Hurricane Preparedness

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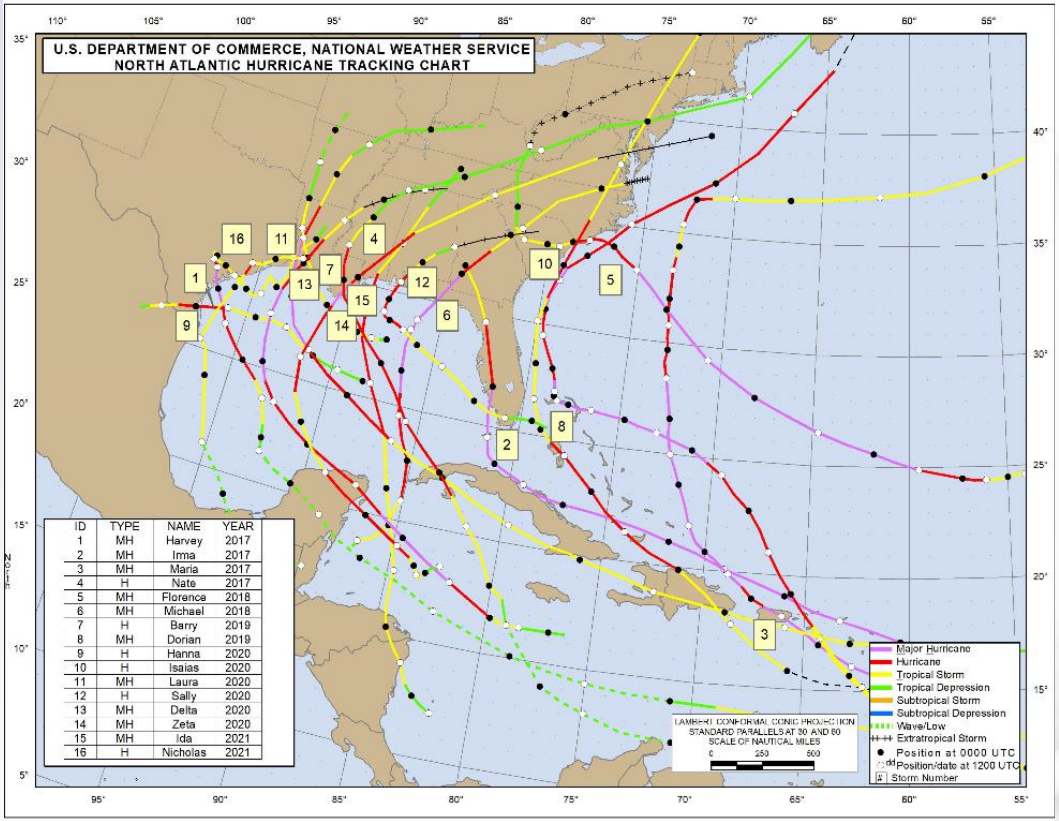
NOAA/National Weather Service
Preparedness & Resilience Lead

It Has Been BUSY

U.S. Landfalling Hurricanes 2017-2021



From 2017-2021:

Estimated Total U.S. Damage:

$320 Billion

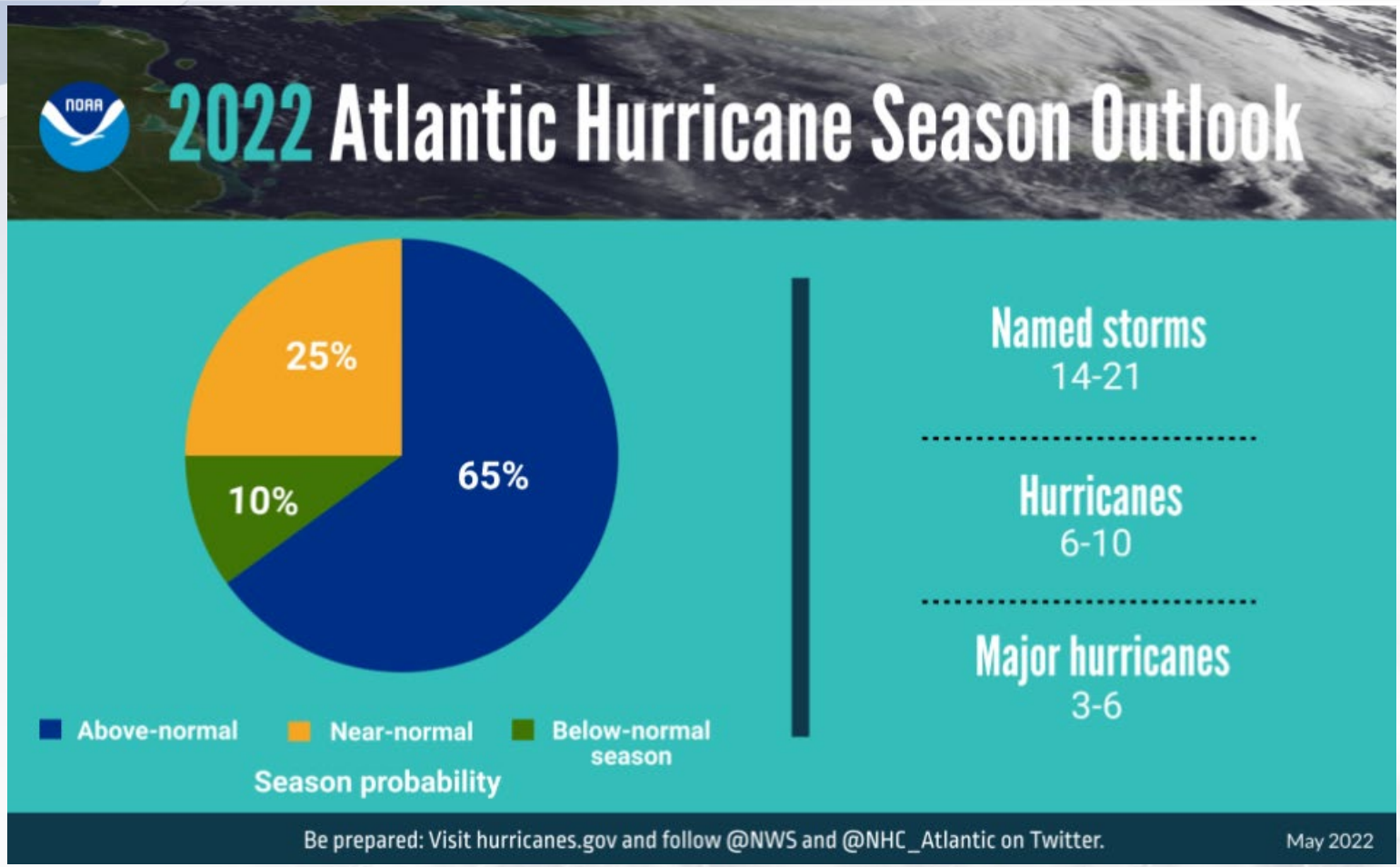
Number of billion dollar storms:

18

Number of 10 billion dollar storms:

7

(Hurricane Ida: $75.25 billion)



"It only takes one."

