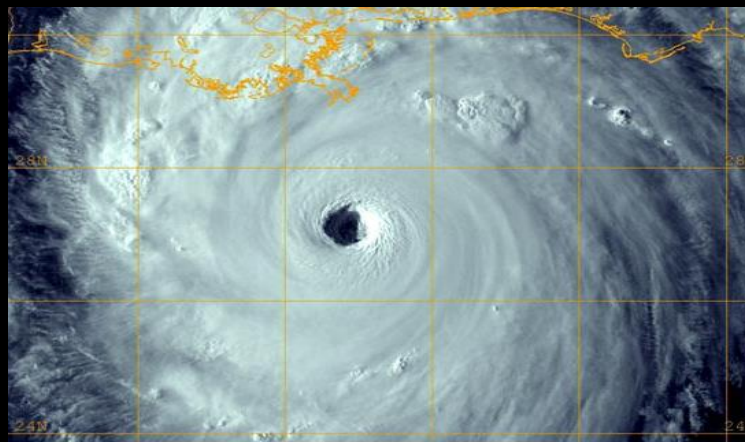


Communication: The Last Frontier in Science



Dr. "Hurricane Hal" Needham
September 19, 2024









Last Science Frontier: Data



~~Last Science Frontier: Data~~

Last Science Frontier:
Communication



Insight #5:

Word Choice is
Important







Mostly Sunny

Partly Cloudy

Galveston, Texas







Mostly Sunny





Sunny



Mostly Sunny



A Mix of Sun and Clouds



Mostly Cloudy



Cloudy





Insight #4:

