

Watch/Warning Philosophy

Key Messages for Tropical Storm Iota
 Advisory 4: 4:00 AM EST Sat Nov 14, 2020

- Iota is expected to strengthen and be a major hurricane when it approaches the coast of Central America. There is a risk of dangerous wind, storm surge, and rainfall impacts across portions of Nicaragua and Honduras beginning Monday. Hurricane Watches will likely be issued for a portion of this area later today.
- Through Wednesday, heavy rainfall from Iota will likely lead to life-threatening flash flooding and river flooding across portions of northern Colombia and Central America. Flooding and mudslides in Honduras and Nicaragua could be exacerbated by Hurricane Eta's recent effects there, resulting in significant impacts.

For more information go to hurricanes.gov

2020

Legend:

- Antigua: Antigua, Barbuda, British Virgin Islands, Montserrat, Nevis and St. Kitts
- Aruba: Aruba
- Bahamas: Bahamas, Turks and Caicos
- Barbados: Barbados, Dominica, St. Vincent and the Grenadines
- Bermuda: Bermuda
- Dominican Rep.: Dominican Republic
- France: All islands - French West Indies
- Netherlands: Bonaire, Saba, and St. Eustatius
- St. Lucia: St. Lucia
- Trinidad: Trinidad, Tobago, and Grenada
- Other islands: Anguilla, St. Martin, St. Kitts, Nevis, Montserrat, Antigua, Barbuda, St. Eustatius, Saba, St. Vincent, Grenadines, Grenada, Barbados, St. Lucia, St. Vincent, Grenadines, Grenada, Barbados, St. Lucia, St. Vincent, Grenadines, Grenada, Barbados.

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.

Potential Tropical Cyclone Nine
 Tuesday July 28, 2020
 11 AM AST Advisory 1
 NWS National Hurricane Center

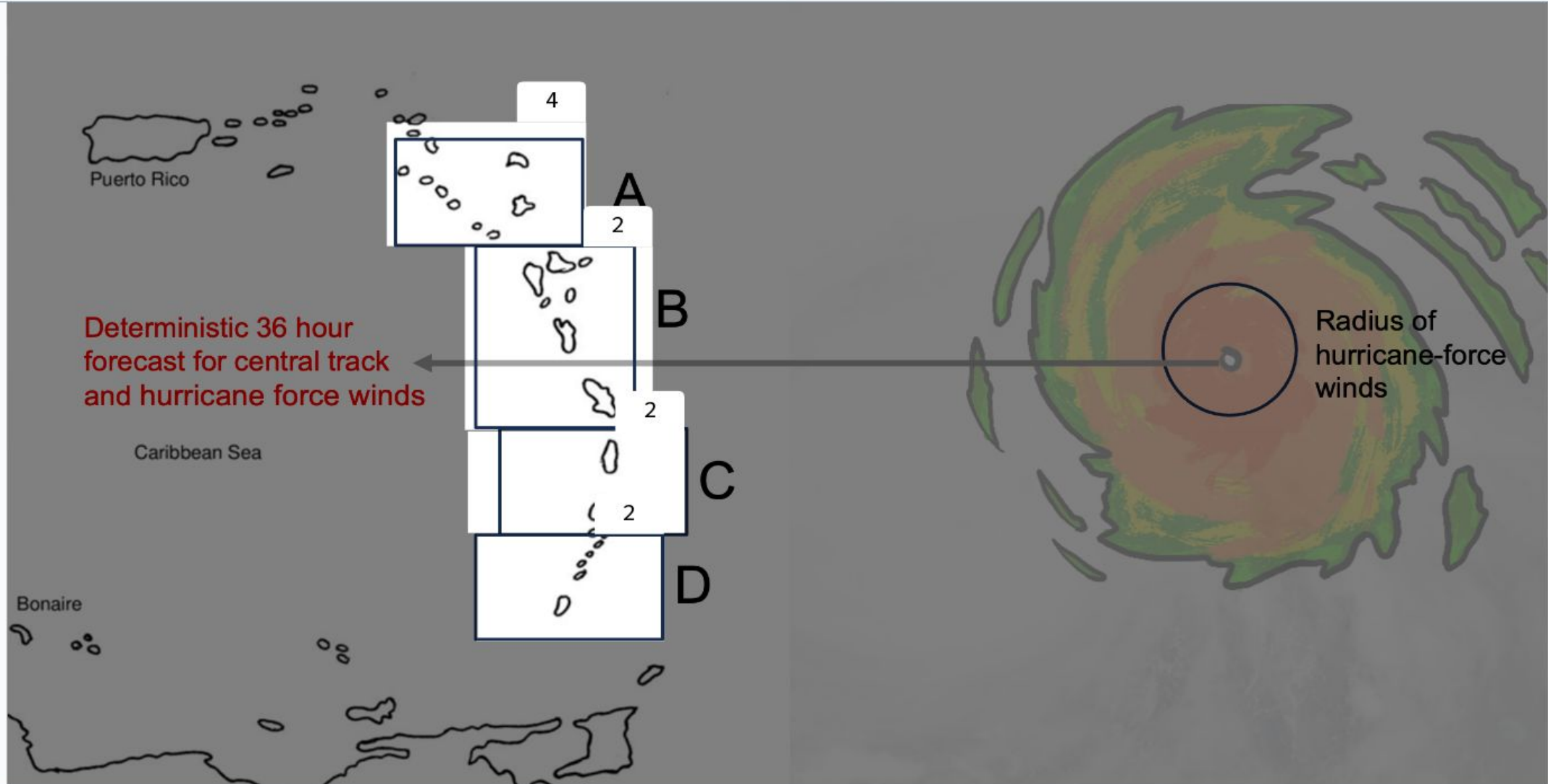
Current information: x
 Center location 13.8 N 53.7 W
 Maximum sustained wind 40 mph
 Movement W at 23 mph

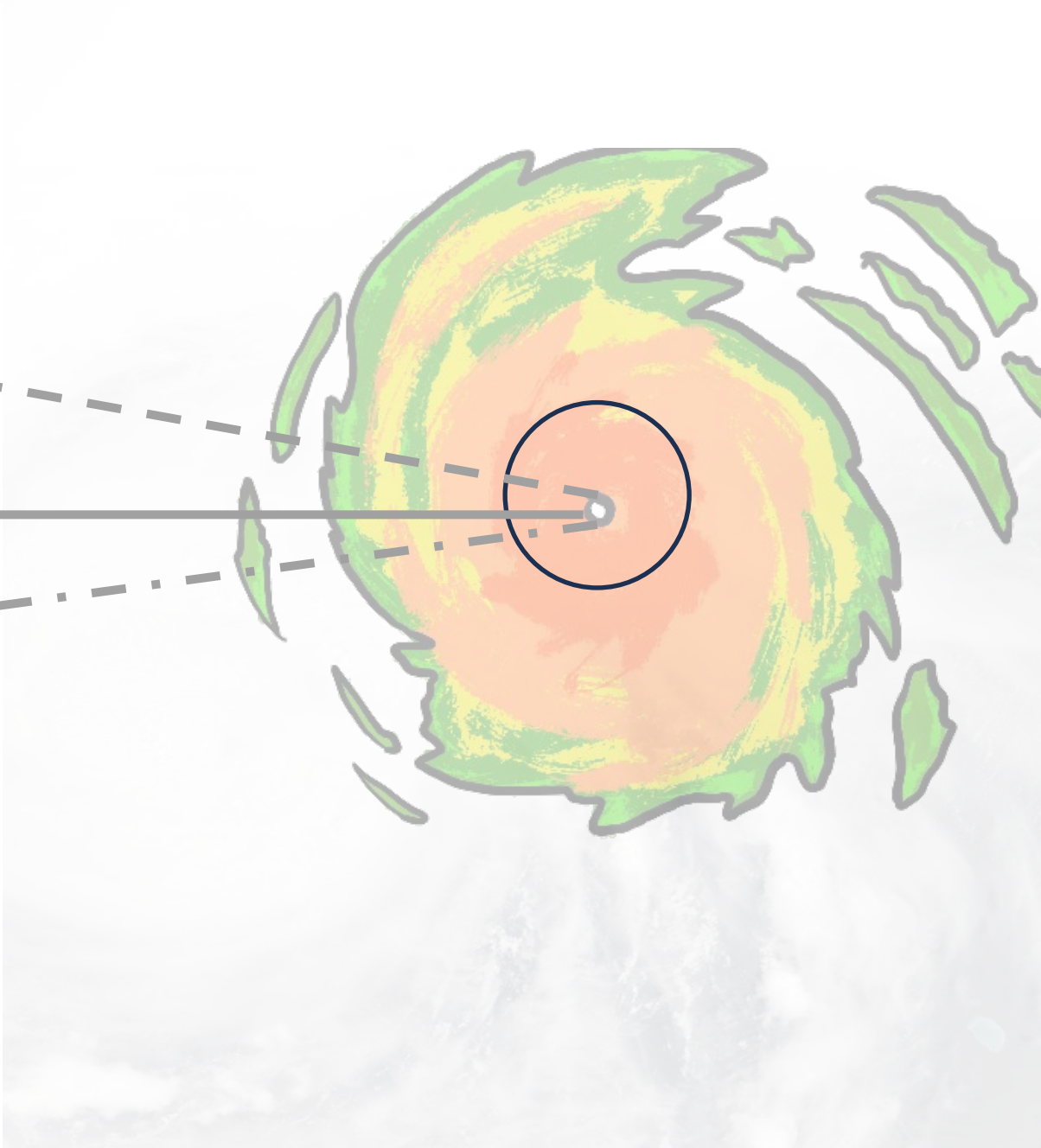
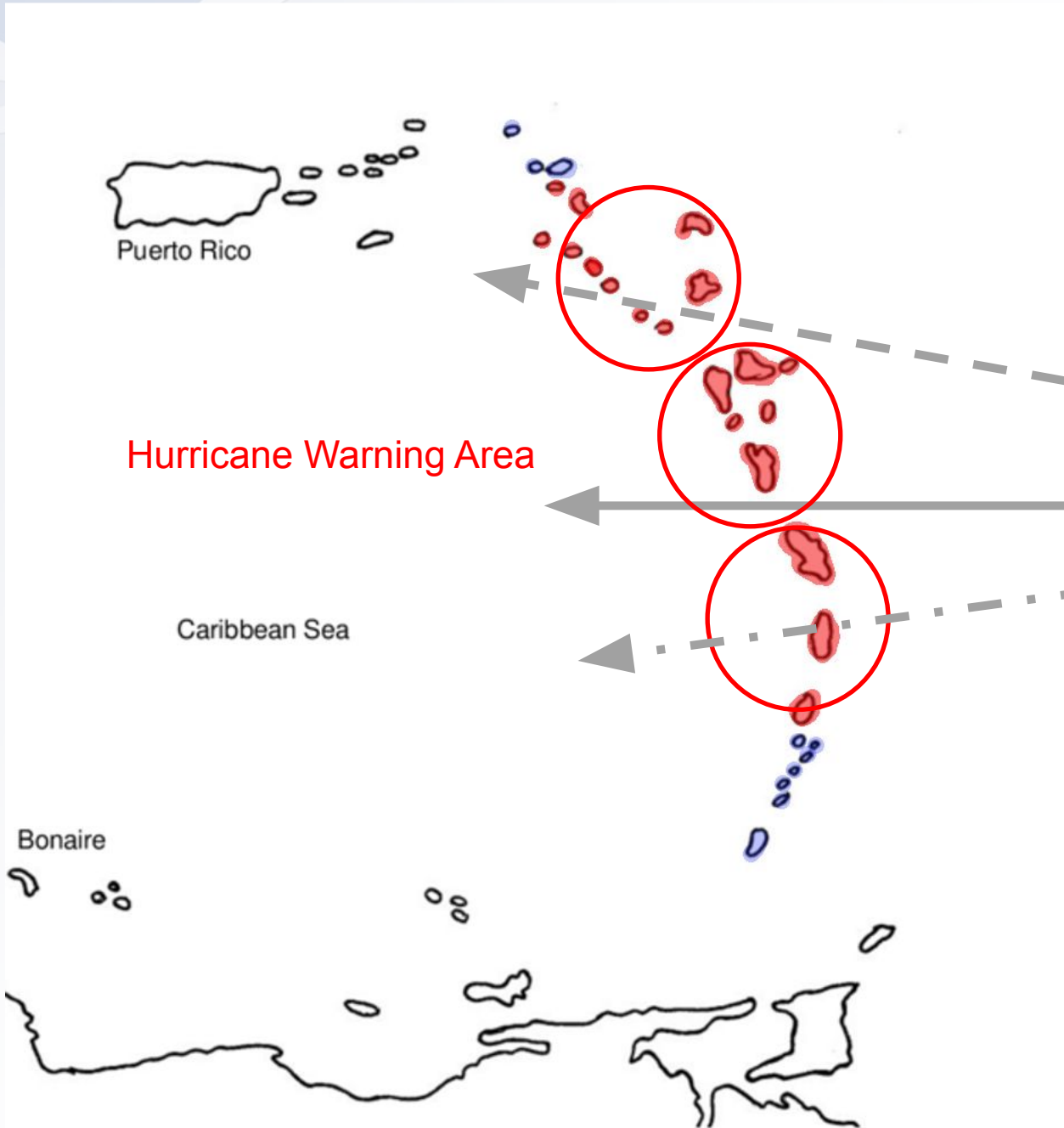
Forecast positions:
 ● Tropical Cyclone ○ Post/Potential TC
 Sustained winds: D < 39 mph
 S 39-73 mph H 74-110 mph M > 110 mph

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

Robbie Berg & Daniel Brown
 National Hurricane Center
 10 April 2023

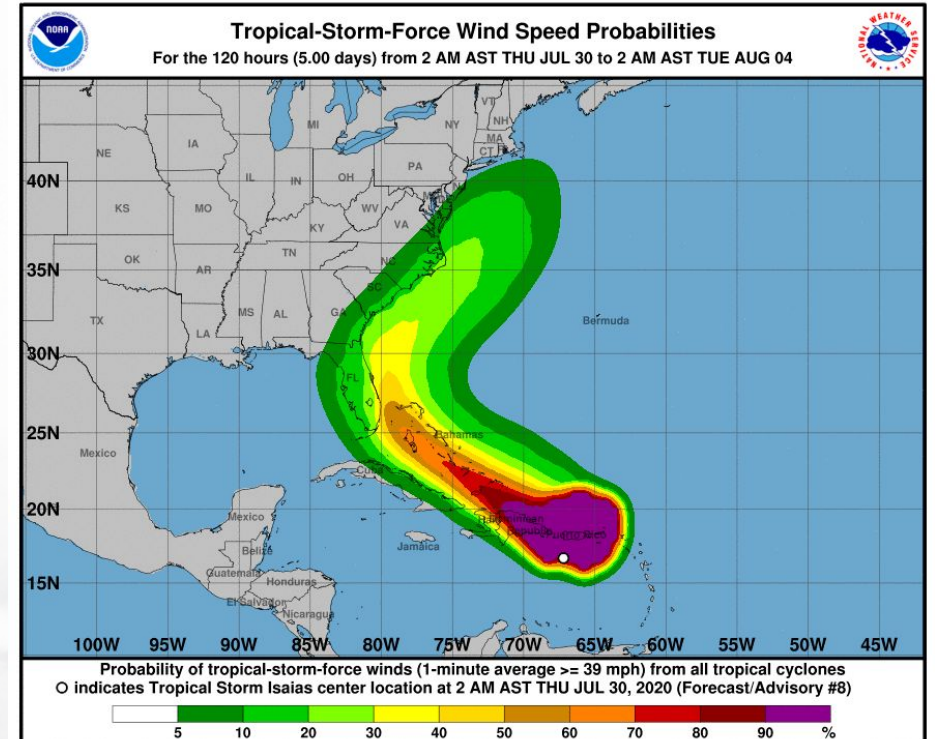
We are 36 hours away from impacts potentially beginning in the islands. Where would you put Hurricane Warnings and Watches? Select all that apply.





