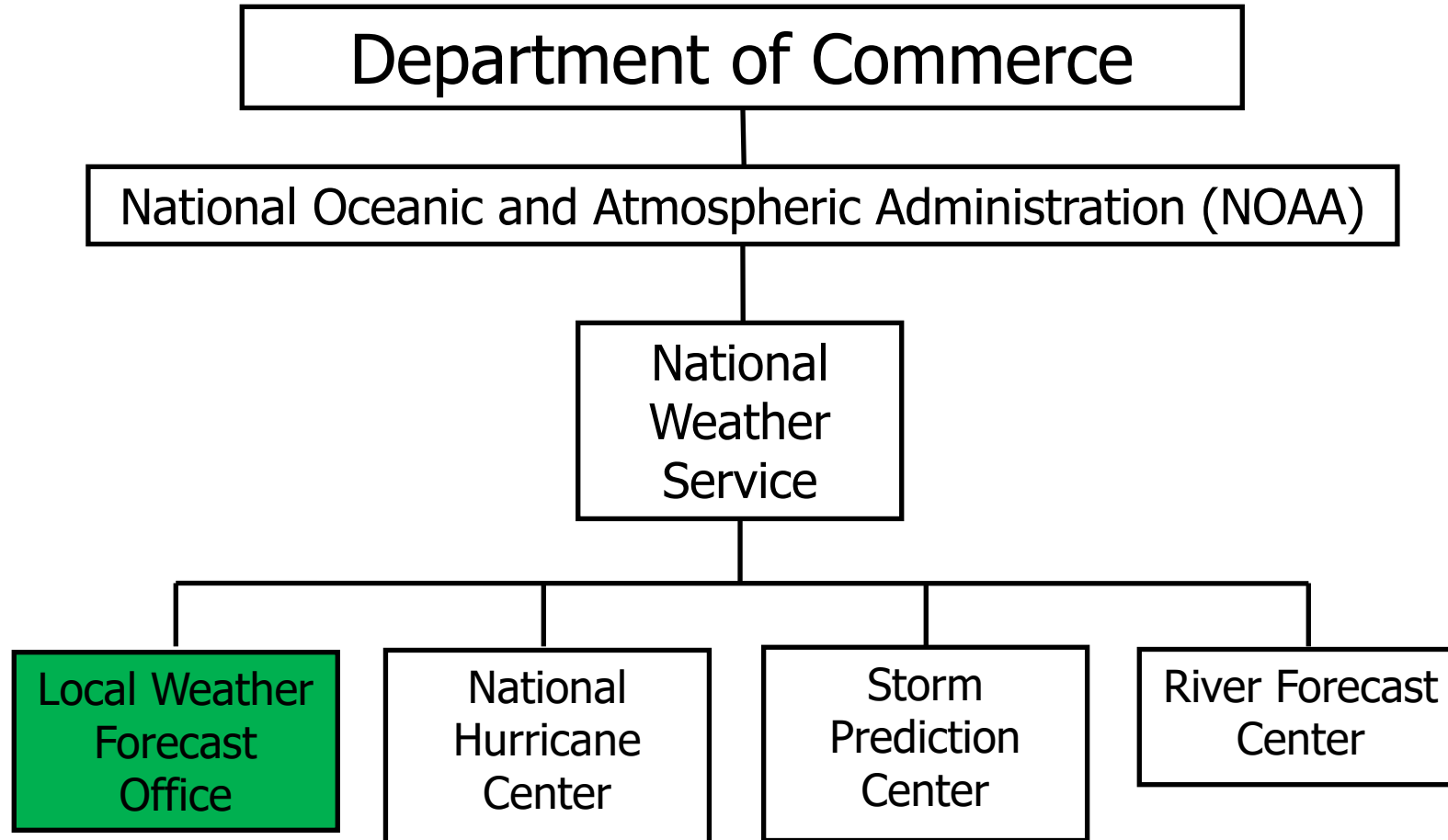
**Daniel Noah**

Warning Coordination Meteorologist

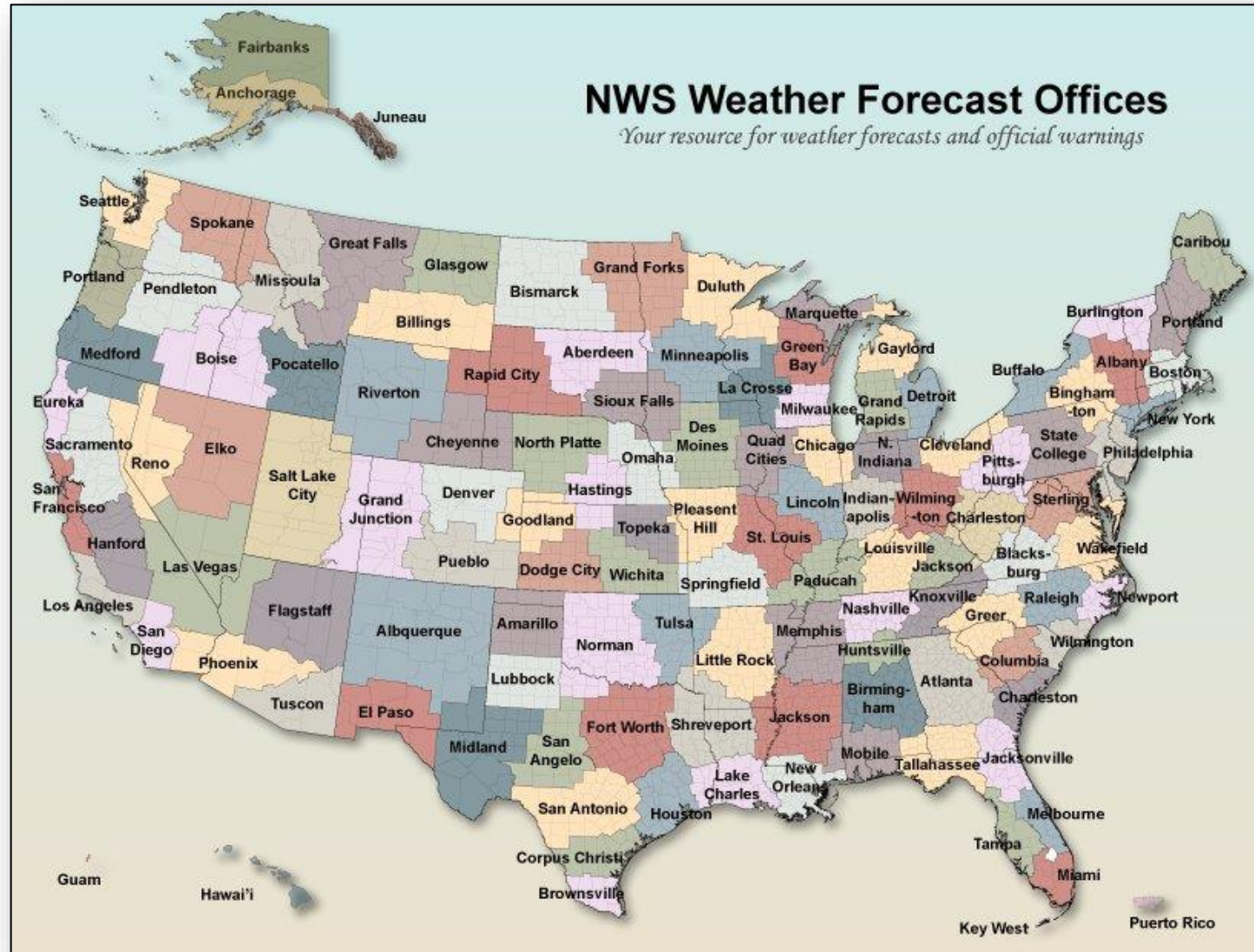
daniel.noah@noaa.gov

<https://weather.gov/tampabay>

# We are a Federal Government Agency



# 122 NWS Local Weather Forecast Offices

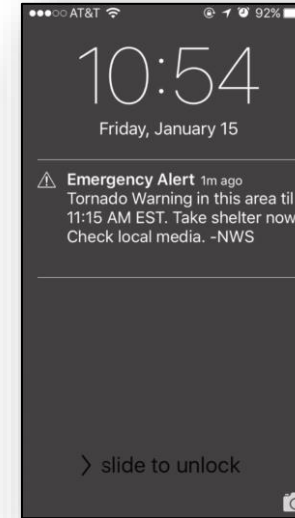


- 23 Employees
- 17 are Meteorologists
- 24 hours a day
- 365 days a year





# We Issue the Weather Warnings You Hear on Radio/TV



# Members of the Integrated Warning Team



Emergency  
Management  
and Public  
Officials

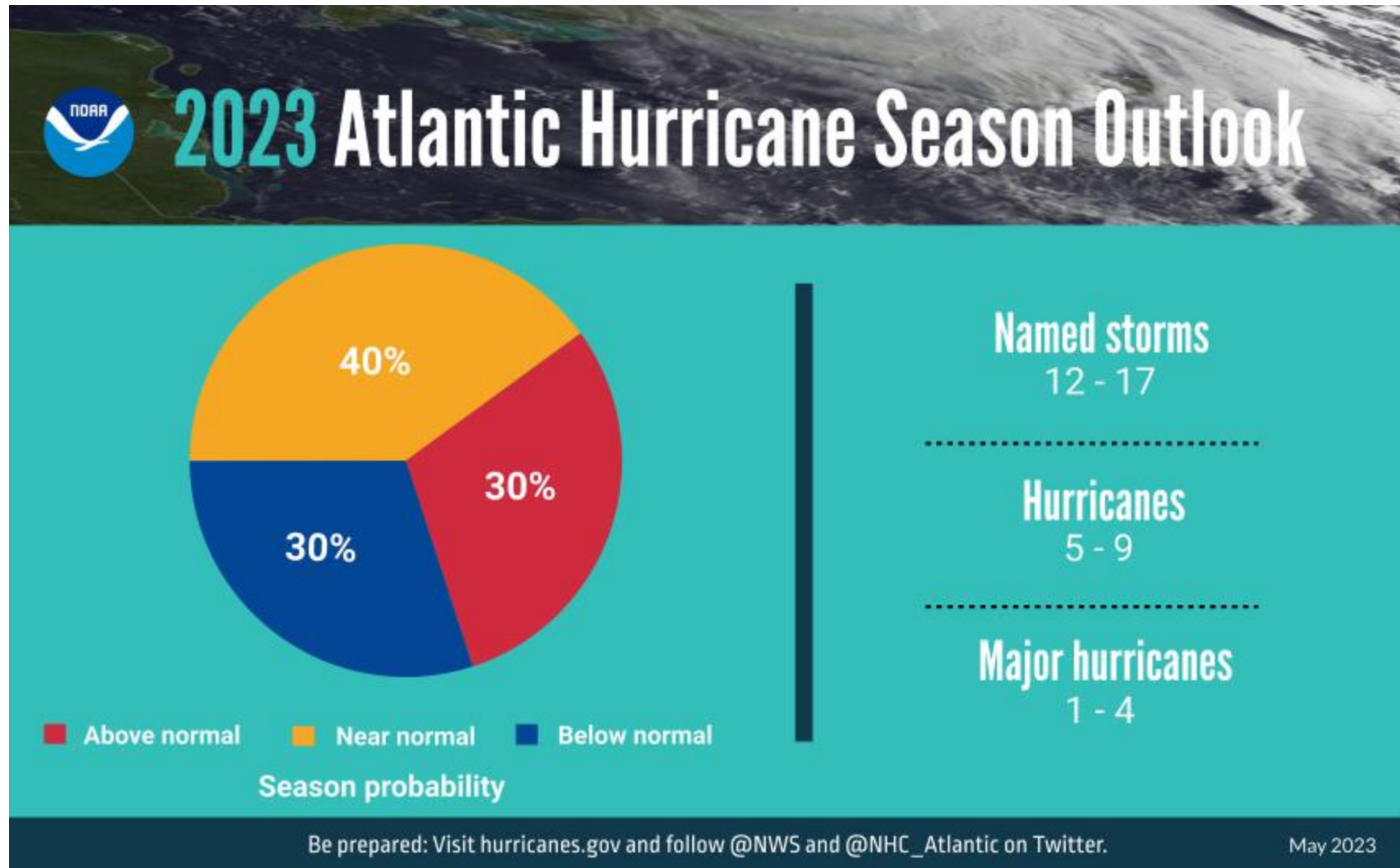


National  
Weather  
Service



America's Weather  
and Climate Industry  
(e.g. TV, Radio, Newspaper,  
Media, Private Companies,  
& App Developers)

# 2023 Hurricane Season Forecast





# Have Multiple Ways to Receive Weather Warnings

## Commercial Apps

From your favorite local  
TV, Radio, or Newspaper



## Search for FEMA in App Store



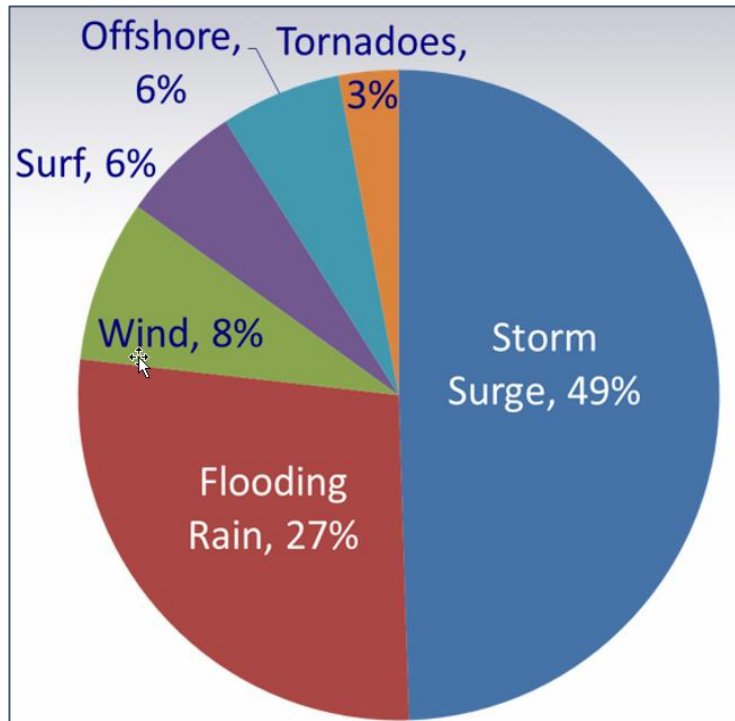
## Weather Radio



## AlertFlorida.com

The AlertFlorida.com website interface is shown. It features the 'ALERT FLORIDA' logo and the text 'AlertFlorida - Statewide Notification Initiative'. Below this, a message states: 'To learn how to receive emergency alerts and other public safety notifications in your community:'. There is a text input field labeled 'Enter County/City:' and a red 'Submit' button.

