

2024 HURREVAC Training Webinar Series

Day 2 – Wind Forecast Features

June 11, 2024



FEMA



NATIONAL HURRICANE PROGRAM



HURREVAC

HURRICANE DECISION SUPPORT TOOL



THIS WEEK'S AGENDA

JUNE 10: Intro to HURREVAC and the NHP (*available on YouTube*)

JUNE 11: Wind Forecast Features

JUNE 12: Evacuation Timing Features

JUNE 13: Storm Surge and Flooding Hazards

JUNE 14: Applying HURREVAC for Planning and Operations

Registration is still open for Days 3, 4 & 5 at webinars.hurrevac.com

Today's Presenters



Dan Brown

Hurricane Specialist Unit Branch Chief
National Hurricane Center

John Boyer

Sea Island Software



NATIONAL HURRICANE PROGRAM

HURREVAC WEBINAR SERIES

Day 2 – Wind Products

NHC WIND-RELATED PRODUCTS

- Tropical Weather Outlook
- Error Cone
- Forecast Advisory
- Wind Speed Probabilities
- Time of Arrival Graphics
- Watches and Warnings



TROPICAL OUTLOOK

Assessment of Tropical Activity



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

TROPICAL WEATHER OUTLOOK
NWS NATIONAL HURRICANE CENTER MIAMI FL
800 PM EDT MON OCT 20 2014

For the North Atlantic...Caribbean Sea and the Gulf of Mexico:

Southwest Gulf of Mexico (AL92):

Showers and thunderstorms associated with an area of low pressure located over the southwestern Bay of Campeche have changed little in organization since this afternoon. This system has the potential to become a tropical cyclone during the next couple of days while it moves slowly eastward across the southern Bay of Campeche. Later in the week, the low is forecast to interact and possibly merge with a frontal system over the southeastern Gulf of Mexico or northwestern Caribbean Sea. An Air Force Reserve reconnaissance aircraft is scheduled to investigate the disturbance tomorrow afternoon, if necessary. Interests in the Yucatan Peninsula should monitor the progress of this system.

- * Formation chance through 48 hours...medium...50 percent.
- Formation chance through 7 days...medium...60 percent.

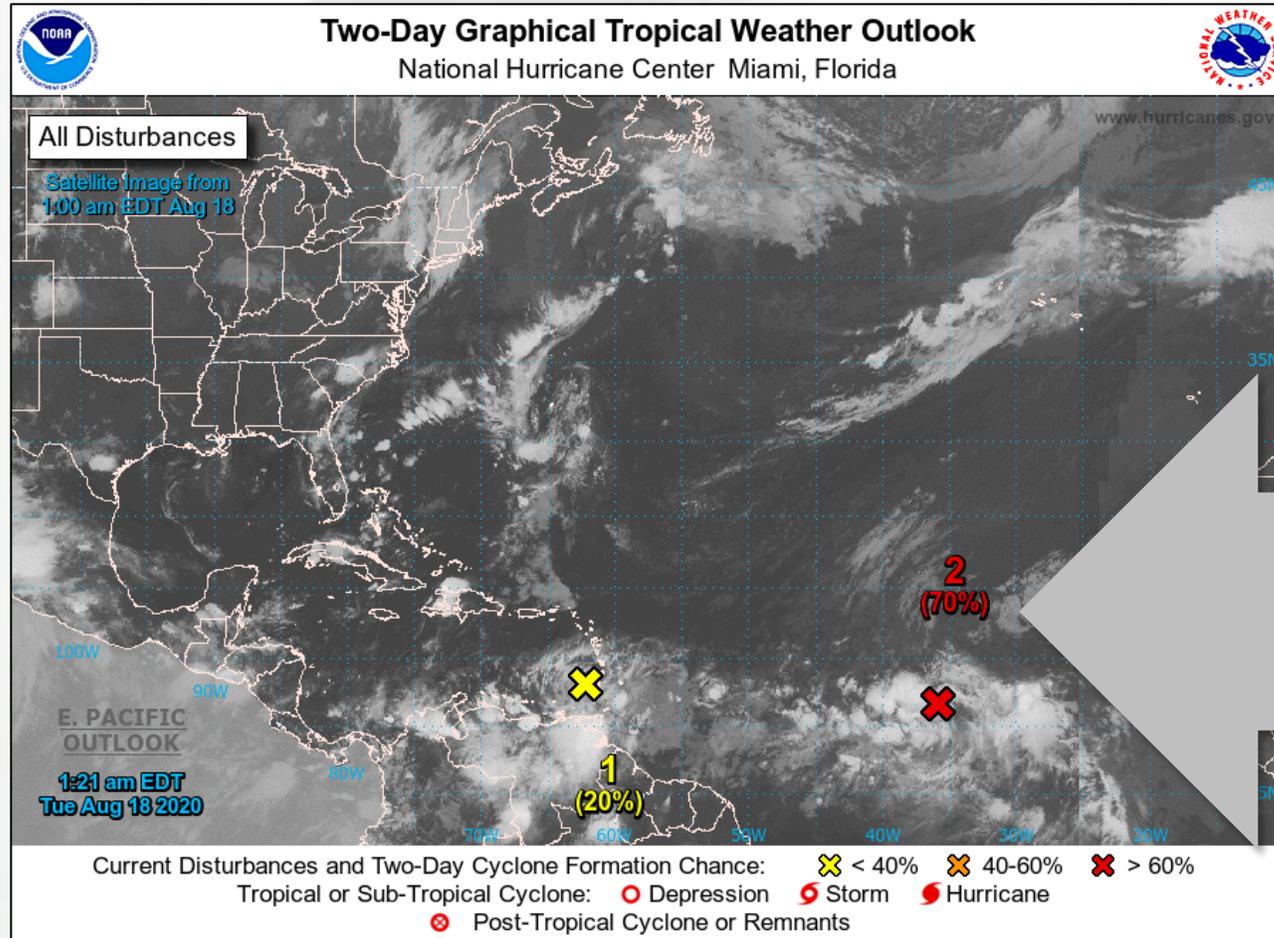
Forecaster Brown

Where is it located?

Potential for development?
Headed where?

TROPICAL OUTLOOK

2-Day Formation Potential

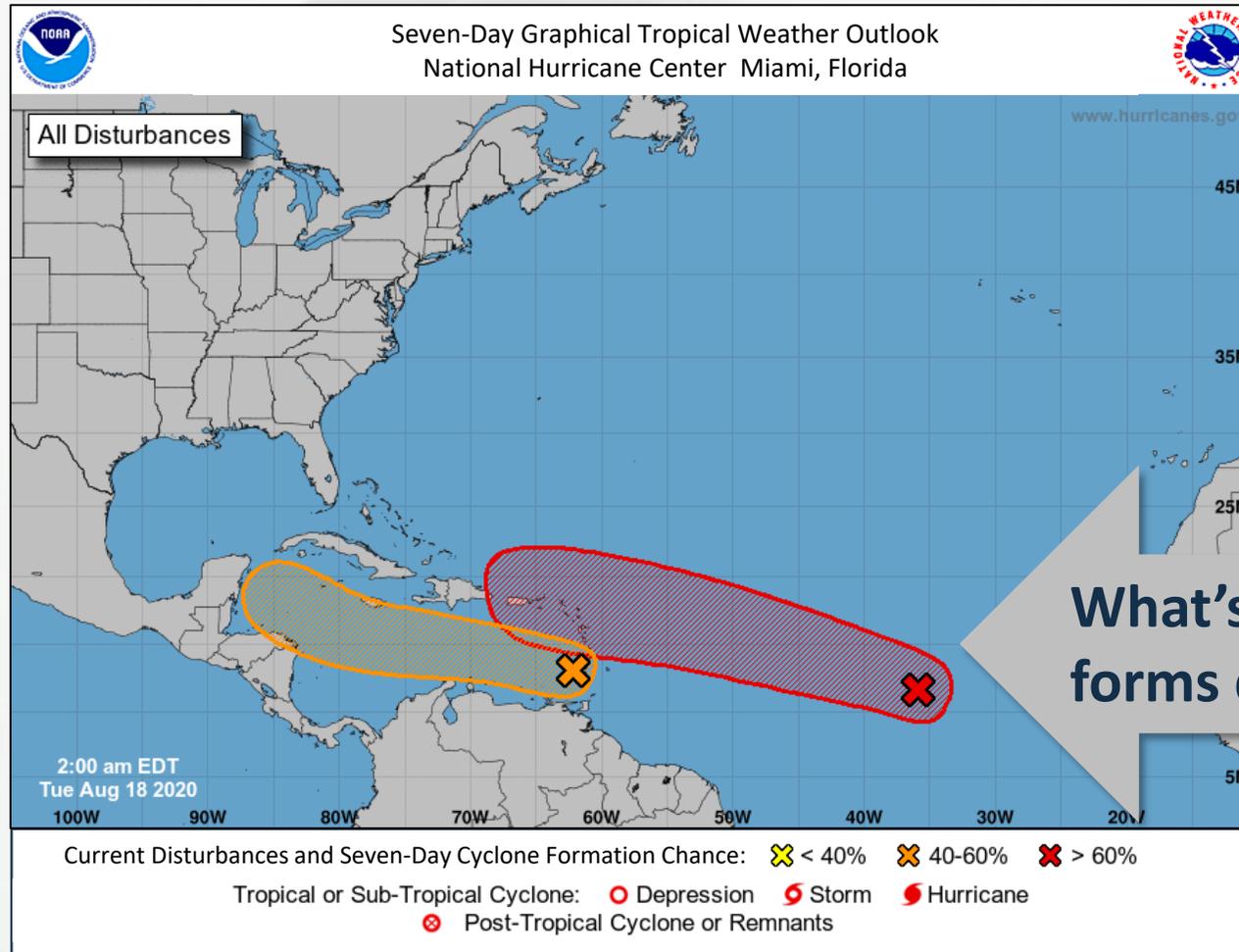


- Current location of disturbances
- Formation chance during the next 48 hrs

- **CATEGORICAL**
(Low, Medium, and High)
- **PROBABILITIES**

TROPICAL OUTLOOK

7-Day Formation Potential



- Initial location of disturbance (x) indicated
- Formation potential during the next 7 days
 - Shading represents formation area

What's the chance this area forms during the next 7 days?