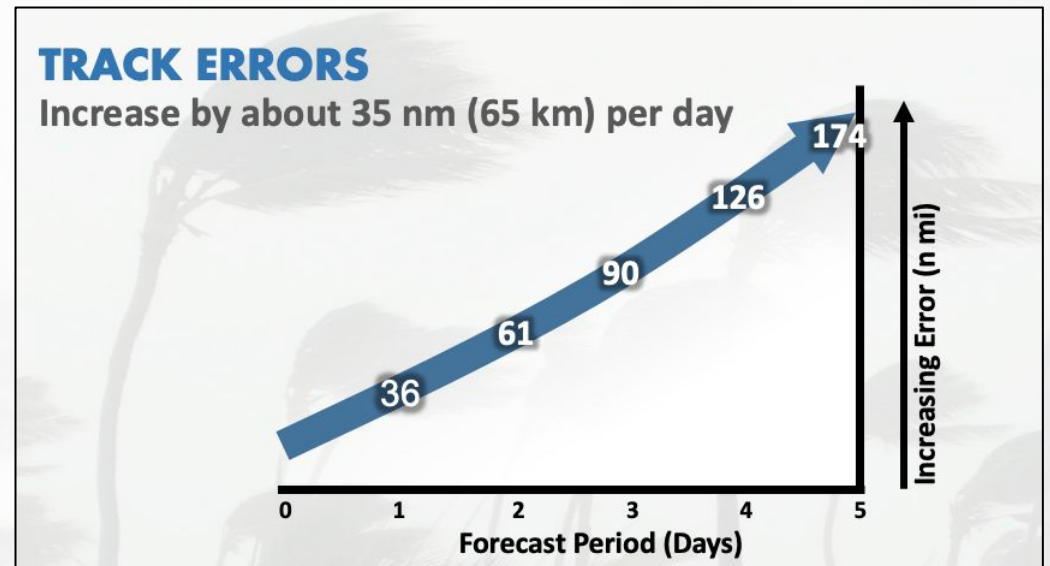
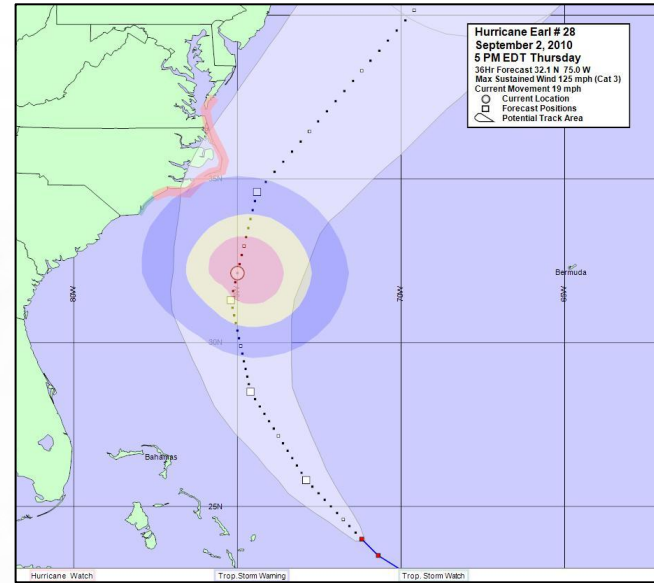
NHC Watch/Warning Philosophy

- Watches and warnings are tools used to **convey risk** – telling users what they should be *prepared for* in terms of hazards
 - Do not think of watches and warnings as a deterministic forecast – yes or no as to conditions occurring
 - Conditions possible (expected) **somewhere** within the watch (warning) area.
- Proper issuance of watches and warnings must account for uncertainty in the forecast and have enough lead time for preparations to occur before the onset of hazards



Determining Watch/Warning Placement and Timing

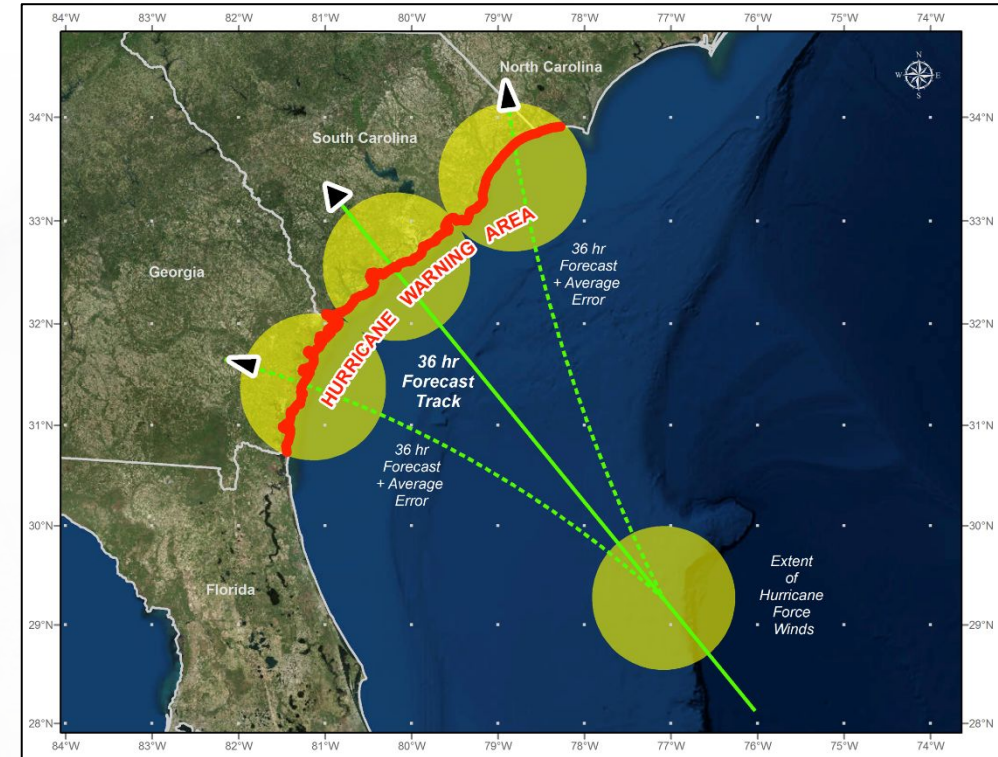
- NHC makes the track, intensity, and wind radii (size) forecasts
- NHC forecaster uses the official forecast and an assessment of the uncertainty in track, intensity, and size forecasts to determine the placement of watches and warnings
- Timing is tied to the anticipated arrival of tropical-storm-force winds

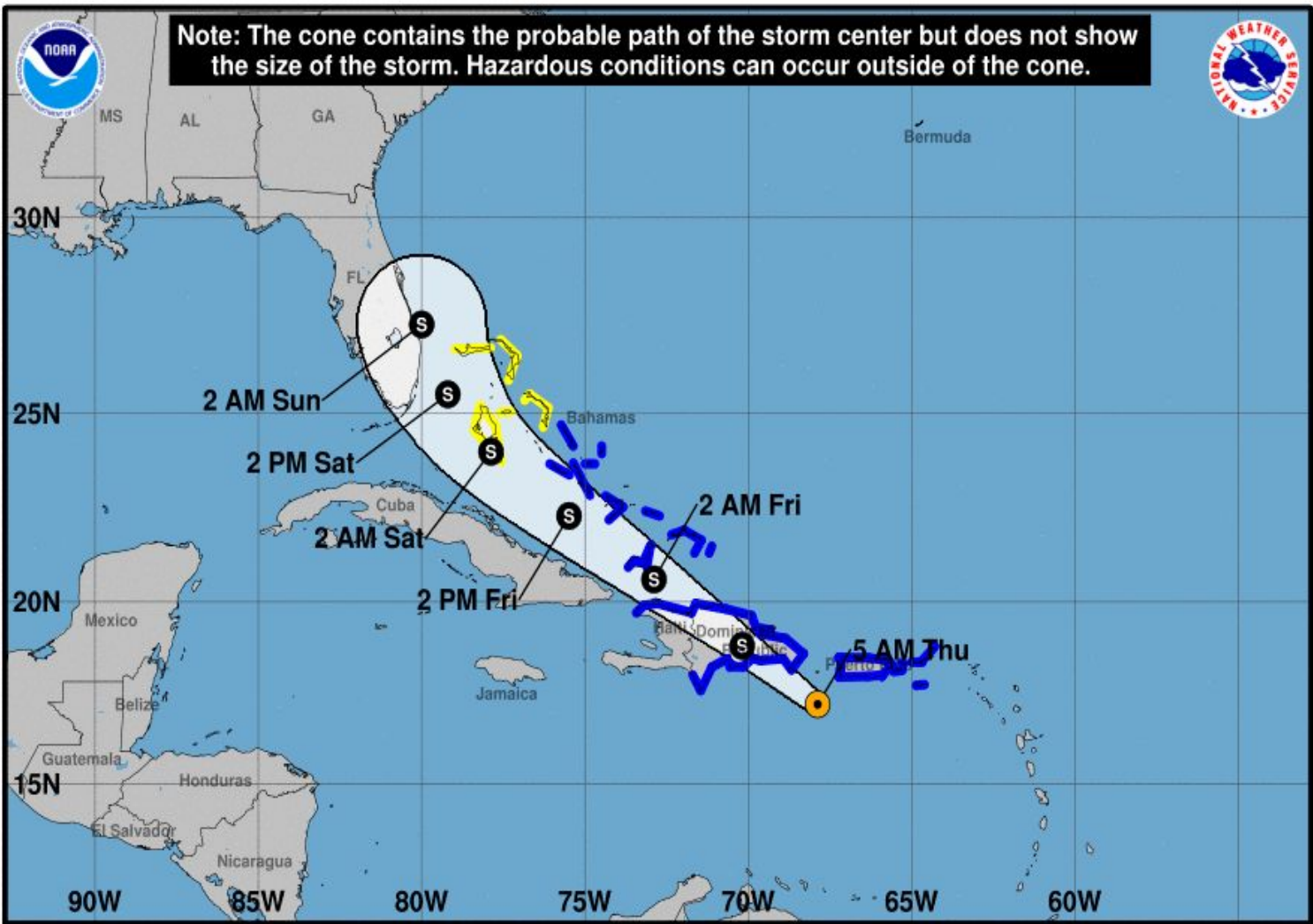


Determining Watch/Warning Placement and Timing

• Considerations include:

- Maintain continuity with previous watch and warning decisions
- Expectations of future changes to the NHC forecast
- Assessment of forecast uncertainty
- Orientation of the forecast track relative to the coast
- Vulnerability of the area potentially affected
- Timing considerations (e.g., time of day)
- Other non-meteorological factors





Tropical Storm Isaias
 Thursday July 30, 2020
 5 AM AST Advisory 8
 NWS National Hurricane Center

Current information: ●
 Center location 17.2 N 67.9 W
 Maximum sustained wind 60 mph
 Movement NW at 21 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 Storm

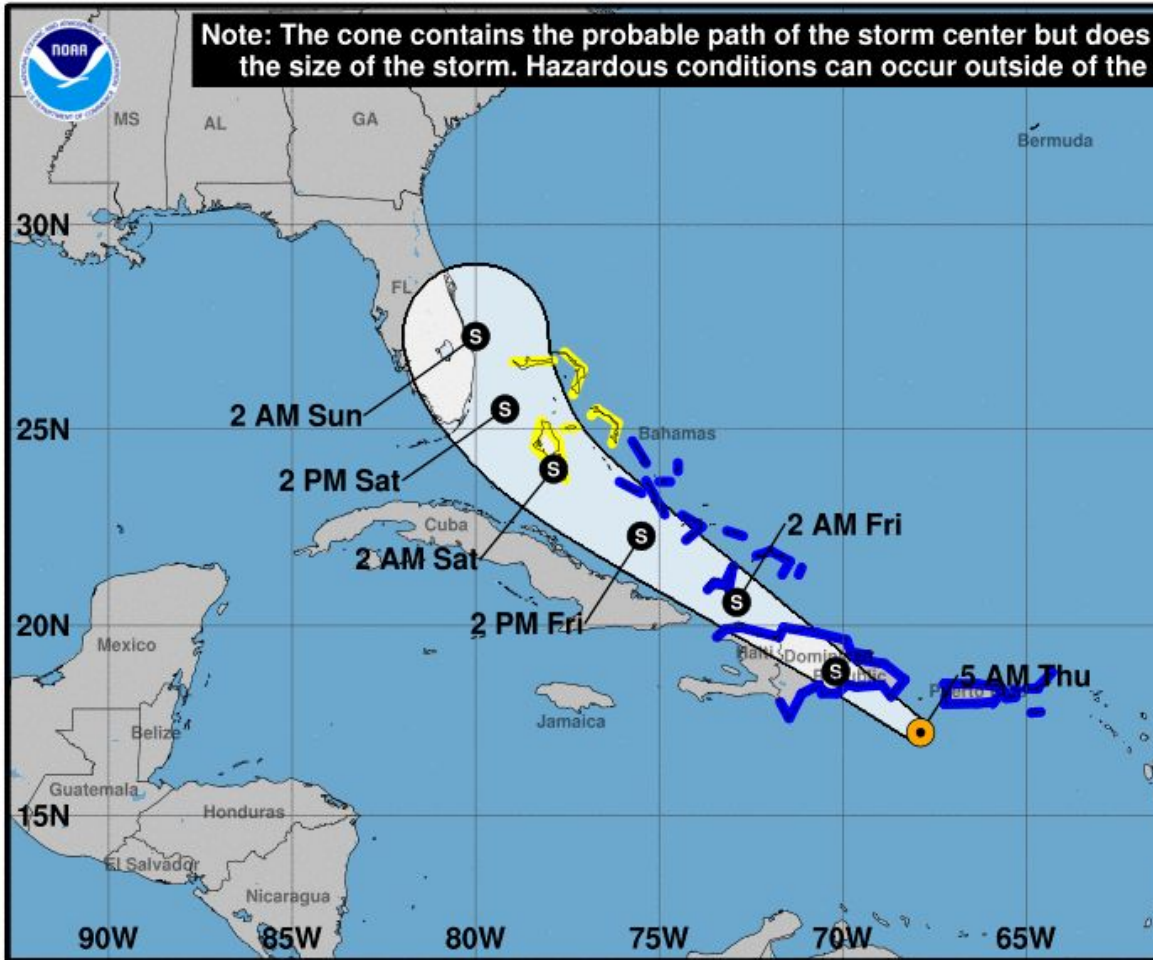
Warnings:
 ■ Hurricane ■ Trop Storm

Why do locations outside of the cone have a Tropical Storm warning? Select the best answer.