Question What is
Communicated



ACADIANA'S WEATHER LEADER

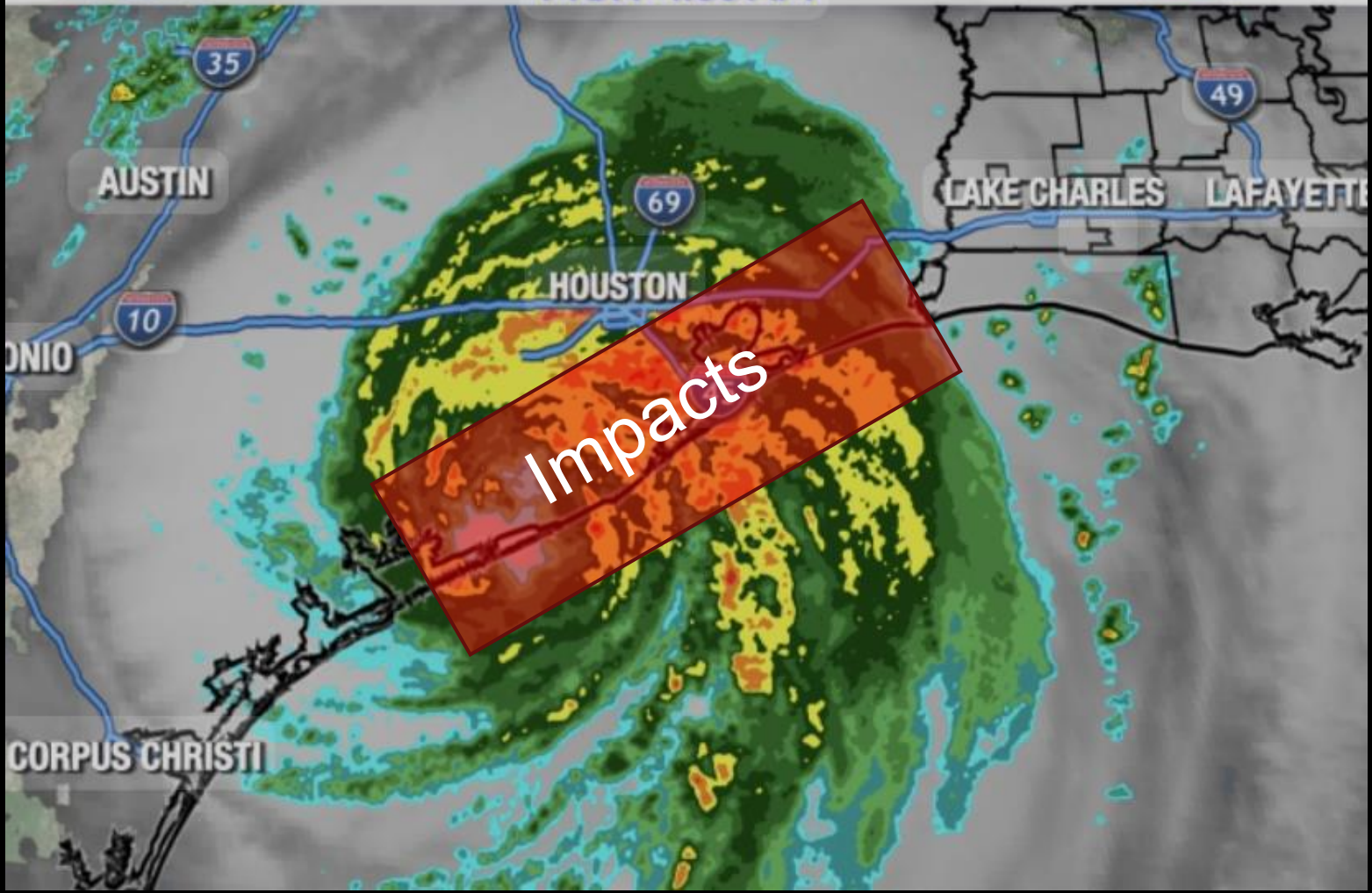


SATELLITE/RADAR

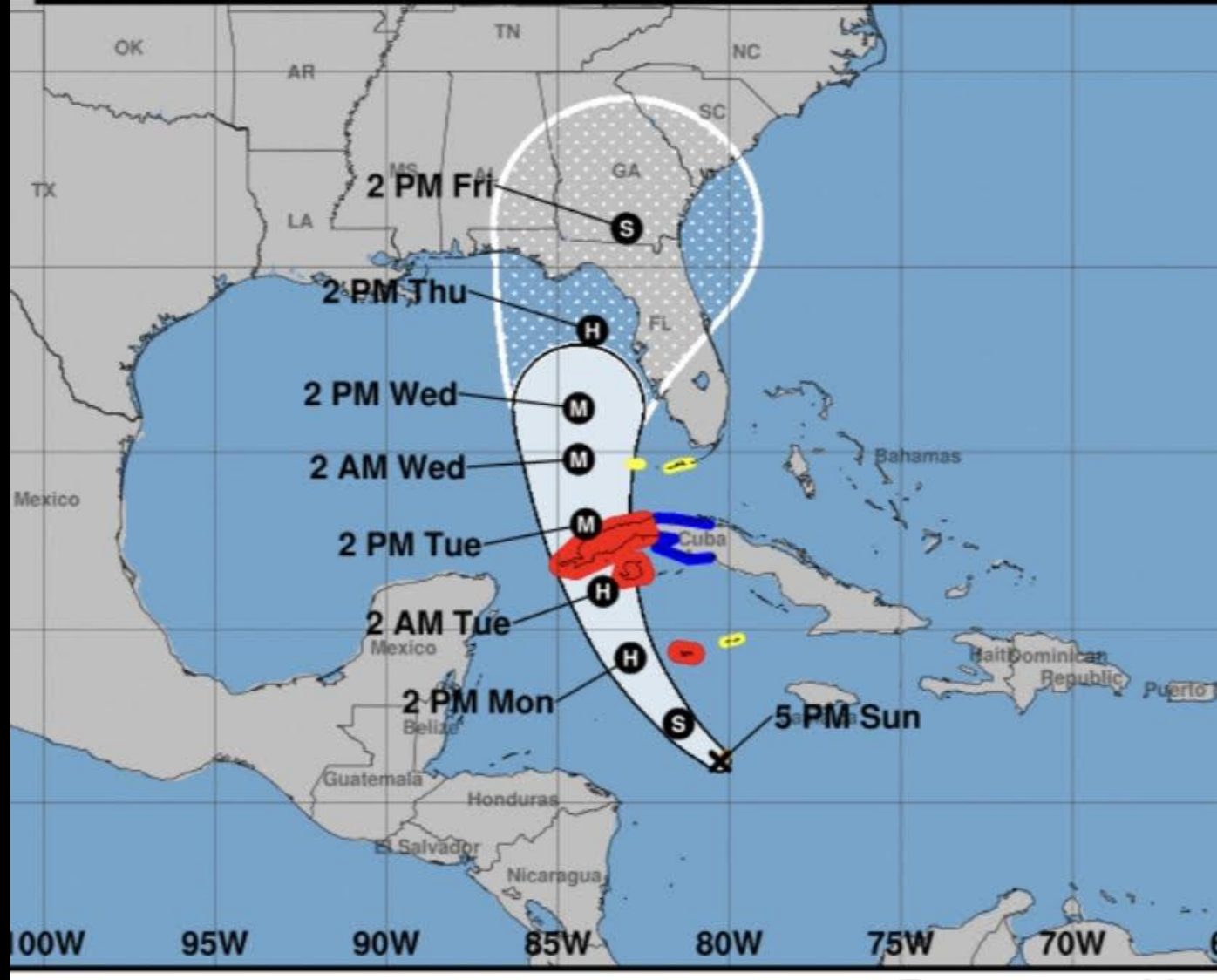
MON 4:30 AM



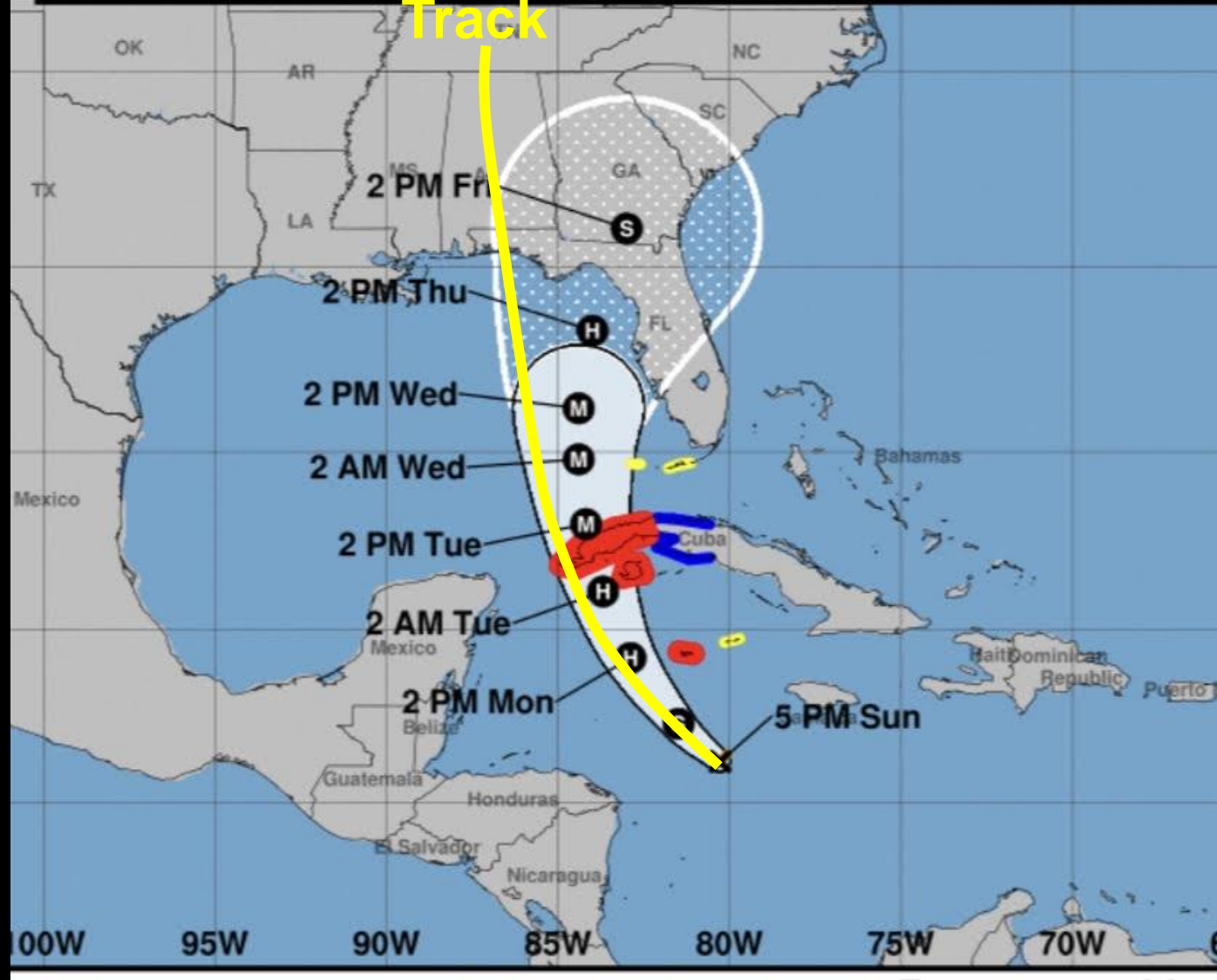
THE GLENN A.
LAW CORPORATION
Where a fair settlement is



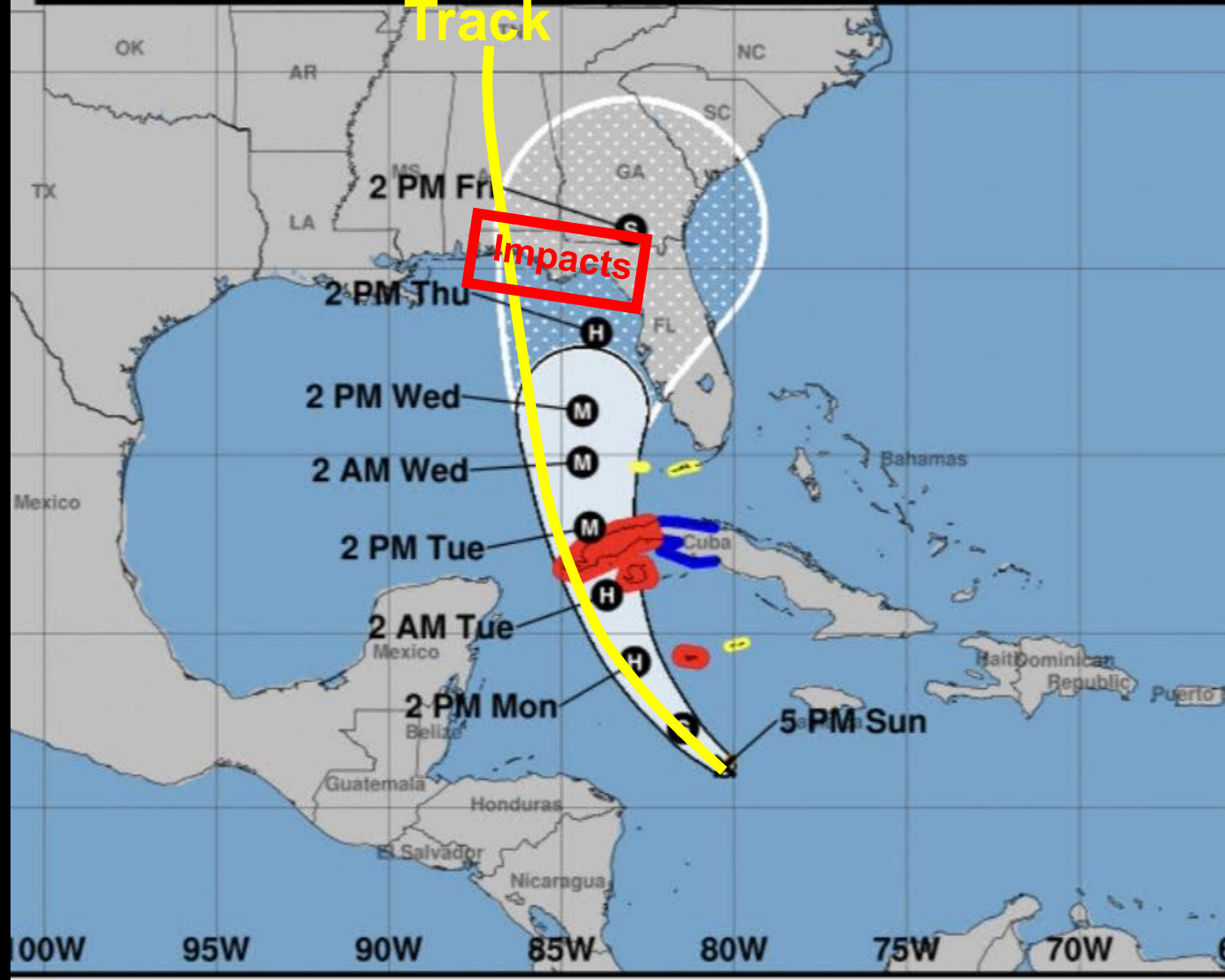
Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.



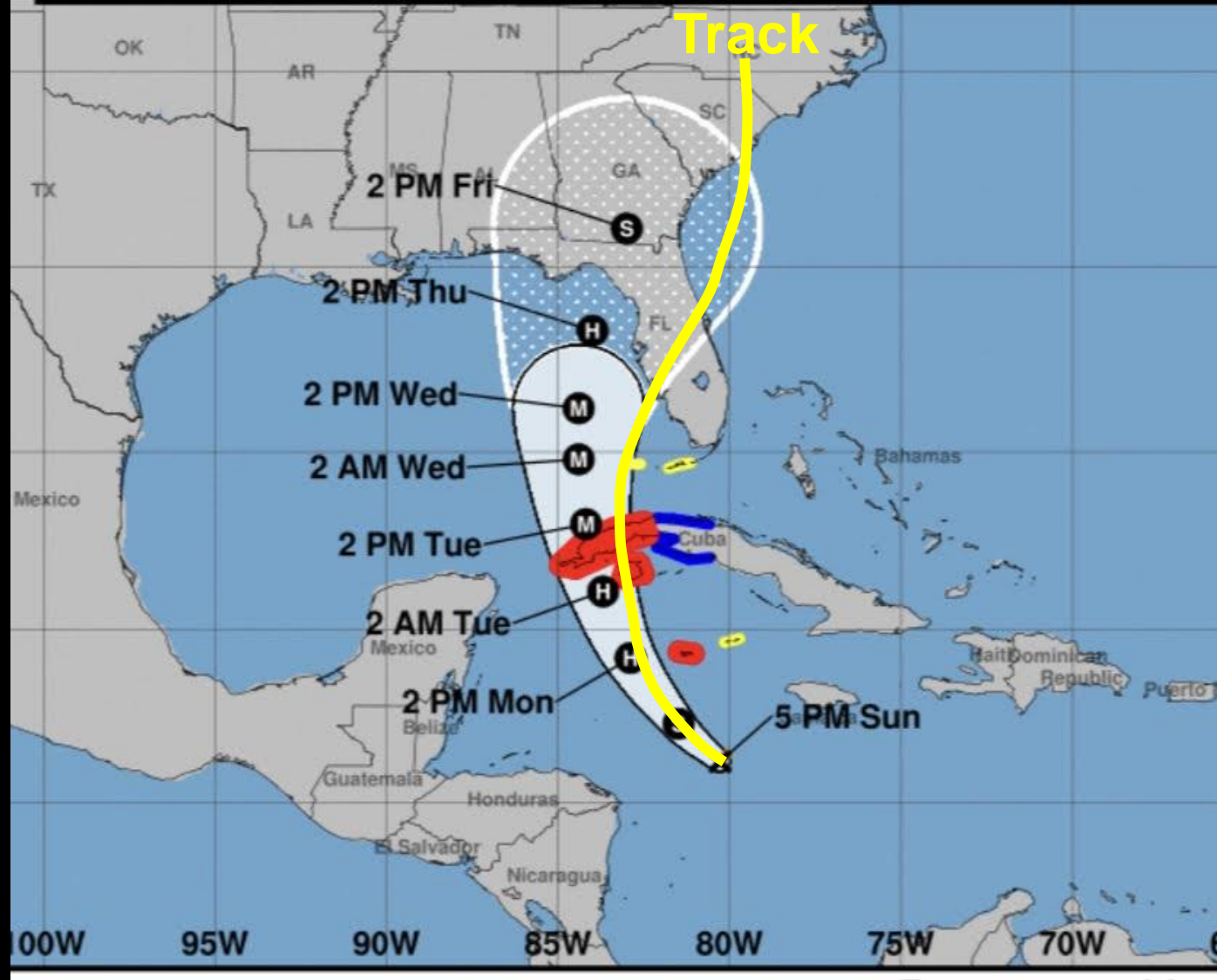
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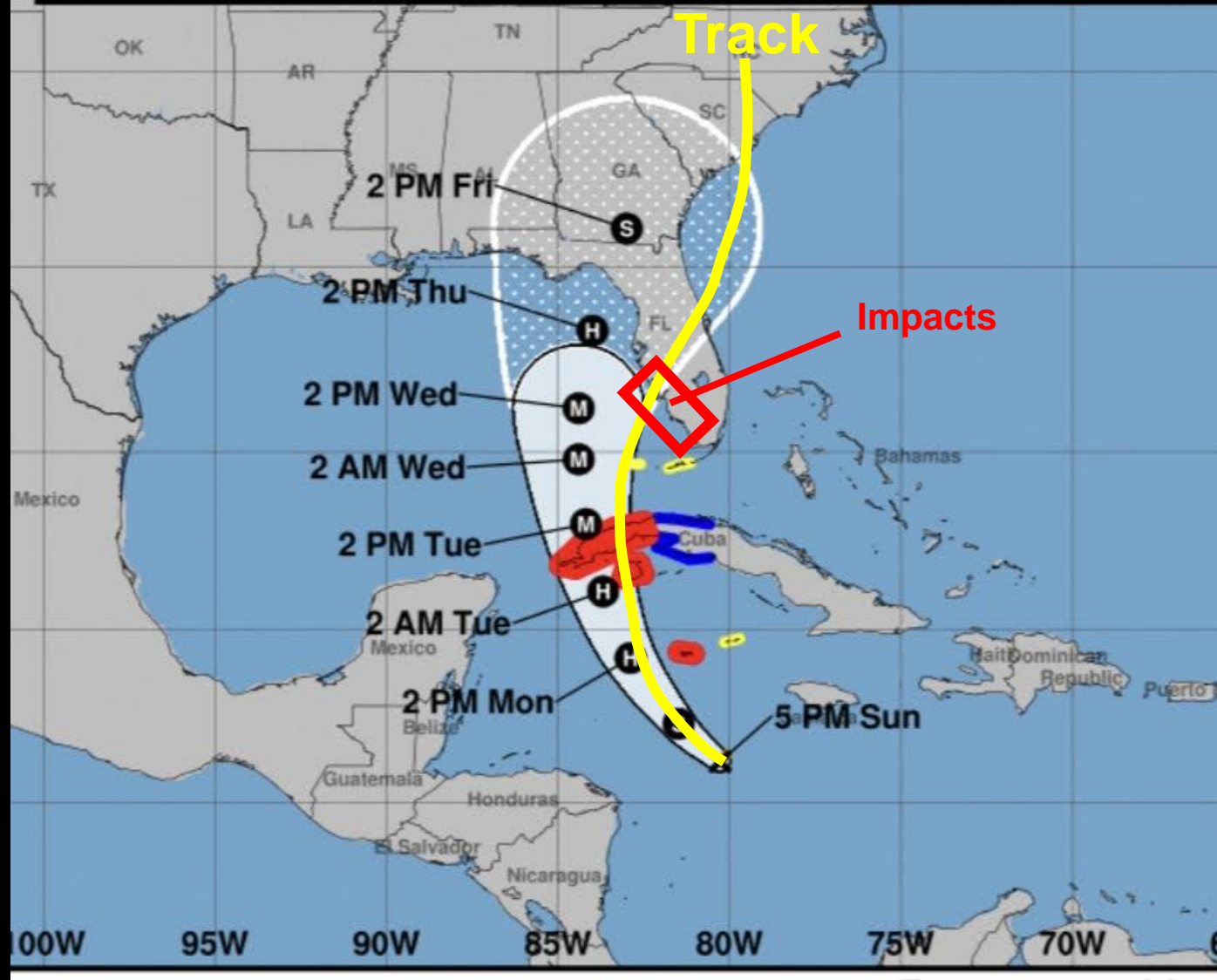