2022 National Hurricane Preparedness Week

www.noaa.gov/hurricane-prep

Let’s focus on…

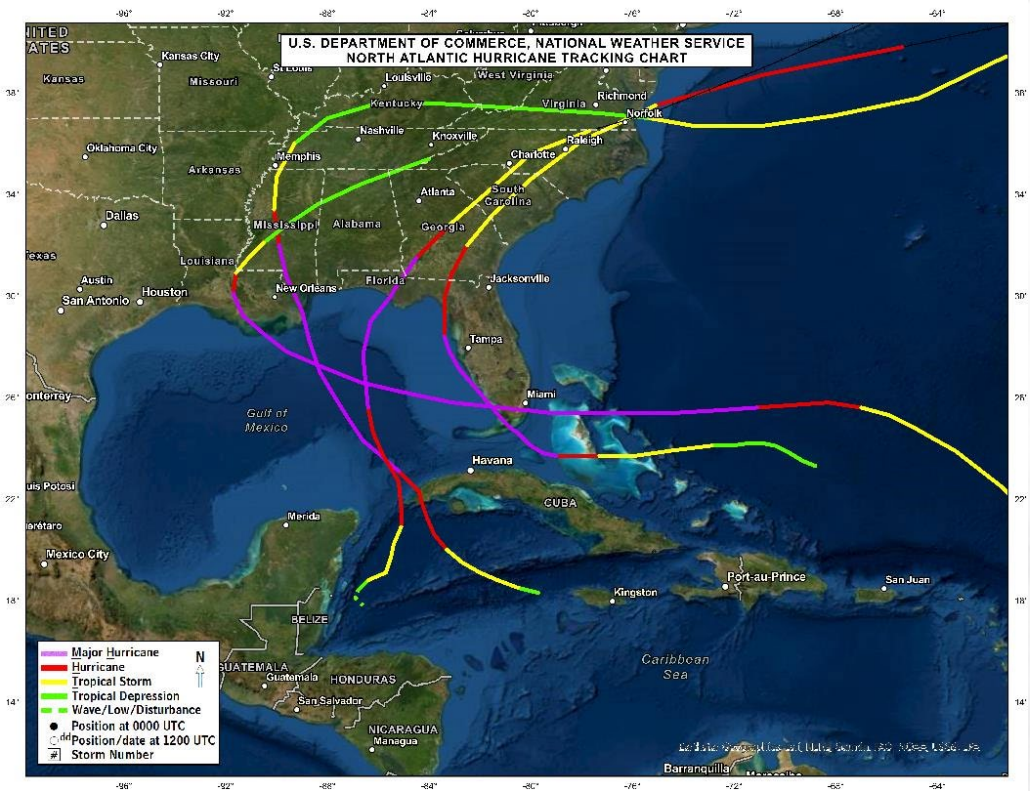
Real life “gotchas”

1. Hurricanes don’t care about your timelines

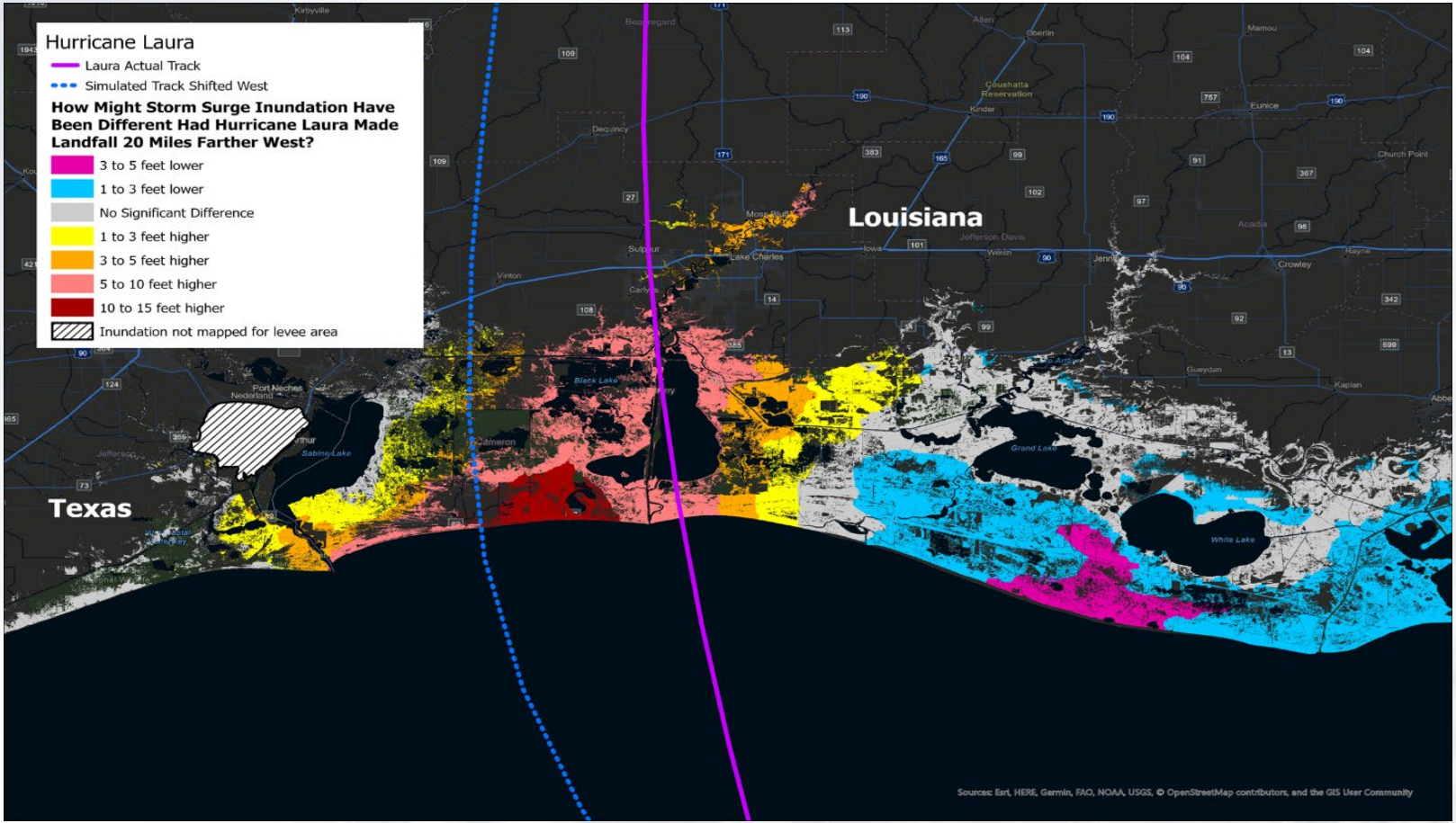
The Nation’s Strongest - Category 5 Hurricanes All Tropical Storms 3 Days Before Landfall