Start the presentation to see live content. For screen share software, share the entire screen. Get help at polllev.com/app

High risk of tropical storm-force winds over Puerto Rico and other islands



Tropical Storm Isaias
 Thursday July 30, 2020
 5 AM AST Advisory 8
 NWS National Hurricane Center

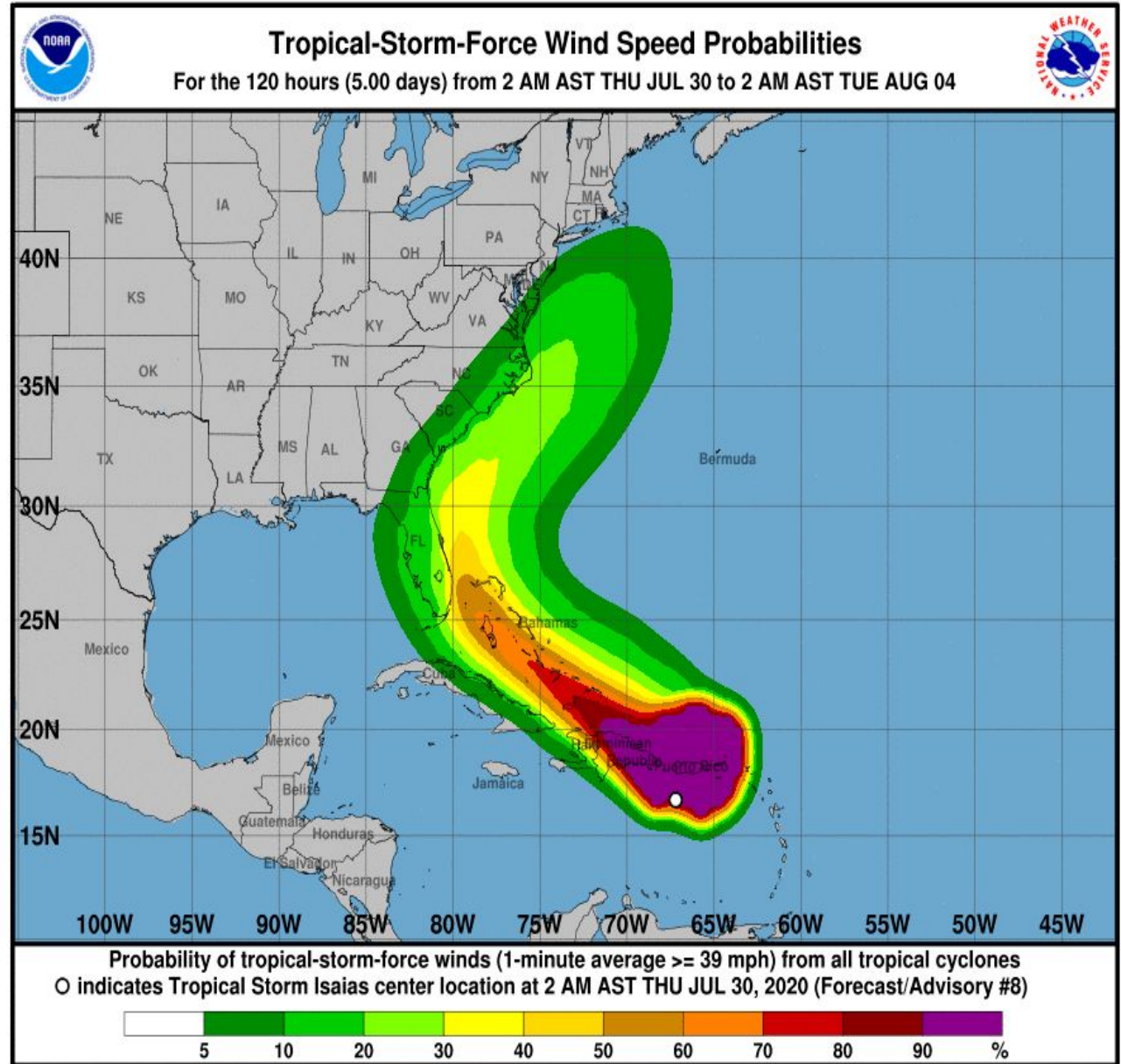
Current information: ●
 Center location 17.2 N 67.9 W
 Maximum sustained wind 60 mph
 Movement NW at 21 mph

Forecast path: ● Tropical Cyclone
 Sustained winds S 39-73 mph H

Potential track area:
 Day 1-3 Day 4-5

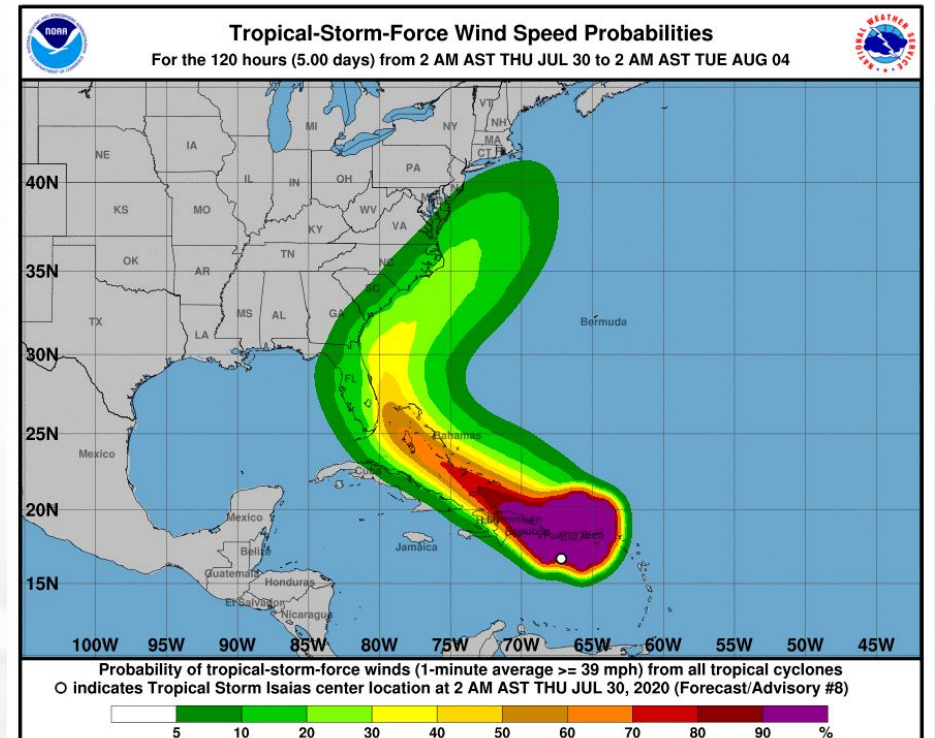
Watches:
 Hurricane Trop Storm

Warnings:
 Hurri

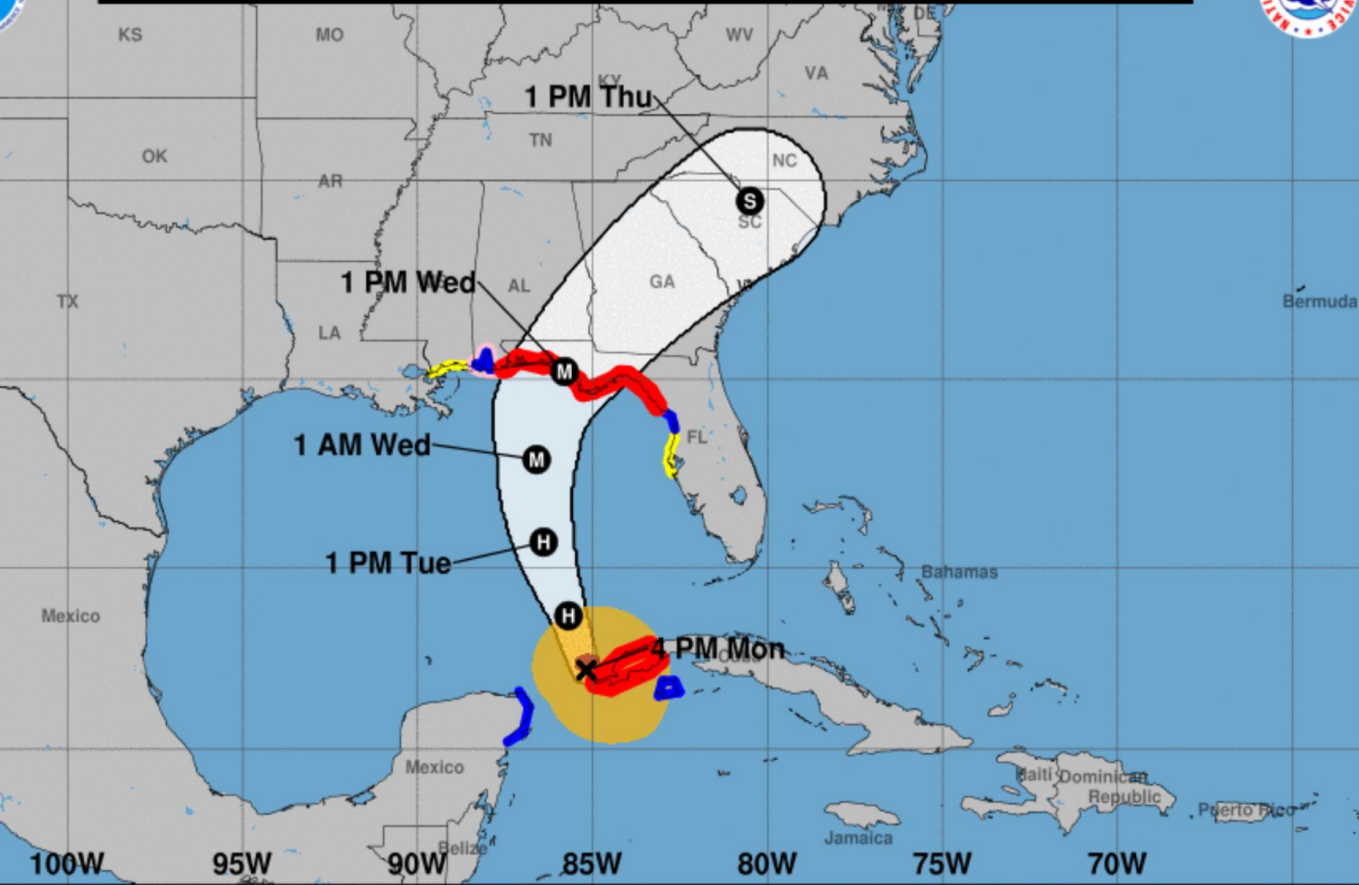


Watch/Warning Philosophy

- Watches and warnings can (and often should) exist for areas where those wind speeds are not explicitly forecast to account for uncertainty
- A watch can be maintained within the warning time frame to account for uncertainty and the possibility of conditions occurring
 - Example: A Hurricane Watch and Tropical Storm Warning are in effect for the same area where tropical storm conditions are expected and hurricane conditions are possible
- A Hurricane Watch can be used to message the threat of near-hurricane winds even when 64-kt winds are not explicitly forecast



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.



Hurricane Michael
 Day October 08, 2018
 CDT Advisory 9
 National Hurricane Center

Current information: x
 Center location 22.2 N 85.2 W
 Maximum sustained wind 80 mph
 Movement N at 9 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 (dotted pattern) Day 4-5 (solid pattern)

Watches: Hurricane (pink), Trop Stm (yellow)

Warnings: Hurricane (red), Trop Stm (blue)

Current wind extent: Hurricane (brown), Trop Stm (orange)

The dark red area surrounding the X (current center location) shows the current hurricane force wind extent. The red areas show hurricane warnings. Why is so much of the US coastline included in the hurricane warning? Select all that apply.

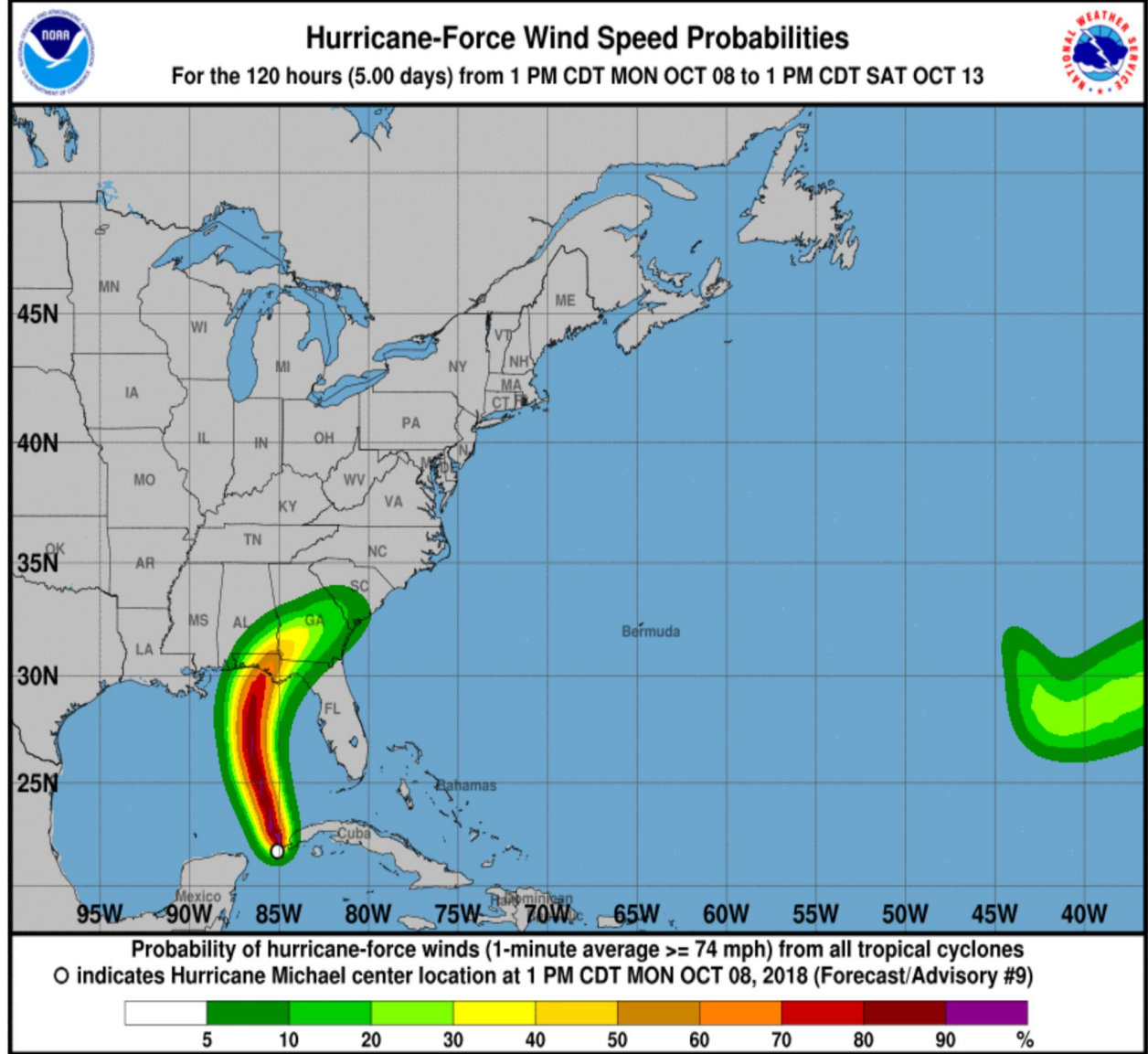
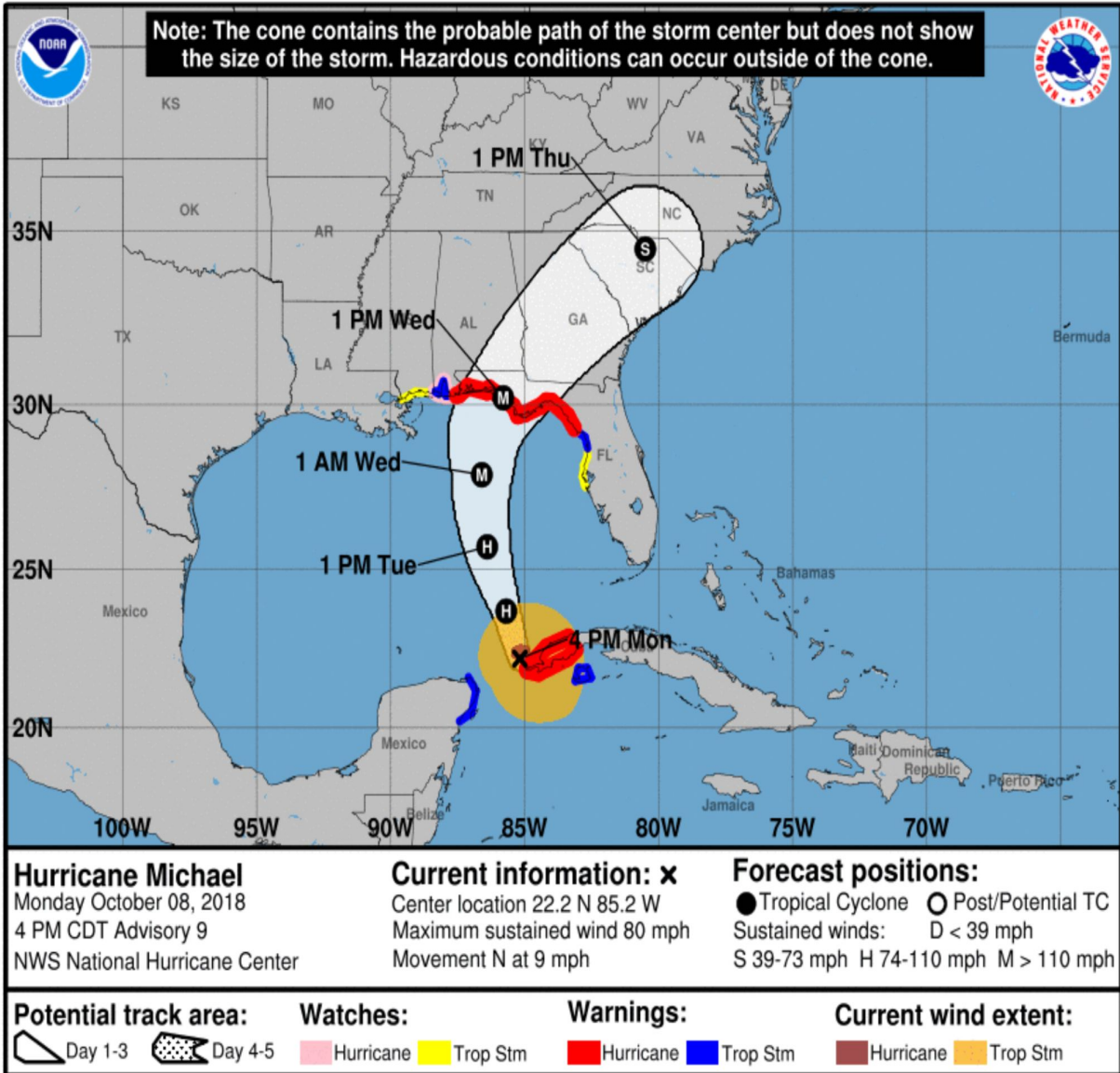