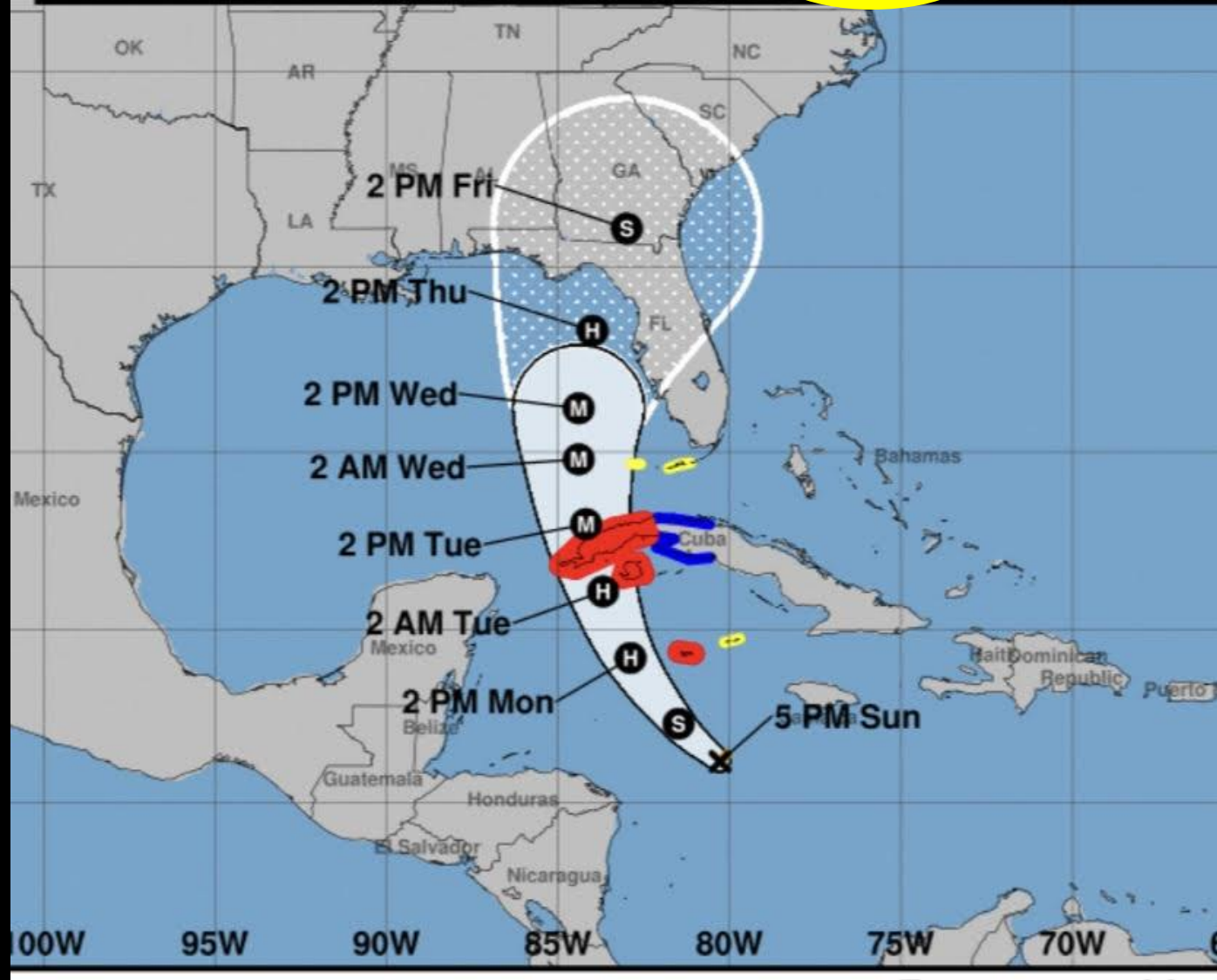


Photo: ABC News



Photo: Jeremiah Long

Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.



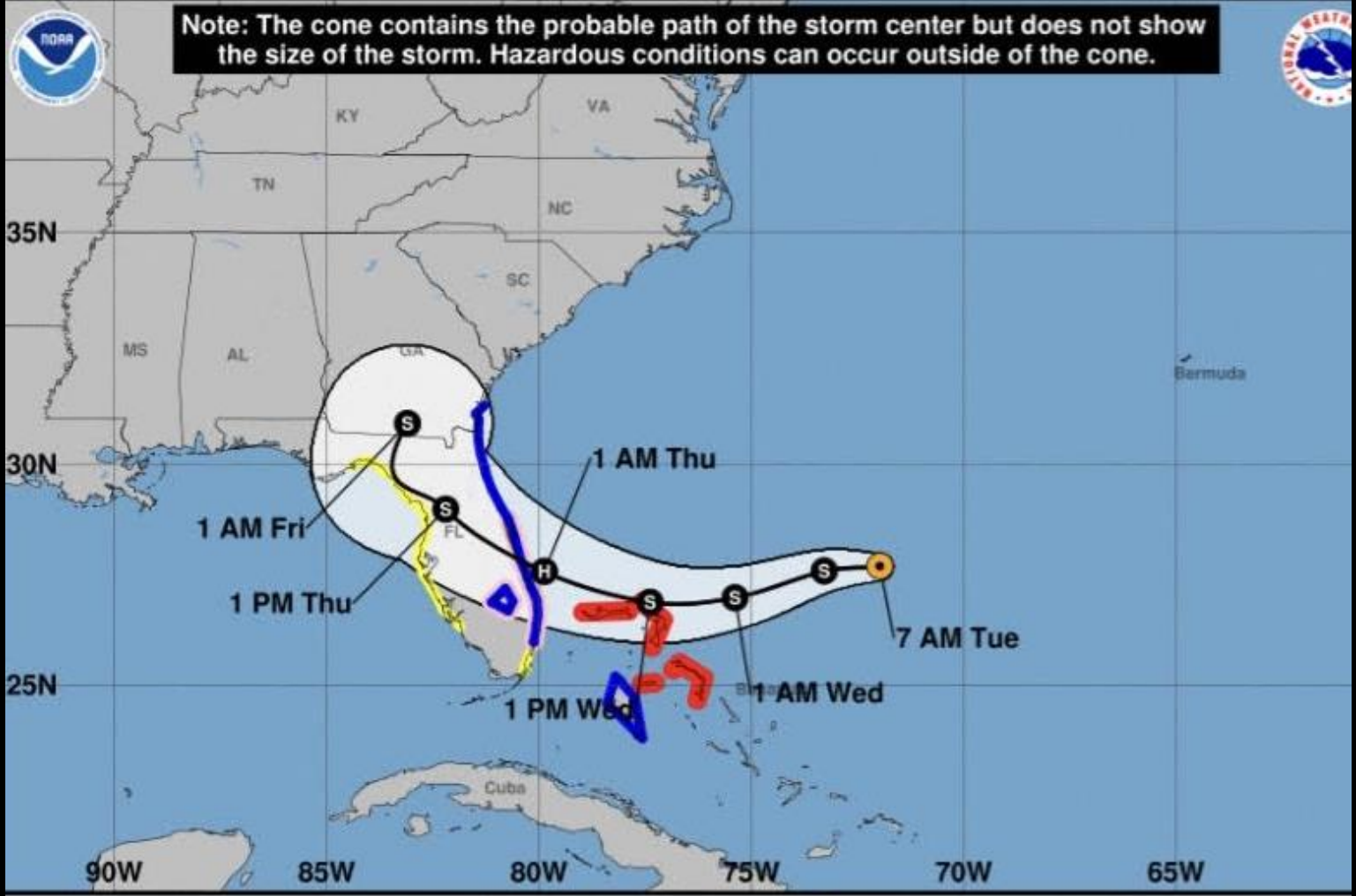
I transformed how I
communicate hurricane risk...