U.S. Category 5s

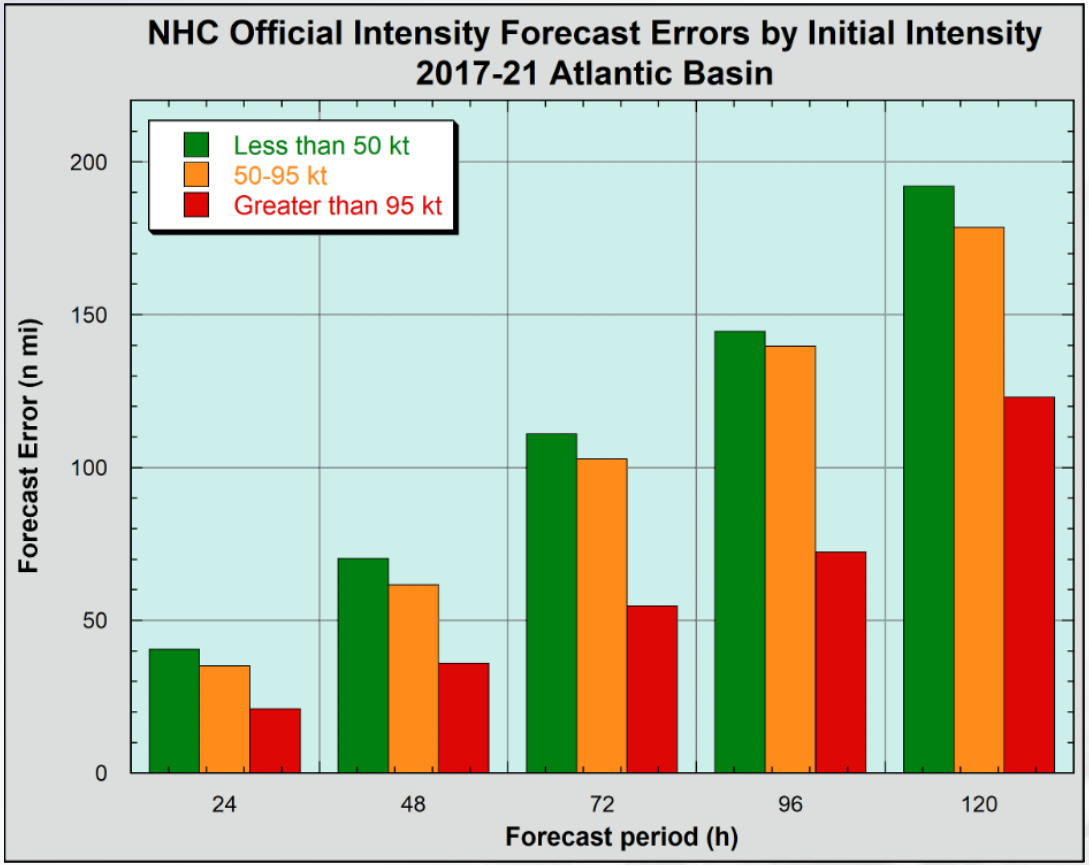
1935 – Labor Day
1969 – Camille
1992 – Andrew
2018 – Michael



2. Little Wiggles Matter

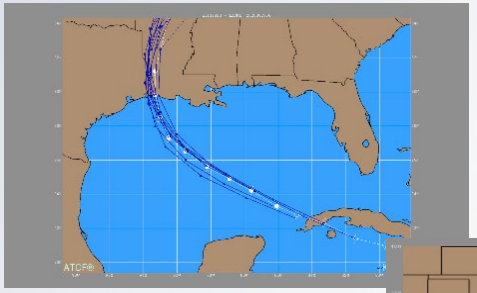


3. Every Storm is Different

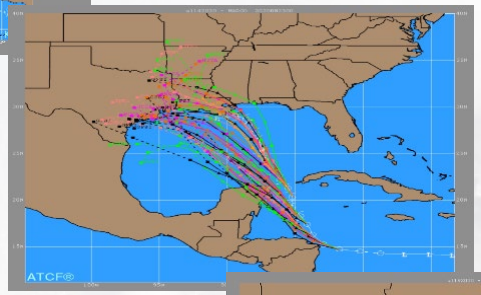


As the initial intensity of the storm increases, NHC average track error gets smaller!