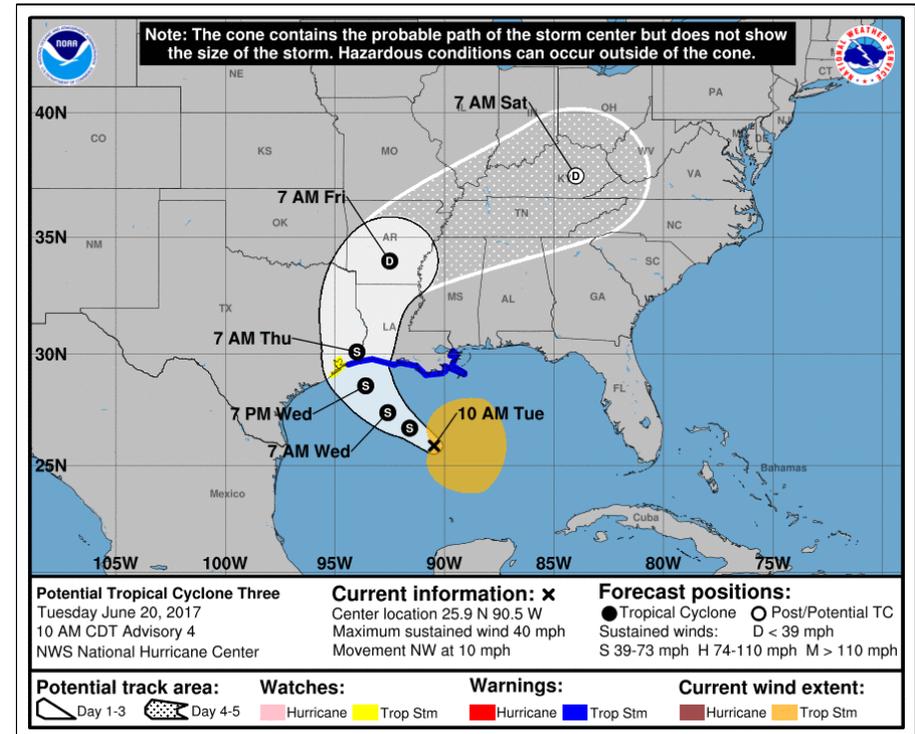
NATIONAL HURRICANE CENTER

Potential, Post-, Tropical Cyclones

NHC ADVISORIES

- **Tropical Cyclones**
 - Tropical Depressions
 - Tropical Storms
 - Hurricanes
- **Post-Tropical Cyclones**
 - Remains a threat to land (e.g., Sandy & Hermine)
- **Potential Tropical Cyclones**
 - Systems not yet a tropical cyclone
 - Threat of TS-force winds to land within 48 hours. (Introduced in 2017)

Potential Tropical Cyclone Three (Cindy 2017)



HURREVAC WEBINAR SERIES

Day 2 – Wind Products

NHC WIND PRODUCTS

Critical for preparedness and evacuation decision making

- **Deterministic:**
 - Based on a Perfect NHC Track & Wind Radii Forecast
 - No forecast uncertainty
 - Information out to 5-day, but Hurrevac displays out to 72 h
- **Wind Speed Probabilities:**
 - Accounts for Track, Intensity, and Size Uncertainty
 - Chance of TS, Strong TS, and Hurricane-force winds
 - Time of Arrival (TOA) of TS-force winds



HURREVAC WEBINAR SERIES

Day 2 – Wind Products



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



Tropical Storm Michael

...MICHAEL ALMOST A HURRICANE... ...HURRICANE WATCH ISSUED FOR THE FLORIDA PANHANDLE AND FLORIDA BIG BEND...

4:00 AM CDT Mon Oct 8

Location: 20.6°N 85.5°W

Moving: N at 7 mph

Min pressure: 983 mb

Max sustained: 70 mph

**Public
Advisory**

#7

400 AM CDT

**Aviso
Publico**

#7

400 AM CDT

**Forecast
Advisory**

#7

0900 UTC

**Forecast
Discussion**

#7

400 AM CDT

**Wind Speed
Probabilities**

#7

0900 UTC

**NWS Local
Products**

613 AM CDT

**US Watch/
Warning**

452 AM CDT



Wind Speed
Probabilities



Arrival Time
of Winds



Wind
History



Warnings/Cone
Interactive Map



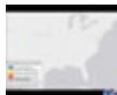
Warnings/Cone
Static Images



Warnings and
Surface Wind



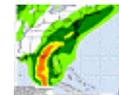
Key
Messages



Storm Surge
Inundation



Storm Surge
Watch/Warning



U.S. Rainfall
Potential



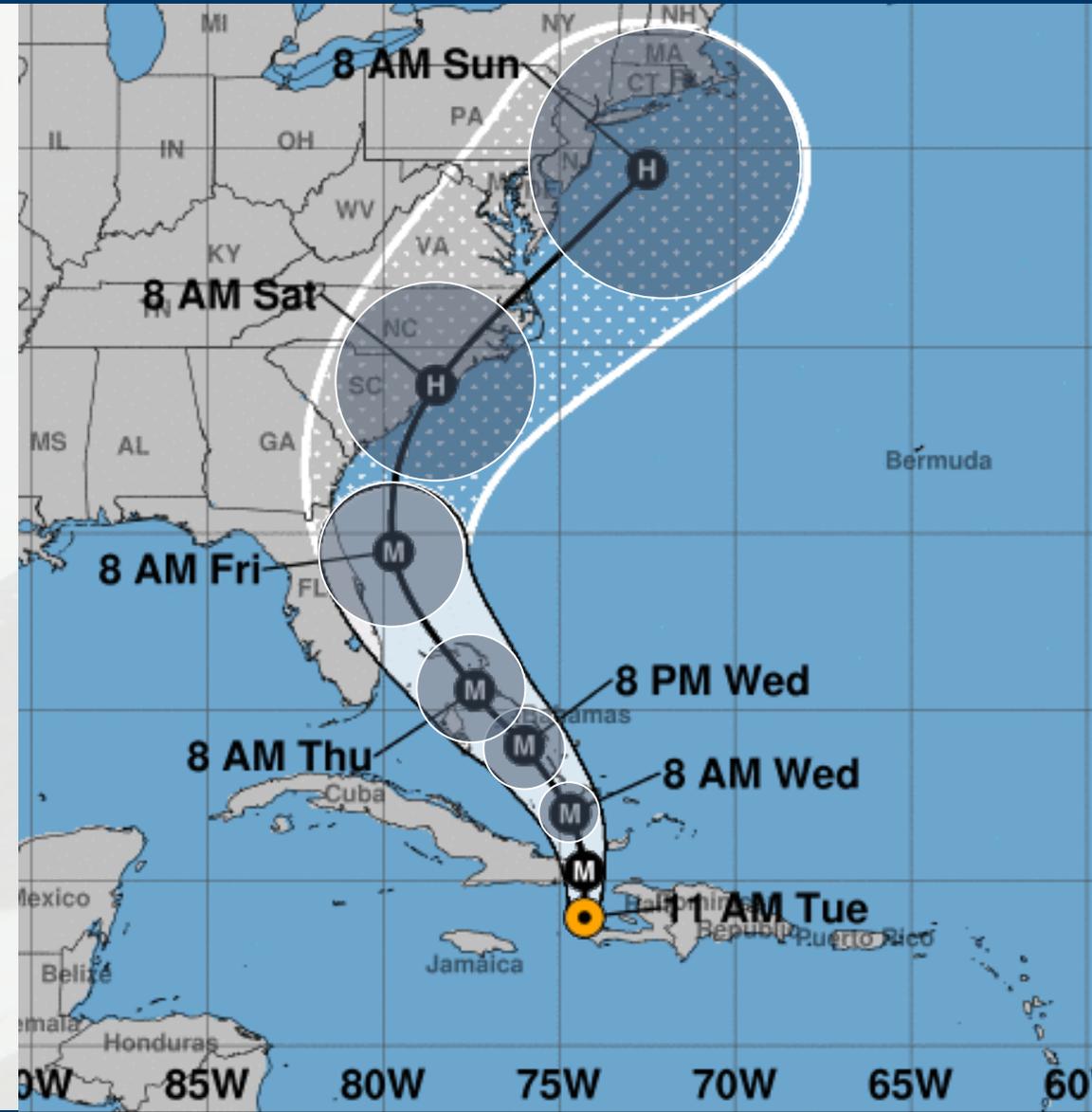
Flash Flood
Potential

FORECAST ERROR CONE

The cure for the skinny black line?