Probability of Flooding



Probability of Wind Damage



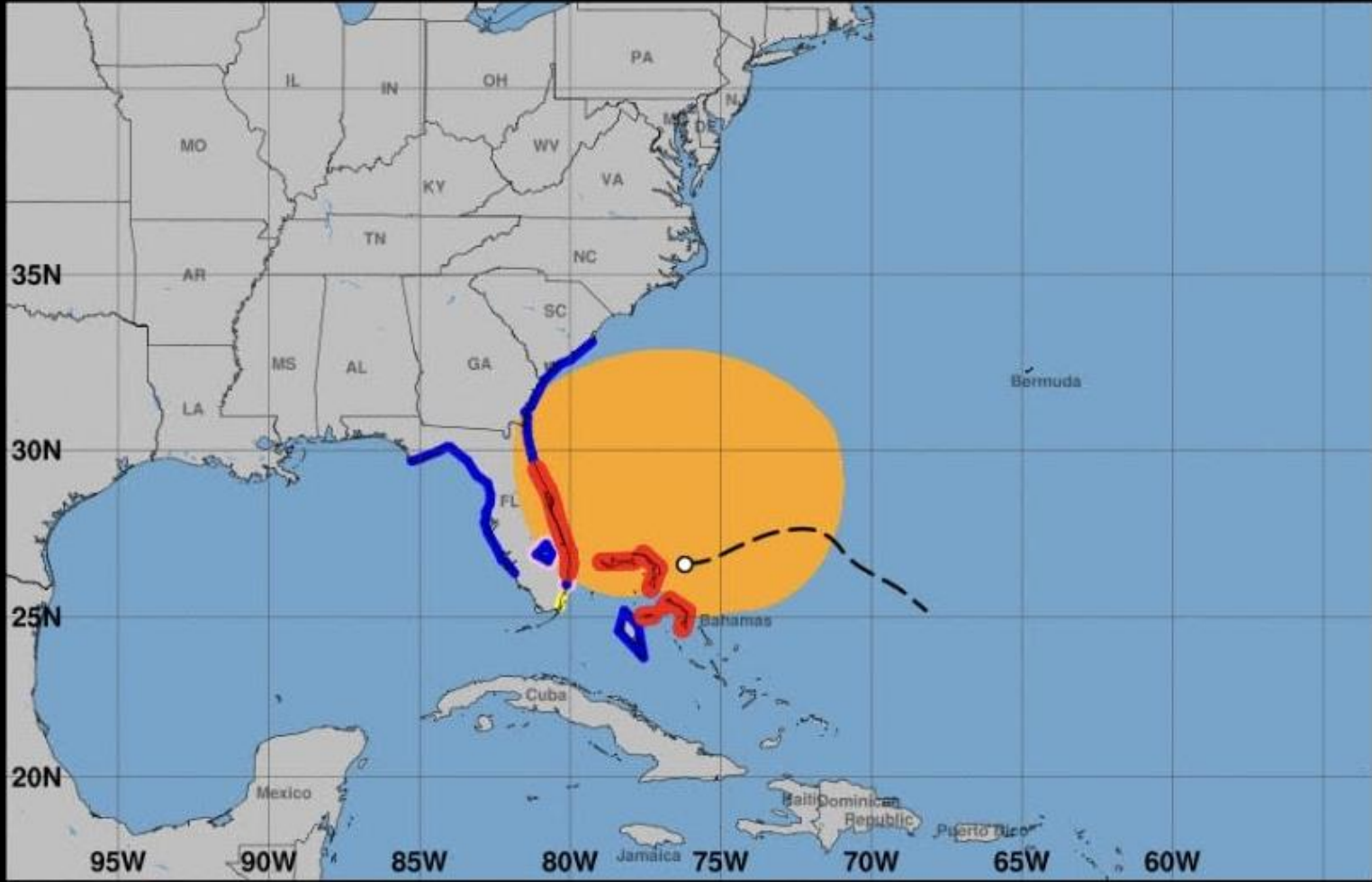


| | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Subtropical Storm Nicole Tuesday November 08, 2022 7 AM EST Intermediate Advisory 5A NWS National Hurricane Center</p> | <p>Current information: ● Center location 27.7 N 72.0 W Maximum sustained wind 50 mph Movement WNW at 8 mph</p> | <p>Forecast positions: ● Tropical Cyclone ○ Post/Potential T Sustained winds: D < 39 mph S 39-73 mph H 74-110 mph M > 110 m</p> |
| <p>Potential track area: ▽ Day 1-3 ▨ Day 4-5</p> | <p>Watches: ■ Hurricane ■ Trop Storm</p> | <p>Warnings: ■ Hurricane ■ Trop Storm</p> |

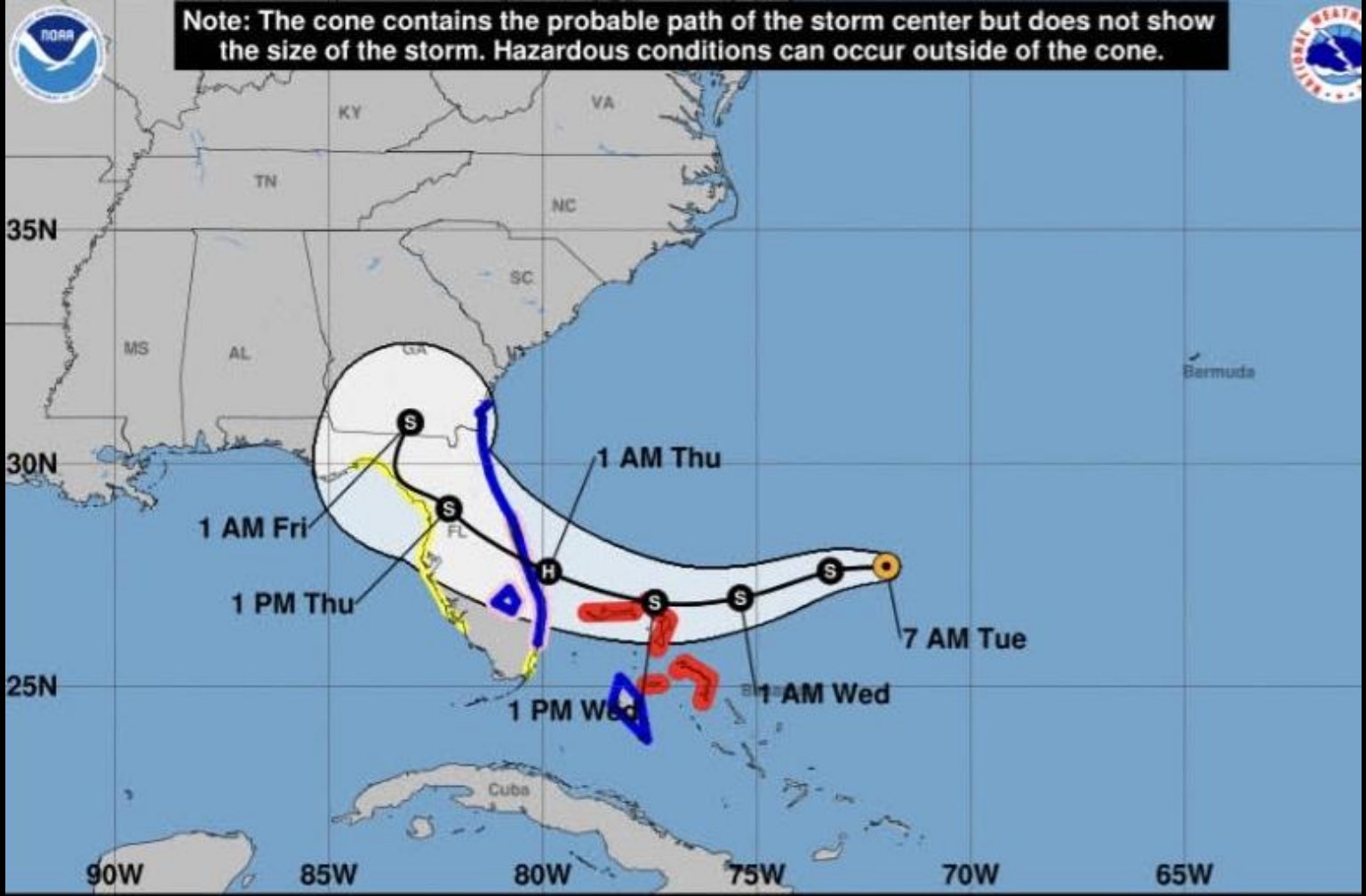


Surface Wind Field of Tropical Storm Nicole

Sustained Winds as of 700 AM EST Wed Nov 09, 2022 Advisory Number 9A



| Watches: | Warnings: | Sustained Winds: | Position: |
|----------------------|------------------------|----------------------|-------------------------|
| Hurricane Watch | Hurricane Warning | Hurricane Force | Center as of 700 AM EST |
| Tropical Storm Watch | Tropical Storm Warning | Tropical Storm Force | Past Track |



Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.

Subtropical Storm Nicole
 Tuesday November 08, 2022
 7 AM EST Intermediate Advisory 5A
 NWS National Hurricane Center

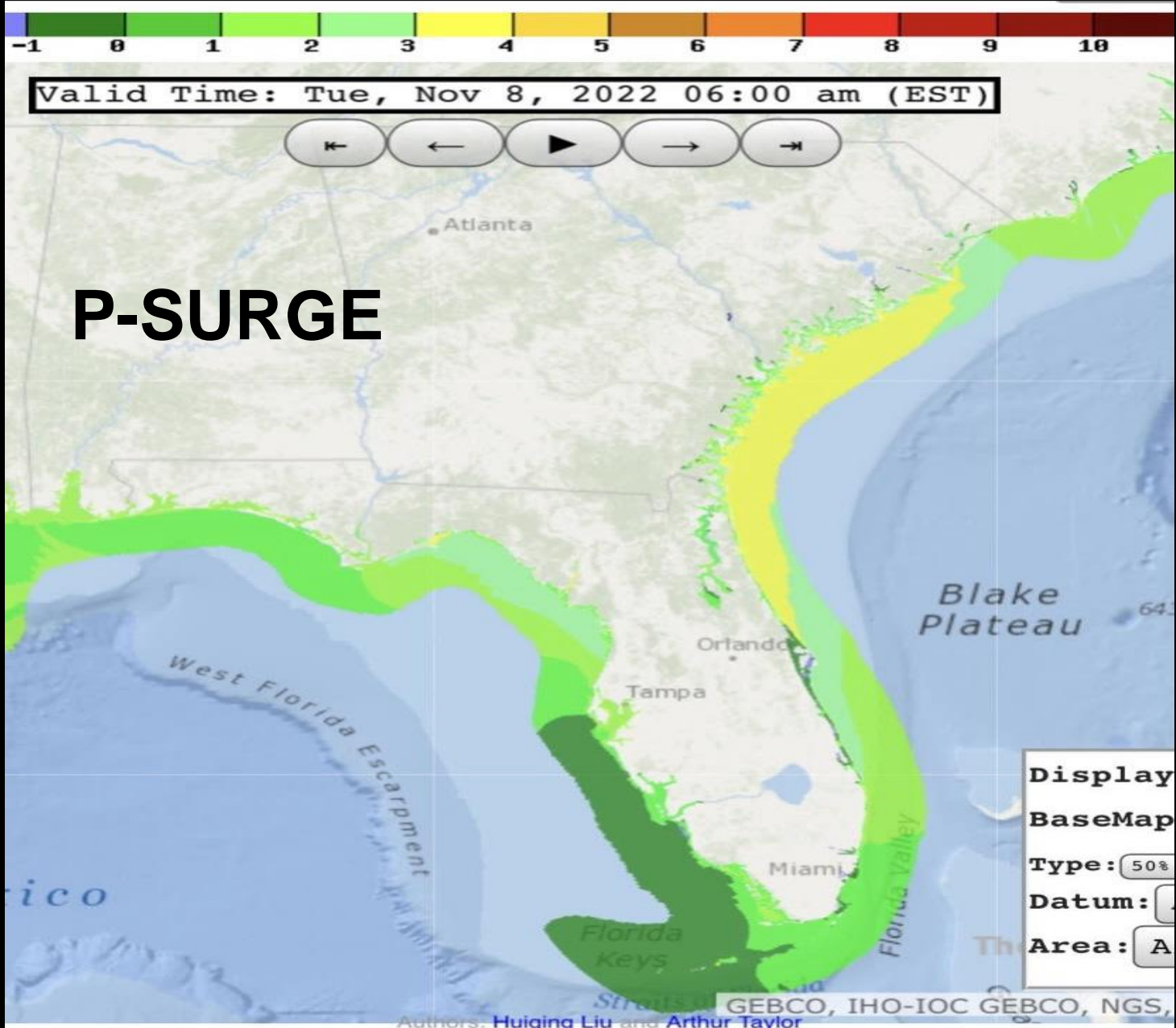
Current information: ●
 Center location 27.7 N 72.0 W
 Maximum sustained wind 50 mph
 Movement WNW at 8 mph