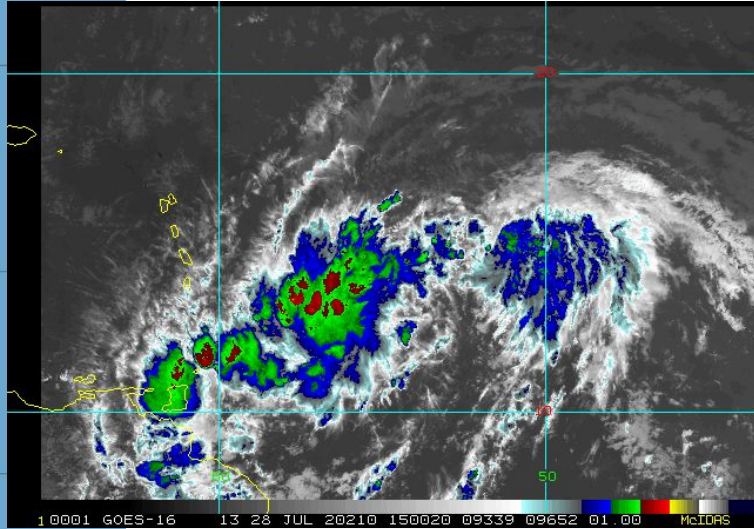
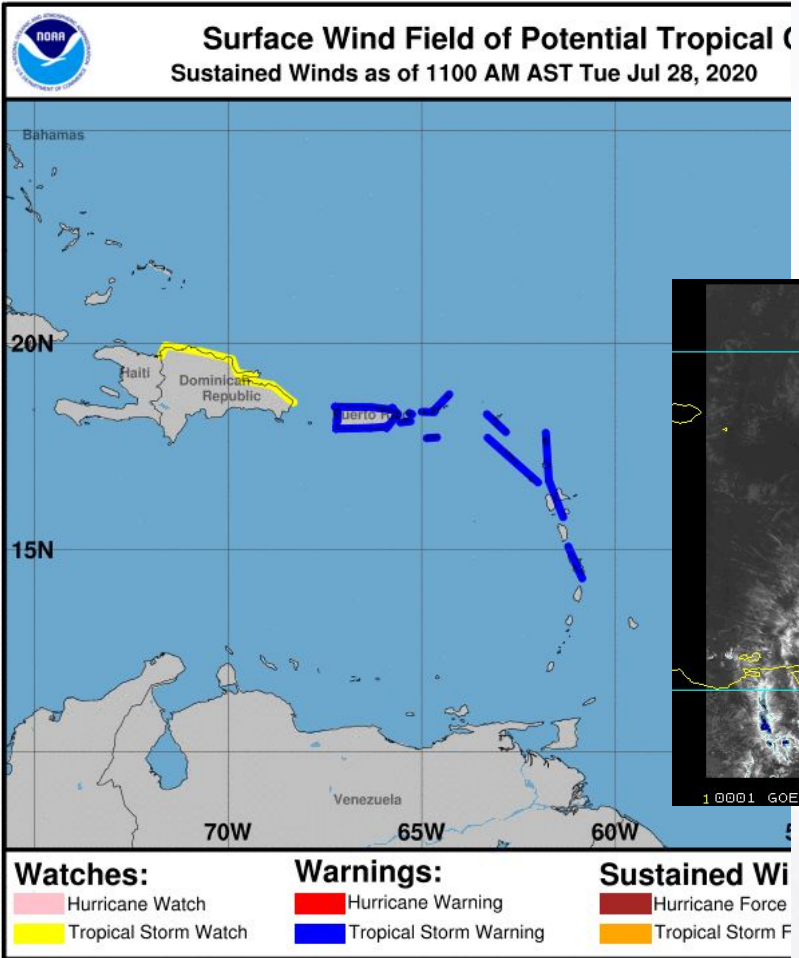
Potential for rapid intensification 0%

Potential changes in the future track of the storm 0%

Potential increase in the size of the storm 0%

Potential increase in the forward speed of the storm 0%





Initial advisory on PTC 9 on 28 July 2020

A disturbance is forecast to move across the Caribbean, but is currently only a potential tropical cyclone. Why did NHC recommend that watches and warnings be issued for this storm? Select the best answer.



rapid intensification



potential for tropical storm formation



changes in the position of the center of the storm



increase in the size of the storm

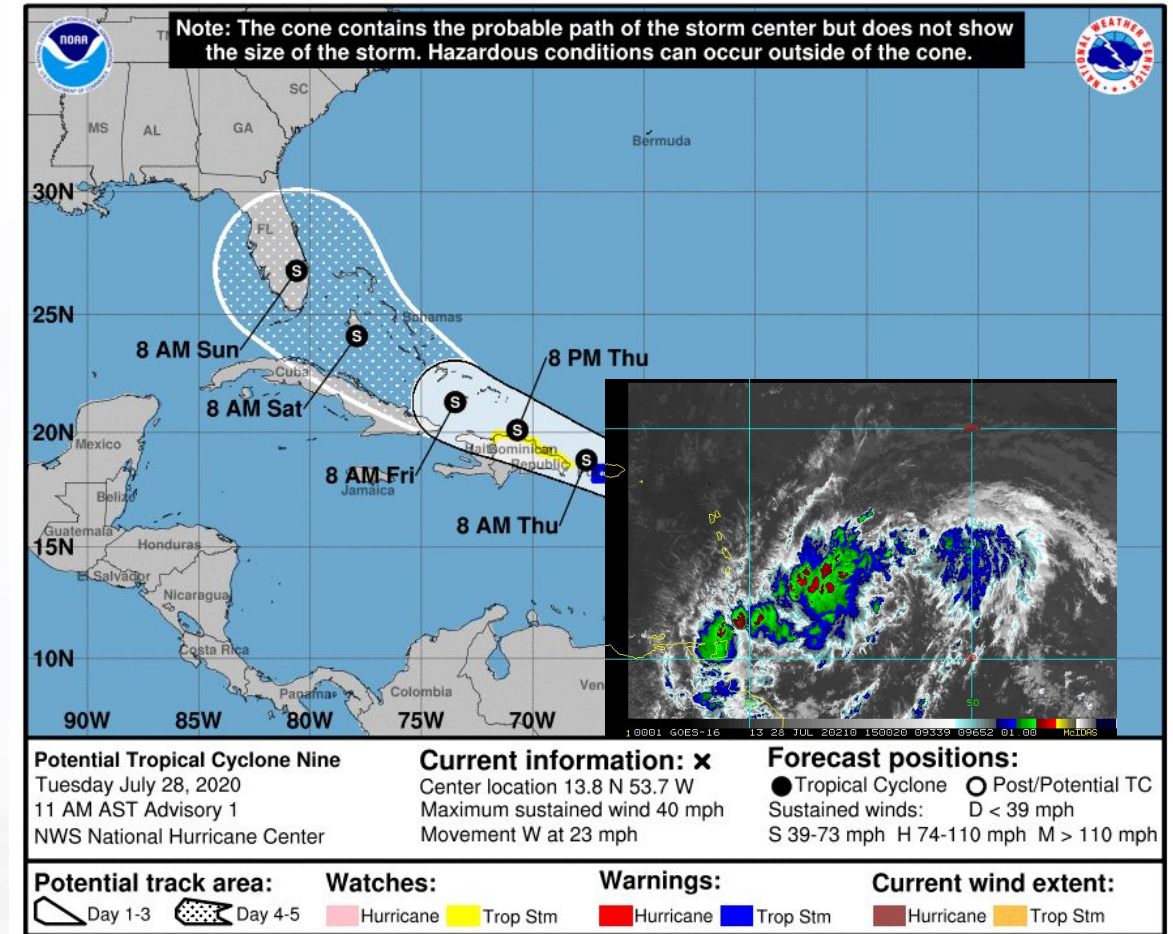


significant track change



Potential Tropical Cyclones

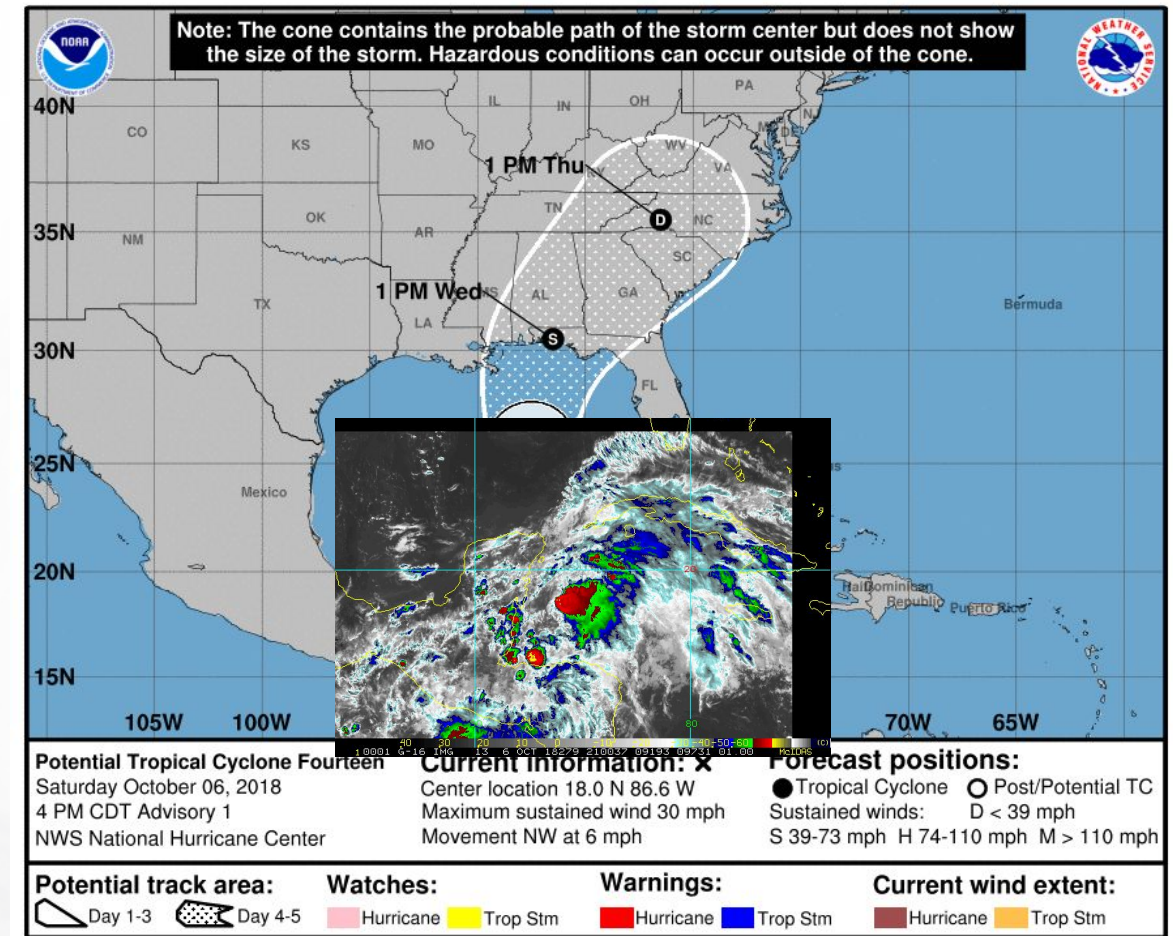
- Allows NHC to provide the same level of service for systems that are not yet tropical cyclones but could bring tropical storm conditions to land areas within 48 h
 - Has provided an average of about 18 h of additional lead time for watch/warning issuance from 2017-2021
- Accompanied by the standard suite of NHC advisory products
- Initiating advisories on a PTC depends on
 - Likelihood of TS force winds occurring
 - Likelihood of system becoming a TC
 - A somewhat trackable “center” feature to maintain continuity from one advisory package to the next
- The need for PTC advisories can be coordinated between NHC and affected countries in advance
- Don't hesitate to reach out to NHC if you have questions or want to coordinate



Initial advisory on PTC 9 (later Isaias) on 28 July 2020, about 30 h before it became a TS

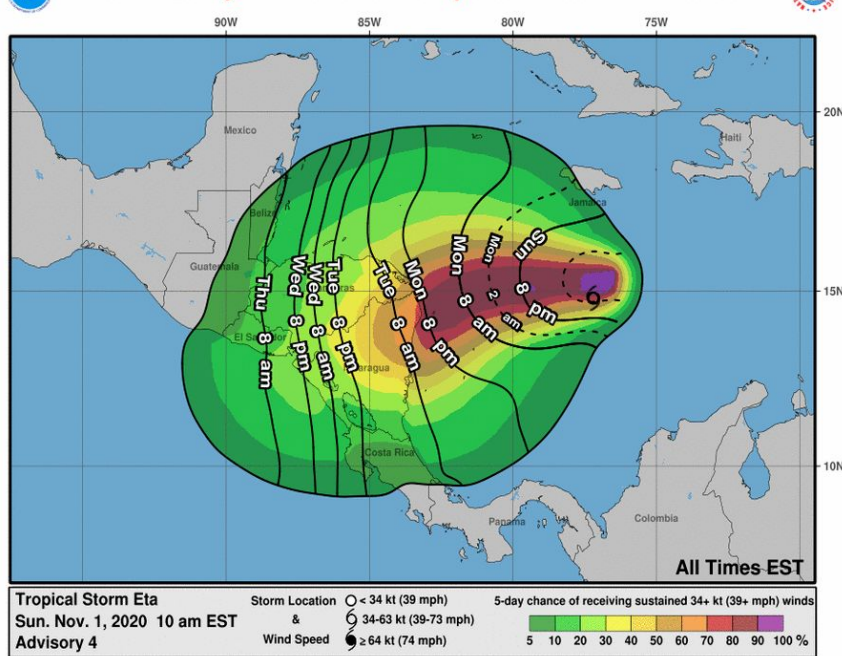
Potential Tropical Cyclones

- Forecast uncertainty can be higher than usual for PTCs given their (lack of) structure, poor model initialization, and center (re)formation
 - Watch/warning areas may need to be larger to account for this uncertainty
- NHC can defer to local met service's opinion on need for PTC advisories for marginal cases
 - Can wait until warning time frame to see if confidence increases
- Unexpected development still occasionally occurs near land, forcing us to go immediately to advisories and warnings on short notice



Initial advisory on PTC 14 (later Michael) on 6 October 2018, about 12 h before it became a TD