ERROR CONE

- Probable track of the center of the tropical cyclone
- Formed by connecting circles centered on each forecast point
- Each circle uses NHC historical (5-year) track errors
Actual storm position will be within the circle 67% of the time

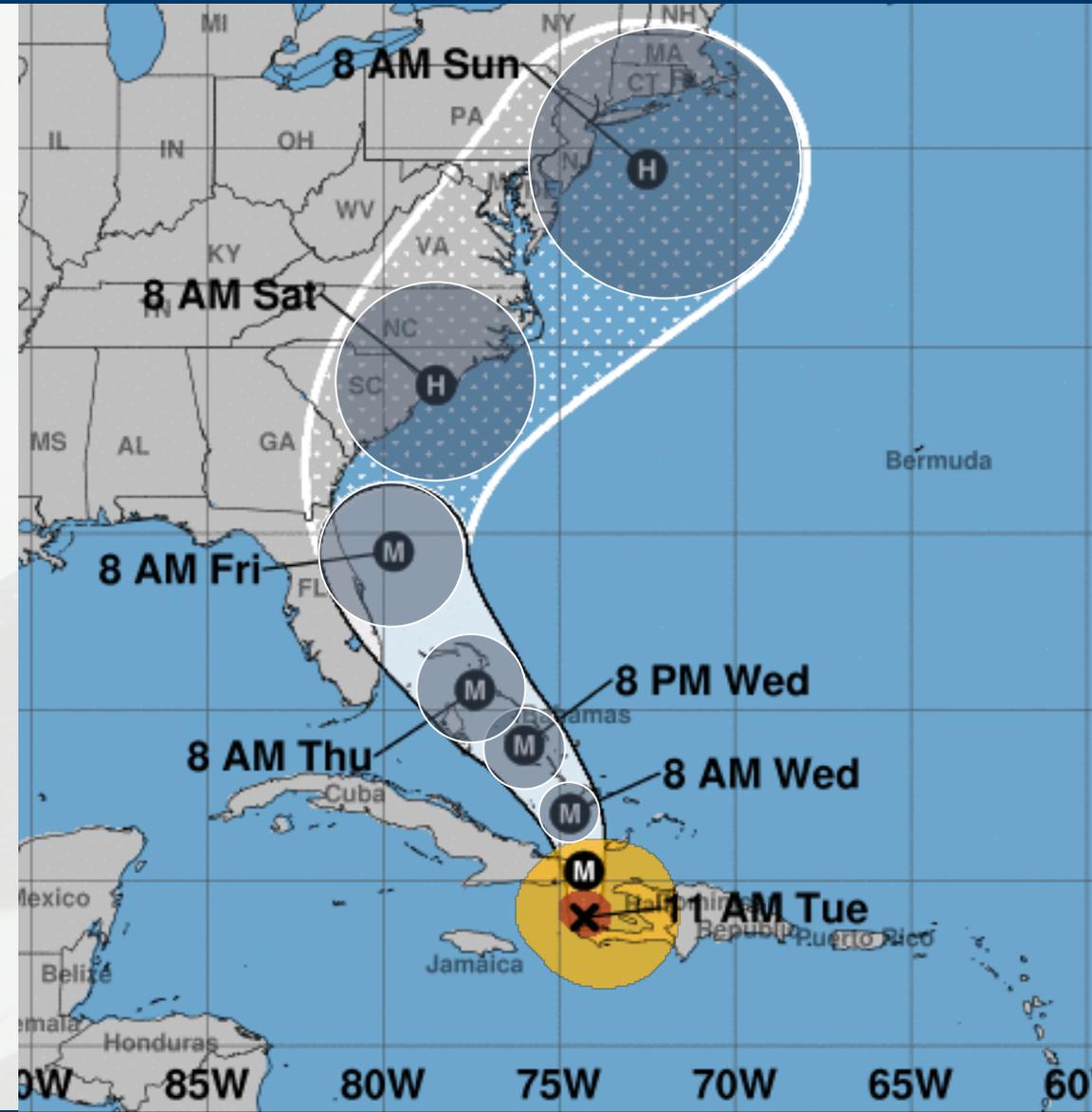


FORECAST ERROR CONE

No worries, not in the cone?

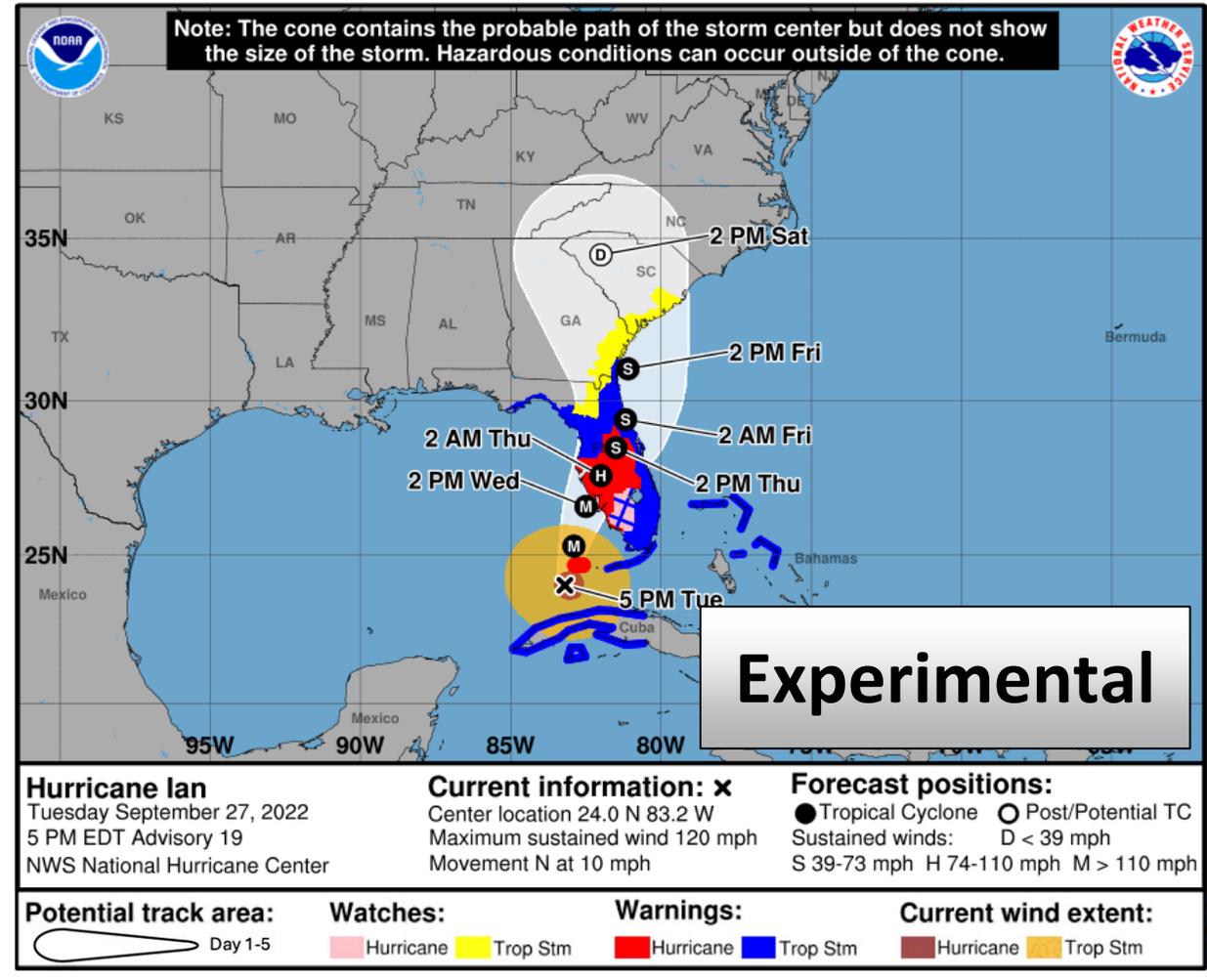
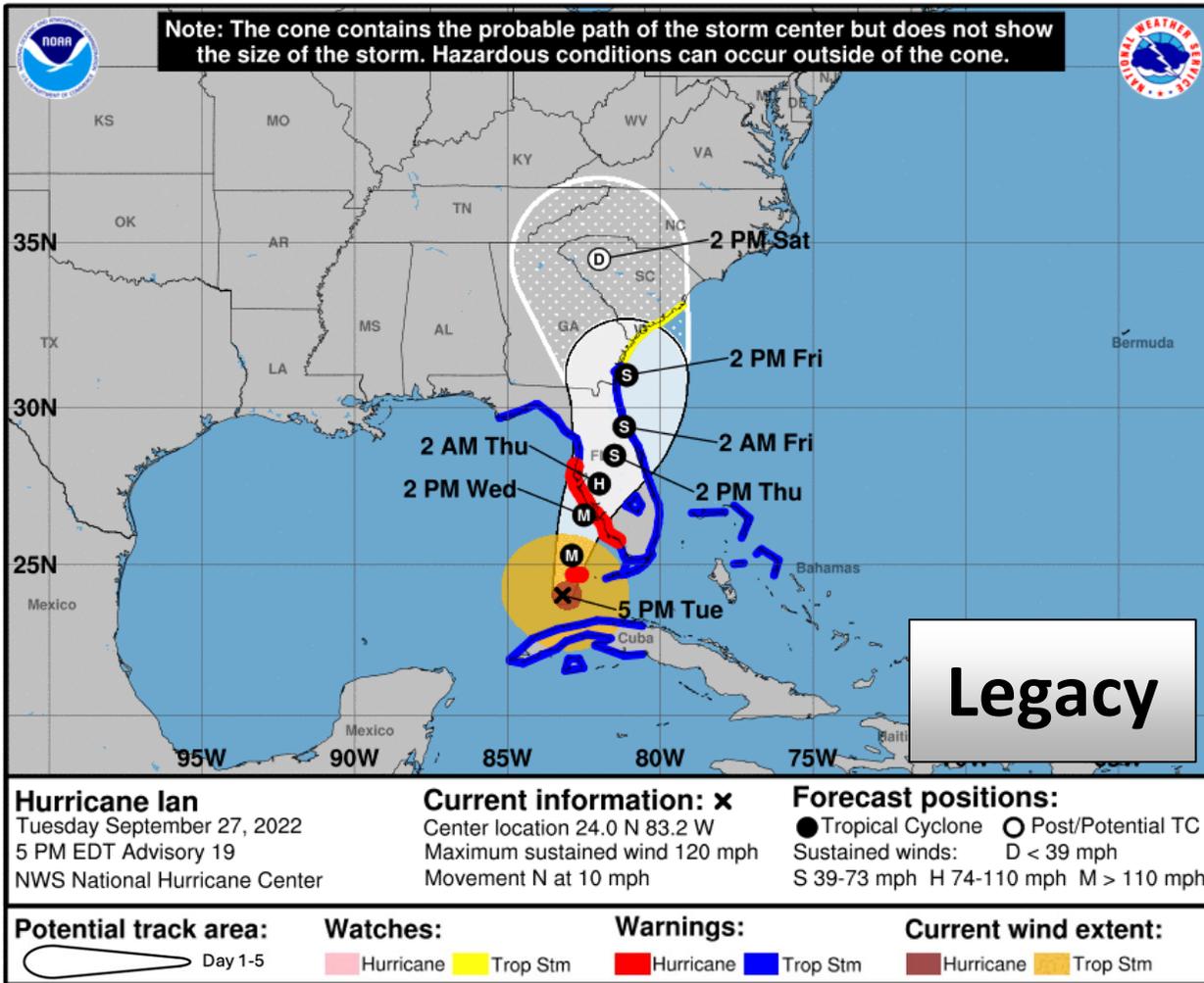
ERROR CONE