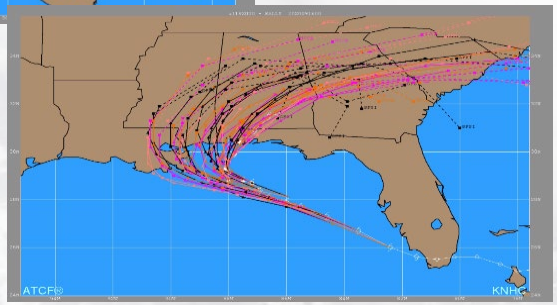
3. Every Storm is Different



Laura



Marco

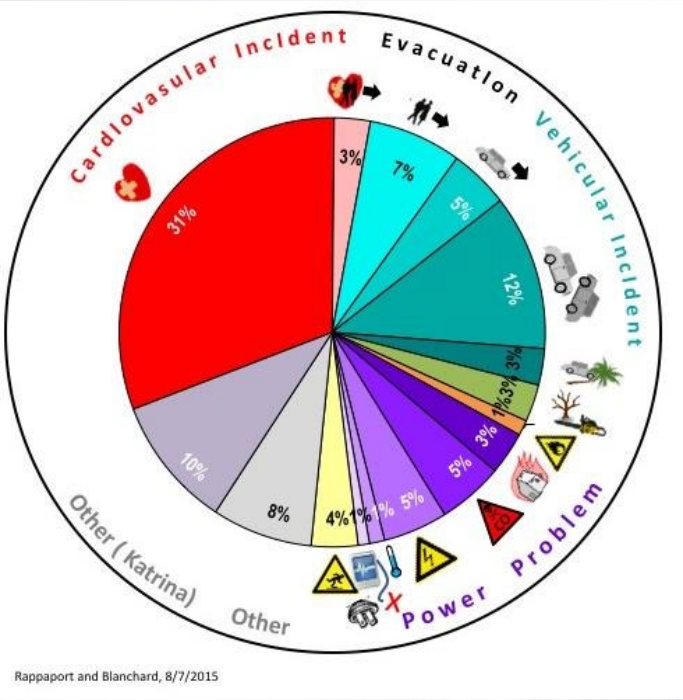


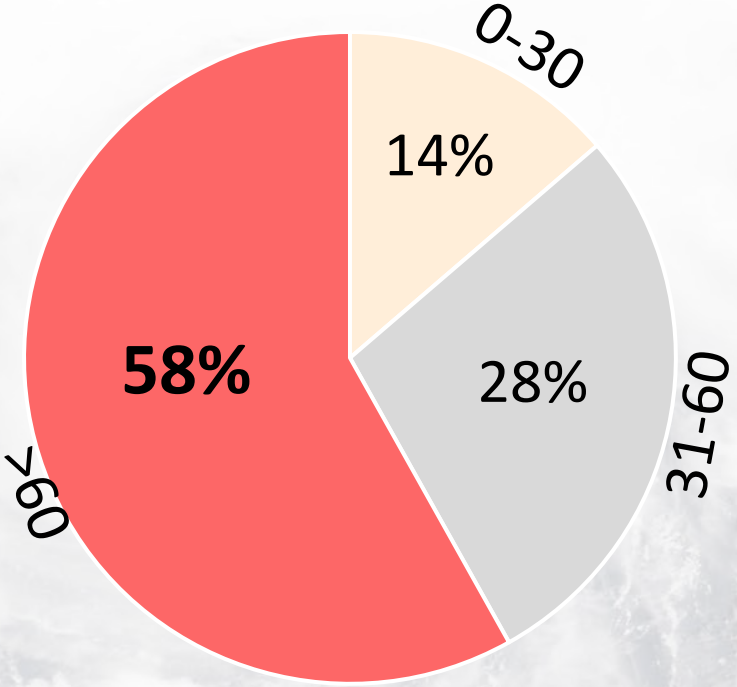
Sally

Other factors come into play; interaction with other storms, forward speed, wind shear, eyewall structure, and confidence in weather patterns

4. Indirect Fatalities

"The storm is past me, I'm safe now"





1963-2012 indirect deaths (heart attacks, power problems (e.g., no A/C, lights, medical equipment), etc.). Outnumber direct deaths in some storms.

Based on Rappaport and Blanchard 2016

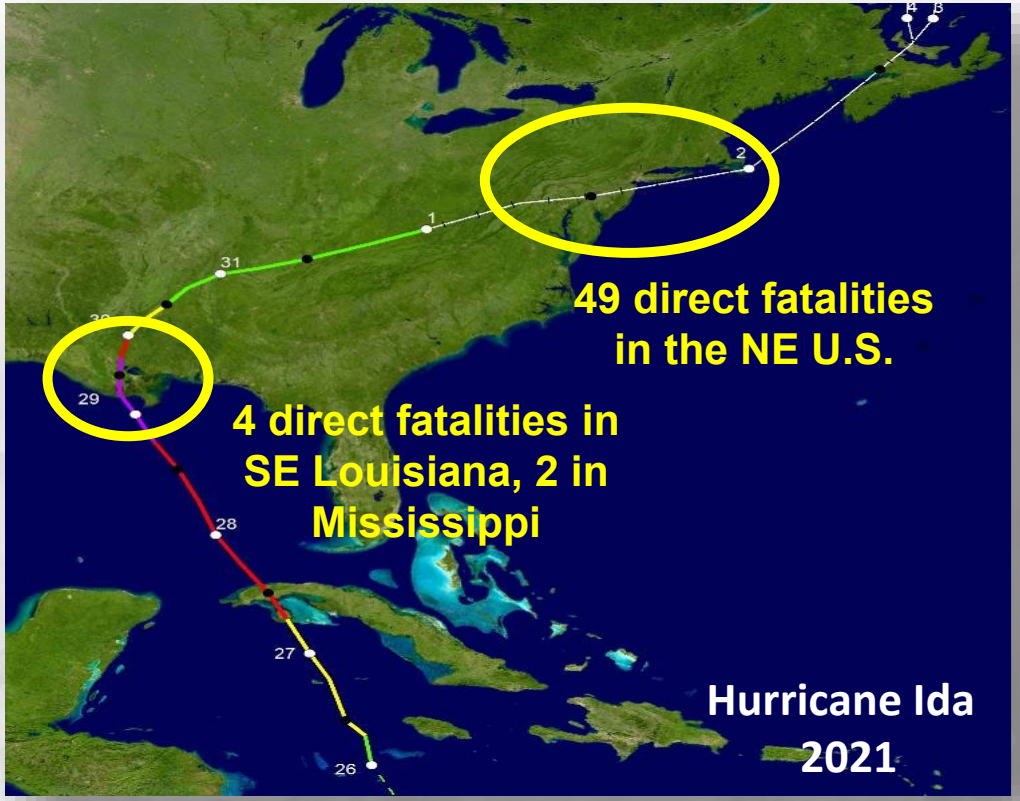
8 times as many victims age over 60 as under 21 years old

Ida Direct vs. Indirect Fatalities

55 direct fatalities
4 in Louisiana,
2 in Mississippi
49 in the NE U.S.

Primary Causes:

- **51 Freshwater Flooding (mostly NE)**
- **2 Wind (Louisiana)**
- **1 Storm Surge (Louisiana)**
- **1 Tornado (Pennsylvania)**