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

Potential track area:
 [Solid Line] Day 1-3 [Hatched Line] Day 4-5

Watches:
 [Red Box] Hurricane [Yellow Box] Trop Storm

Warnings:
 [Red Box] Hurricane [Blue Box] Trop Storm

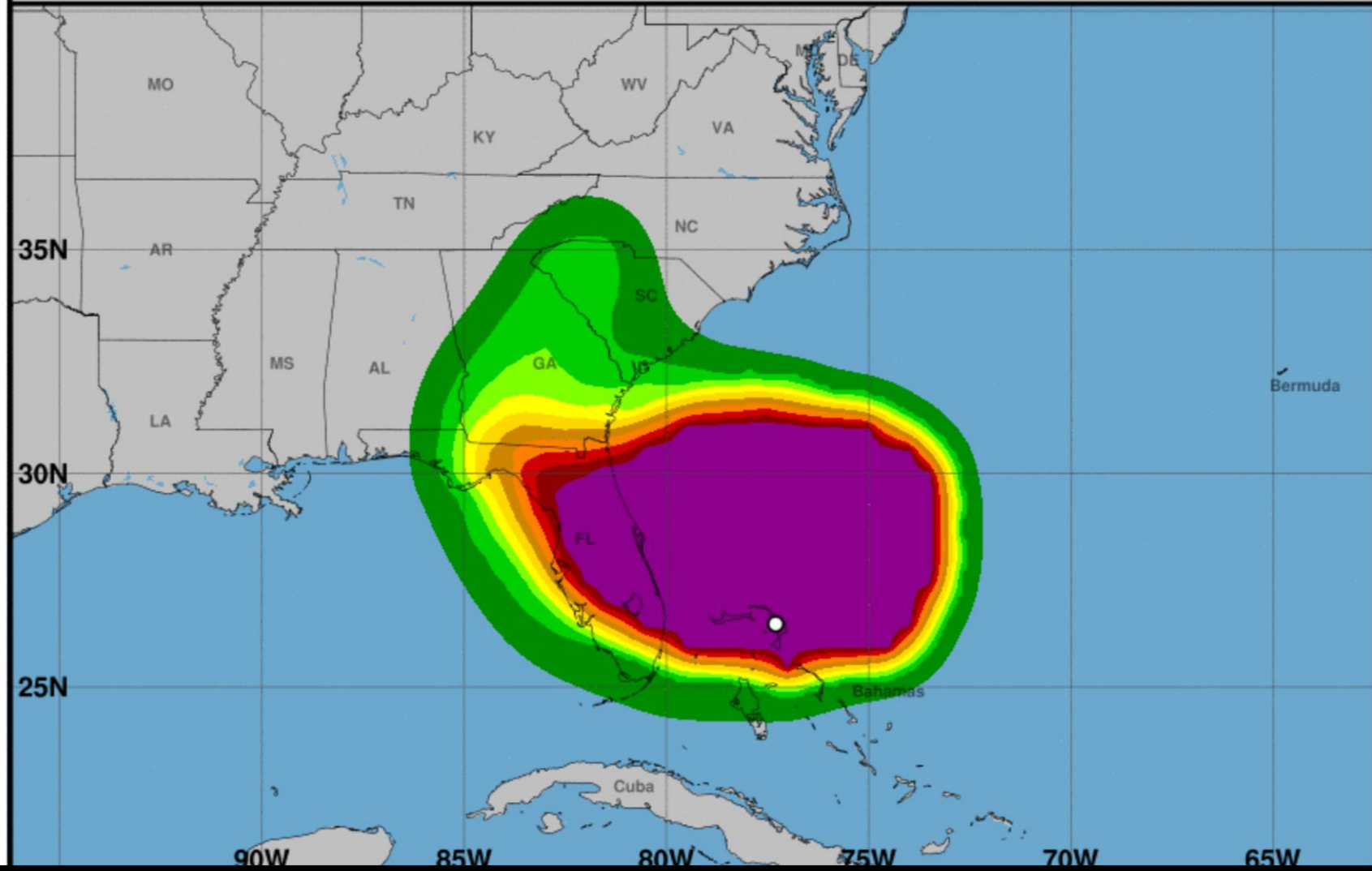


P-SURGE



Tropical-Storm-Force Wind Speed Probabilities

For the 120 hours (5.00 days) from 1 PM EST WED NOV 09 to 1 PM EST MON NOV 14



We have not adjusted hurricane communication because....

“This is the way it has always been done...”

Reflection Questions:

1. What are our communication goals with stakeholders?
2. What are we doing well?
3. What are inefficient or misguided areas of communication that follow “the way it has always been done?”



Insight #3:

Simplify Communication



Hazard Area Likelihood (HAL) Index

What is the likelihood that ...
(hazard) will exceed (threshold)?

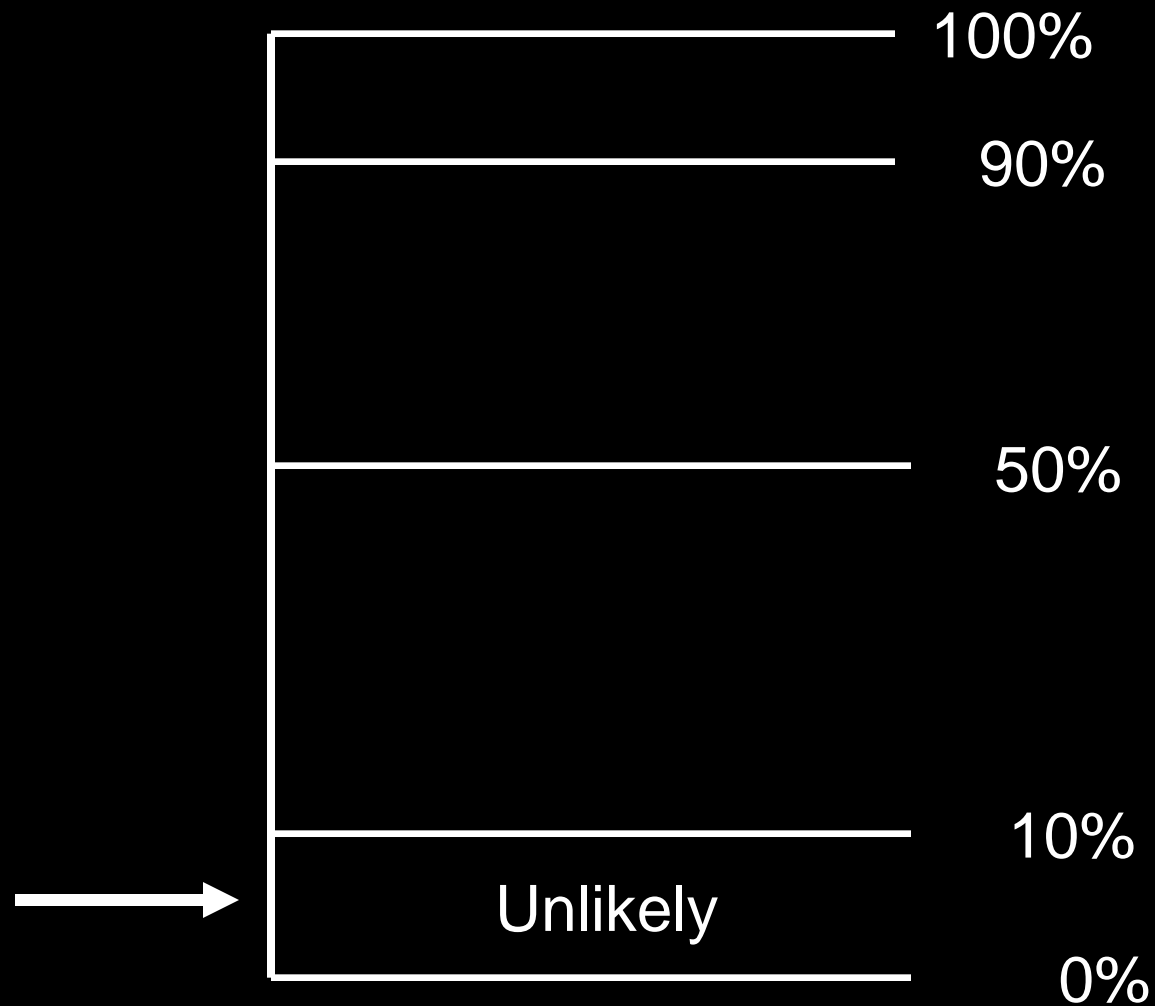
Hazard Area Likelihood (HAL) Index

What is the likelihood that ...
(flooding) will exceed (5 feet)?