When you close your eyes, what do you see when you think of a hurricane?



9 out of 10 U.S. tropical cyclone fatalities are due to water



# Hurricane Threats



Storm  
Surge



Wind



Flooding  
Rain

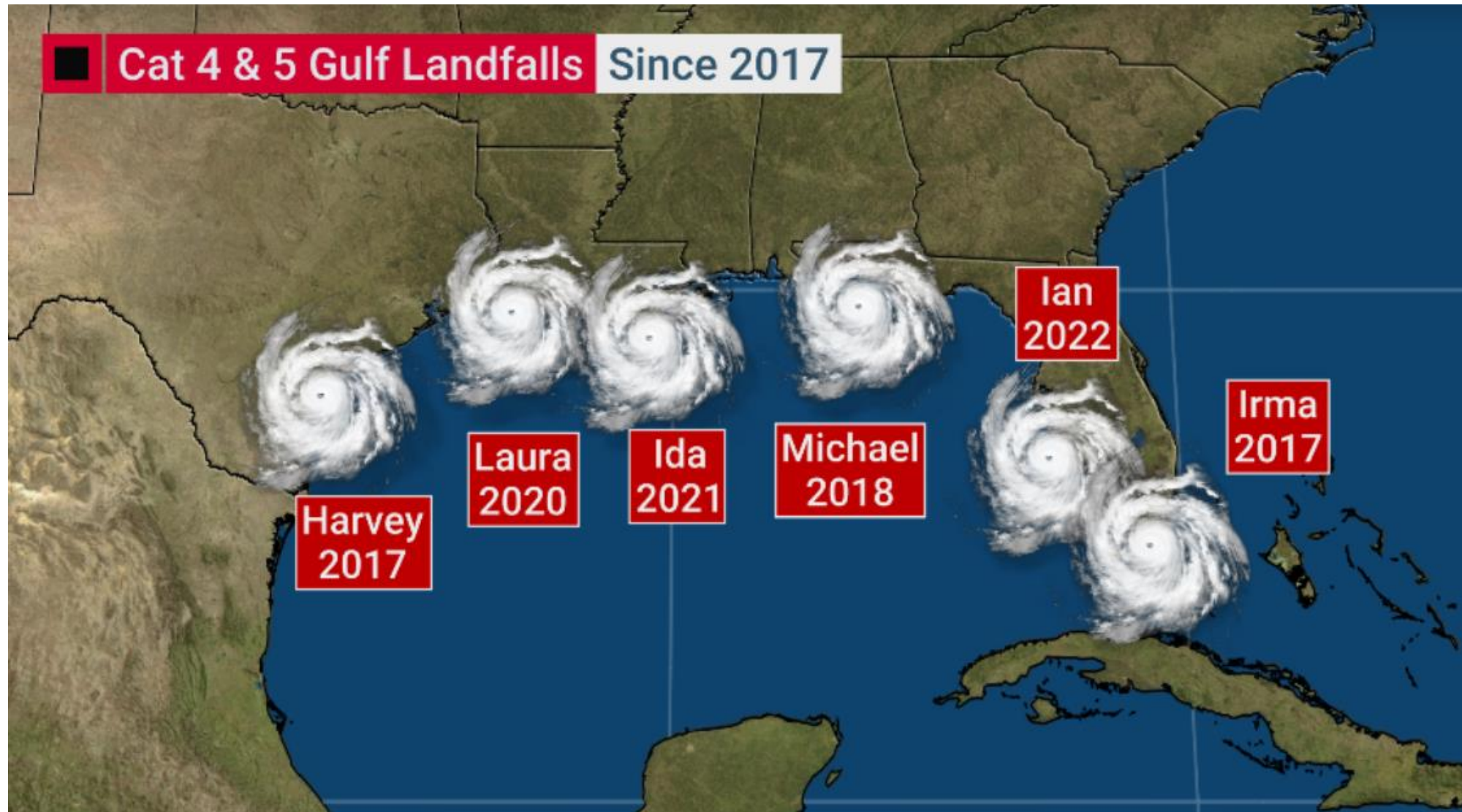


Waves  
and Rip  
Currents



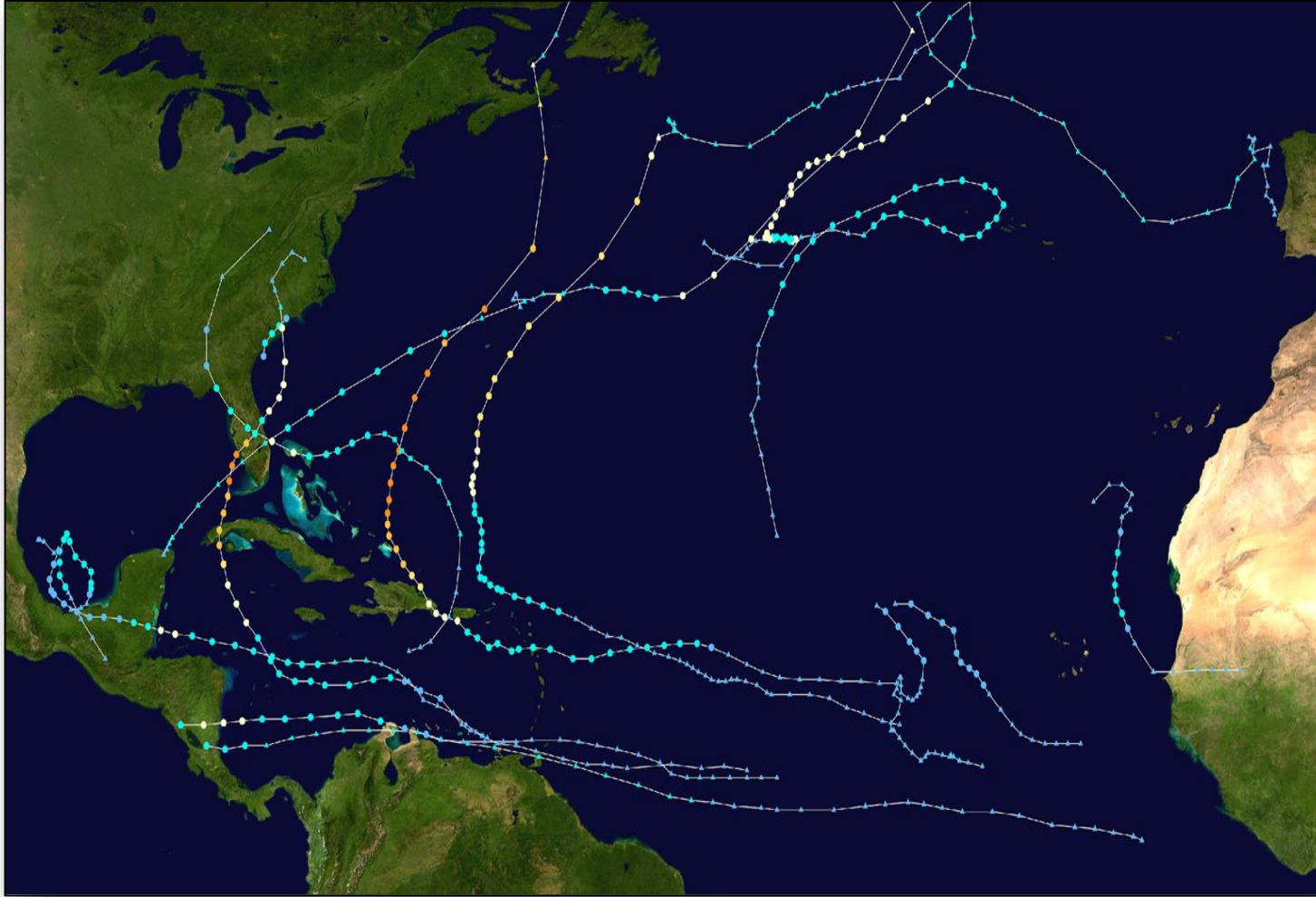
Tornadoes

# Gulf of Mexico: Category 4 and 5 Hurricanes Since 2017





# 2022 Hurricane Season: **It only takes one!**



**Season: June 1 – Nov 30**

First Storm: June 5 (Alex)

Last Storm: Nov 7 (Nicole)

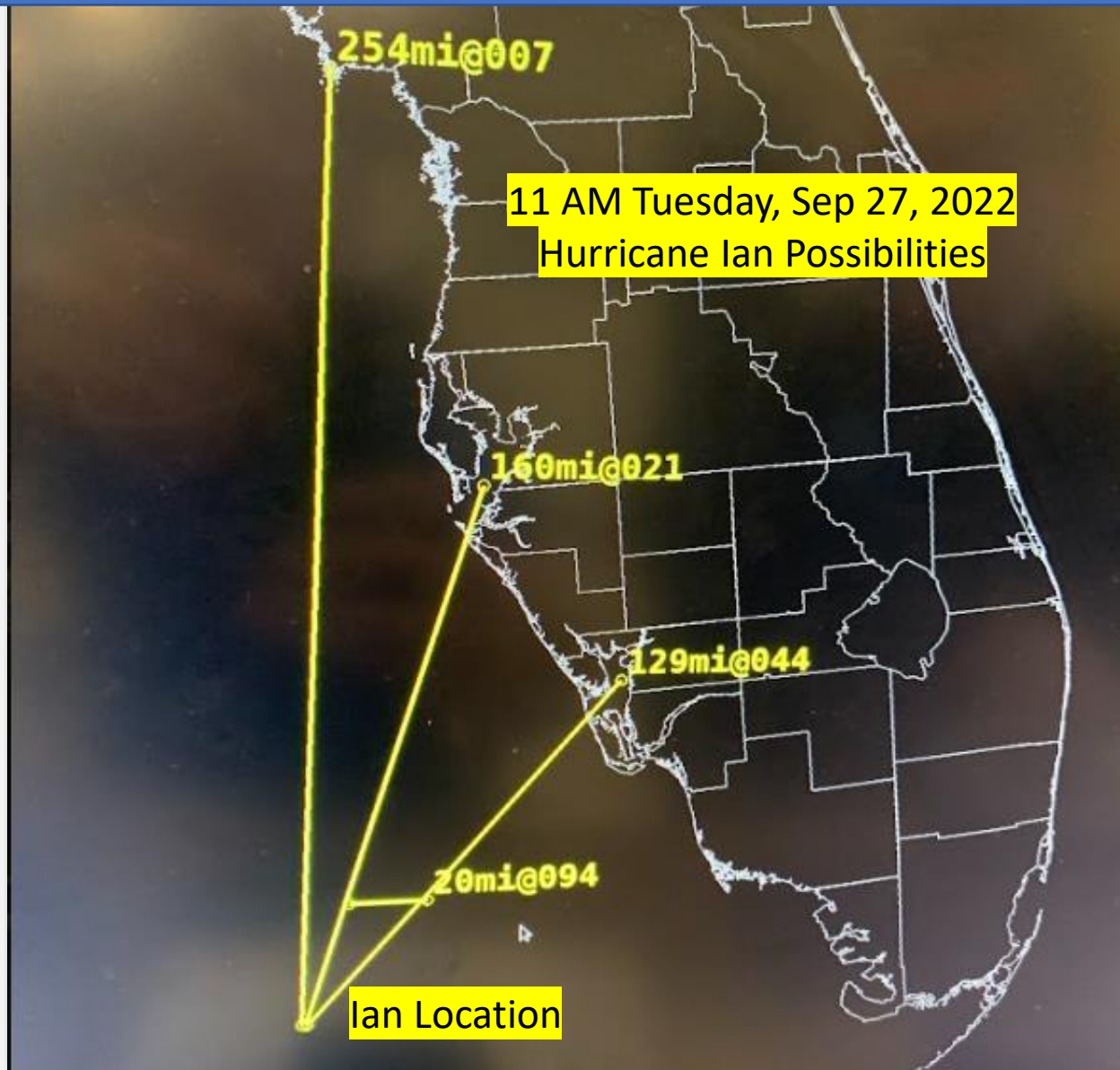
Significant impacts from  
Hurricanes **Ian**, Fiona, **Nicole**.