Most Likely Arrival Time of Tropical-Storm-Force Winds

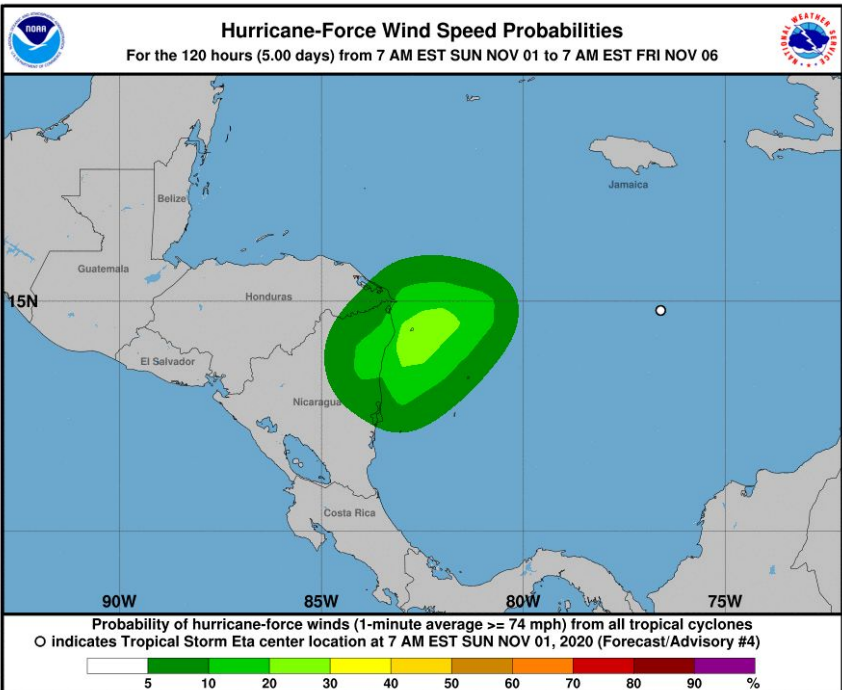


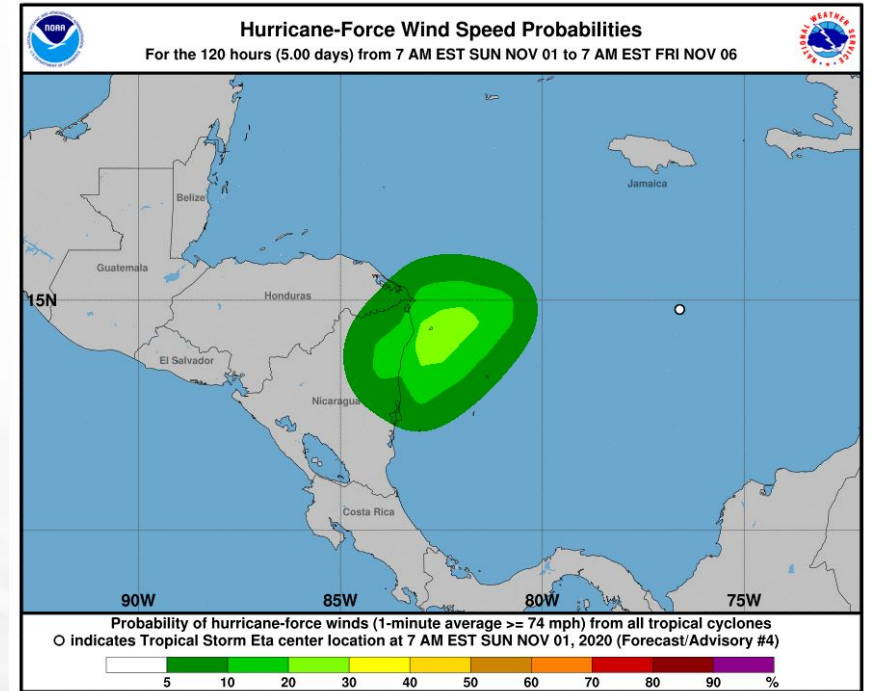
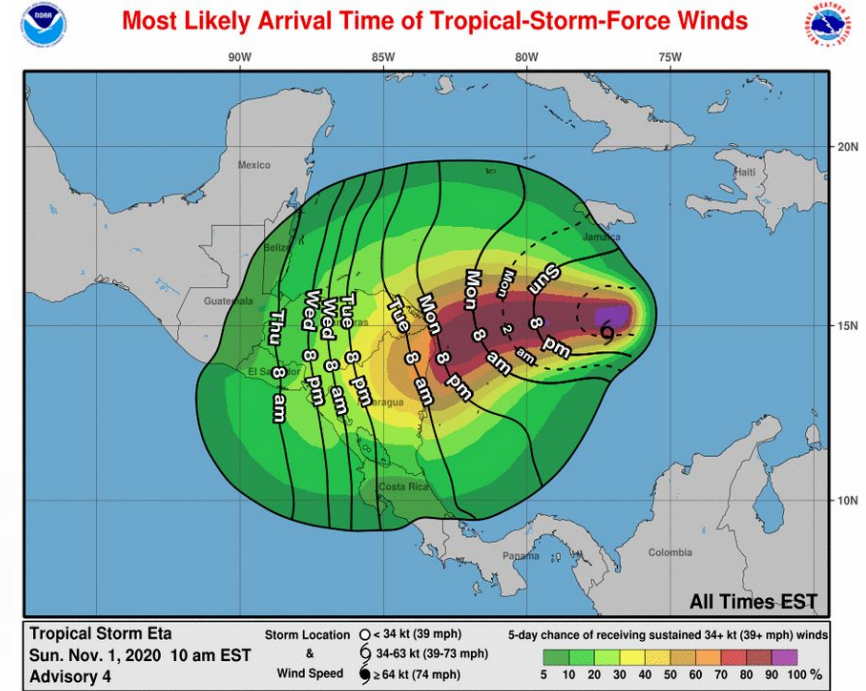
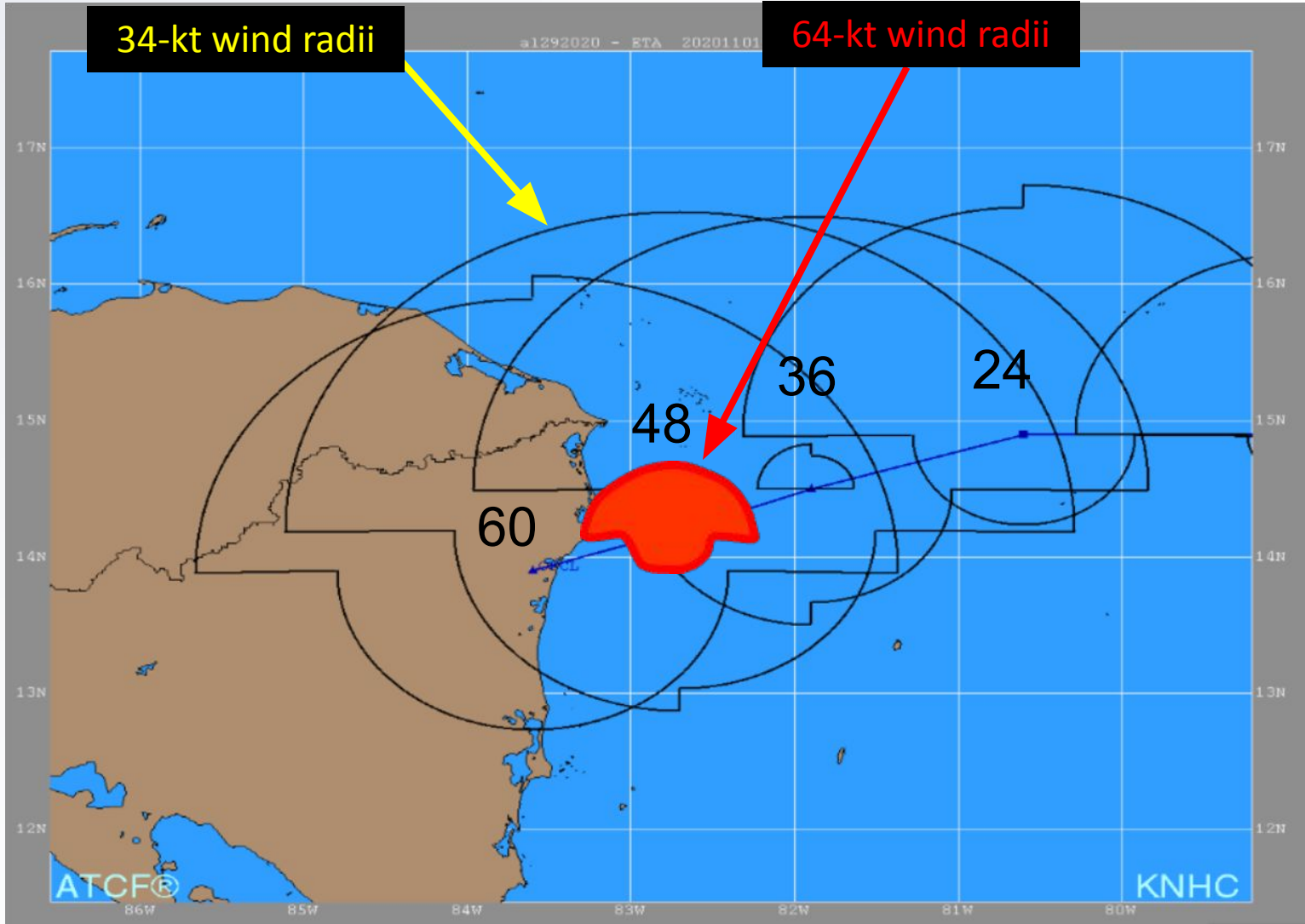
You are an NHC forecaster. A TC is situated south of Jamaica. Based on these forecast products, what is the best representation of hurricane and tropical storm watches and warnings that you would recommend for Central America? Select the best option.

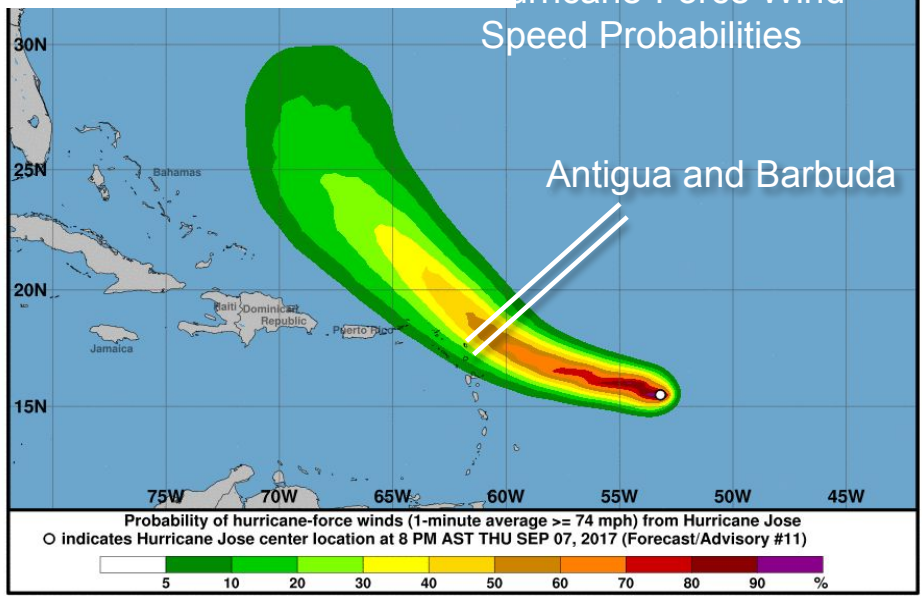
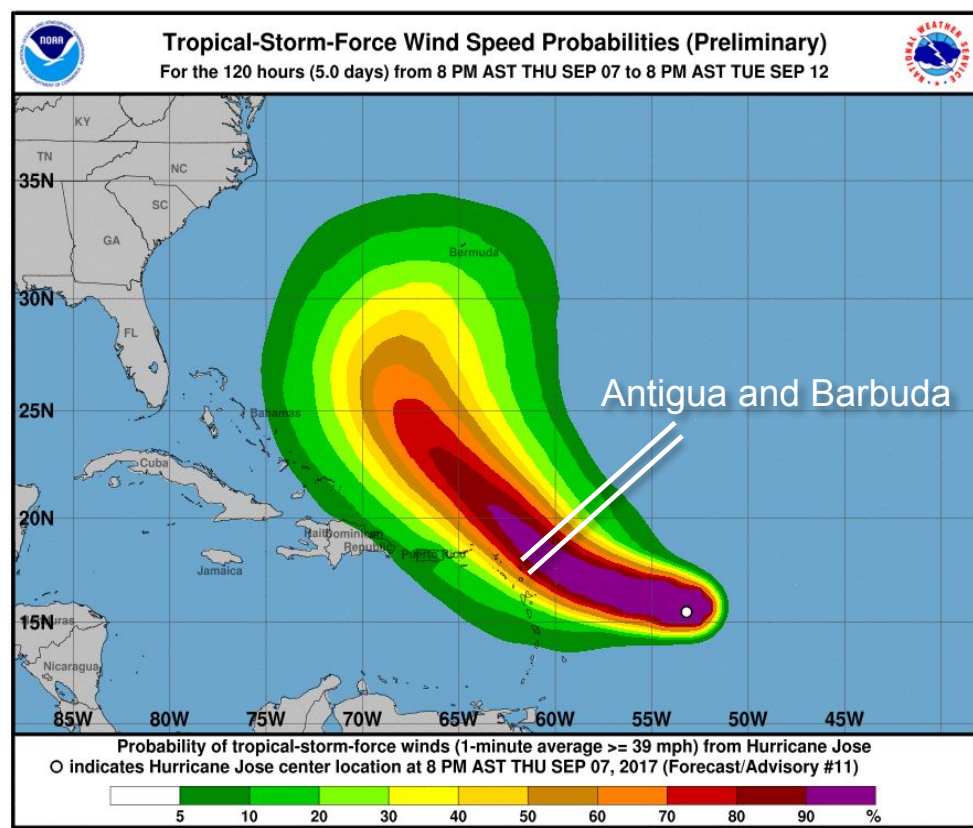
A 0%

B 0%

C 0%







How will you communicate the threat of potential hurricane conditions to agencies preparing for the approaching storm on the islands of Barbuda and Antigua? Select the best answer.



A Hurricane Warning is in effect along the islands of Barbuda, Antigua, and Anguilla. Hurricane conditions are expected somewhere within this area, with tropical-storm-force winds arriving within 36 hours.

0%

Hurricane conditions are expected at all locations along the Barbuda, Antigua, and Anguilla coastlines, with tropical-storm-force winds arriving within 36 hours. A Hurricane Warning has been issued.