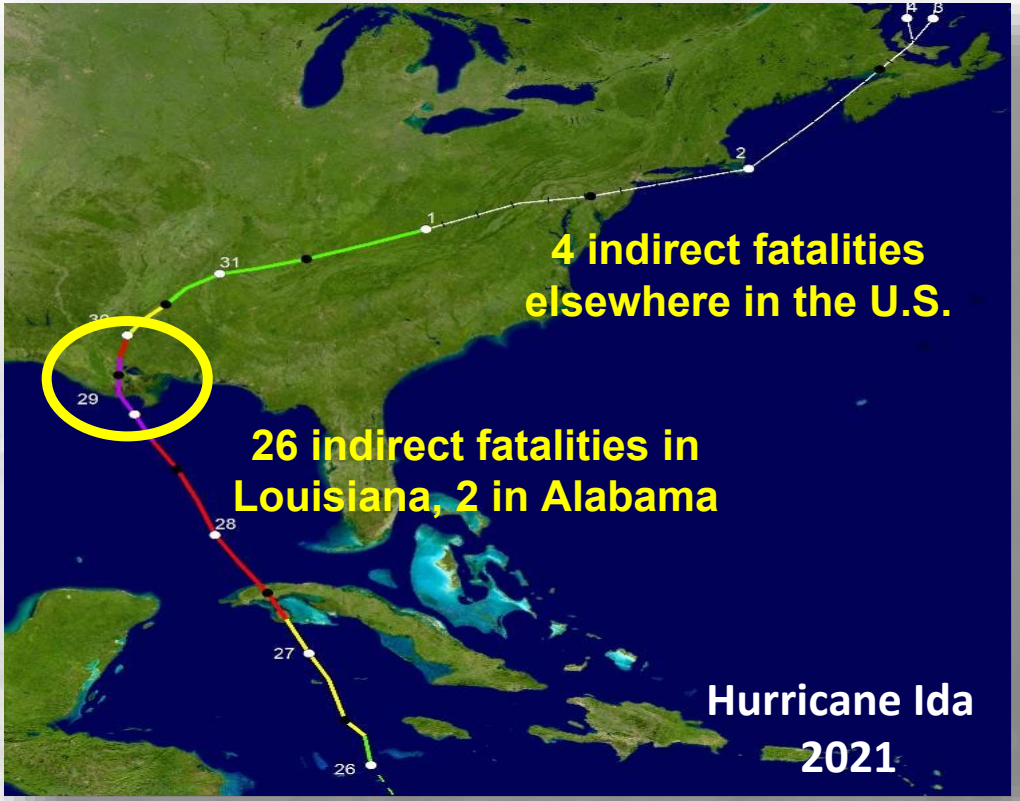


Ida Direct vs. Indirect Fatalities

32 indirect fatalities
(26 in Louisiana, 2 in Alabama)

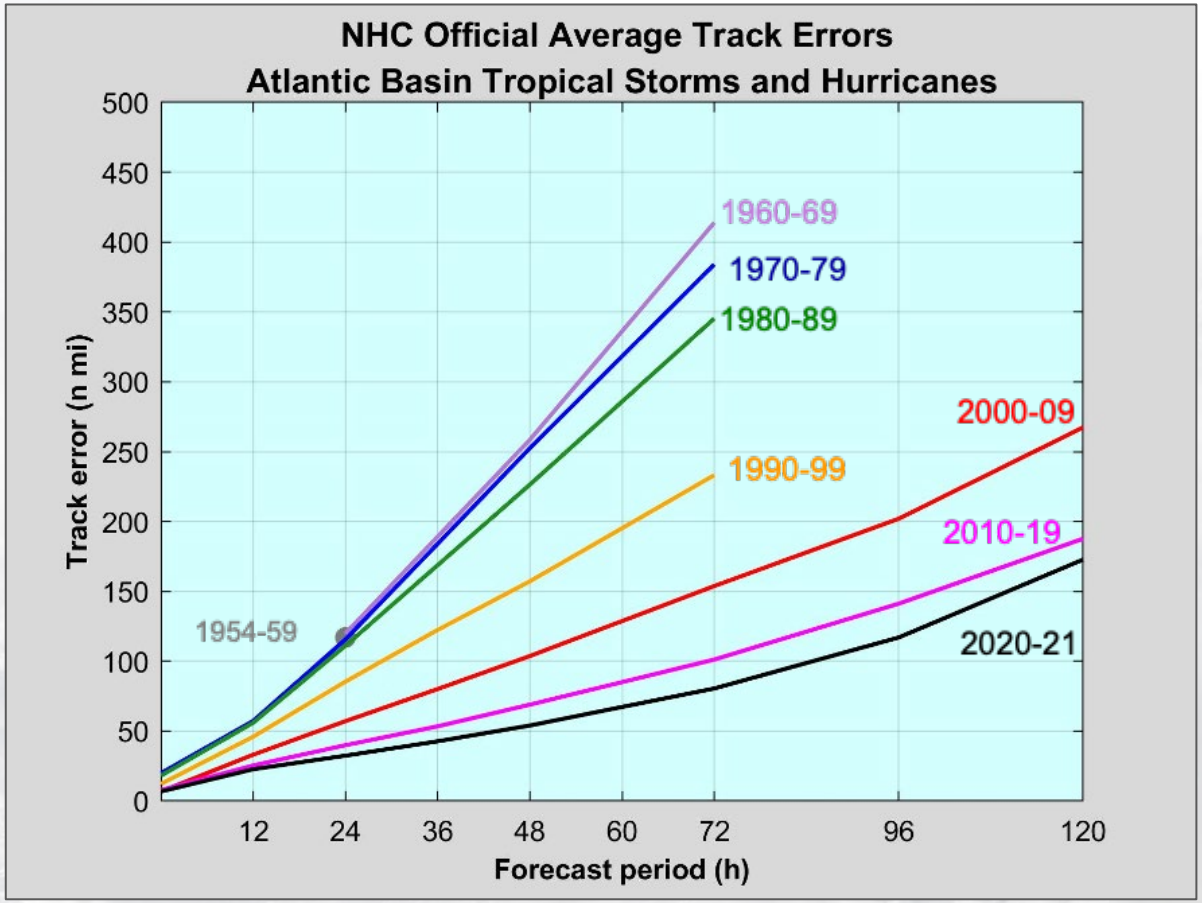
Primary Causes:

- **13 heat related**
- **6 Carbon Monoxide**

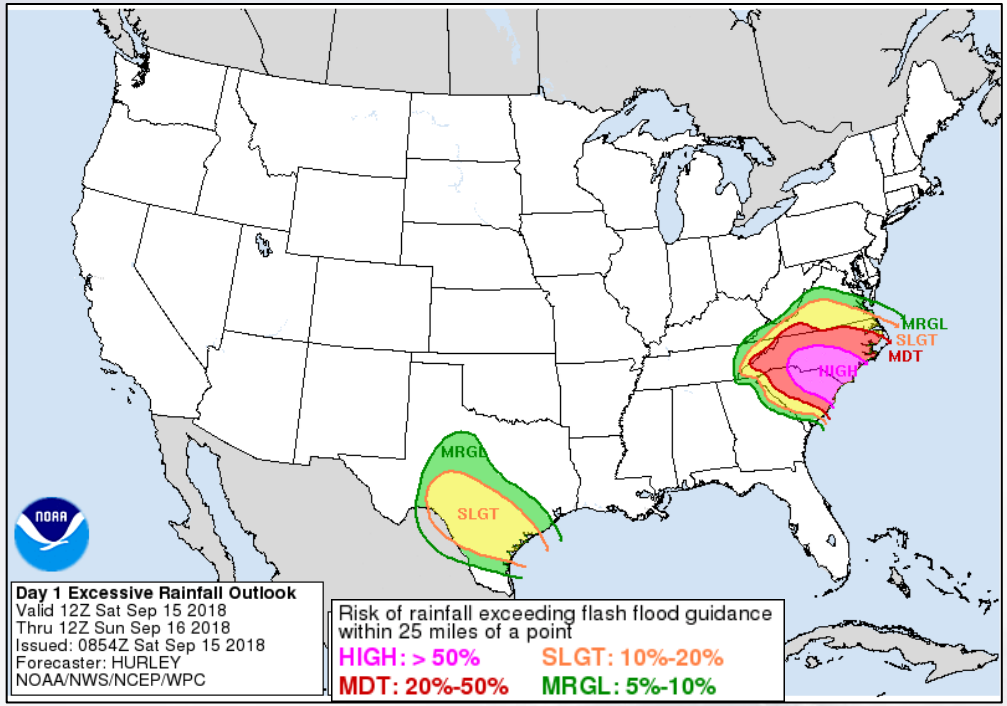


5. Deterministic Concerns

The forecast from NHC has a lower average track error and is more consistent than any individual model overall



Excessive Rainfall Outlook



Generally answers the question:

Where is the greatest risk of rainfall-induced flash flooding?