# Social Science: Who Evacuates

<b>First Out</b> <b>21%</b>	Anxious and eager to leave if a hurricane is in the forecast
<b>Constrained</b> <b>14%</b>	Aware of risks & willing to evacuate but face barriers
<b>Optimists</b> <b>16%</b>	Doubt that a hurricane will occur but willing to evacuate
<b>Reluctant</b> <b>27%</b>	Reluctant to evacuate but will leave if ordered to
<b>Diehards</b> <b>22%</b>	Confident they can safely ride out hurricanes at home

Hurricane Sandy study by Jennifer Marlon, Yale University





Hurricane Ian took about 20 hours for the eyewall to move from Cuba and make landfall Wednesday Afternoon near Punta Gorda in Coya Costa

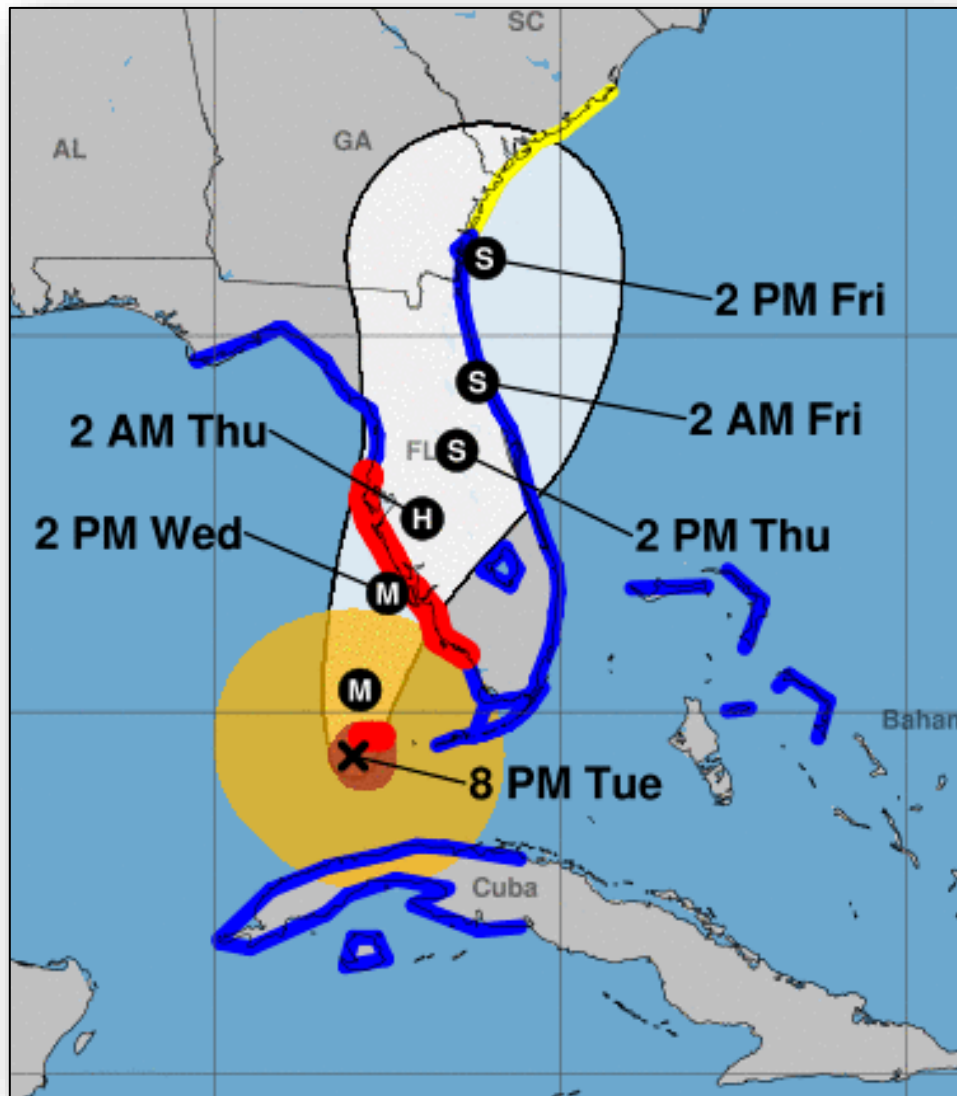
If Ian wobbled west 20 miles:

- Landfall in Tampa Bay in 22 hours
- Storm Surge 5-15 ft from Tampa Bay through Fort Myers
- Highest surge associated with right side of eye wall where winds come onshore

If Hurricane Ian Wobbled West 25 Miles

- Cedar Key landfall in 28 hours

# Be Careful with the Forecast Cone vs Impacts

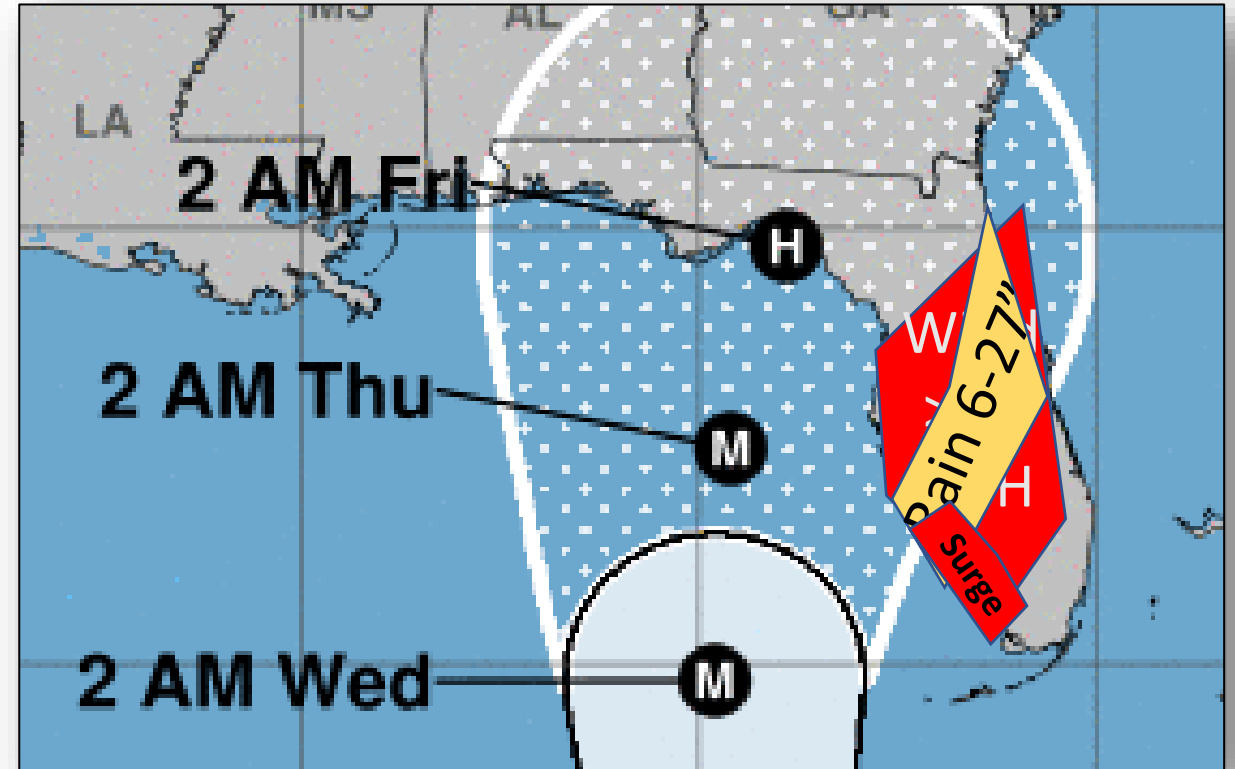
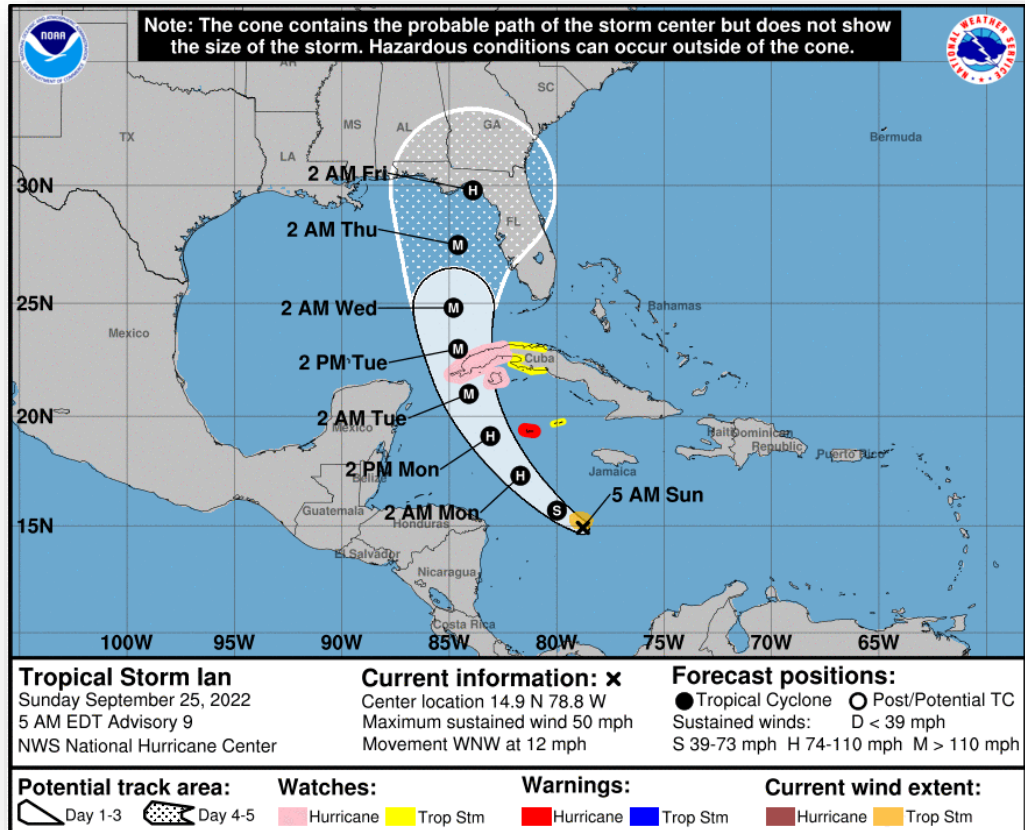


Look how much bigger Ian's wind field was when compared to the cone

Life threatening impacts occur outside the cone

Cone only shows you where center of storm is expected to be

# Be Careful with the Forecast Cone vs Impacts







# Hurricane Ian – 28 September 2022

1:30 – 4:00 PM EDT



[weather.gov/tampa](https://weather.gov/tampa)