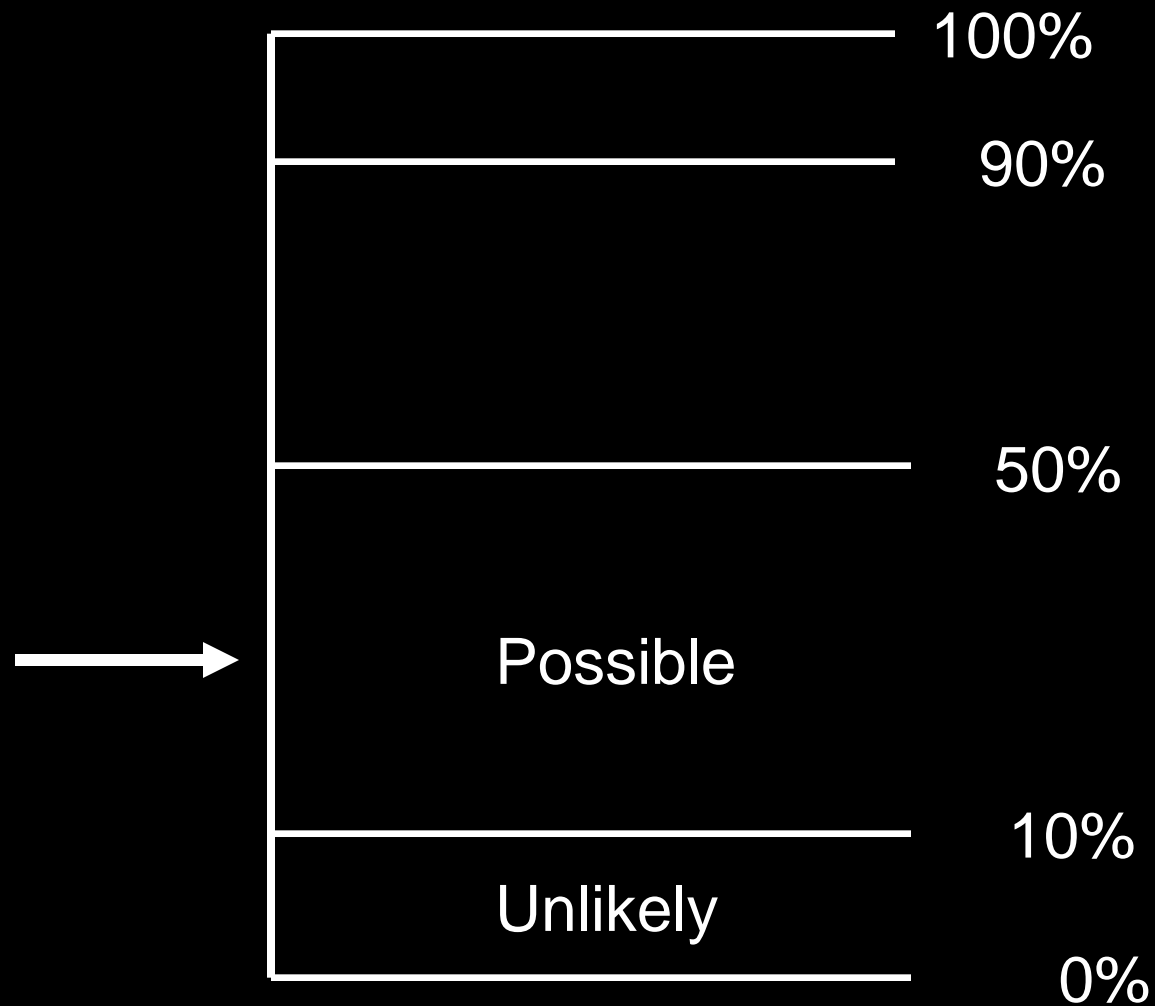
Hazard Area Likelihood (HAL) Index



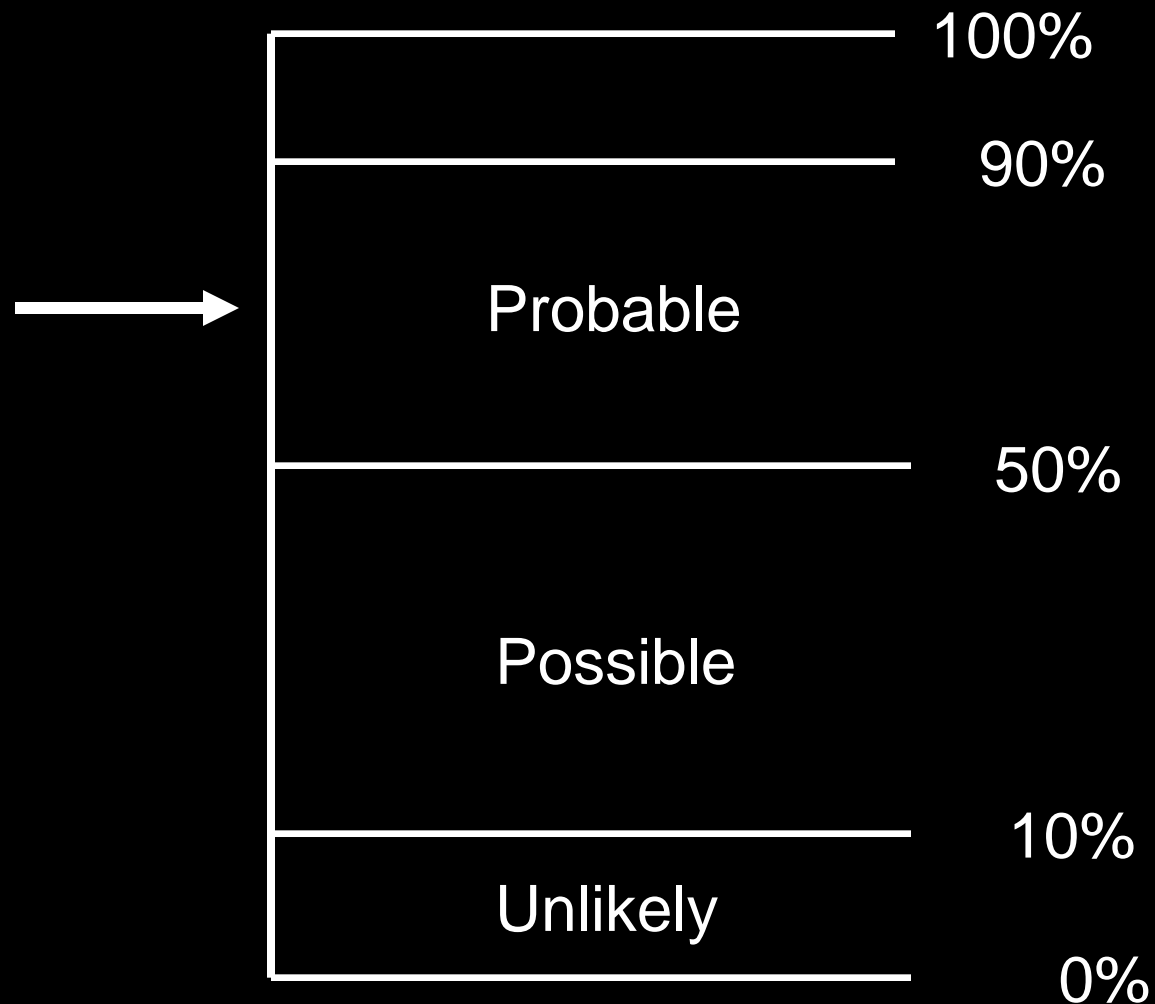
Hazard Area Likelihood (HAL) Index



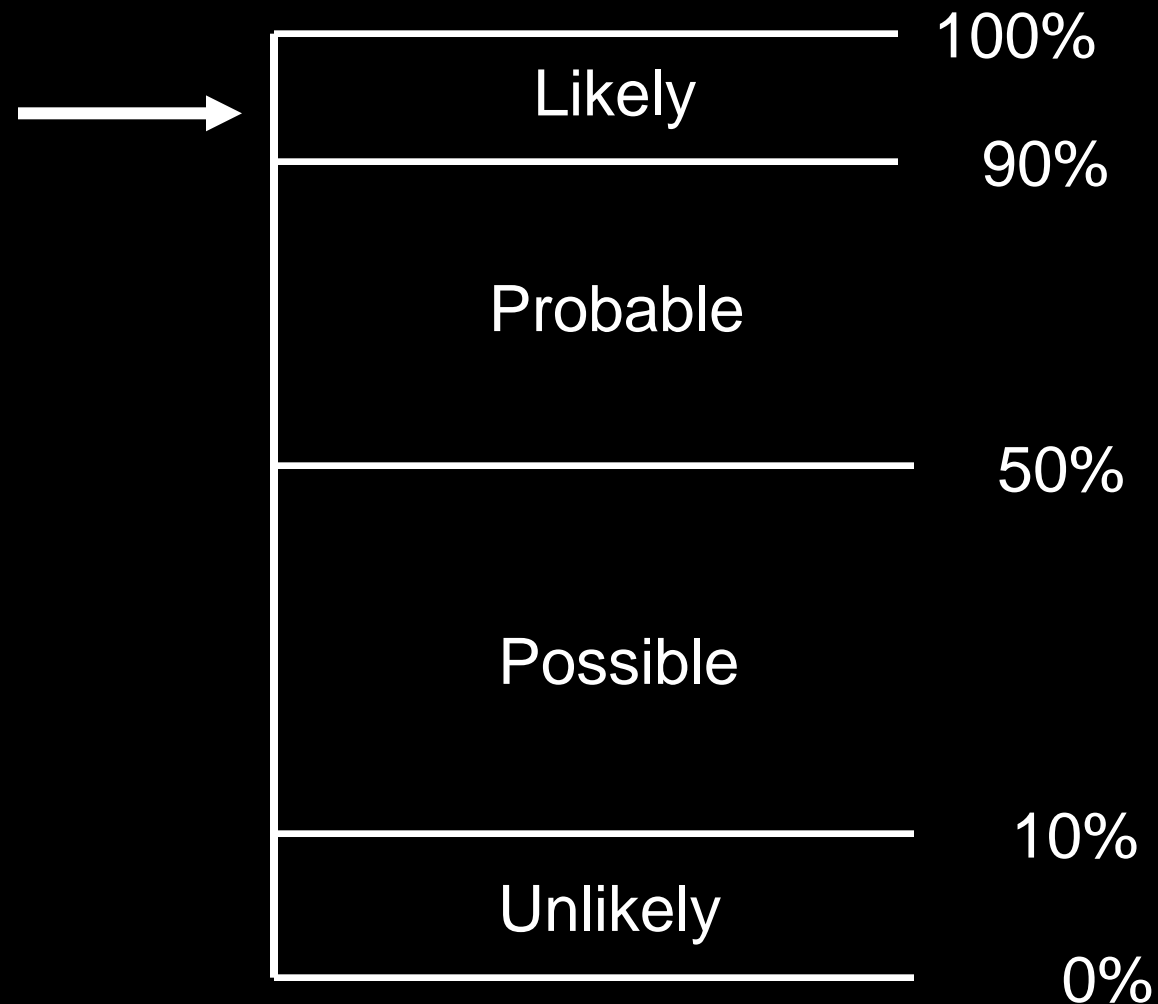
Hazard Area Likelihood (HAL) Index



Hazard Area Likelihood (HAL) Index



Hazard Area Likelihood (HAL) Index



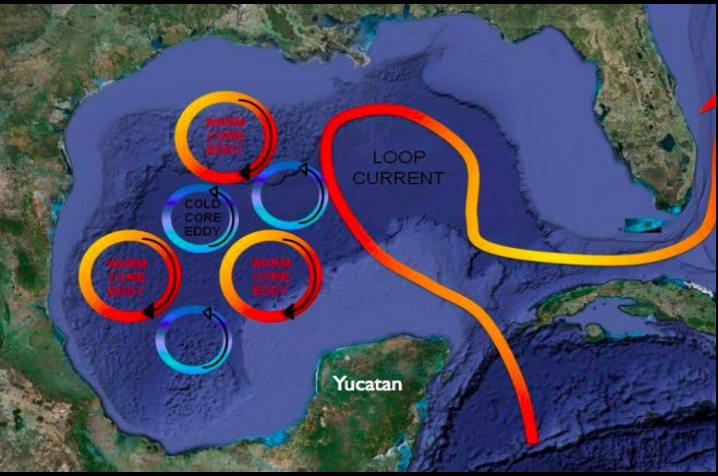
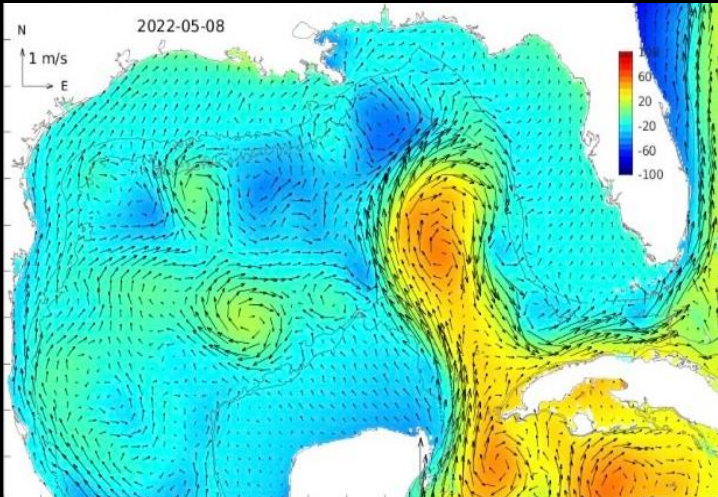
Flooding