The ERO is:

A situational awareness and planning tool

The ERO is *NOT*:

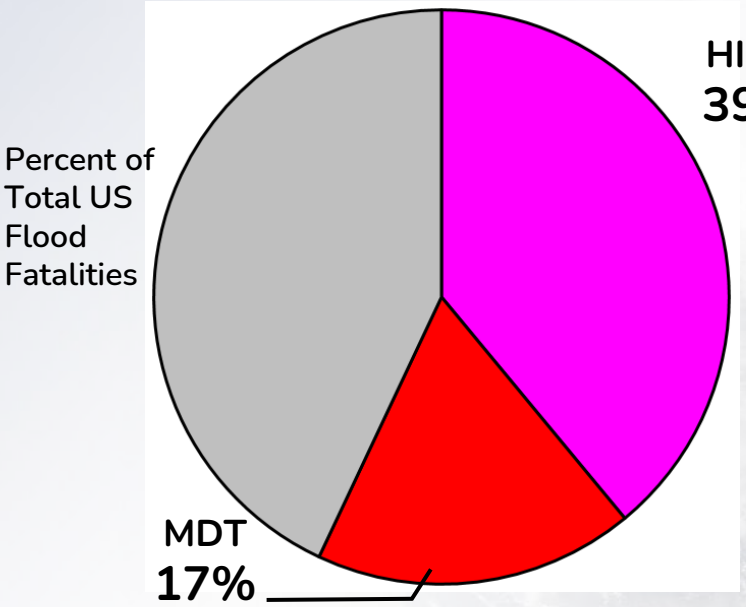
~~A forecast of flash flooding at a specific location~~

WEATHER PREDICTION CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

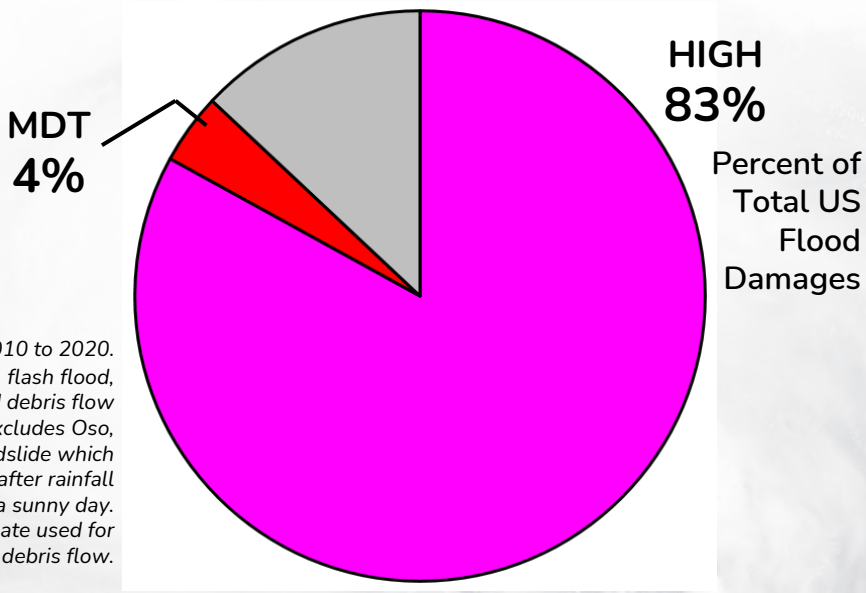
WPC High Risk Days are a BIG DEAL

High Risks are only issued by WPC on ~4% of days, but "High Risk Days" have accounted[1] for:

2/5 of ALL Flood-related **Fatalities**



4/5 of ALL Flood-related **Damages**

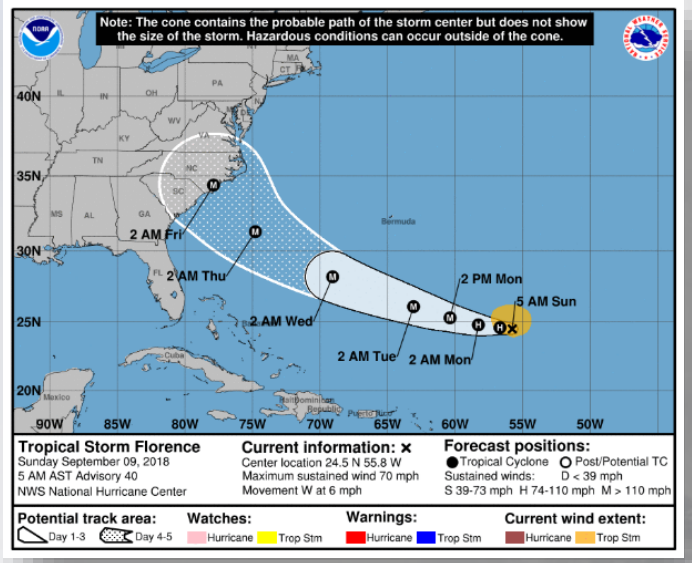


[1] *From 2010 to 2020. Includes flood, flash flood, heavy rain, and debris flow Storm Data. Excludes Oso, WA landslide which occurred well after rainfall and on a sunny day. Damage estimate used for Montecito debris flow.*

WPC High Risks are a strong indicator of a potentially deadly and damaging flash flood day