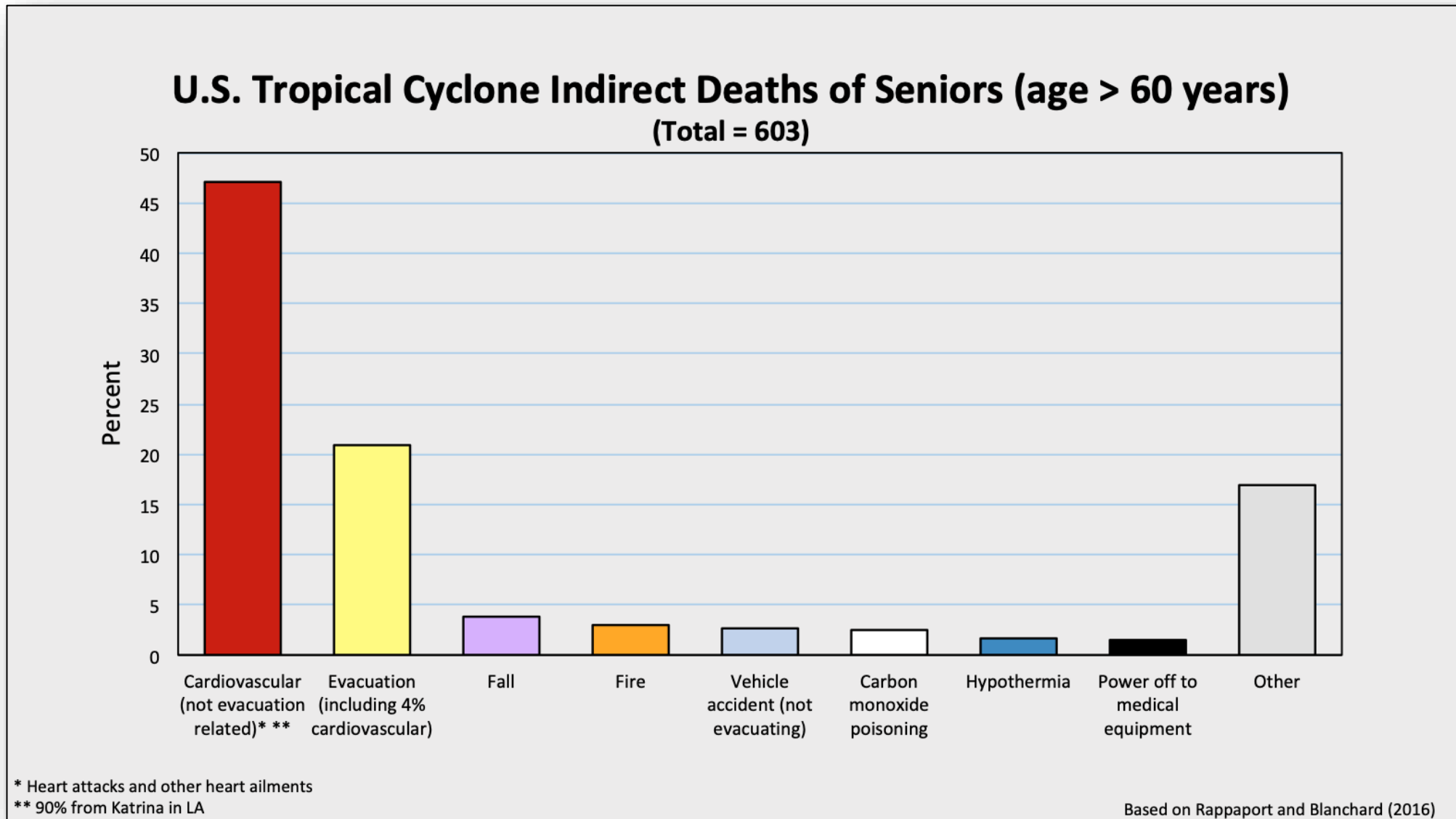
@NWSTampaBay



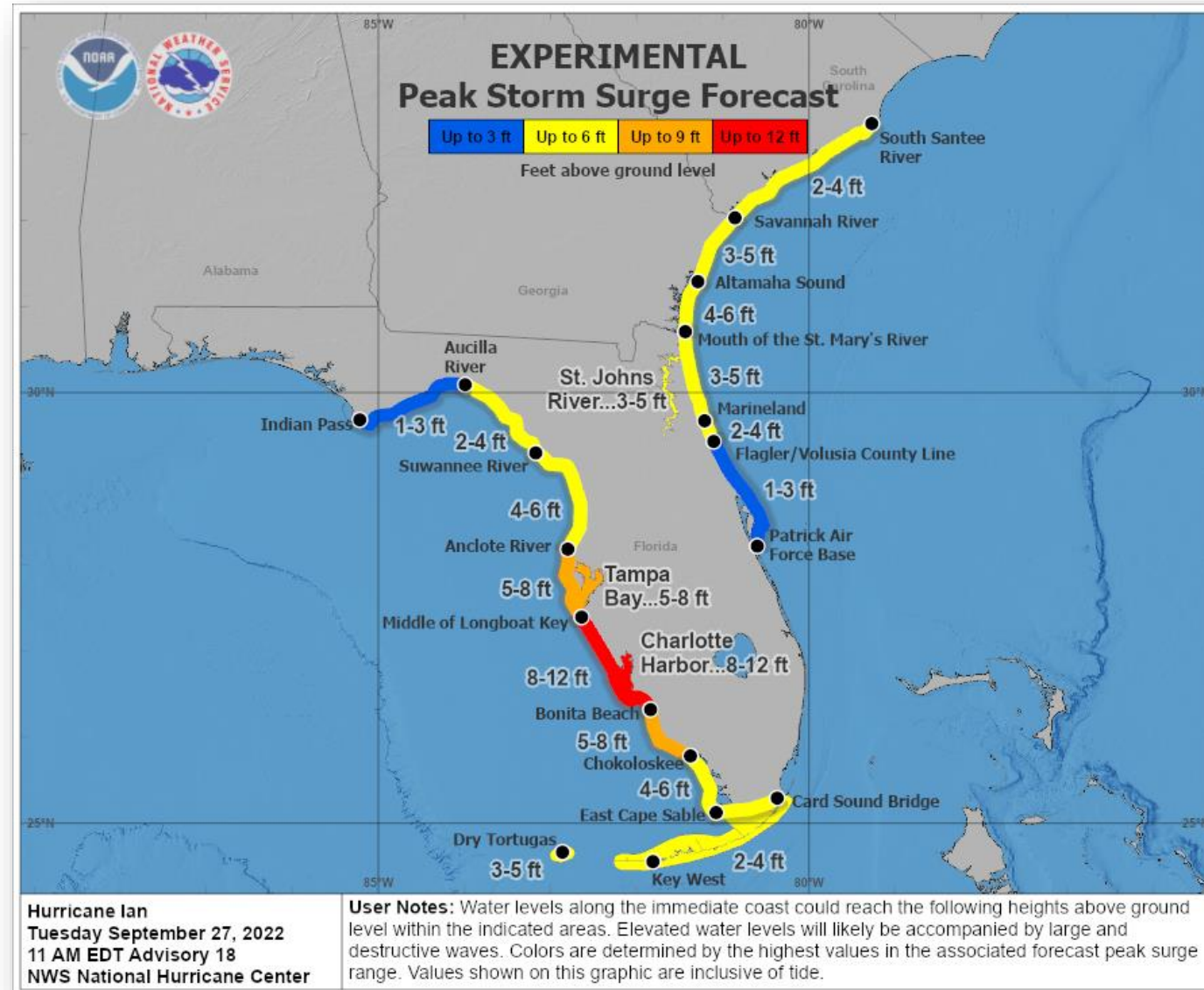
@NWSTampaBay



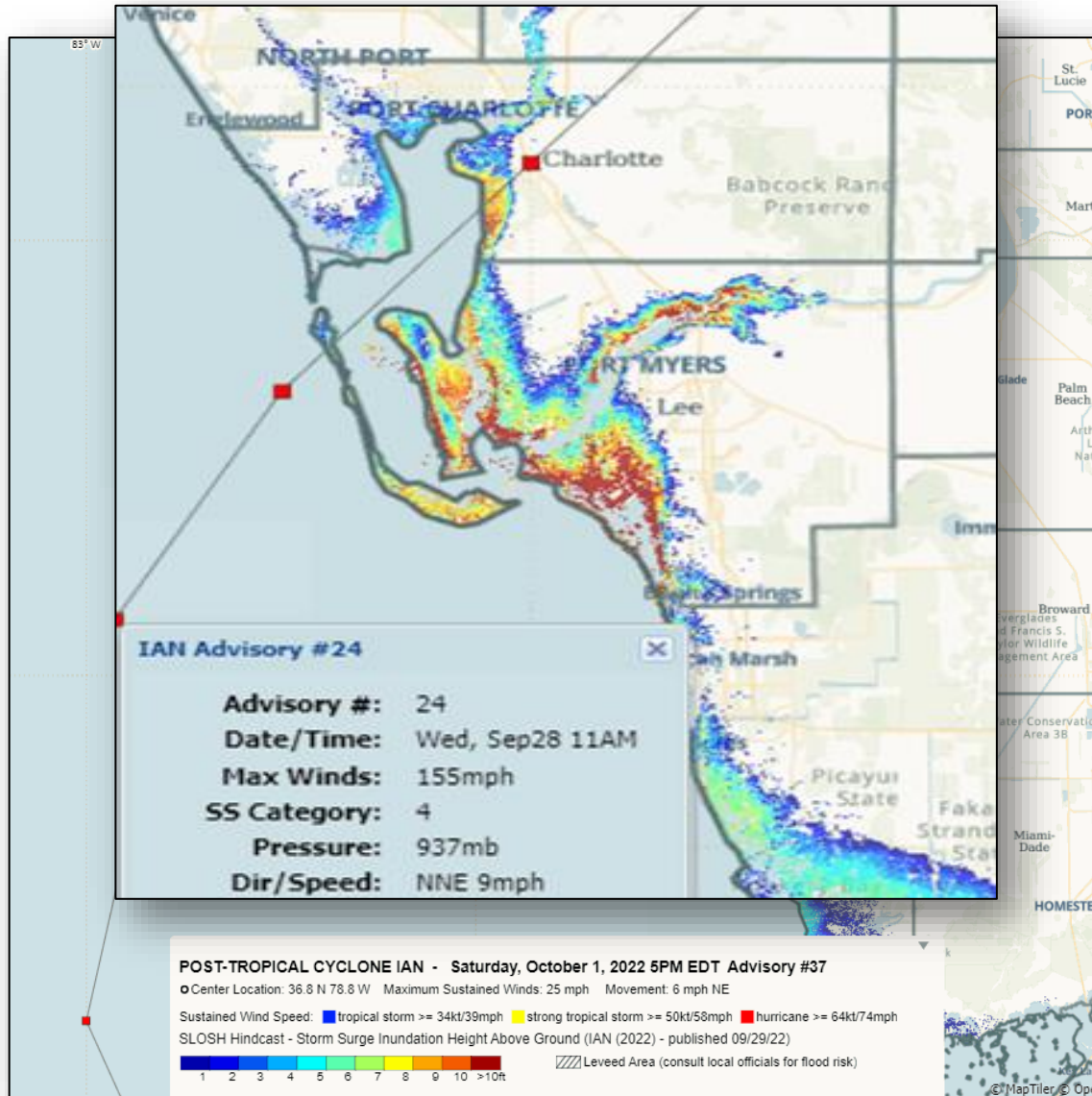
# Leading Cause of Indirect Storm Fatalities



# Surge Forecast 24-27 Hours Before Impact



# 2022 Major Hurricane Ian - Storm Surge



- 6-10 feet water overtopped barrier islands
- Max surge 10 to 15 feet.
  - Structures washed off their foundation at locations where water was *flowing* over the barrier islands
  - Structures flooded with salt water on the inland side of the intercoastal
- Tides were 4-7 feet below normal north of the eye wall

# What is the Risk?

Storm surge is the abnormal rise of water generated by storm's winds. This hazard is historically the leading cause of hurricane related deaths in the U.S. Storm surge and large battering waves can result in large loss of life and cause massive destruction along the coast.

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Above ground level describes the water level of the flooding that moves inland due to the combined effect of storm surge and tide.



NATIONAL WEATHER SERVICE  
WEATHER FORECAST OFFICE  
TAMPA BAY, FL

Greater than 9 feet above ground.....

6 to 9 feet above ground.....

3 to 6 feet above ground.....

1 to 3 feet above ground.....