0%

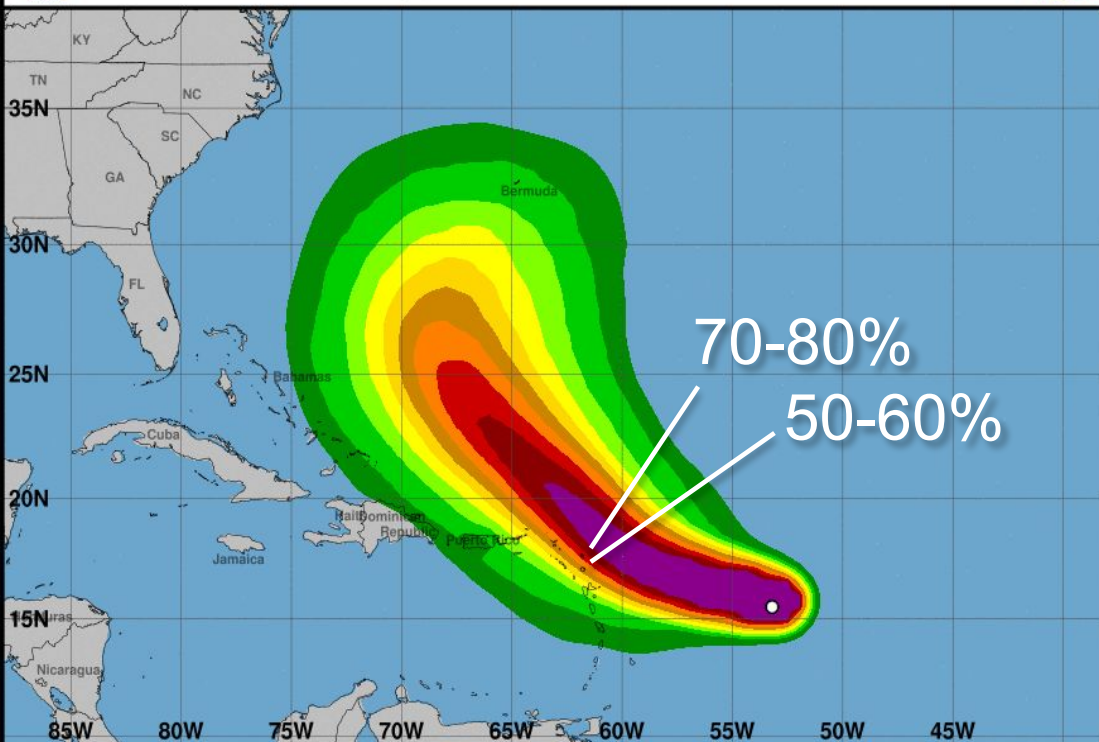
Tropical storm and hurricane conditions are anticipated everywhere in the tropical storm and hurricane warning areas within 36 hours. That's why a Hurricane Warning is in effect for the islands of Barbuda, Antigua, and Anguilla.

0%



Tropical-Storm-Force Wind Speed Probabilities (Preliminary)

For the 120 hours (5.0 days) from 8 PM AST THU SEP 07 to 8 PM AST TUE SEP 12

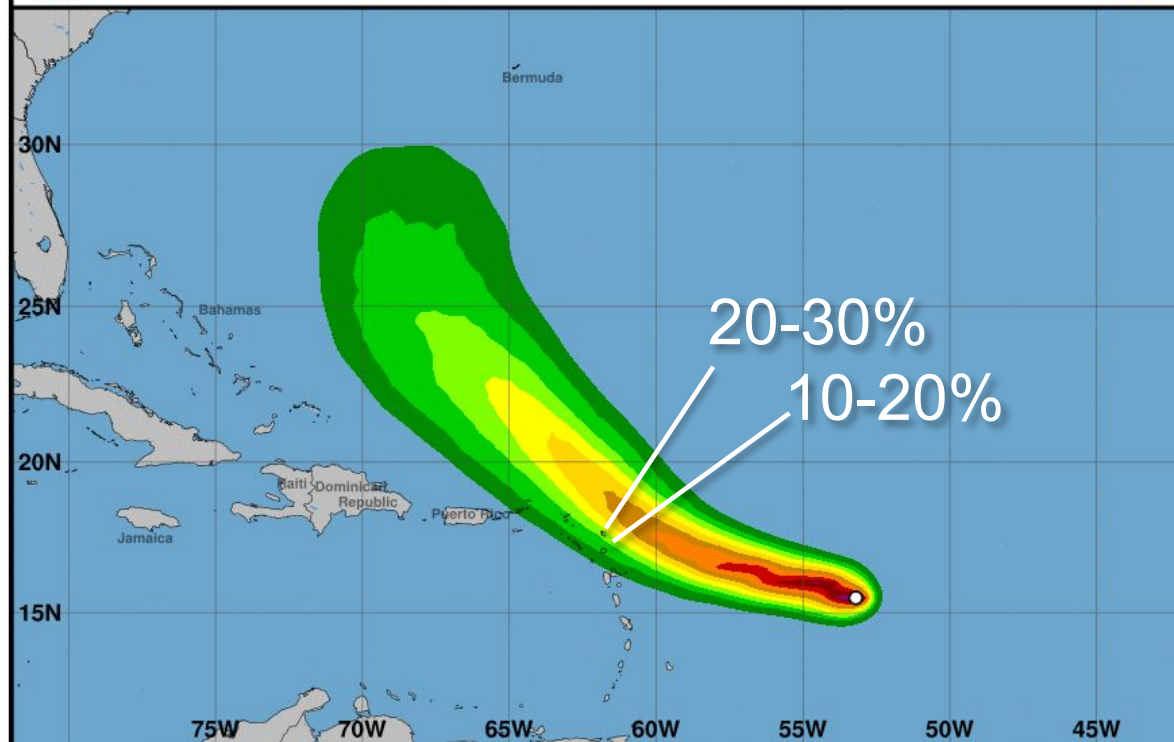


Probability of tropical-storm-force winds (1-minute average ≥ 39 mph) from Hurricane Jose
O indicates Hurricane Jose center location at 8 PM AST THU SEP 07, 2017 (Forecast/Advisory #11)



Hurricane-Force Wind Speed Probabilities (Preliminary)

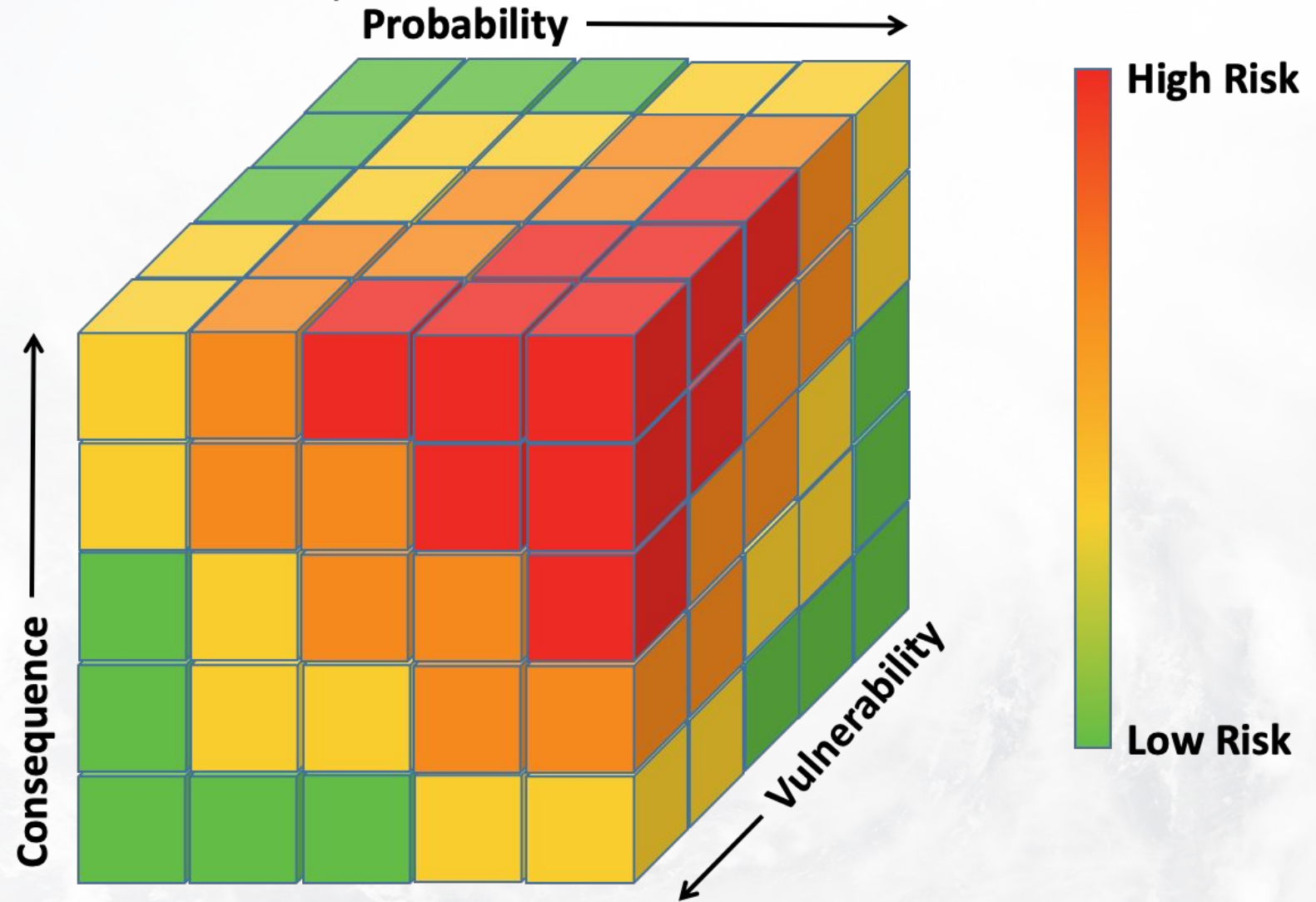
For the 120 hours (5.0 days) from 8 PM AST THU SEP 07 to 8 PM AST TUE SEP 12



Probability of hurricane-force winds (1-minute average ≥ 74 mph) from Hurricane Jose
O indicates Hurricane Jose center location at 8 PM AST THU SEP 07, 2017 (Forecast/Advisory #11)



Low-Probability, High-Consequence Events (why low probabilities matter)



- Risk: the potential of gaining or losing something of value
Risk = Probability × Consequence × Vulnerability
- Risk perception: the subjective judgment people make about probability, consequences, or vulnerability, which may vary from person to person
- **Actual Risk ≠ Perceived Risk**
Risk tolerance: how willing people are to “take their chances”

Which choice would you make?

0

Receive \$100 guaranteed

0%

Flip a coin, "heads" you win \$200, "tails" you win nothing

0%

Which choice would you make?

0

Flip a coin, "heads" you lose \$200, "tails" you lose nothing

0%

Lose \$100 guaranteed

0%

Risk Tolerance



People tend to be **risk-averse** when they see themselves as ***gaining*** something

Prefer to take the sure thing (receiving \$100), rather than gamble (receiving \$200 or nothing)



People tend to be **risk-seeking** when they see themselves as ***losing*** something

Prefer to gamble (losing \$200 or nothing), rather take the sure thing (losing \$100)

The pain of losing a thing > the pleasure of winning that thing

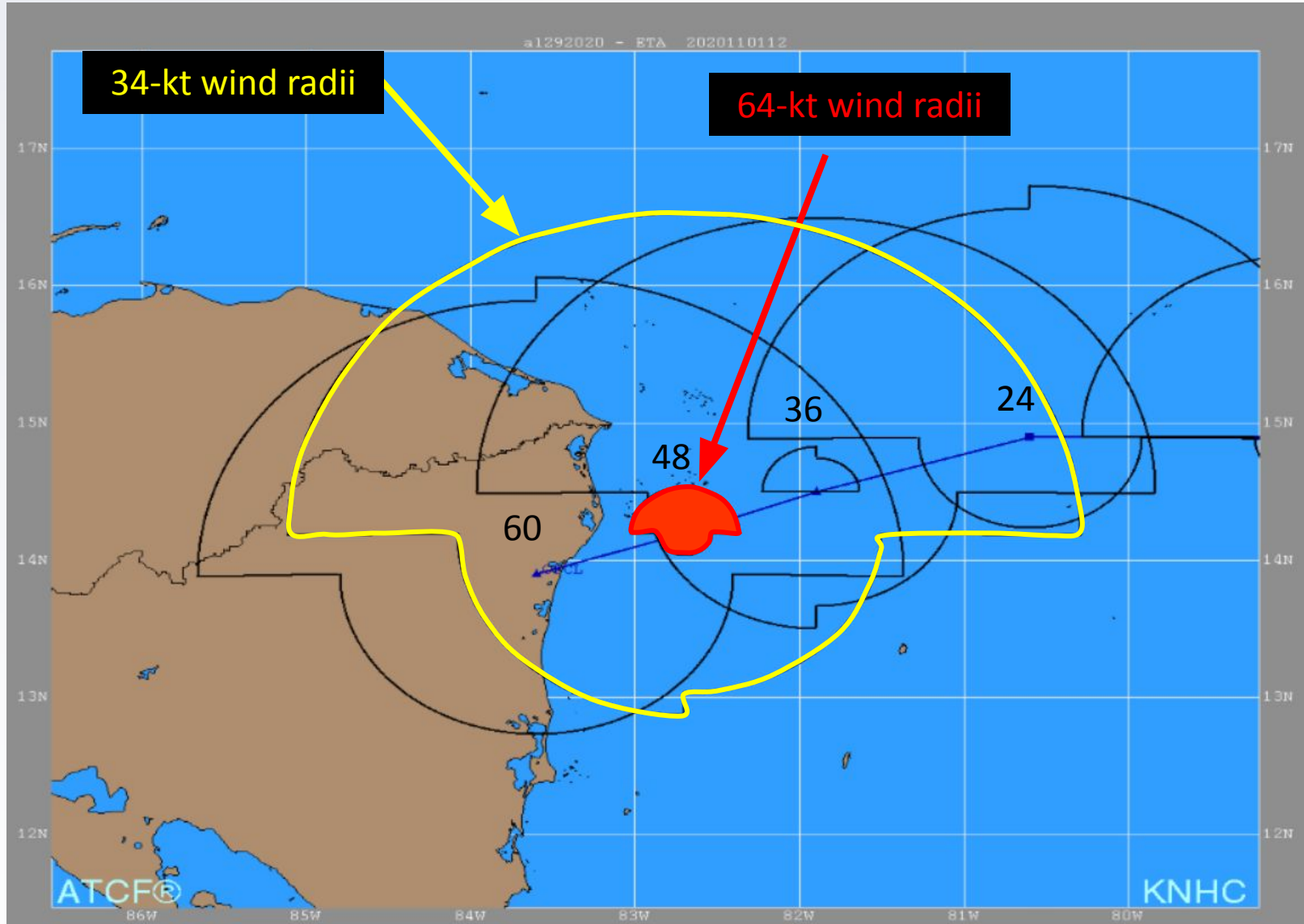
Final Reminders about Watch/Warning Coordination

- **Helpful if countries are anticipating the need for watches or warnings and able to make a final decision when contacted**
 - **If you need to confirm a decision and call NHC back, please do so as quickly as possible.**
 - **All watch/warning decisions need to be made and coordinated with NHC by about 45 minutes before the advisory deadline (0300, 0900, 1500, and 2100 UTC).**
 - **Anything later than that may not make it into the next advisory cycle. NHC can issue a TCU to convey international watch and warning changes.**
- **Ensure contact numbers are correct in Attachment 8A. Communicate any in-season changes to NHC!**



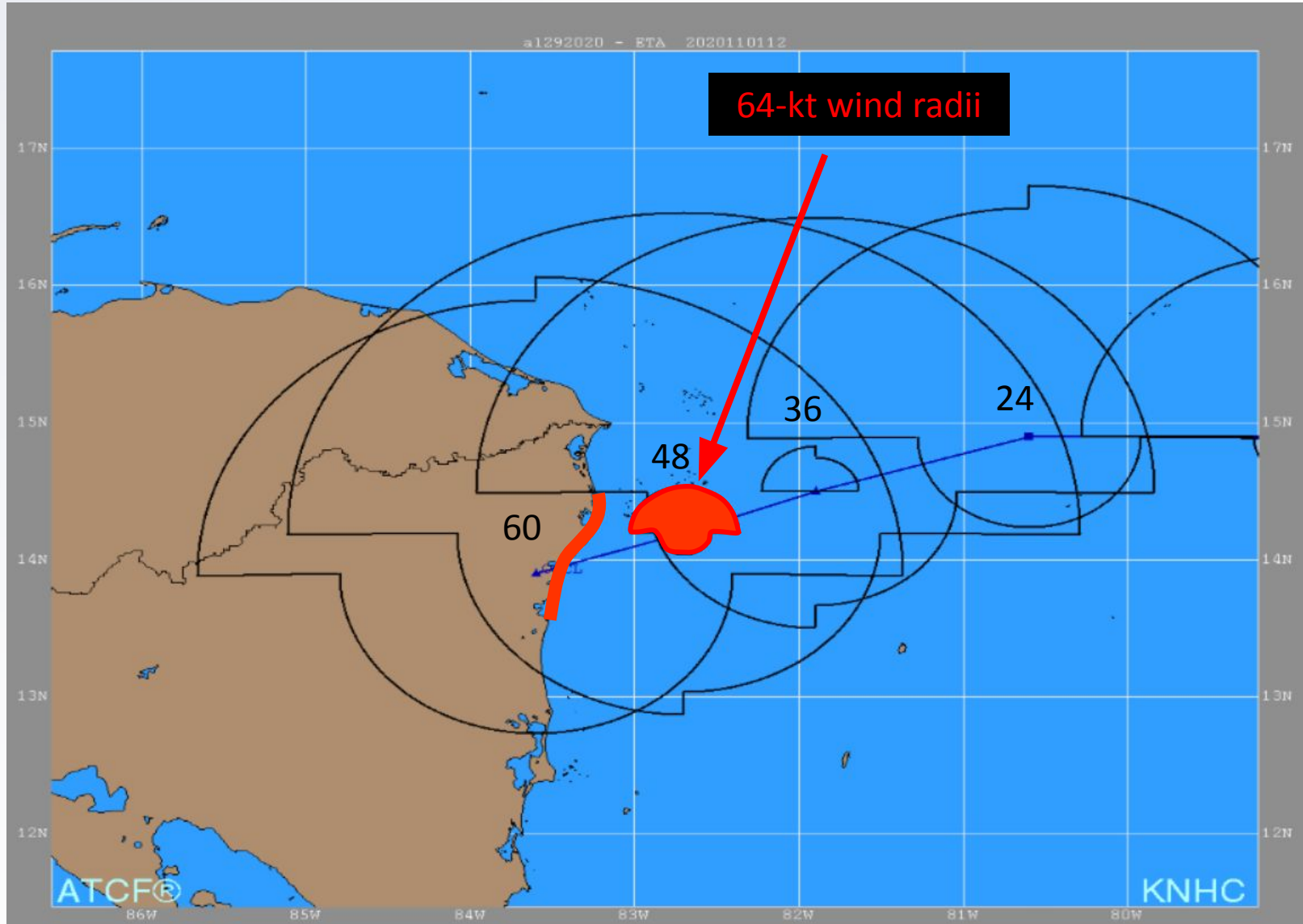
Questions/Discussion?