- Only displays information about track uncertainty
Nothing about specific impacts
- Impacts can occur well outside the area enclosed by the cone
Center is expected to be outside the cone about 1/3 of the time

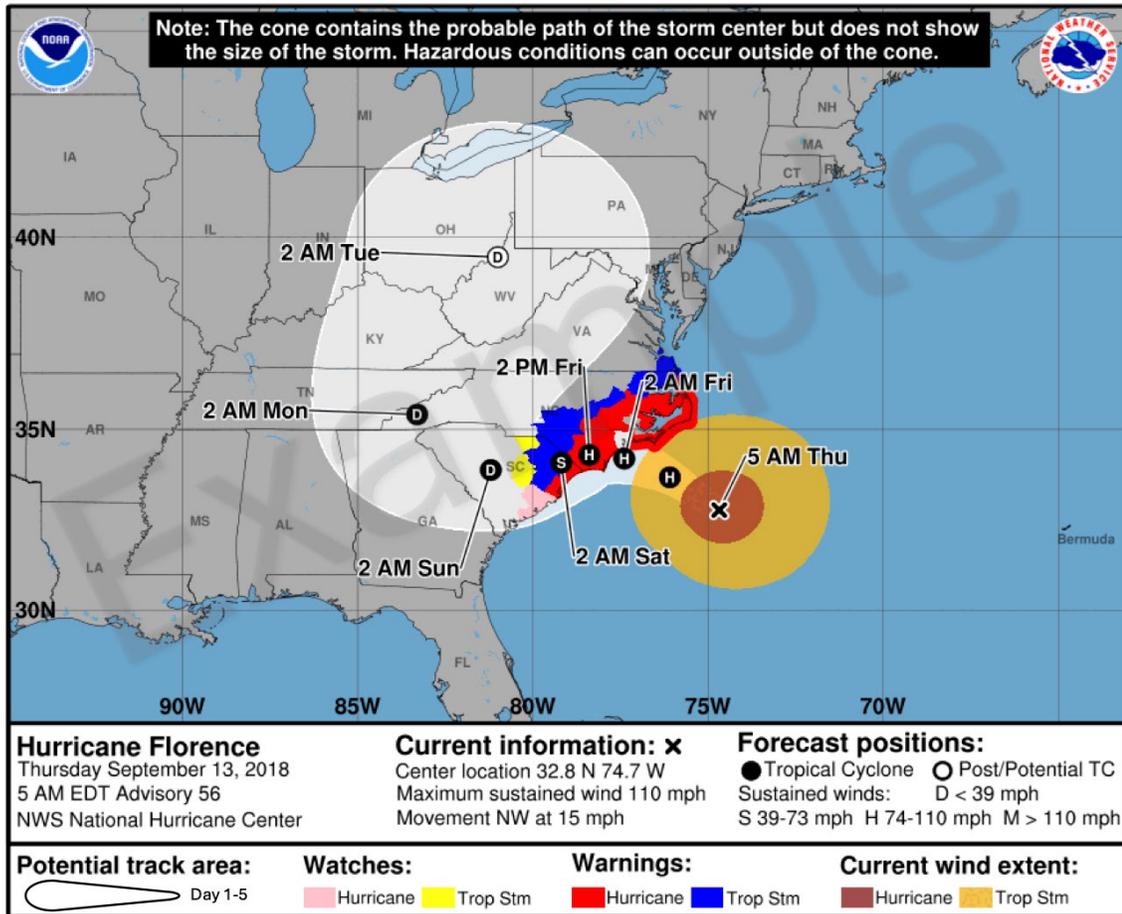


New Cone Helps to Convey Wind Risk

Depicts coastal and inland areas in the U.S. under hurricane and tropical storm watches and warnings



New for 2024: Depicting Inland Watches and Warnings on Cone



- Experimental cone graphic depicting inland U.S. tropical storm and hurricane watches and warnings will be available in 2024 around mid August
- Will better 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
- Feedback and comments will be collected during experimental period
- Inland Watch/Warning information not available in Hurrevac

FORECAST ADVISORY

Position. Size. Radii. Intensity.



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



TROPICAL STORM MICHAEL FORECAST/ADVISORY NUMBER 7
NWS NATIONAL HURRICANE CENTER MIAMI FL AL142018
0900 UTC MON OCT 08 2018

A TROPICAL STORM WATCH HAS BEEN ISSUED FROM THE SUWANEE RIVER TO ANNA MARIA ISLAND FLORIDA...INCLUDING TAMPA BAY.

PRESENT MOVEMENT TOWARD THE NORTH OR 360 DEGREES AT 6 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 983 MB
MAX SUSTAINED WINDS 60 KT WITH GUSTS TO 75 KT.

50 KT..... 80NE 80SE 0SW 0NW.

34 KT.....120NE 150SE 90SW 100NW.

12 FT SEAS..135NE 120SE 30SW 60NW.

WINDS AND SEAS VARY GREATLY IN EACH QUADRANT. RADII IN NAUTICAL MILES ARE THE LARGEST RADII EXPECTED ANYWHERE IN THAT QUADRANT.

REPEAT...CENTER LOCATED NEAR 20.6N 85.5W AT 08/0900Z
AT 08/0600Z CENTER WAS LOCATED NEAR 20.2N 85.5W

FORECAST VALID 08/1800Z 21.7N 85.6W
MAX WIND 70 KT...GUSTS 85 KT.