# Another Surge Wave Making the Surge Higher



# This is a Road



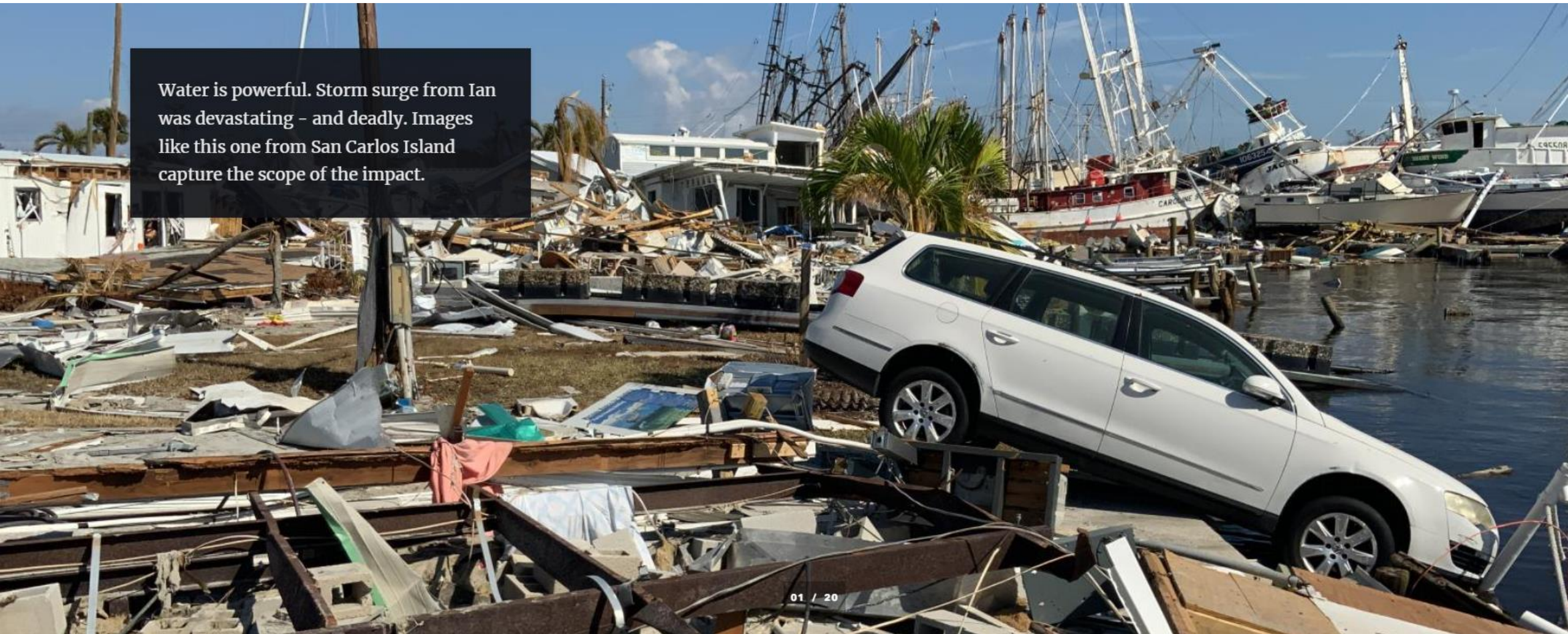
If the surge is about to flood your neighborhood, it is too late to leave safely

Flooding happens fast. One minute a dry road, the next minute it looks like this



# Hurricane Ian: The Power of Moving Water

Water is powerful. Storm surge from Ian was devastating – and deadly. Images like this one from San Carlos Island capture the scope of the impact.



01 / 20



# 2022 Major Hurricane Ian - Impact



 **Casey Shannon**  
1d · 🌐

I took this earlier today, around 4:30. This is highway 70 looking south east over the train tracks coming into Arcadia. I took some video too but I don't have a battery big enough to upload it over a mobile Hotspot. This is the highest I've ever seen the river...

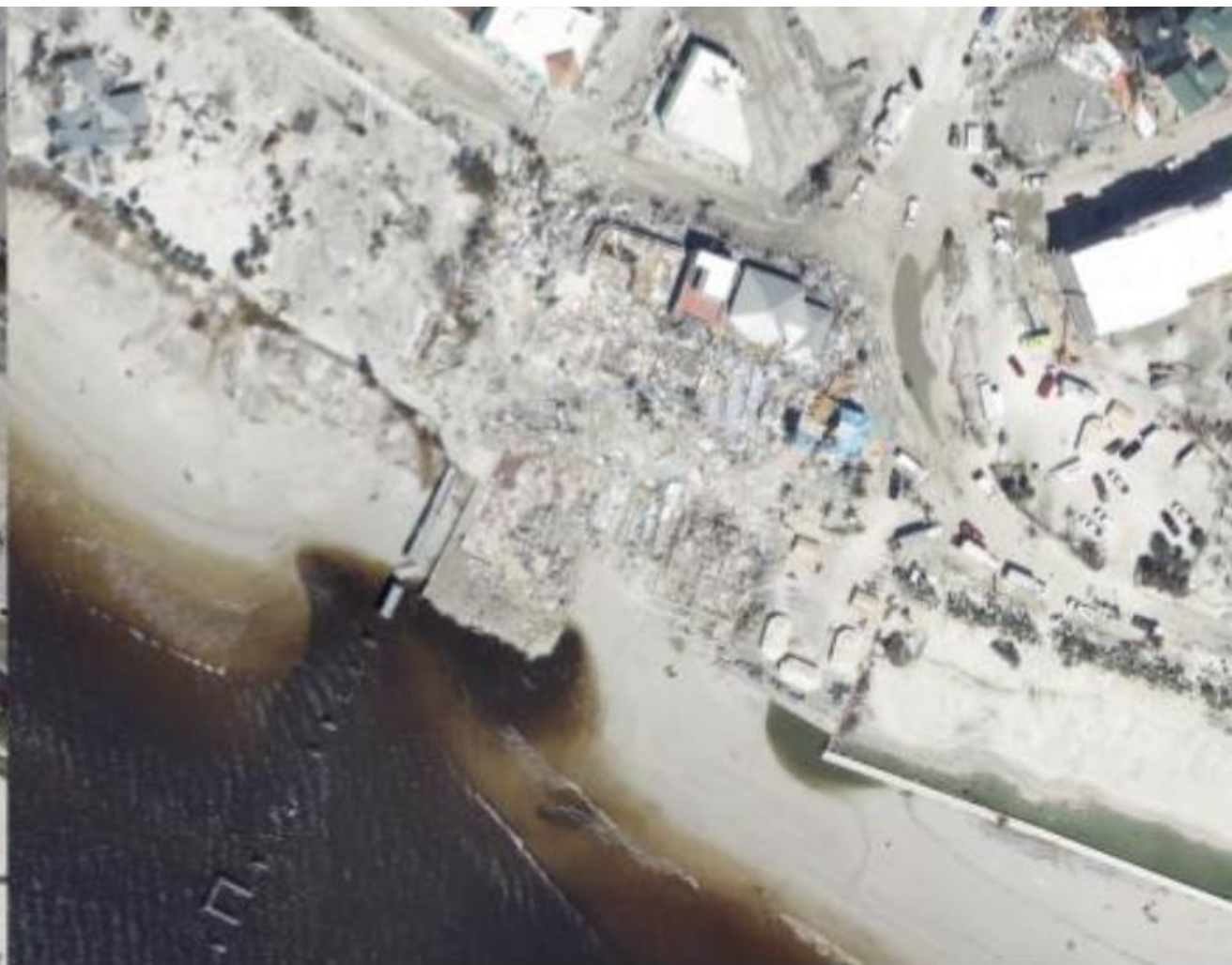


👍👍👍 6 2 shares

👍 Like    💬 Comment    ➦ Share



# Before & After: Time Square, Fort Myers Beach









# Naples & Naples Airport during 2022 Hurricane Ian







Max storm surge height

Water mark inside building above door on Fort Myers Beach



This is the storm surge +/- tide height. Add wave action on top of this



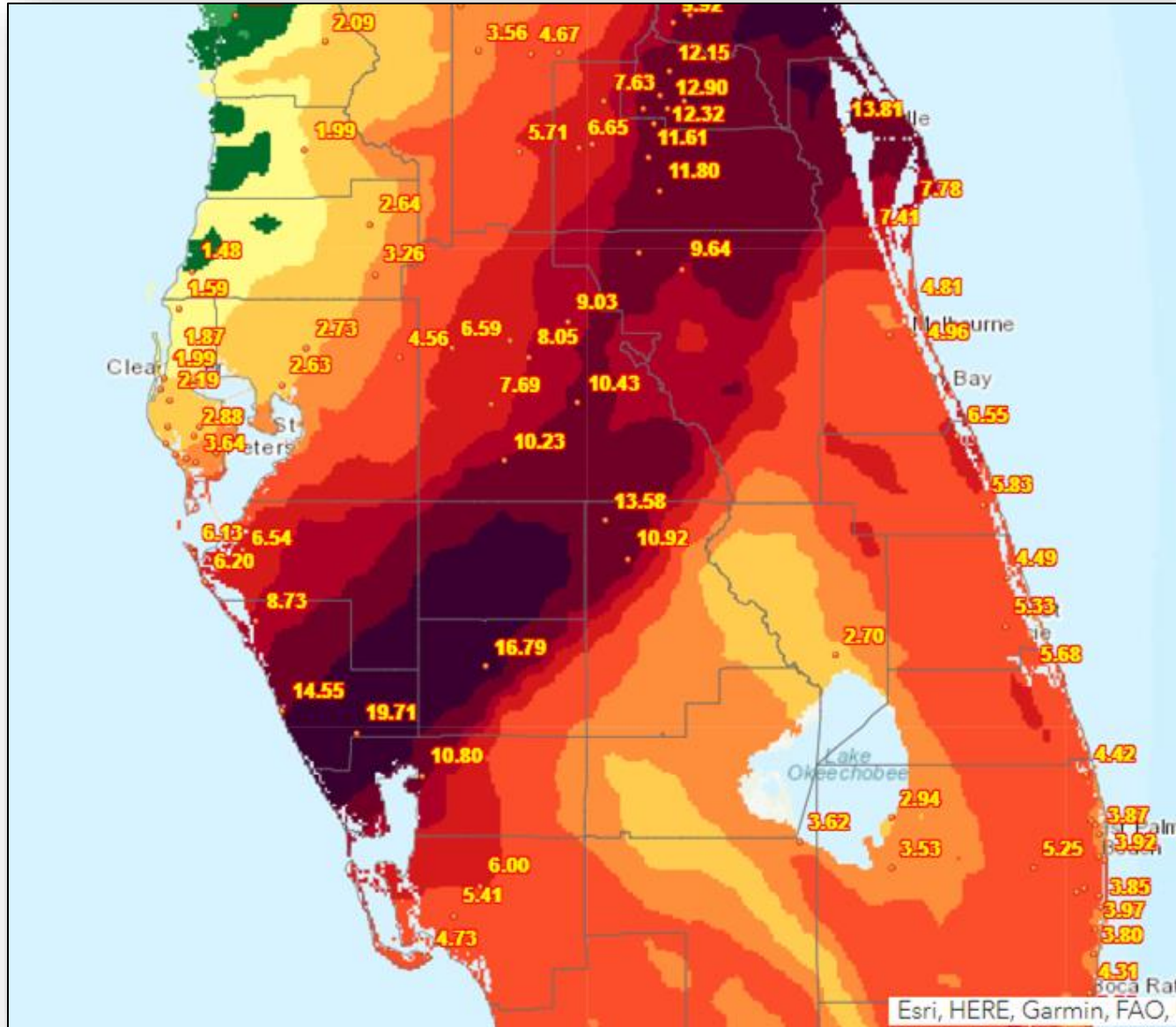
# Hurricane Ian: The People and Their Stories





Flooding from heavy rain is the second leading cause of fatalities in a tropical cyclone

# 2022 Major Hurricane Ian - Rain



C. STORM TOTAL RAINFALL FROM 1200 UTC SEP 27 UNTIL 1200 UTC SEP 30

CITY/TOWN LAT LON DEG DECIMAL	COUNTY	ID	RAINFALL (IN)
1 NNW GROVE CITY 26.93 -82.33	CHARLOTTE	25056	26.95
1 NW CHARLOTTE BEACH 26.94 -82.22	CHARLOTTE	25218	22.97
3 NE NORTH PORT 27.08 -82.15	SARASOTA	25835	21.45
2 S ZOLFO SPRINGS 27.46 -81.80	HARDEE	25195	20.13
3 E ZOLFO SPRINGS 27.50 -81.75	HARDEE	25172	19.97
10 WSW PINE LEVEL 27.19 -82.13	SARASOTA	25603	19.83