Exercise: Where Would You Issue the Warning?



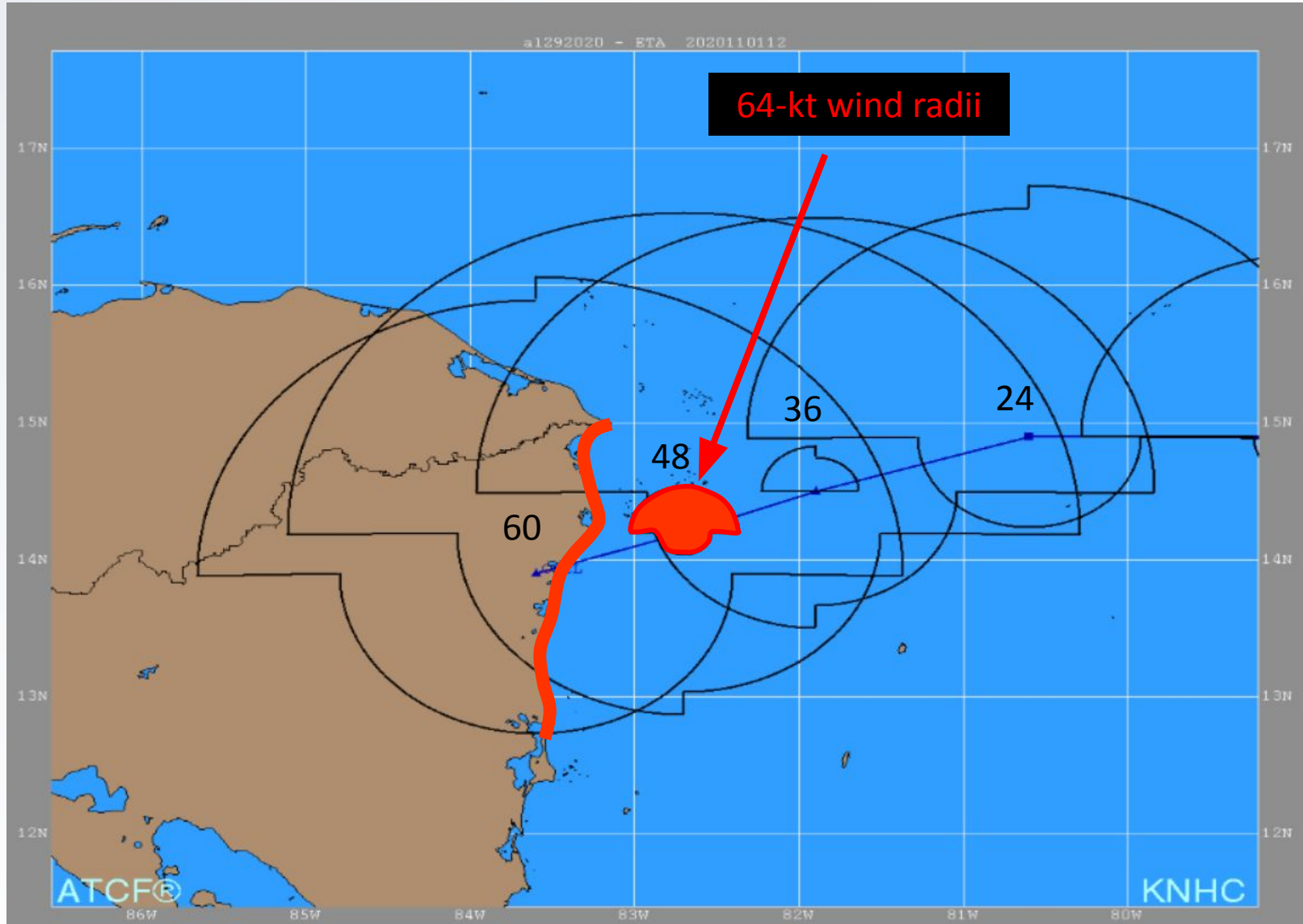
- Hurricane forecast to reach the coast of Nicaragua in 48-60 h
- 34-kt winds arrive on the coast in about 36 h
- Where would you issue a Hurricane Warning?

Exercise: Where Would You Issue the Warning?



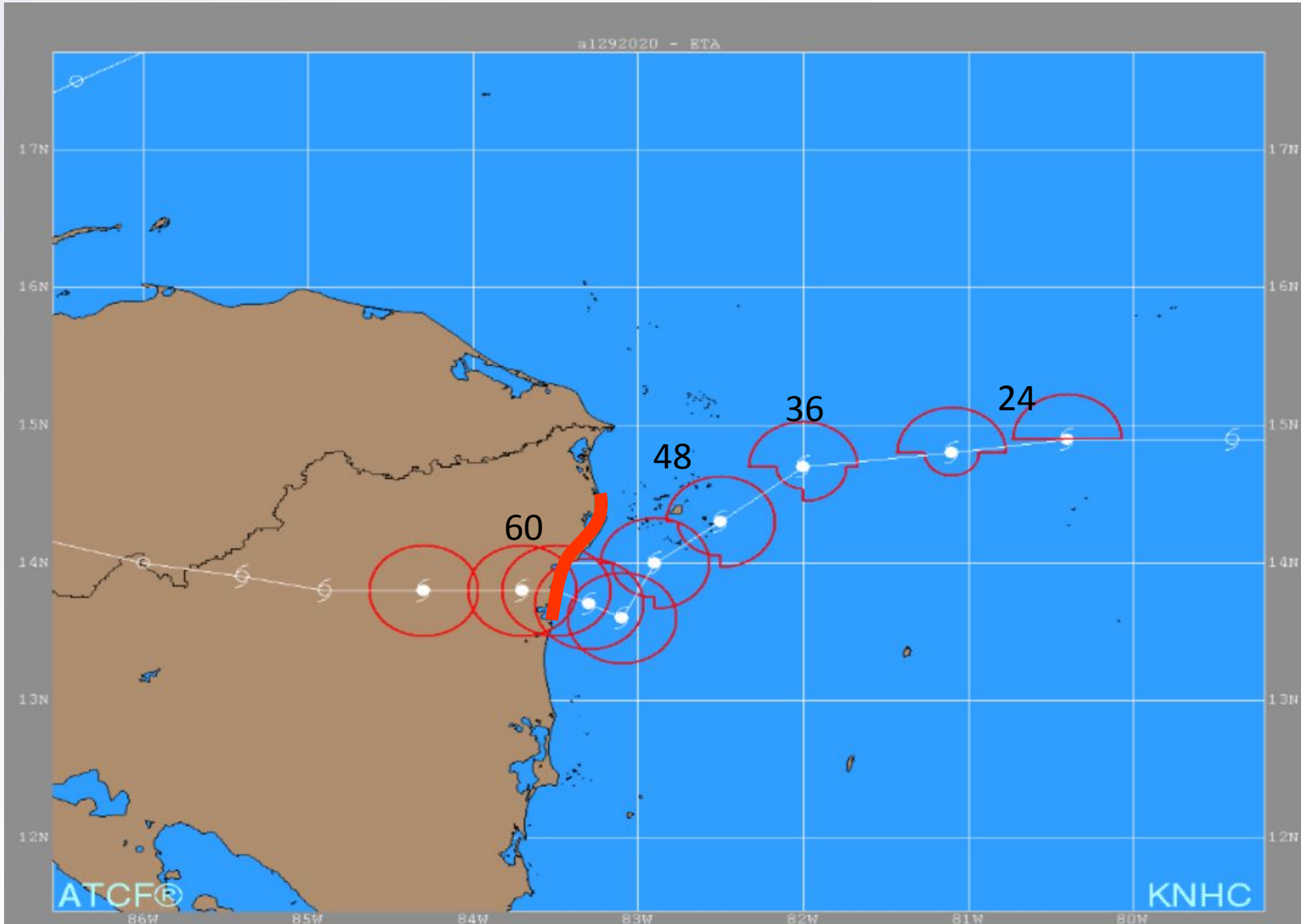
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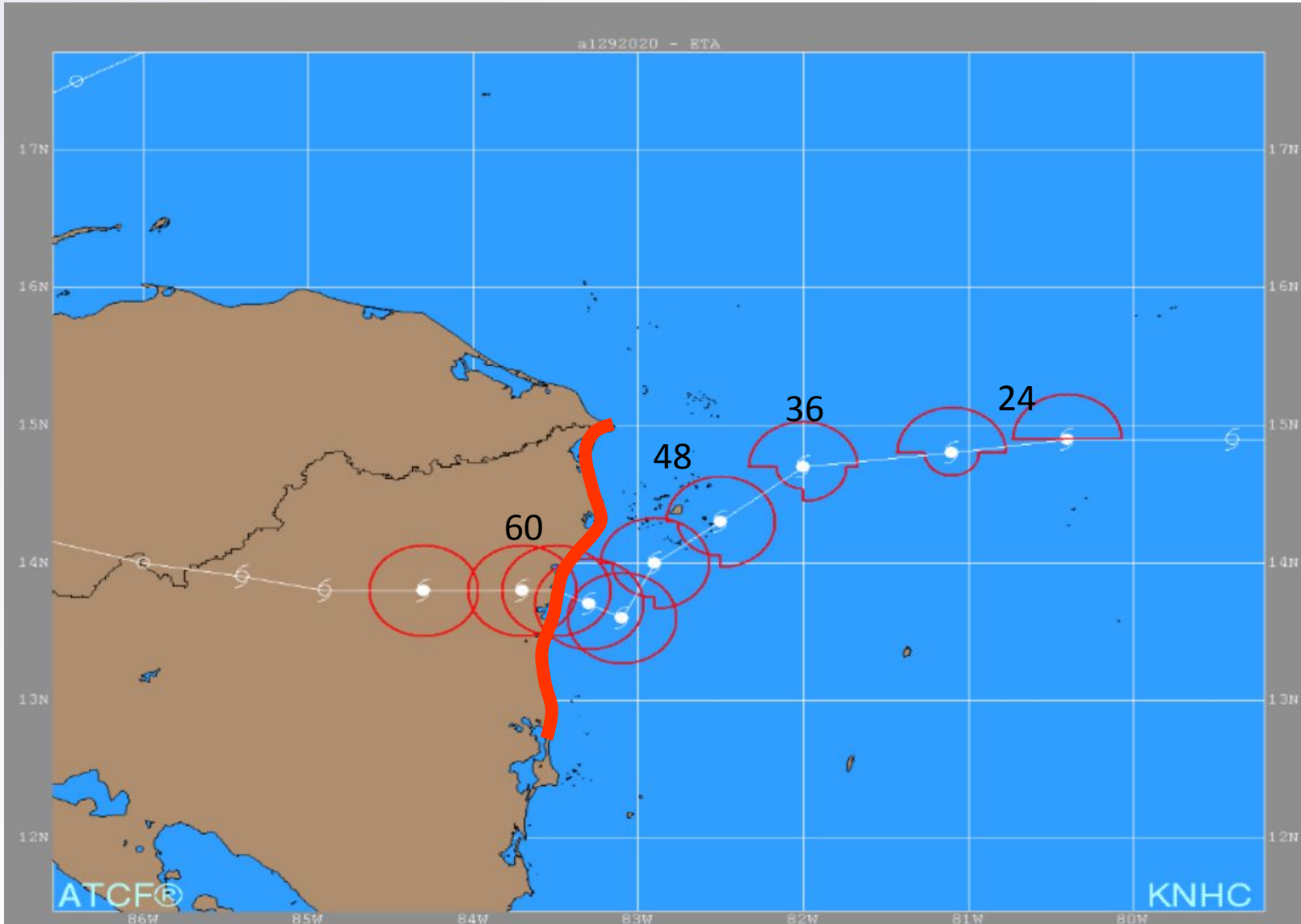
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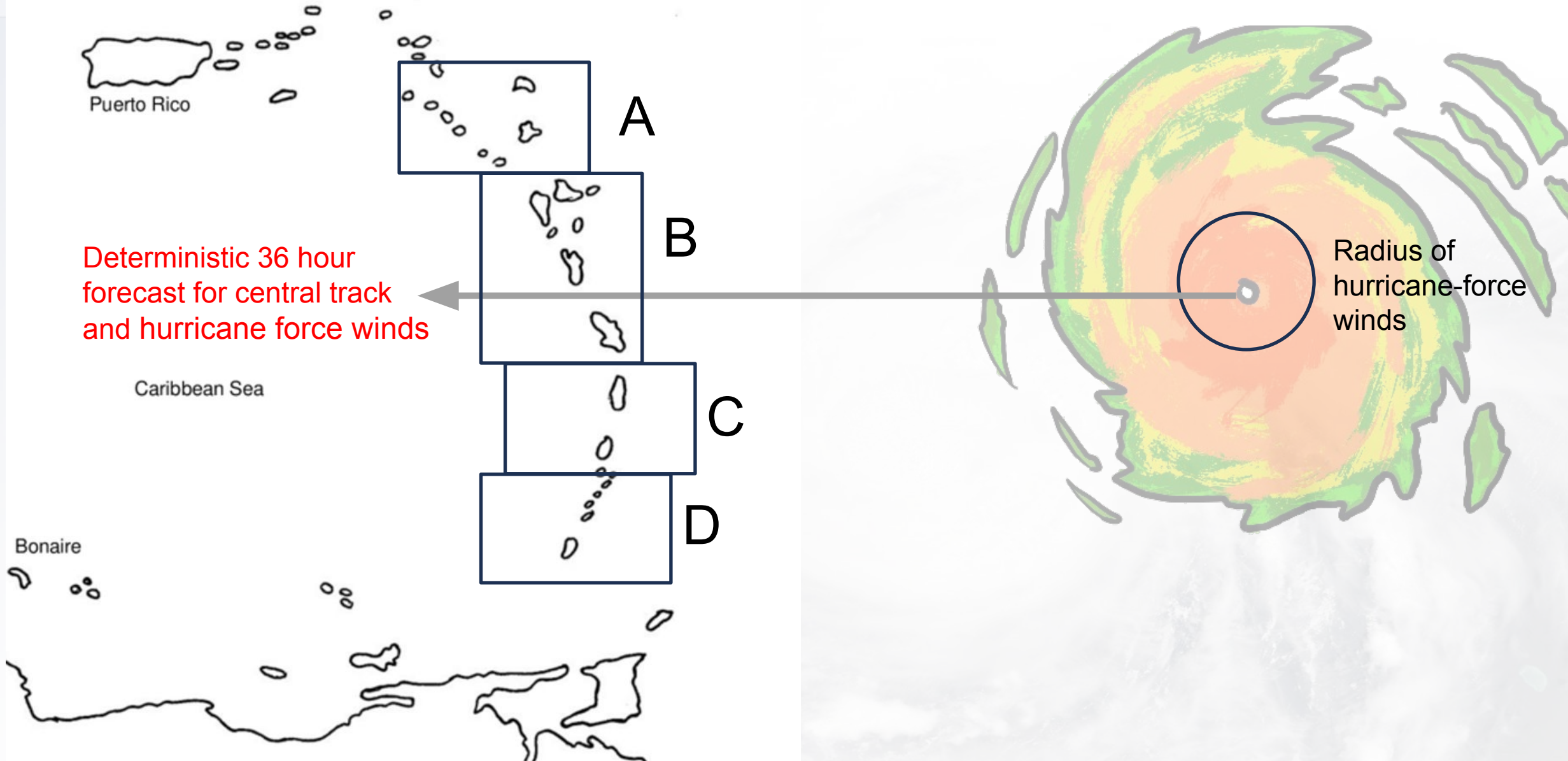
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Exercise: Where Would You Issue the Warning?