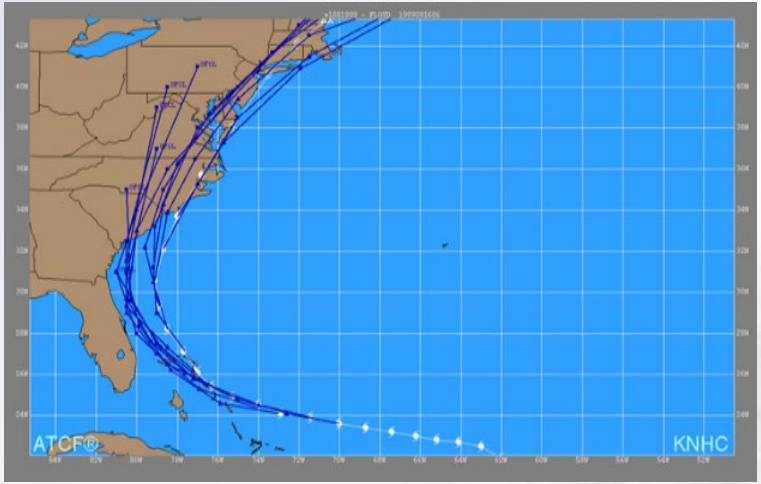
6. Forecast Accuracy = Better Decisions

Forecast Models



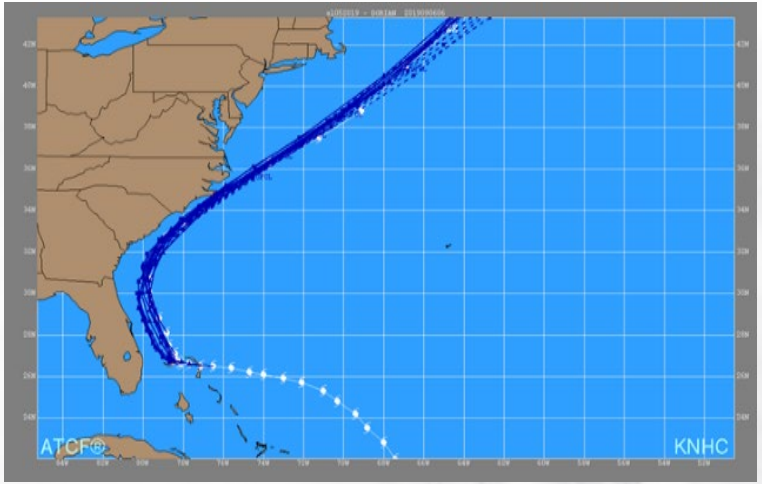
6. Forecast Accuracy = Better Decisions

Why does this matter?



NHC Track Forecasts for Floyd from
06Z 13 Sep - 06Z 16 Sep 1999

2.6 million people evacuated



NHC Track Forecasts for Dorian from
06Z 1 Sep - 06Z 6 Sep 2019

As many as 3 million people NOT evacuated

7. Words Matter

15 to 20 feet Above Ground

7. Words Matter

Storm Surge Warning

7. Words Matter

“We still have people not evacuating, what can we say?”

7. Words Matter

Unsurvivable

7. Words Matter

No Storm Surge Fatalities

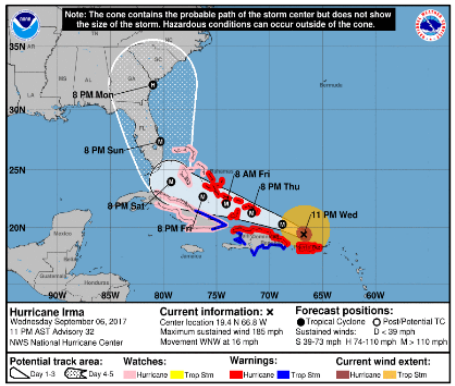
8. No Such Thing as Storm “Justa”

2010-2020

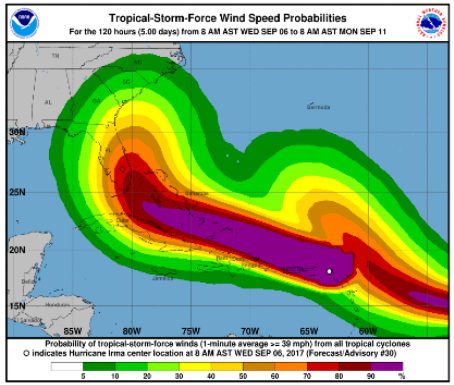
In the U.S., Category 1 hurricanes* have caused 185 direct deaths $110 billion

*Irene, Isaac, Sandy, Hermine, Matthew, Nate, Florence, Barry, Hanna, and Isaias

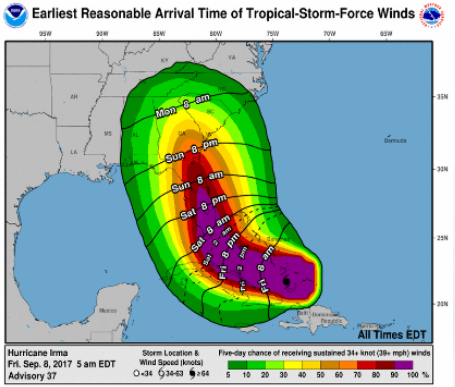
9. All About the Impacts



Forecast Cone/Wind Warnings/Size

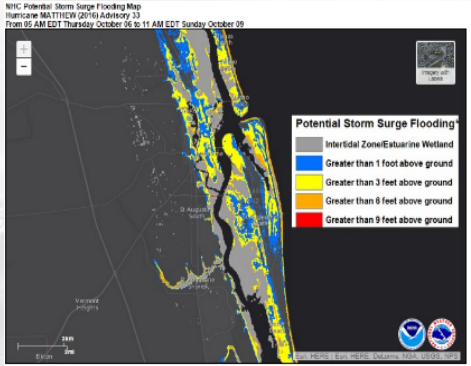


Wind Speed Probabilities

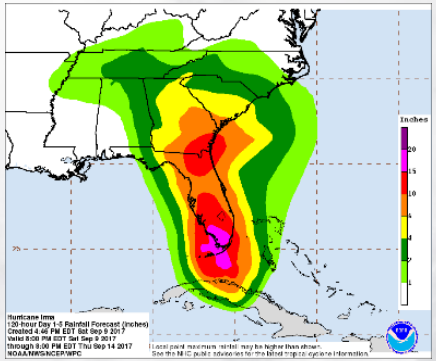


Time of Arrival of Winds

Storm Surge Warnings



Storm Surge Potential Inundation



Weather Prediction Center Rainfall

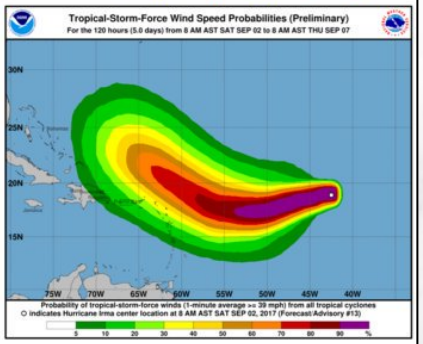
9. All About the Impacts

Key Messages for Hurricane Irma

Advisory 13: 11:00 AM AST Sat Sep 02, 2017

1. Irma is expected to be a major hurricane when it moves closer to the Lesser Antilles early next week, producing rough surf and rip currents. Irma could also cause dangerous wind, storm surge, and rainfall impacts on some islands, although it is too soon to specify where and when those hazards could occur. Residents in the Lesser Antilles should monitor the progress of Irma through the weekend and listen to any advice given by local officials.