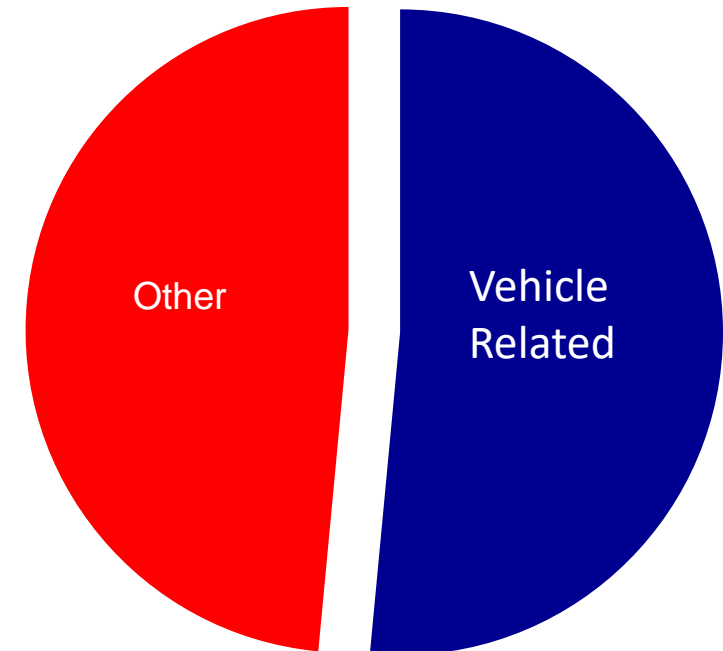
# 2016-2018 Water Continues to Kill

**More than half the U.S. tropical cyclone water-related fatalities were vehicle related!**



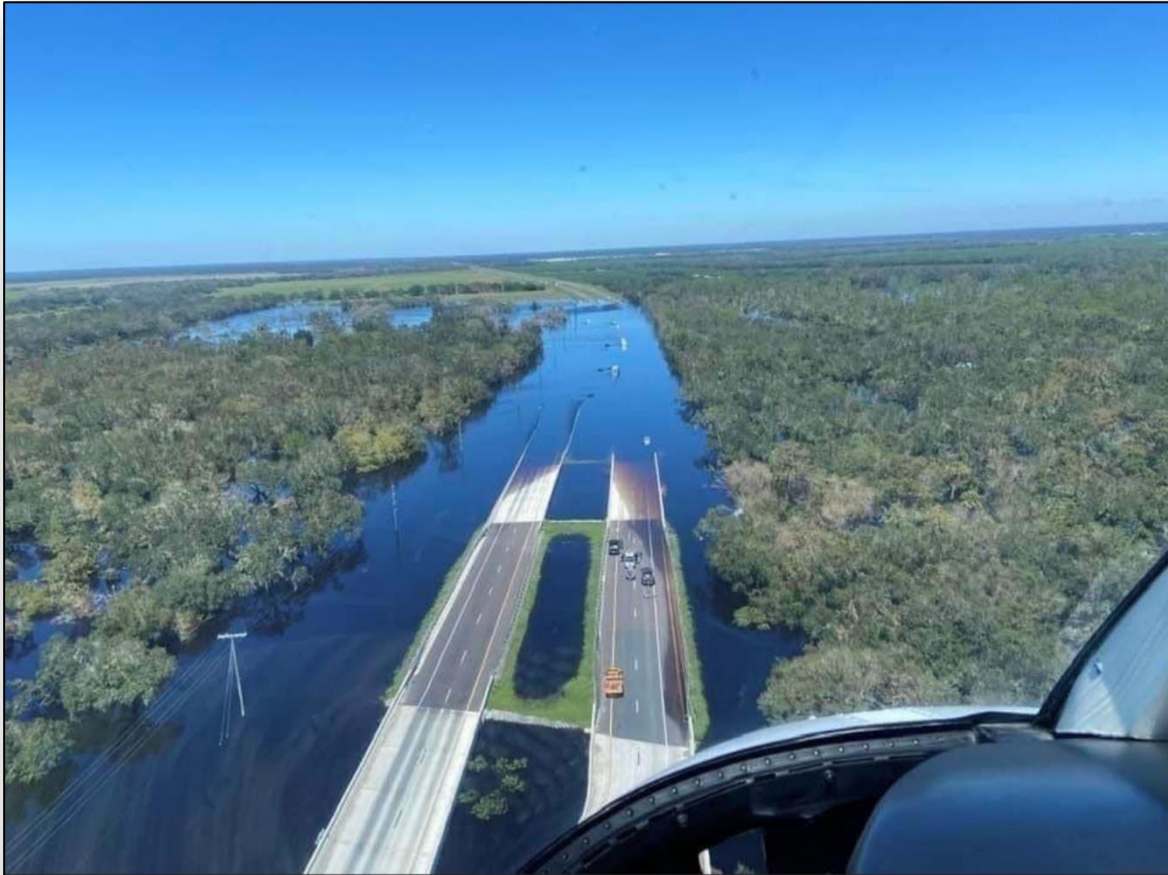
DeSoto County after 2022 Hurricane Ian

2016-18 U.S. Tropical Cyclone  
Water Related Fatalities





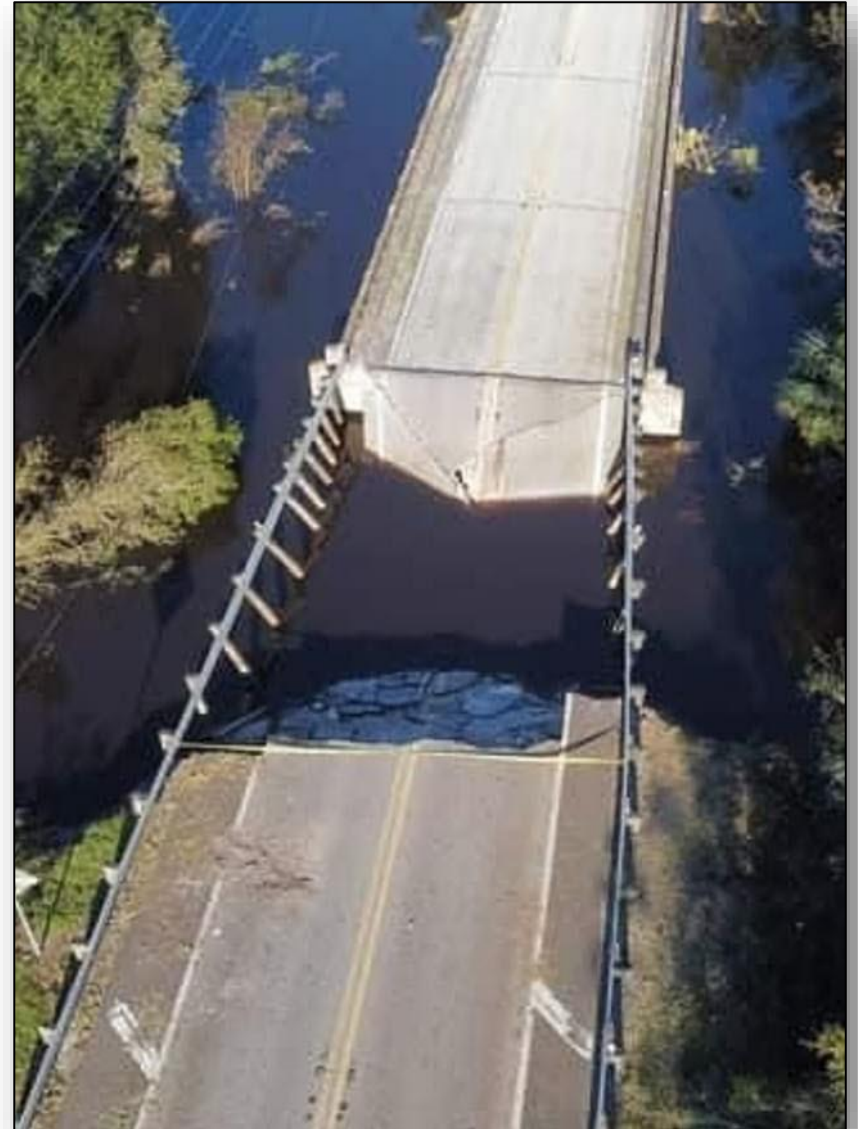
# Flooding from Heavy Rain is #2 Hurricane Threat



**Wayne Sallade**

5h · 🌐

Gee, you wondering why U.S. 17 South is closed and probably will be for some time?





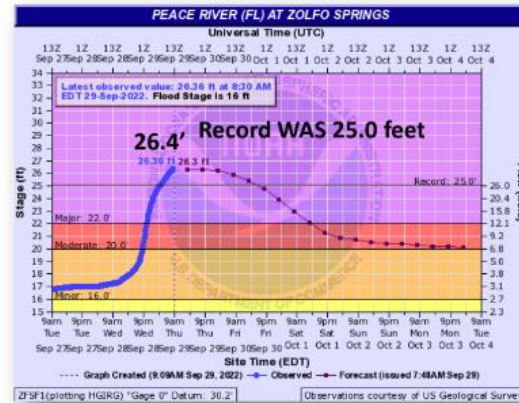
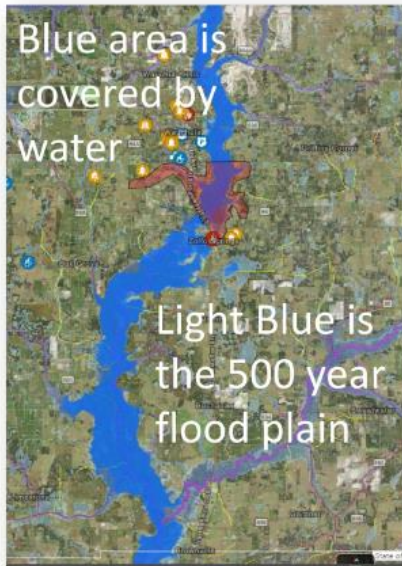




# Flood Inundation Modeling for Rivers



## Flood Inundation Modeling – Peace River Zolfo Springs

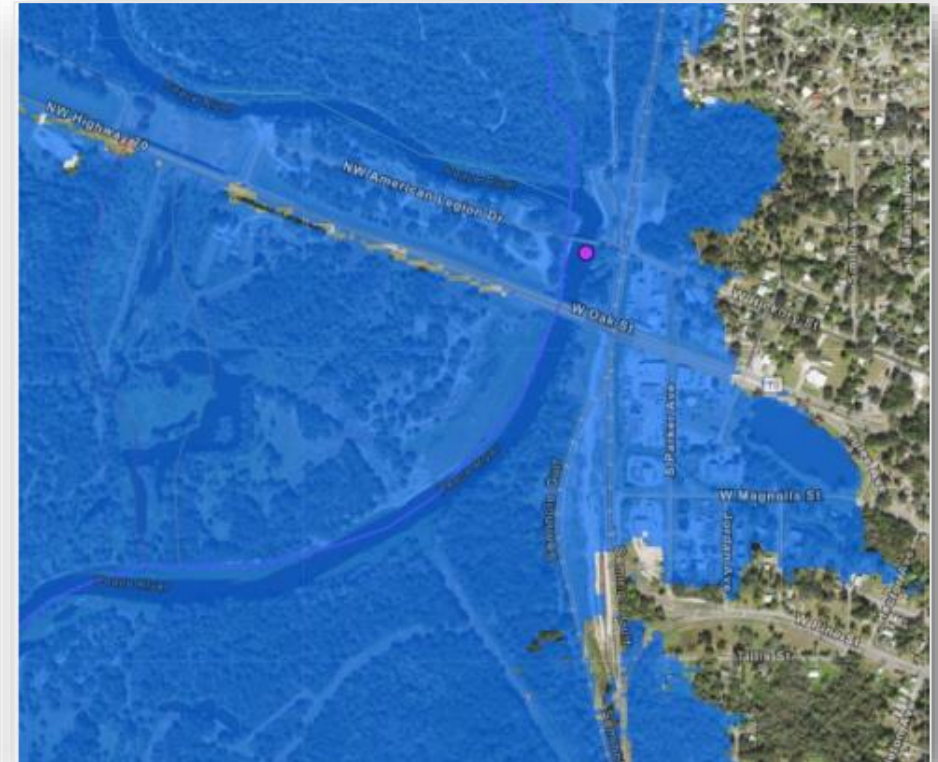


Remain in Major Flood until Saturday Evening, then remaining in Moderate Flood Through Tuesday

[View All River Stages and Forecasts](#)