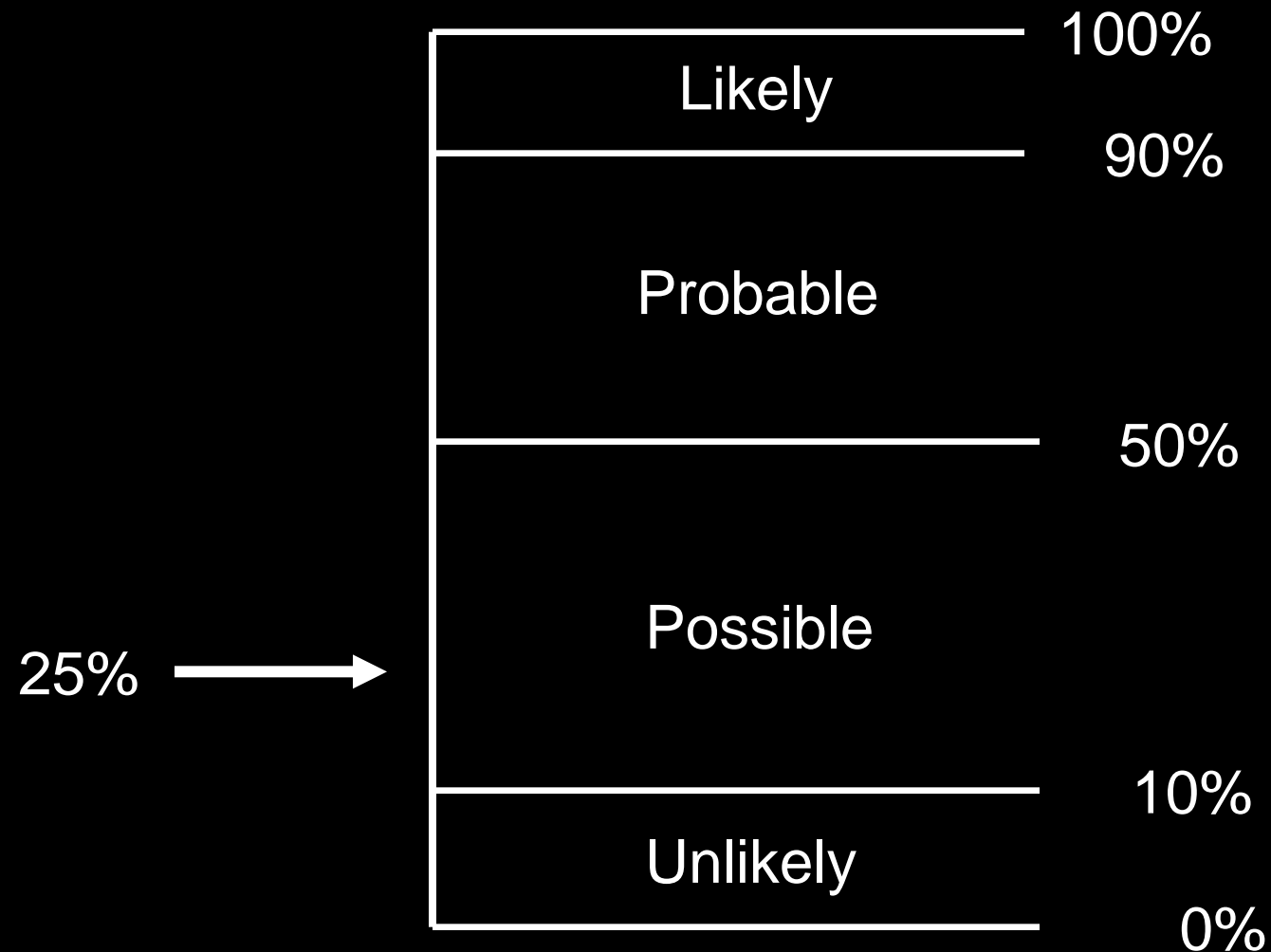
Forensic Meteorology – Big Hail



Seaweed Inundation



Hazard Area Likelihood (HAL) Index



Storm Prediction Center



5 Risk Words

Slight

Marginal

Moderate

Enhanced

High

Word Choices for Severe Weather Risk Communication

| | Group 1 | Group 2 | Group 3 |
|--------------|----------|----------|----------|
| Highest Risk | High | High | High |
| | Enhanced | Enhanced | Moderate |
| | Moderate | Moderate | Enhanced |
| | Slight | Marginal | Slight |
| Lowest Risk | Marginal | Slight | Marginal |

I Thought



| | Group 1 | Group 2 | Group 3 |
|--------------|----------|----------|----------|
| Highest Risk | High | High | High |
| | Enhanced | Enhanced | Moderate |
| | Moderate | Moderate | Enhanced |
| | Slight | Marginal | Slight |
| Lowest Risk | Marginal | Slight | Marginal |

They Use

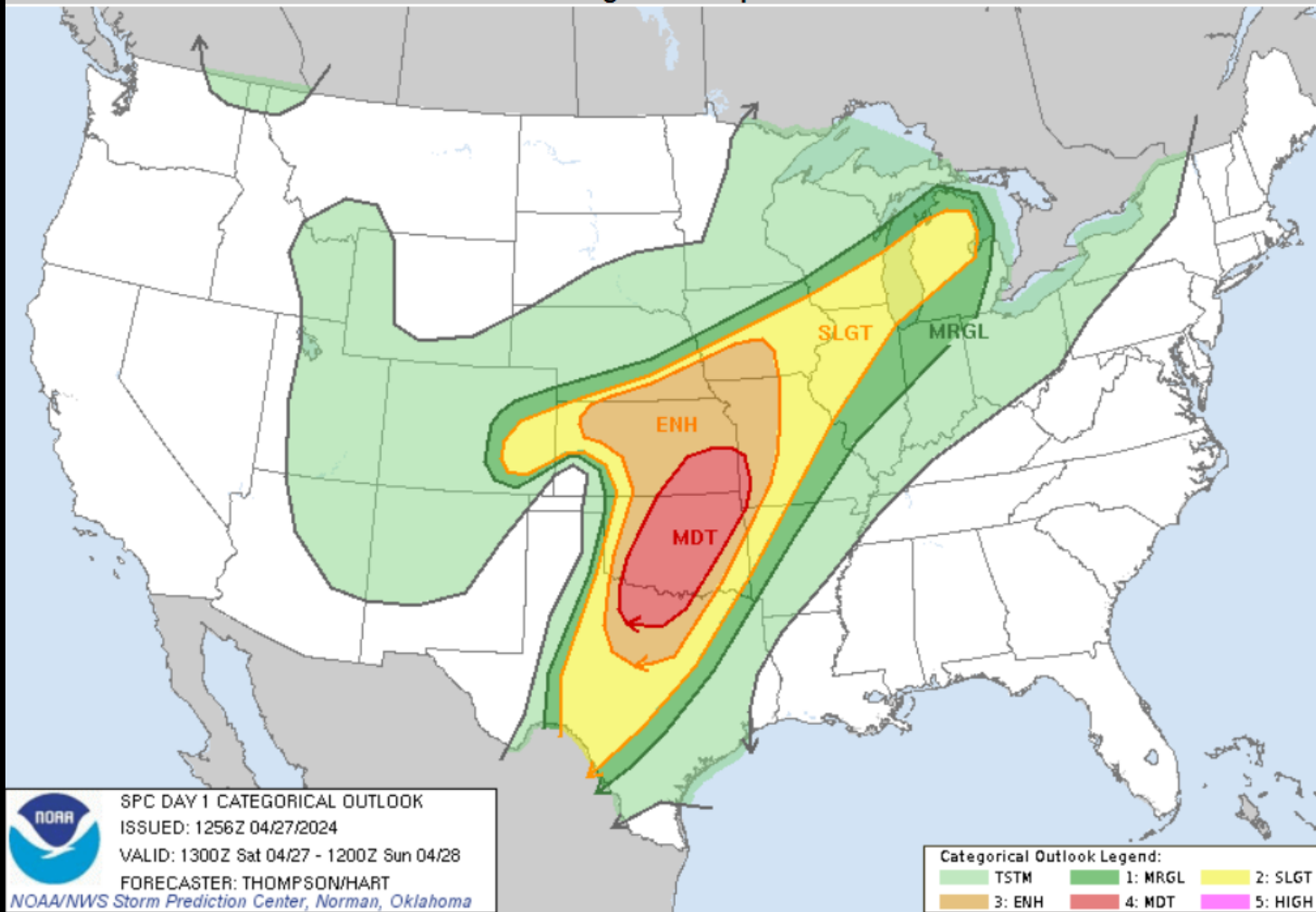


| | Group 1 | Group 2 | Group 3 |
|--------------|----------|----------|----------|
| Highest Risk | High | High | High |
| | Enhanced | Enhanced | Moderate |
| | Moderate | Moderate | Enhanced |
| | Slight | Marginal | Slight |
| Lowest Risk | Marginal | Slight | Marginal |

Apr 27, 2024 1300 UTC Day 1 Convective Outlook

Updated: Sat Apr 27 12:56:20 UTC 2024 (🌐 | 📄)
[Probabilistic to Categorical Outlook Conversion Table](#)

Categorical Graphic



NOAA SPC DAY 1 CATEGORICAL OUTLOOK
 ISSUED: 1256Z 04/27/2024
 VALID: 1300Z Sat 04/27 - 1200Z Sun 04/28
 FORECASTER: THOMPSON/HART
 NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Categorical Outlook Legend:
 TSTM 1: MRGL 2: SLGT
 3: ENH 4: MDT 5: HIGH

| Day 1 Risk | Area (sq. mi.) | Area Pop. | Some Larger Population Centers in Risk Area |
|------------|----------------|------------|--------------------------------------------------------------------------------|
| MODERATE | 67,250 | 4,322,223 | Oklahoma City, OK...Tulsa, OK...Norman, OK...Wichita Falls, TX...Lawton, OK... |
| ENHANCED | 123,611 | 11,995,039 | Dallas, TX...Fort Worth, TX...Kansas City, MO...Arlington, TX...Wichita, KS... |
| SLIGHT | 221,399 | 21,962,587 | Chicago, IL...Milwaukee, WI...Omaha, NE...Madison, WI...Grand Rapids, MI... |
| MARGINAL | 156,984 | 16,413,975 | San Antonio, TX...Austin, TX...St. Louis, MO...Fort Wayne, IN...Lansing, MI... |

Scientist: “We need to make things a little complicated, so we sound smart...”