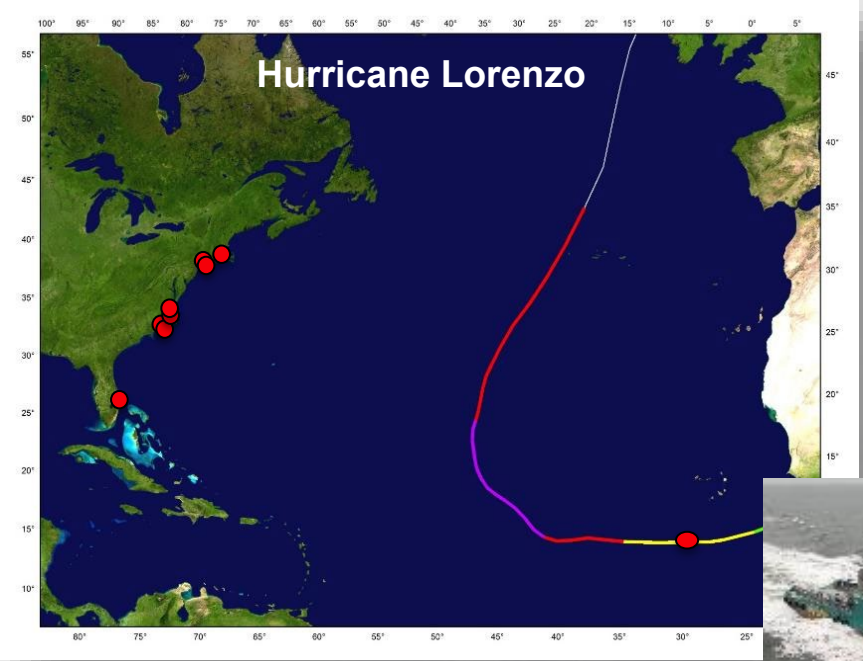
2. It is much too early to determine what direct impacts Irma will have on the Bahamas and the continental United States. Regardless, everyone in hurricane-prone areas should ensure that they have their hurricane plan in place, as we are now near the peak of the season.



For more information go to hurricanes.gov

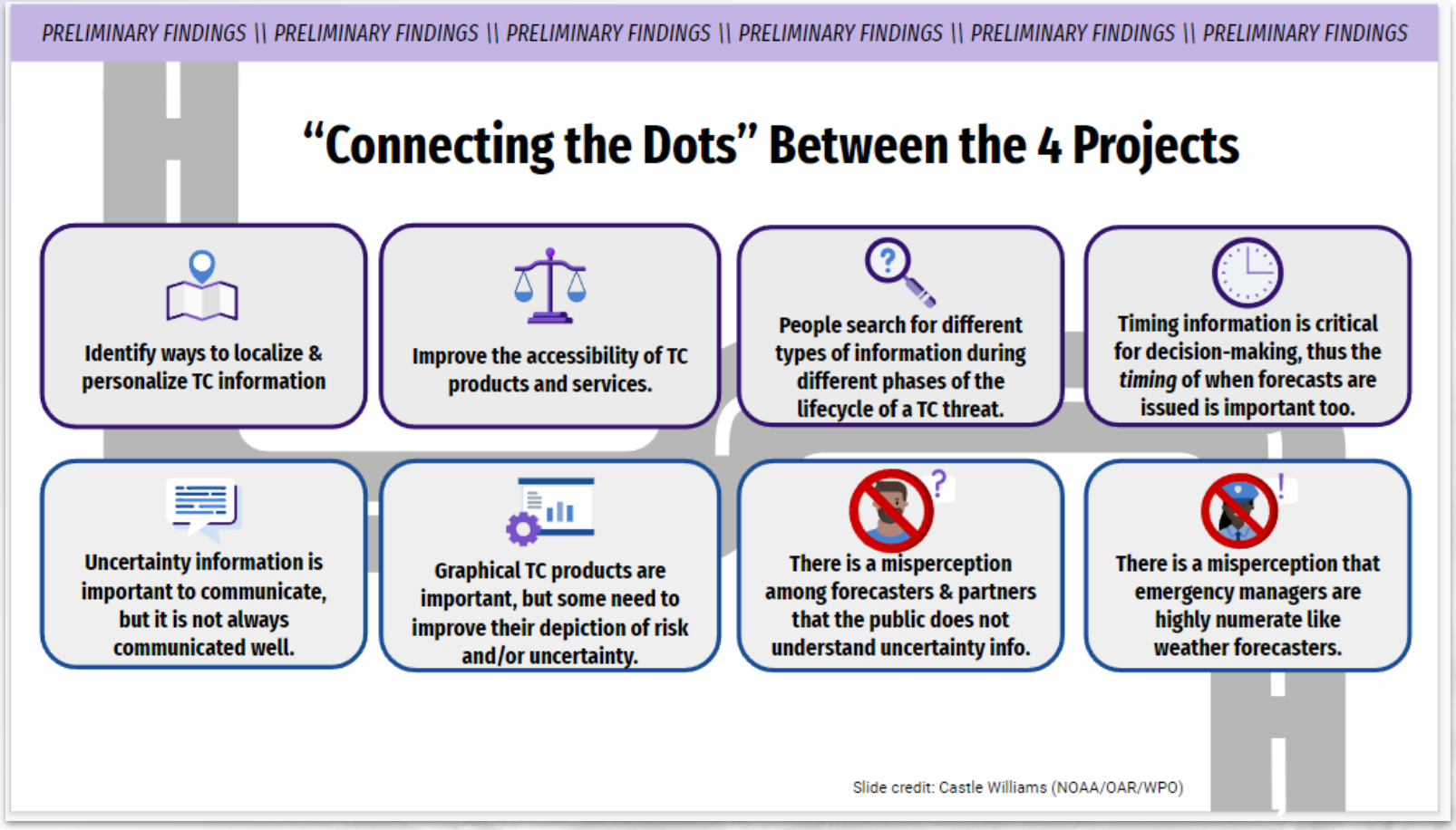
10. No Such Thing as a “fish storm”

Second Deadliest 2019 Atlantic Basin Storm
Lorenzo – 19 Direct Fatalities – All Water Related



- 11 offshore deaths due to sinking of the tug boat *Bourbon Rhode*
- 3 crew rescued
- 8 rip current deaths in the United States, from Florida to Rhode Island

Path Forward: What Are We Going To Do About It?



Path Forward: What Are We Going To Do About It?

- Identify ways to localize and personalize information.
- Improve accessibility of products and services.
- People search for different information during different phases of the life cycle of a threat.
- Timing information is critical for decision-making thus the timing of when forecasts are issued is important too.
- Uncertainty information is important to communicate, but it is not always communictated well.
- Graphical products are important but need to improve their depiction of risk and/or uncertainty.
- Misperception among forecasters and partners that the public does not understand uncertainty information.
- Misperception that emergency managers are highly numerate like weather forecasters.