64 KT... 30NE 30SE 0SW 0NW.

50 KT... 90NE 90SE 30SW 30NW.

34 KT...130NE 150SE 90SW 120NW.

FORECAST VALID 09/0600Z 23.5N 86.1W

Current wind radii

Forecast wind radii

FORECAST ADVISORY

Position. Size. Radii. Intensity.

WIND RADII

- NHC forecasts the wind radii in four quadrants



TROPICAL STORM MICHAEL FORECAST/ADVISORY NUMBER 7
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0500 FT MON OCT 08 2018

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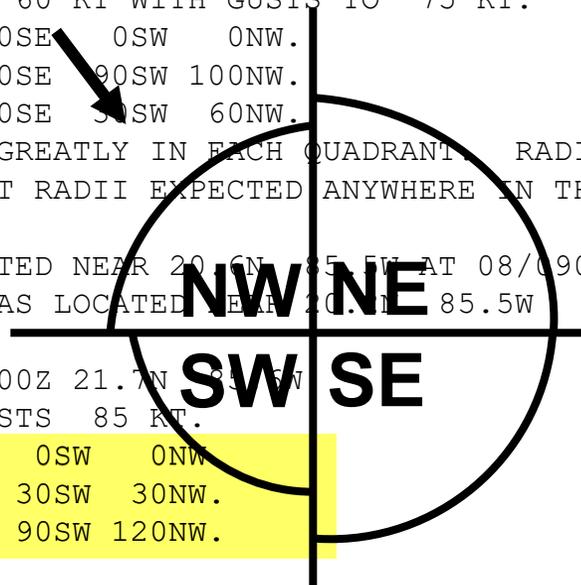
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FORECAST VALID 09/0600Z 23.5N 86.1W



Radii are the largest distance from the center in a quadrant

Leads to an inherent over-estimate of radii, especially near land

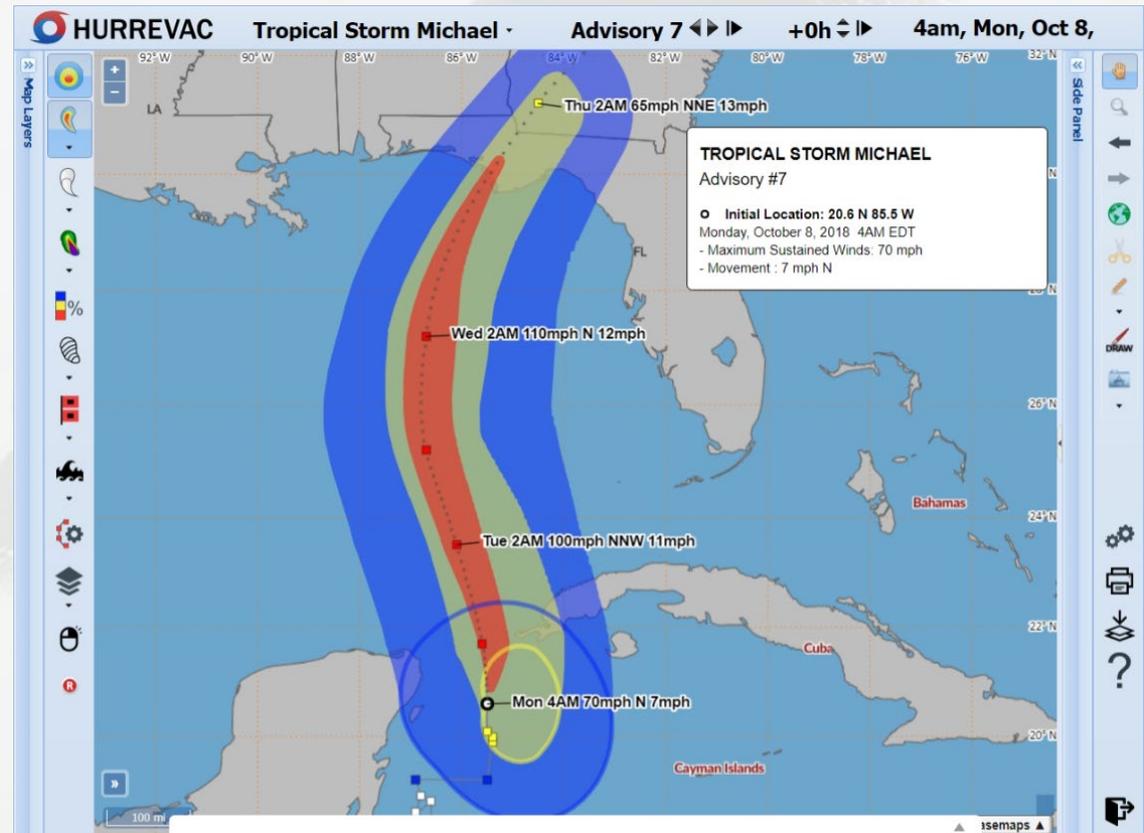
FORECAST ADVISORY

Position. Size. Radii. Intensity.

WIND RADII

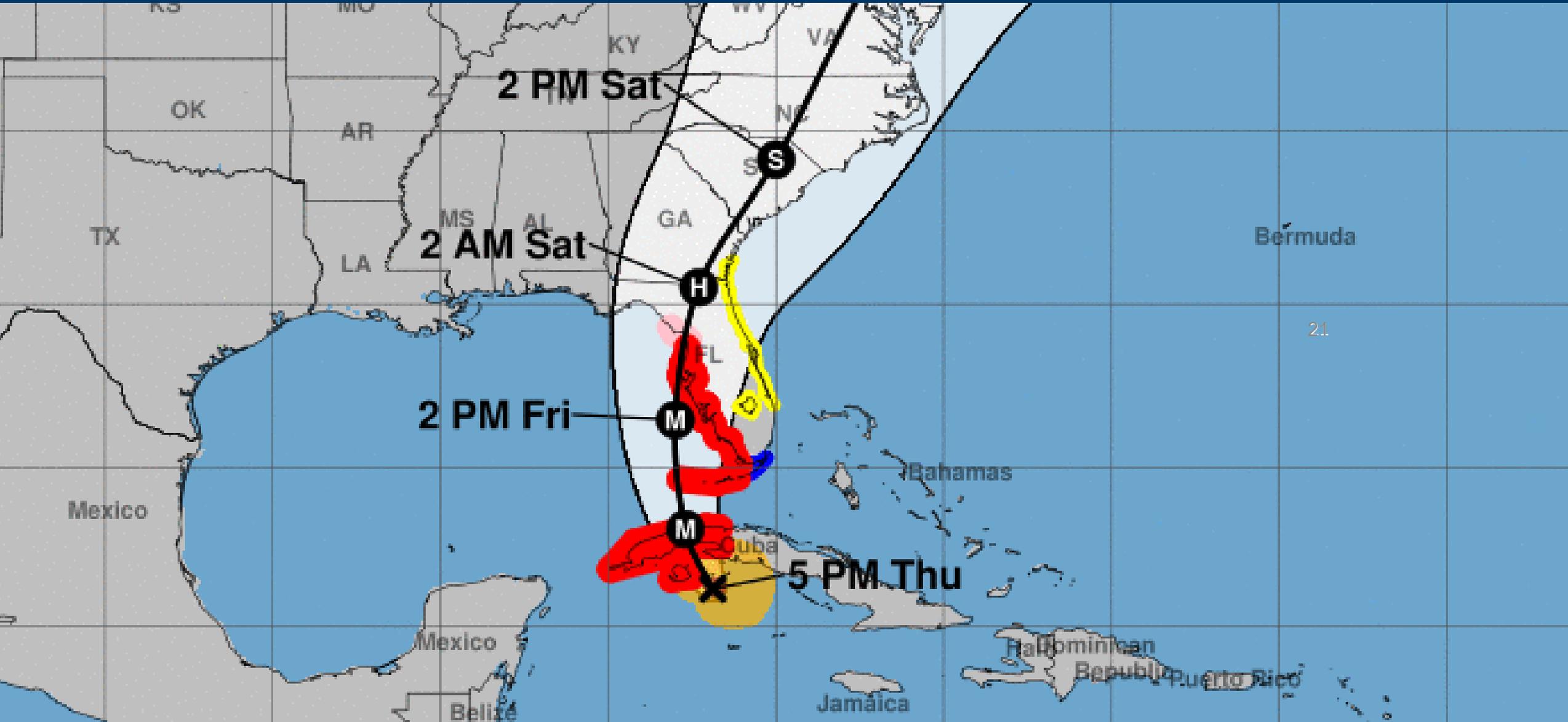
- NHC forecasts the wind radii in four quadrants

	34 kt (Blue)	50 kt (Yellow)	64 kt (Red)
12 hr	Yes	Yes	Yes
24 hr	Yes	Yes	Yes
36 hr	Yes	Yes	Yes
48 hr	Yes	Yes	Yes
60 hr	Yes	Yes	N/A
72 hr	Yes	Yes	N/A
96 hr	Yes	Yes	N/A
120 hr	Yes	Yes	N/A