A photograph of a desert landscape, likely a dry riverbed or a similar natural feature. The terrain is reddish-brown and rocky, with a clear, winding path or channel cutting through the center. The background shows rolling hills under a clear sky. The image is presented as a collage of several overlapping rectangular panels.

Insight # 2:

Action Items: Find
Solutions that are
Achievable and Affordable



Fire



Flood



Snow



Wind



Fire



Flood

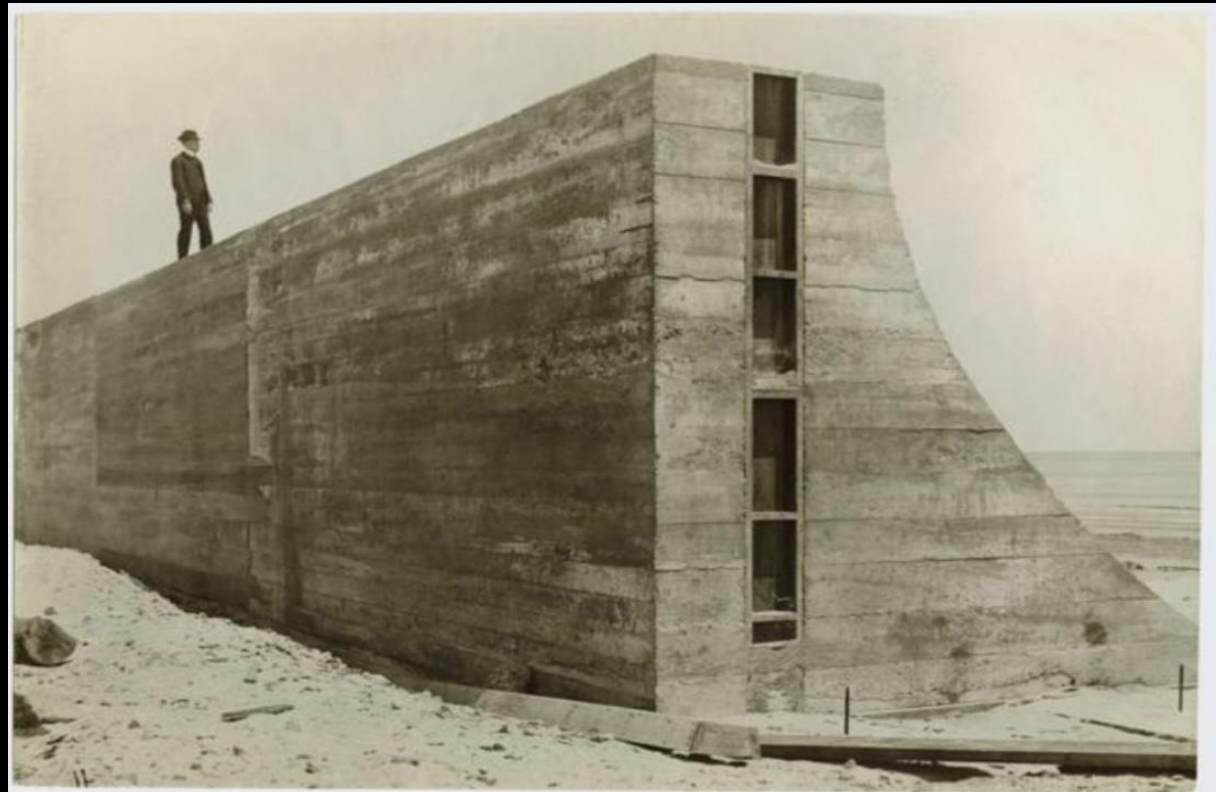
What Can I Do?



Snow



Wind













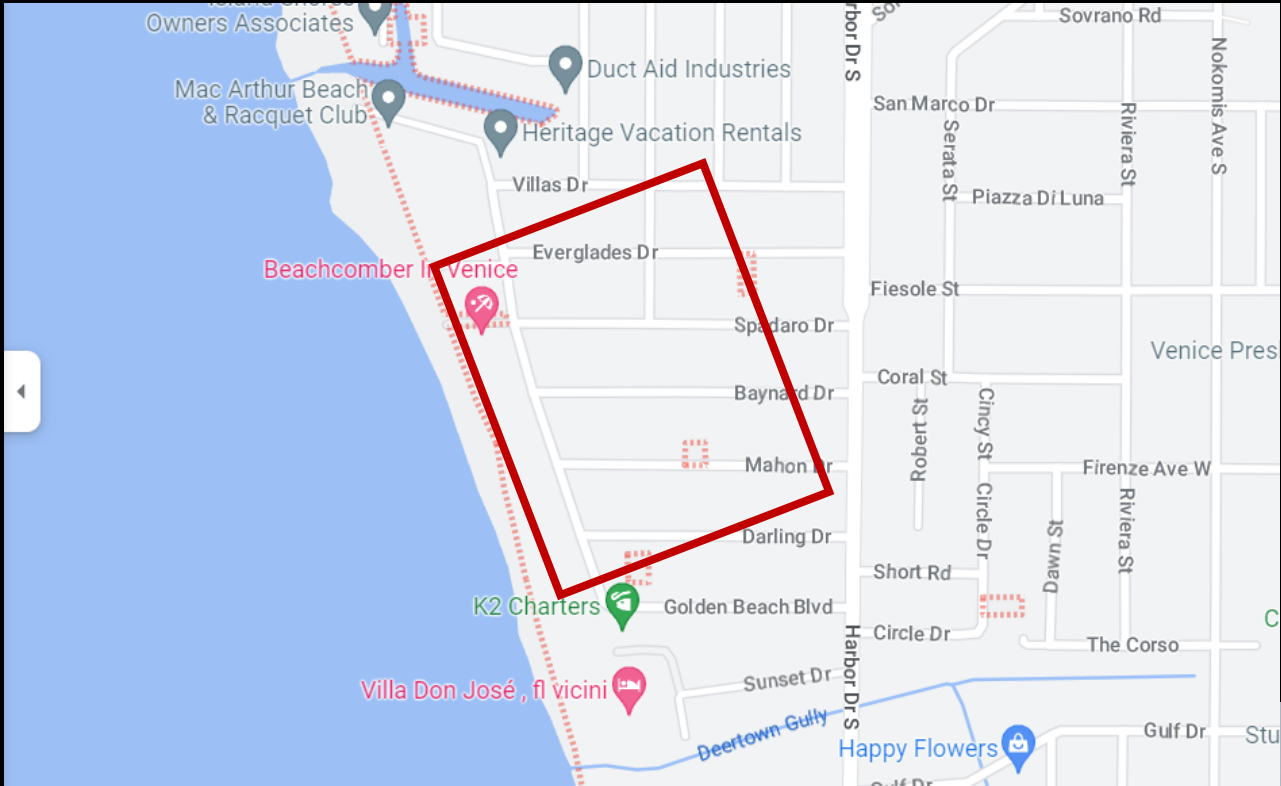


Achievable and Affordable



Insight #1:

Communicating about
Extremes Requires
Imagination



Venice, FL





Mexico Beach, FL October 2018





Mitch Pacyna is with Mary J Wojciechowski at 103 Hercules Dr.

Sep 28, 2022 · Fort Myers Beach, FL · 🌐

Hopefully didn't make a bad decision to stay !! 8am 40mph winds,,,,,SO FAR !!!!



🤔😬😱 185

81 comments 33 shares



Mitch Pacyna is with Mary J Wojciechowski at 103 Hercules Dr.



Sep 28, 2022 · Fort Myers Beach, FL · 🌐

Oh boy !!!!



🥵👍🤯 104

19 comments 28 shares 40.3K views



Mitch Pacyna is with Mary J
Wojciechowski at 103 Hercules Dr.



Sep 28, 2022 · Fort Myers Beach, FL · 🌐

Too late to do anything now !! GOOD BYE BAR ! 27
YEARS in Florida, NEVER SEEN ANYTHING LIKE THIS
!!



🙄😭👍 635 120 comments 374 shares 133K views



Mitch Pacyna



Sep 28, 2022 · 🌐

OK,,WE'RE TERRIFIED !!



1.2K

608 comments 212 shares



Mitch Pacyna is with Mary J Wojciechowski at 103 Hercules Dr.



Sep 28, 2022 · Fort Myers Beach, FL · 🌐

Hopefully didn't make a bad decision to stay !! 8am 40mph winds,,,,,SO FAR !!!!



😭😭😭 185

81 comments 33 shares

The most extreme events
produce conditions outside our
frame of reference.

At some point, the numbers don't
mean anything to most people.

Mexico Beach, FL October 2018







Use Storytelling as a Platform...



Every Story Has Three Parts

1. Setting
2. Problem
3. Solution

Every Story Has Three Parts

1. **Setting:** Central Texas is a great place to live, with a robust economy
2. **Problem:** Unfortunately, demand for water can exceed capacity in this drought-prone region
3. **Solution:** Fortunately, (our organization) has innovated solutions to better meet demand

Video Production



Audio Content (Podcasts)



#2 Podcast on Natural
Disasters (FeedSpot)





“Hurricane Hal” Needham Ph.D.

Extreme Weather and Disaster Scientist
Based in Galveston, TX

Phone/ Text: 409-310-0525

halneedham@cnc-resource.com





Hurricane Hal



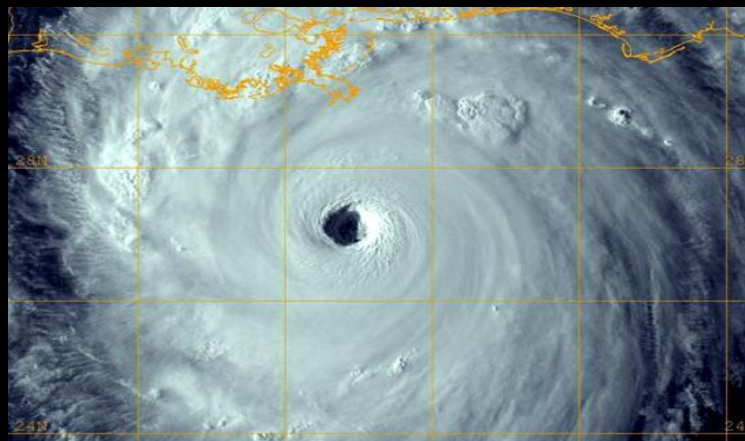
_hurricanehal



hurricanehal_



Communication: The Last Frontier in Science



Dr. "Hurricane Hal" Needham
September 19, 2024