Last Updated: 9/29/2022 11:56 AM

National Weather Service – Tampa Bay



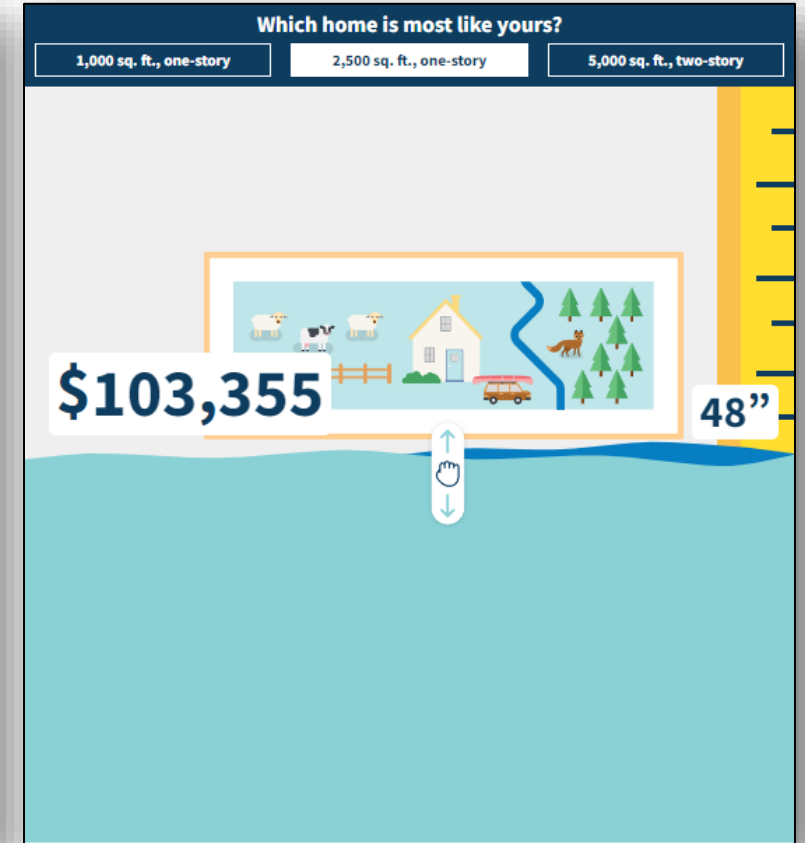
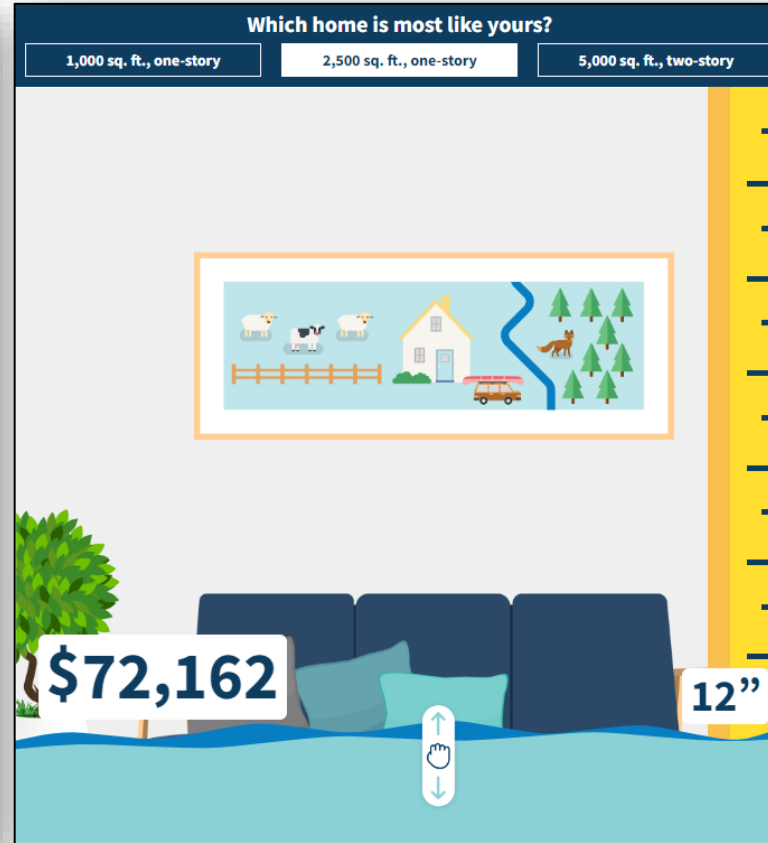
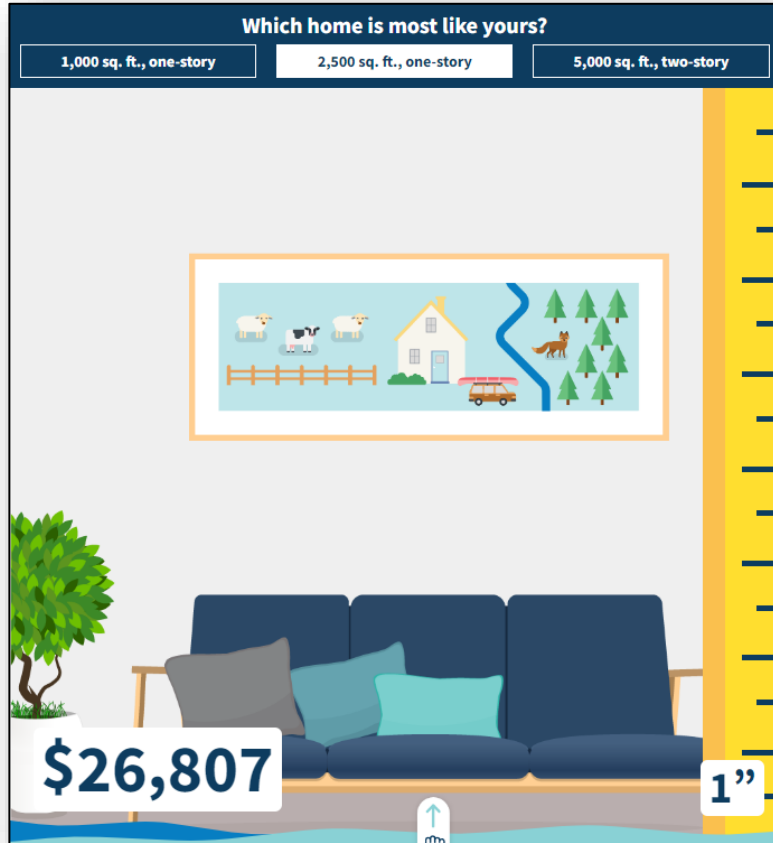
# 2012 Tropical Storm Debby – Hernando County



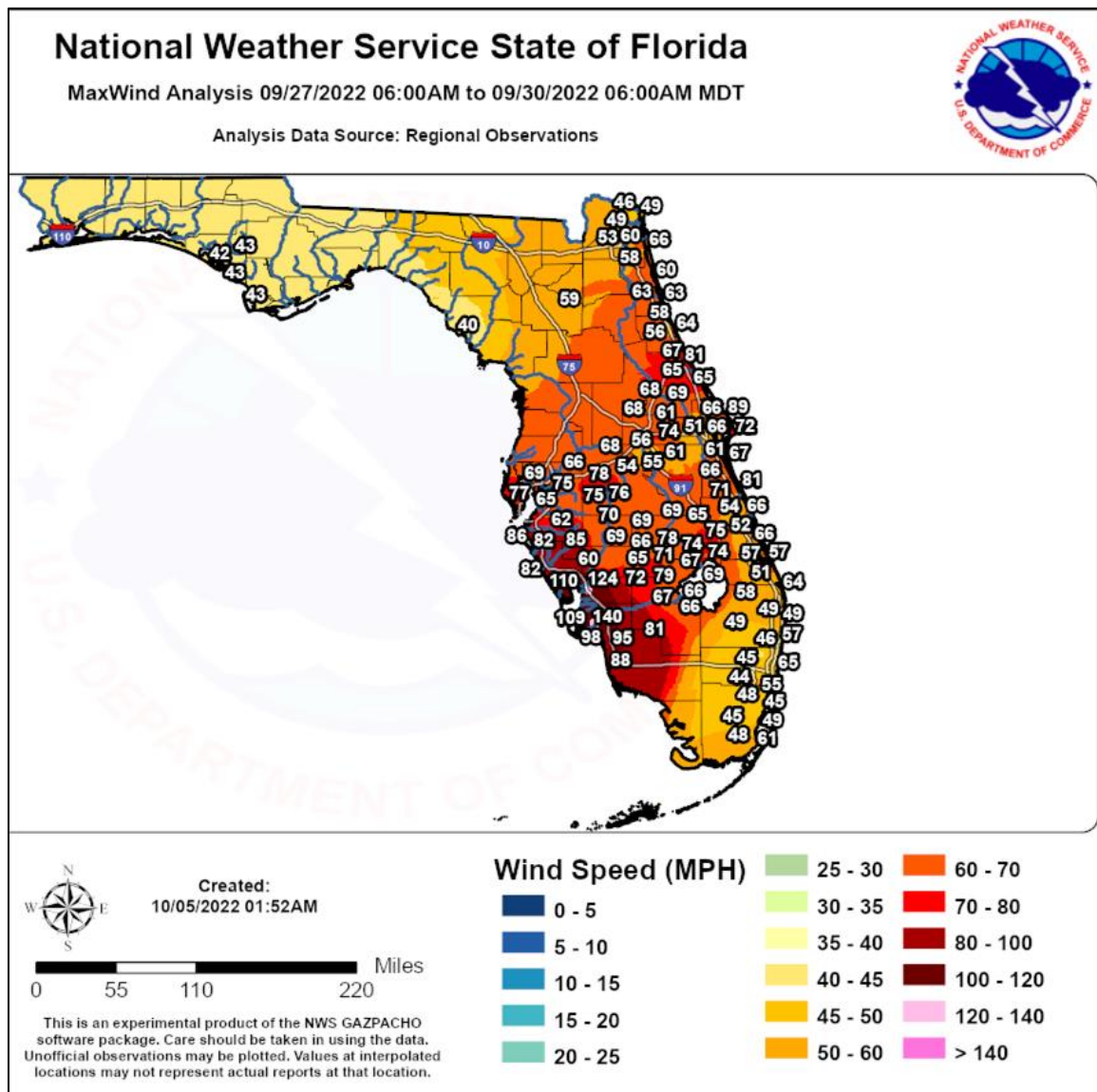
Sun Coast Parkway Closed for 7 Days



# Consider Flood Insurance, Even if not Required



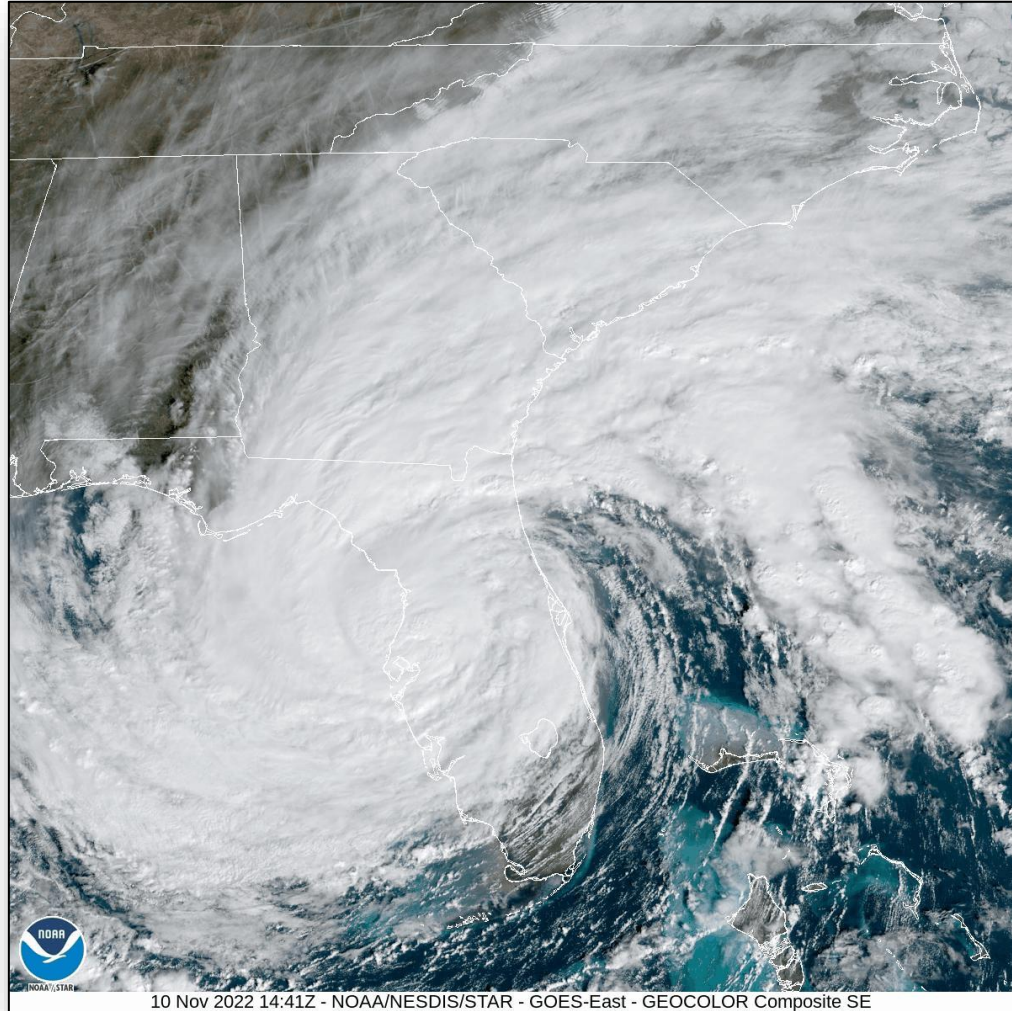
# 2022 Major Hurricane Ian – Max Wind Gust



- Landfall is when the *center* of the eye wall crosses the beach
- Landfall at Cayo Costa - 305 PM EDT Wed Sep 28, 2022
  - CAT 4, 150 mph, 940 mb
- Max Recorded Wind over land
  - 140 mph in Cape Coral
  - 135 MPH in Punta Gorda