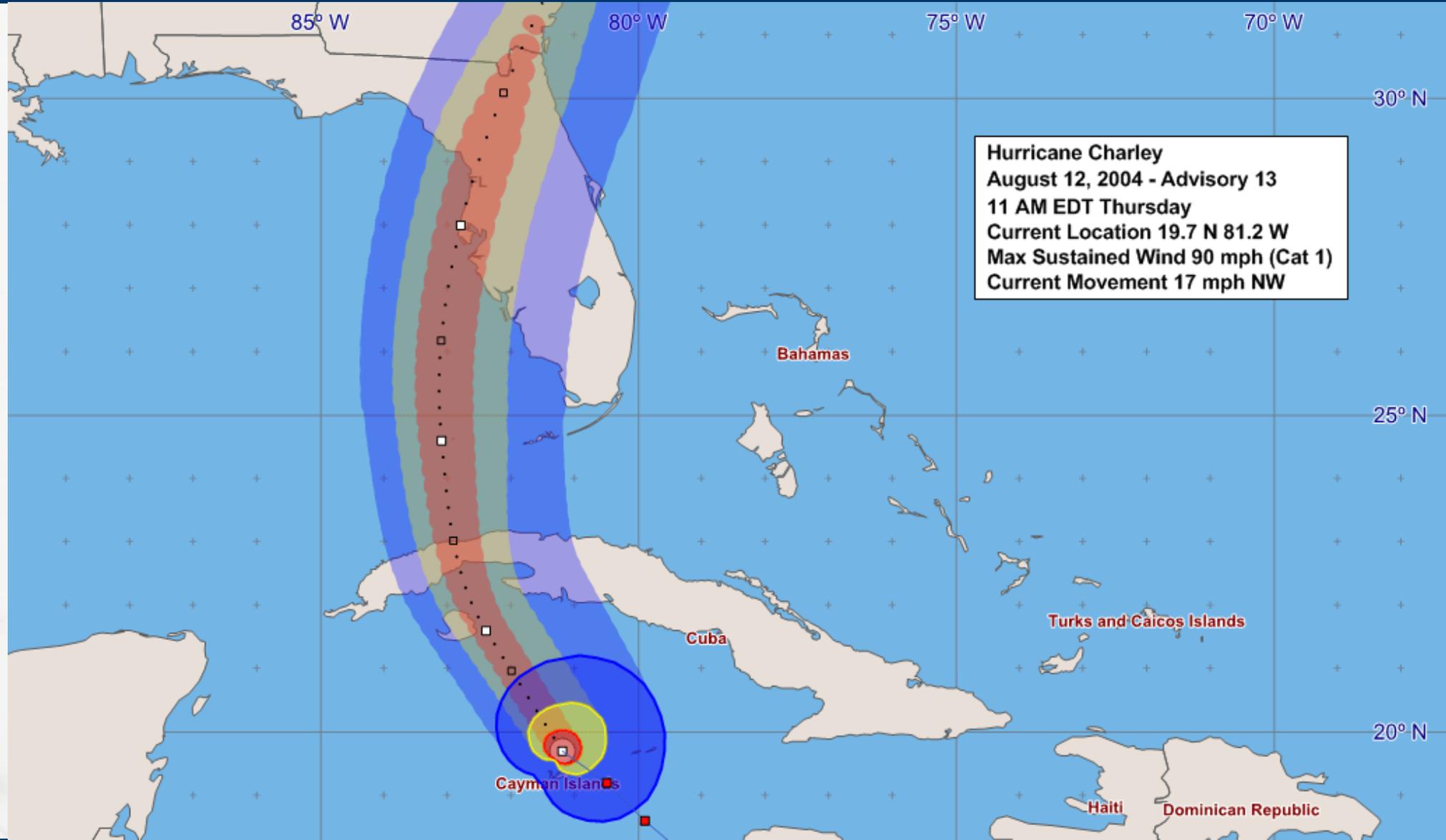
HURRICANE CHARLEY

Don't focus on the skinny black line.



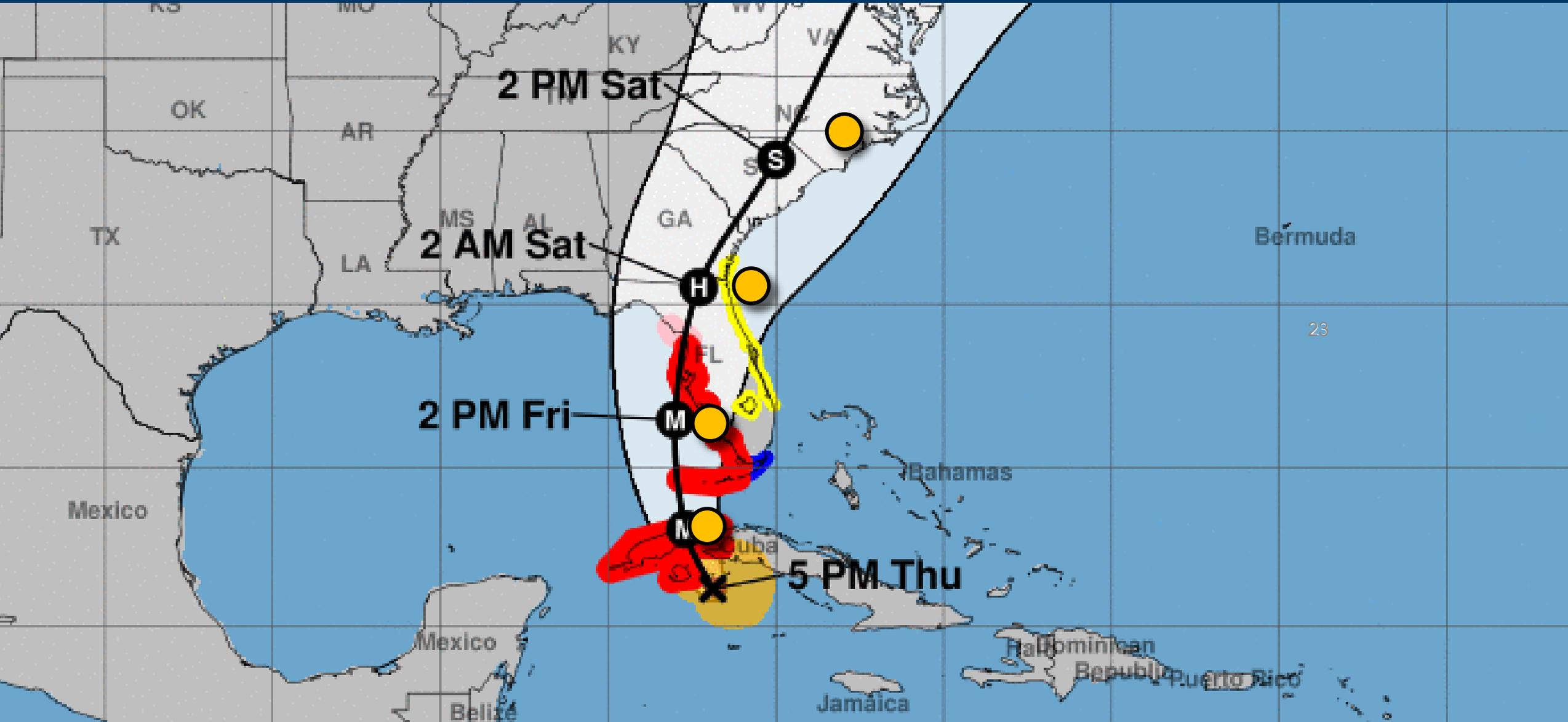
HURRICANE CHARLEY

Don't focus on the skinny black line.



HURRICANE CHARLEY

Don't focus on the skinny black line.



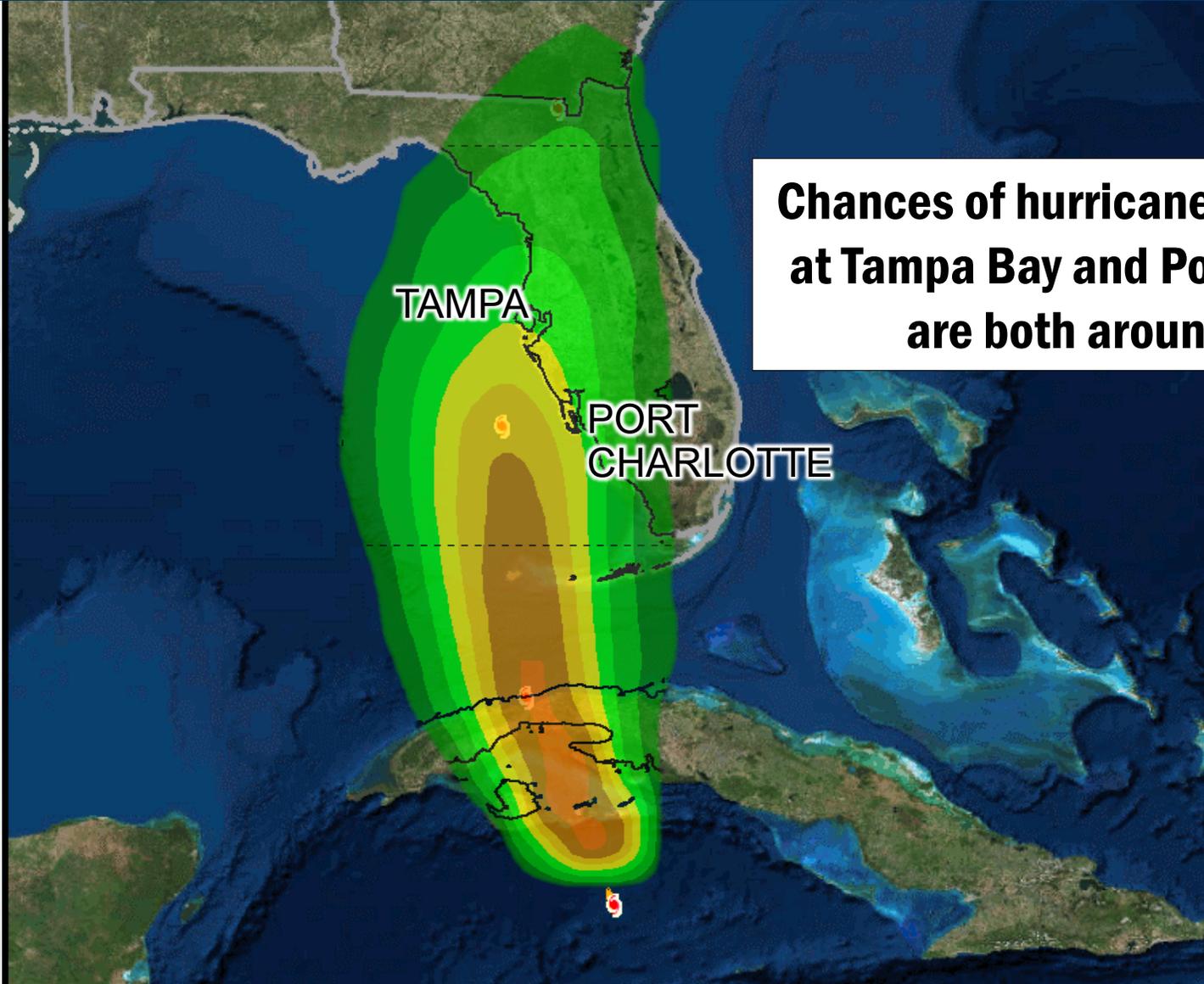
HURRICANE CHARLEY

Would alternate scenarios help?



HURRICANE CHARLEY

Would alternate scenarios help?



**Chances of hurricane-force winds
at Tampa Bay and Port Charlotte
are both around 30%**

WIND SPEED PROBABILITIES

Text Product



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TROPICAL STORM MICHAEL WIND SPEED PROBABILITIES NUMBER 7
 NWS NATIONAL HURRICANE CENTER MIAMI FL AL142018
 0900 UTC MON OCT 08 2018

- - - - WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS - - - -

TIME PERIODS	FROM 06Z MON		FROM 18Z MON		FROM 06Z TUE		FROM 18Z TUE		FROM 06Z WED		FROM 06Z THU		FROM 06Z FRI	
	TO 18Z MON	TO 06Z TUE	TO 18Z TUE	TO 06Z WED	TO 06Z THU	TO 06Z FRI	TO 06Z SAT							
FORECAST HOUR	(12)	(24)	(36)	(48)	(72)	(96)	(120)							
LOCATION	KT													
TALLAHASSEE FL 34	X	X (X)	1 (1)	6 (7)	68 (75)	6 (81)	X (81)							
TALLAHASSEE FL 50	X	X (X)	X (X)	1 (1)	41 (42)	6 (48)	X (48)							
TALLAHASSEE FL 64	X	X (X)	X (X)	X (X)	20 (20)	4 (24)	X (24)							
APALACHICOLA 34	X	X (X)	5 (5)	29 (34)	57 (91)	1 (92)	X (92)							
APALACHICOLA 50	X	X (X)	X (X)	6 (6)	59 (65)	2 (67)	X (67)							
APALACHICOLA 64	X	X (X)	X (X)	1 (1)	39 (40)	1 (41)	X (41)							
PANAMA CITY FL 34	X	X (X)	4 (4)	26 (30)	60 (90)	1 (91)	X (91)							
PANAMA CITY FL 50	X	X (X)	X (X)	6 (6)	57 (63)	1 (64)	X (64)							
PANAMA CITY FL 64	X	X (X)	X (X)	1 (1)	37 (38)	X (38)	X (38)							

Location-Specific Probabilities

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force

WIND SPEED PROBABILITIES

Text Product



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PANAMA CITY FL 64	X	X (X)	X (X)	1 (1)	37 (38)	X (38)	X (38)

Onset Probabilities

- Timing information

WIND SPEED PROBABILITIES

Text Product



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Cumulative Probabilities

- Total chance through the time period

WIND SPEED PROBABILITIES

5-Day Cumulative Graphic



Location-Specific Probabilities

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force

WIND SPEED PROBABILITIES

5-Day Cumulative Graphic



Location-Specific Probabilities

- Tropical-Storm-Force
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WIND SPEED PROBABILITIES

5-Day Cumulative Graphic

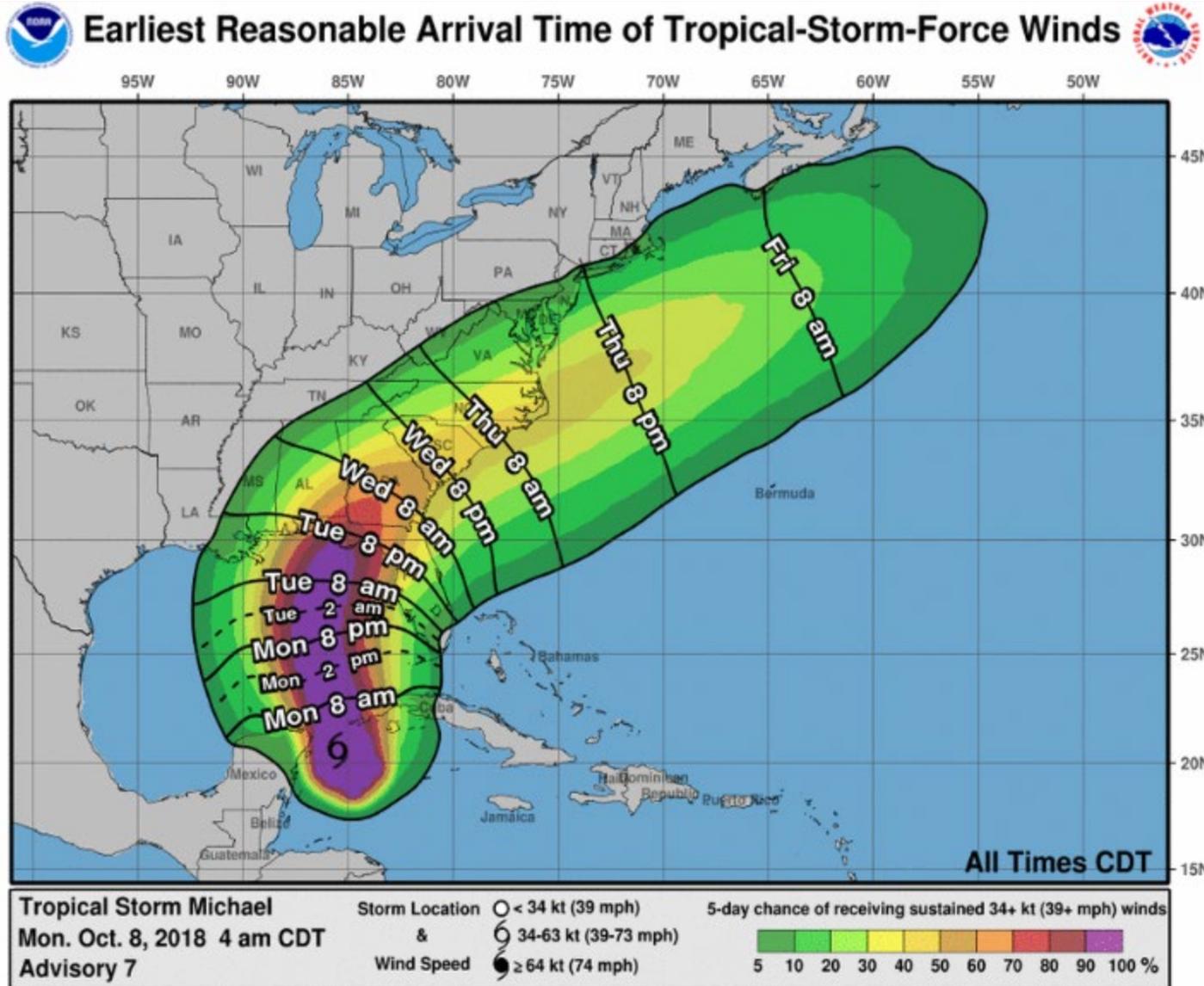


Location-Specific Probabilities

- Tropical-Storm-Force
- 58 mph
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WIND SPEED PROBABILITIES