# Hurricane Ian Wind Damage



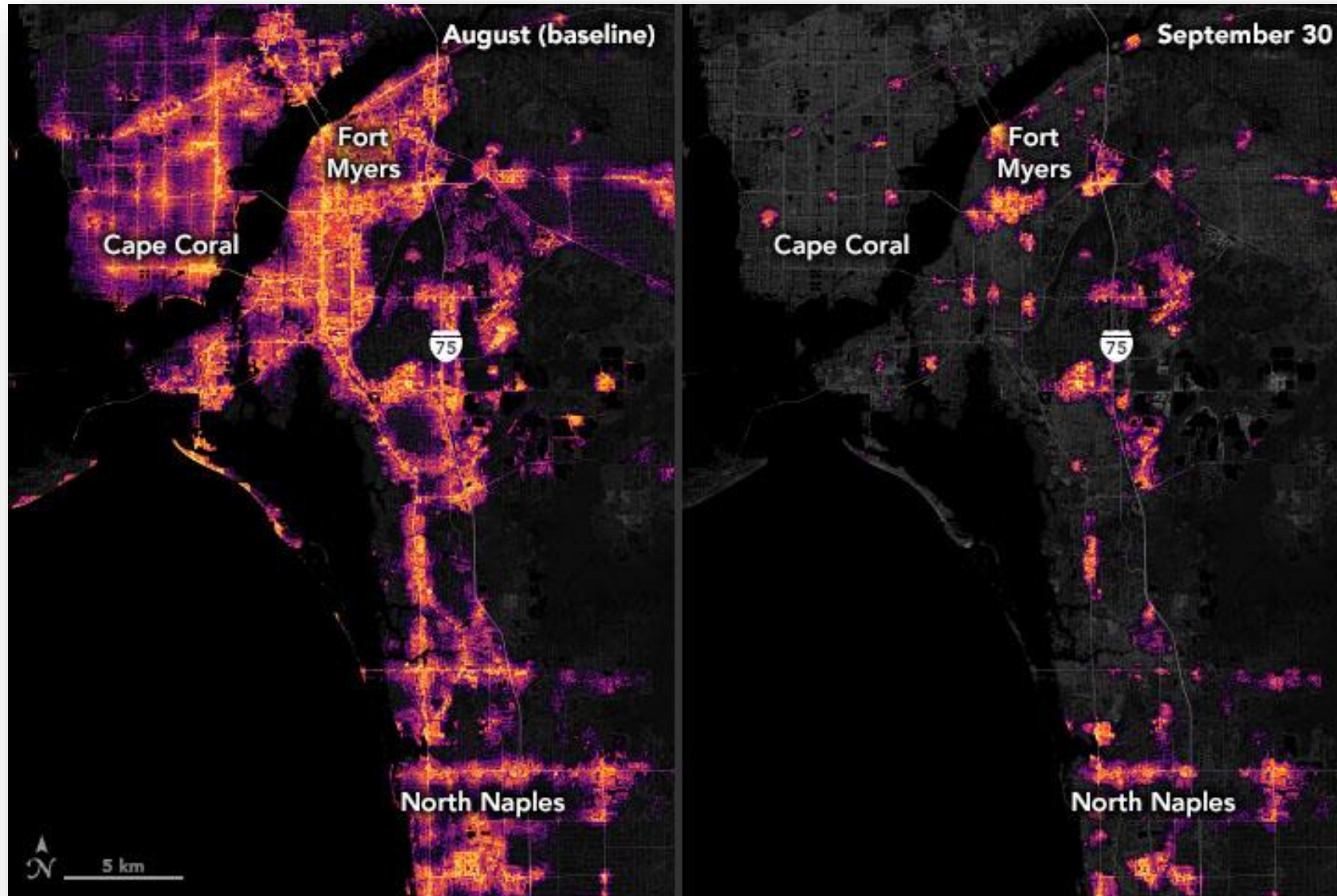


# 2017 Hurricane Irma - Falling Trees and Power Outages



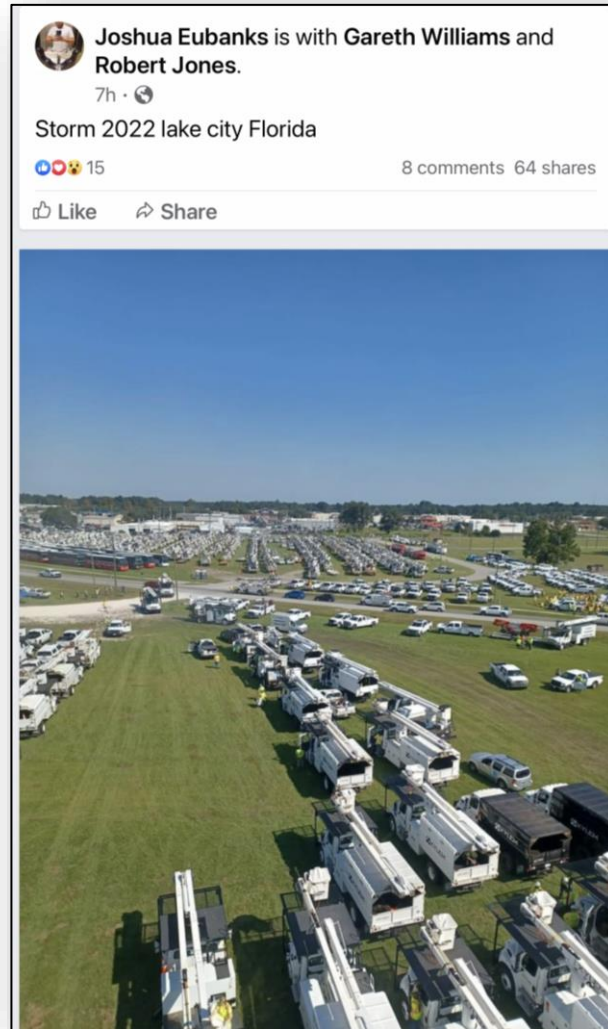


# Power Outages After Hurricane Ian



Unofficial estimate of  
2.7 million without  
power on Sep 29, 2022

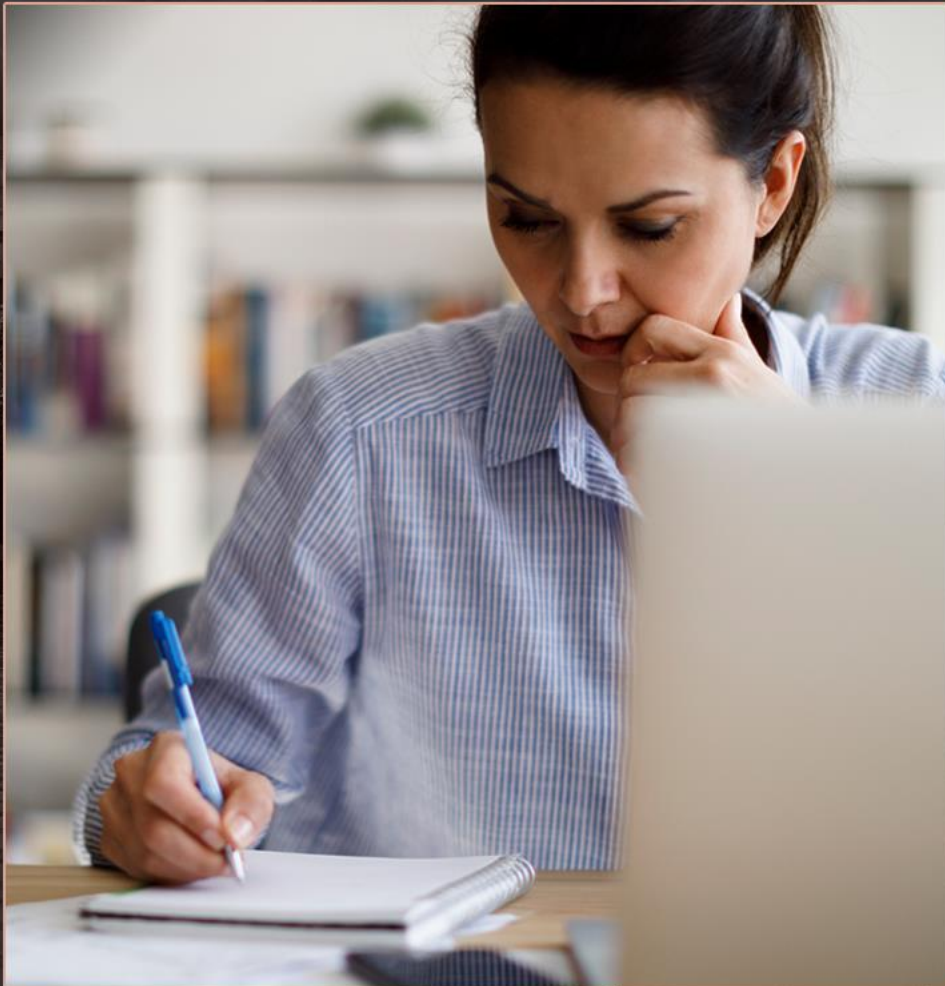
# Recovery





*Hurricane Preparedness*

# Complete a Written Plan



Have a  
contact list



Keep critical  
documents  
together for  
quick access



Have at least  
one contact  
outside of the  
impact area



Share your  
plan

<https://www.ready.gov>

weather.gov





# Hurricane Preparedness

## ASSEMBLE DISASTER SUPPLIES



Make a list of supplies and assemble them before hurricane season begins. Have enough food and water for each person for at least three days. Fill your prescriptions and have medicine on hand. Radios, batteries and phone chargers are also must-haves. Gas up your vehicle and have cash on hand.



Food & water



Medicine & prescriptions



Keep gas tank full



Radio, batteries, phone chargers



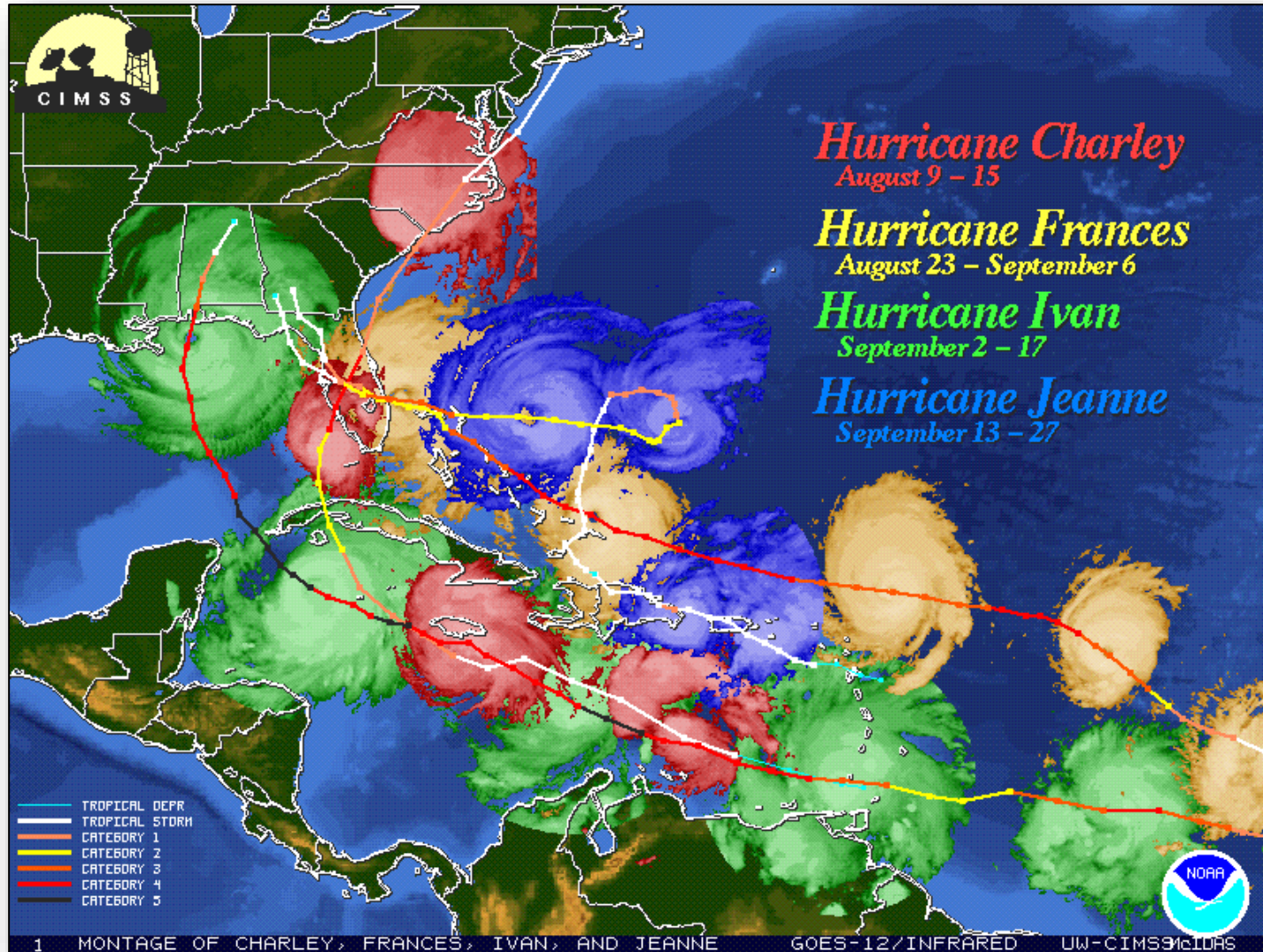
Cash on hand

[weather.gov/hurricane](https://weather.gov/hurricane)





Questions or Comments? Email [Daniel.Noah@noaa.gov](mailto:Daniel.Noah@noaa.gov)



<https://weather.gov/tampa>

<https://radar.weather.gov>

<https://weather.gov/forecastpoints>

<https://weather.gov/wrn>



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