Time of Arrival of TS Winds

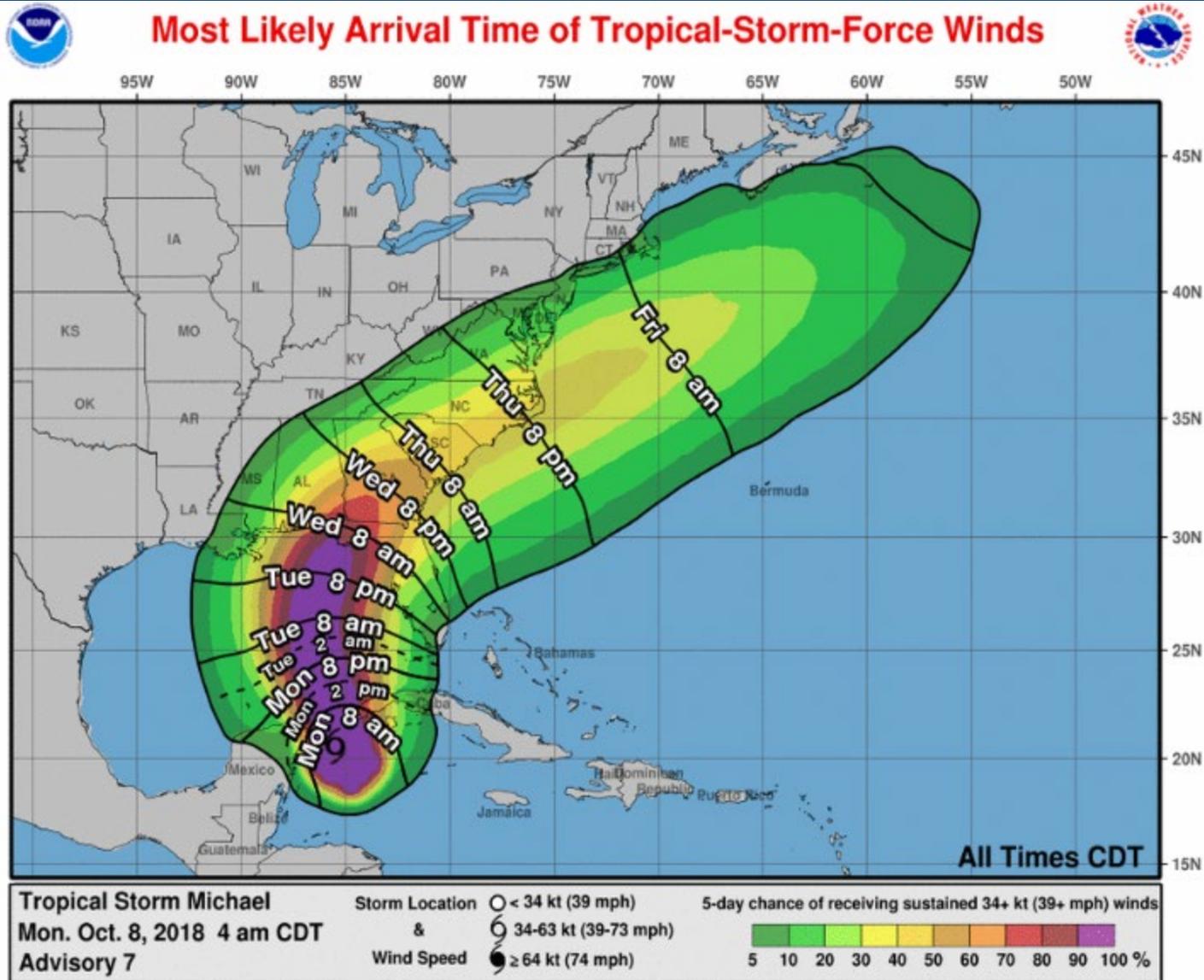


Time of Arrival of TS Winds

- Earliest Reasonable
- Most Likely

WIND SPEED PROBABILITIES

Time of Arrival of TS Winds



Time of Arrival of TS Winds

- Earliest Reasonable
- Most Likely

WATCHES & WARNINGS

Where. When. What. Action.



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TROPICAL STORM WATCH

Tropical storm conditions are **possible** somewhere within the watch area, generally **within 48 hours**

TROPICAL STORM WARNING

Tropical storm conditions are **expected** somewhere within the warning area, generally **within 36 hours**



WATCHES & WARNINGS

Where. When. What. Action.



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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



HURRICANE WATCH

Hurricane conditions are **possible** somewhere within the watch area, generally **within 48 hours**

HURRICANE WARNING

Hurricane conditions are **expected** somewhere within the warning area, generally **within 36 hours**

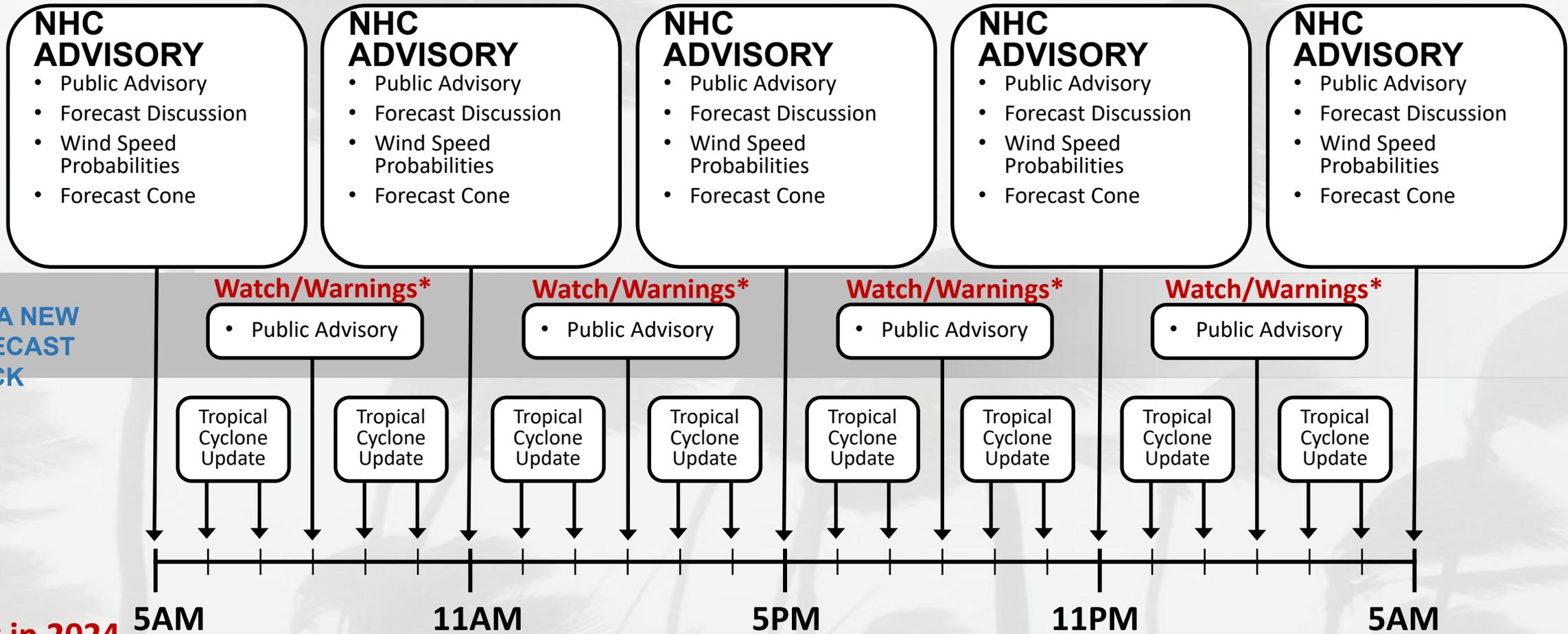
Note: The lead time for Hurricane Watches and Warnings is tied to the anticipated arrival time of tropical-storm-force winds



NHC ADVISORY TIMELINE

Scheduled Updates

~~WATCHES/ADVISORIES~~ *in effect and eye tracked by radar*



Questions/Comments on NHC Products

Daniel Brown

Branch Chief, Hurricane Specialist Unit

National Hurricane Center

daniel.p.brown@noaa.gov

HURREVAC Demo



◆ 100 Kilometers



THIS WEEK'S AGENDA

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JUNE 11: Wind Forecast Features (*on YouTube later today*)

NEXT >>>>> JUNE 12: Evacuation Timing Features

JUNE 13: Storm Surge and Flooding Hazards

JUNE 14: Applying HURREVAC for Planning and Operations

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Thank you!

HURREVAC Support Team
support@hurrevac.com



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HURRICANE DECISION SUPPORT TOOL