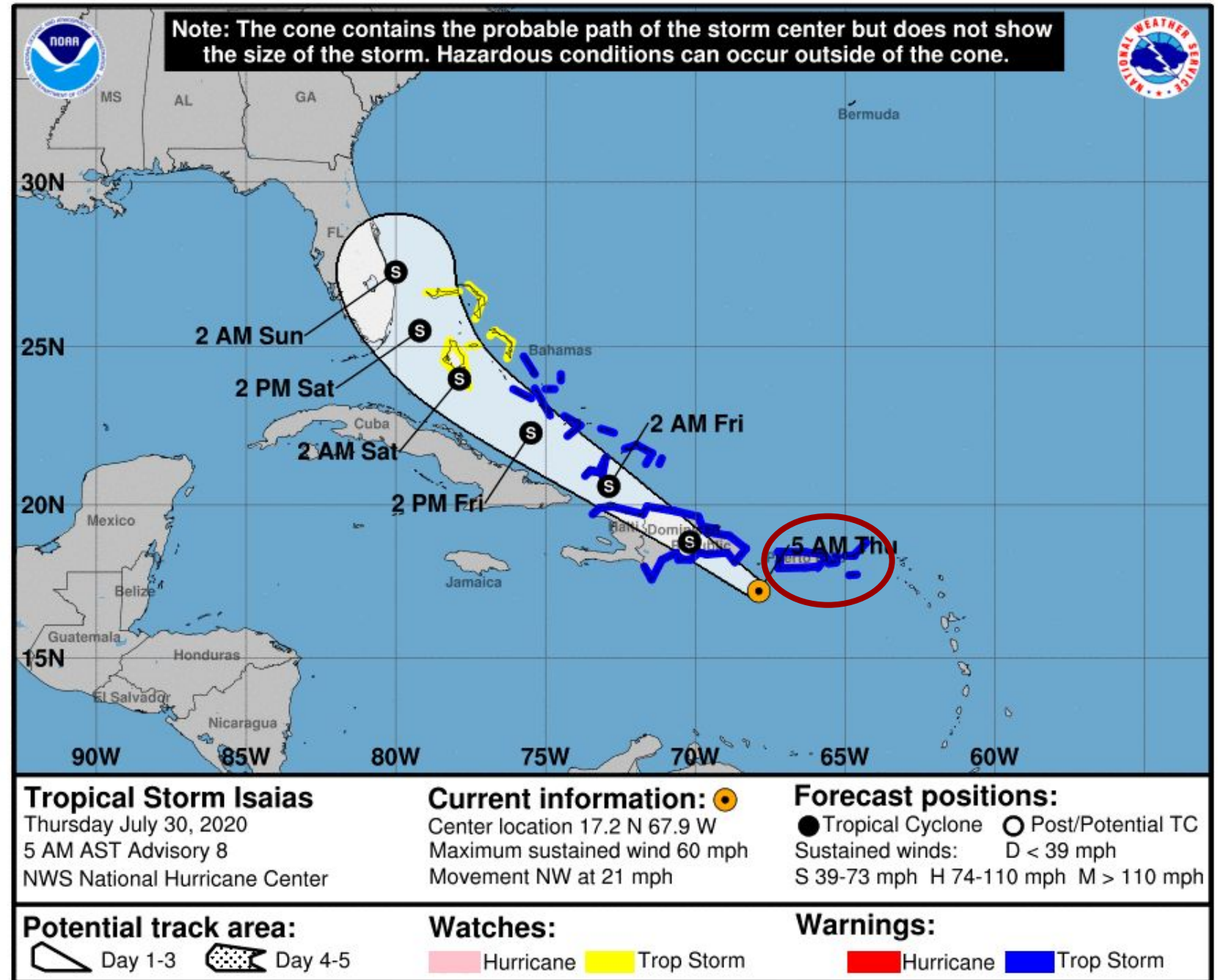
- Hurricane forecast to reach the coast of Nicaragua in 48-60 h
- 34-kt winds arrive on the coast in about 36 h
- Where would you issue a Hurricane Warning?

We are 36 hours away from impacts potentially beginning in the islands. Where would you put Hurricane Warnings and Watches? Select all that apply.



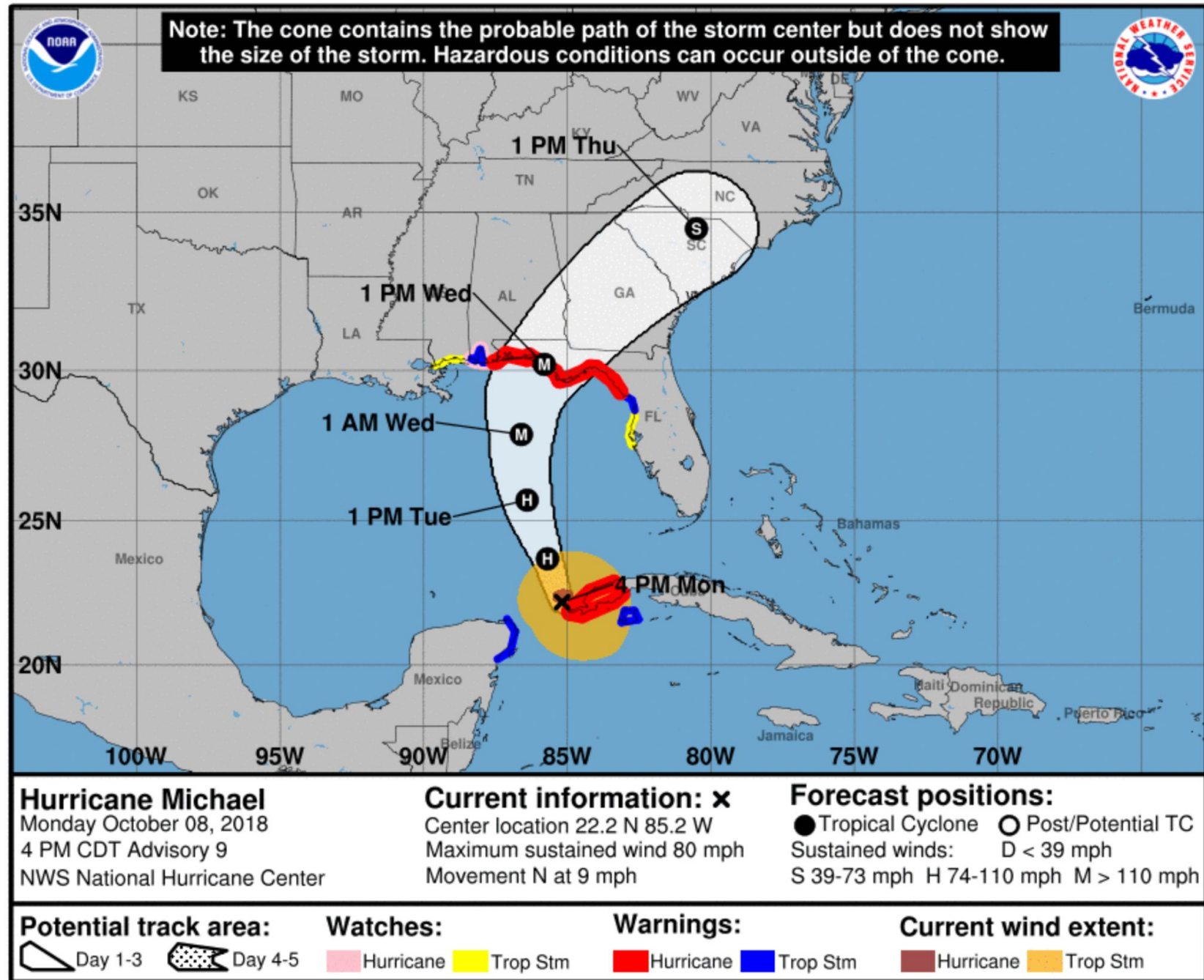
Why do locations outside of the cone have a Tropical Storm warning? Select the best answer.

- A. NHC forgot to update the map
- B. Rapid intensification potential
- C. Large wobble in the track of the storm
- D. High risk of tropical storm winds**



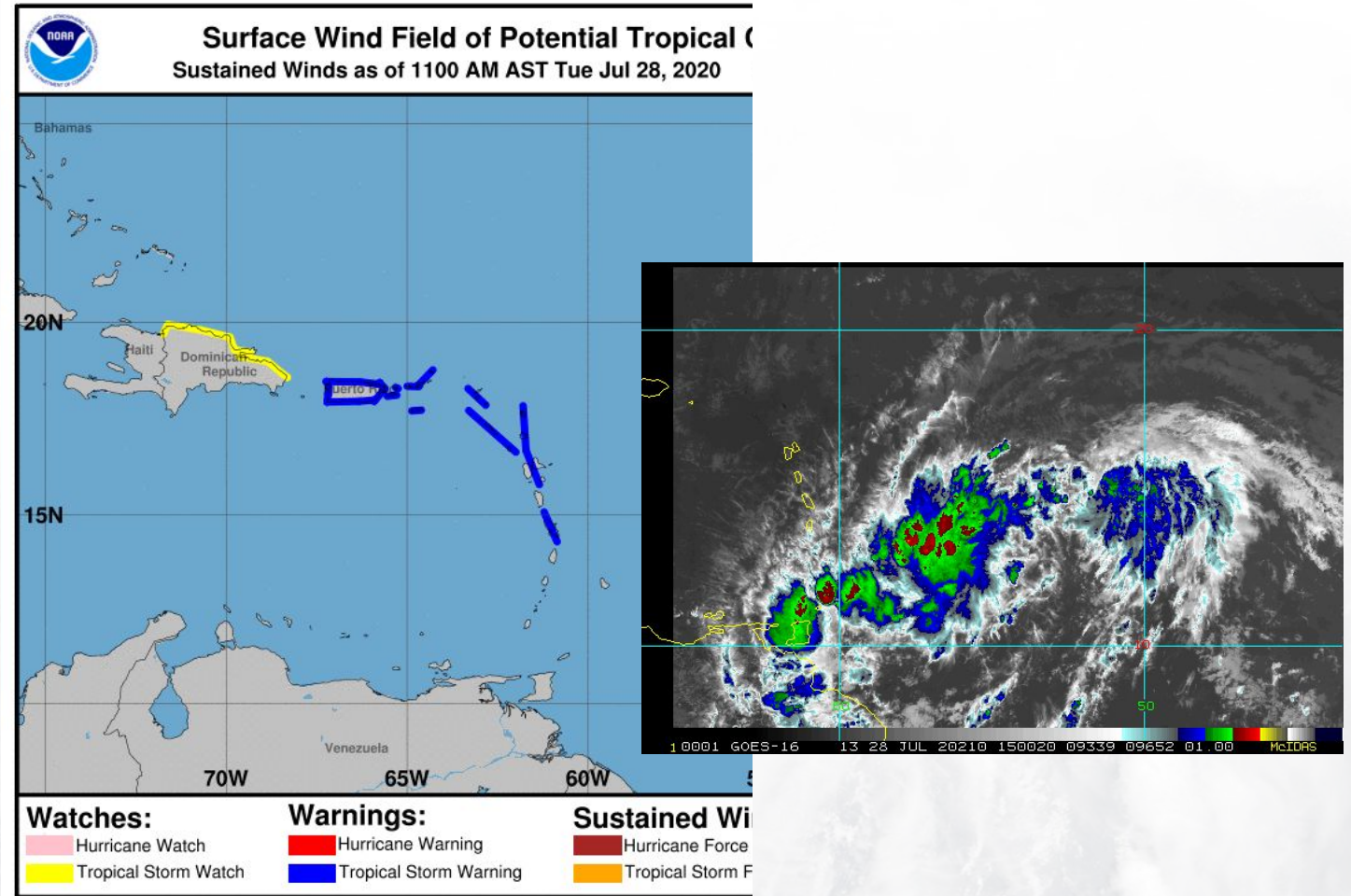
The brown area surrounding the X (current center location) shows the current hurricane force wind extent. The red areas show hurricane warnings. Why is so much of the US coastline included in the hurricane warning? Select all that apply.

- A. Potential for rapid intensification
- B. Potential changes in the future track of the storm
- C. Potential increase in the size of the storm
- D. Potential increase in the forward speed of the storm.



A disturbance is forecast to move across the Caribbean, but is currently only a potential tropical cyclone. Why did NHC recommend that watches and warnings be issued for this storm? Select the best answer.

- A. rapid intensification
- B. potential for tropical storm formation**
- C. changes in the position of the storm's center
- D. increase in the size of the storm
- E. significant track change



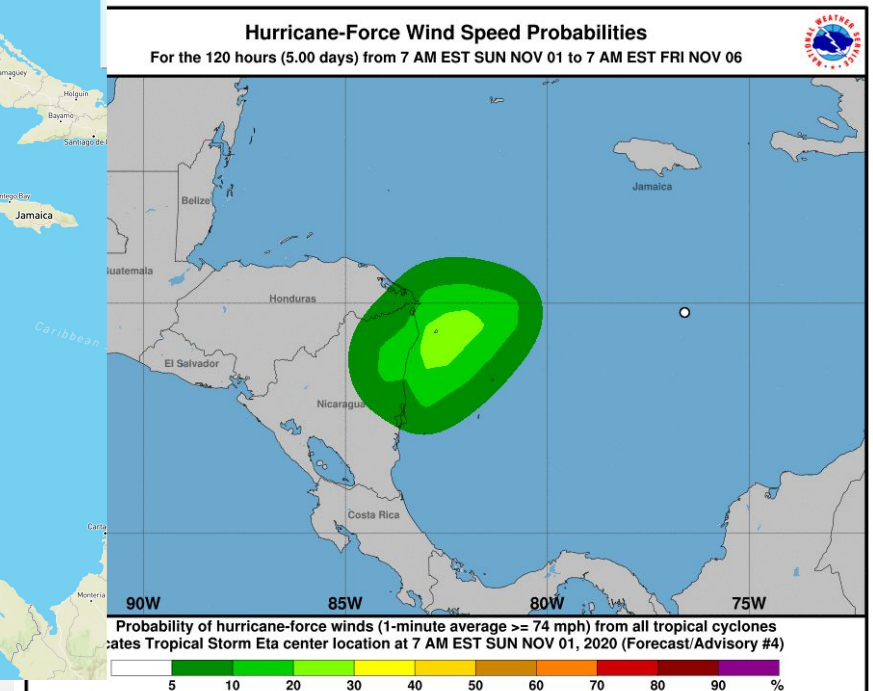
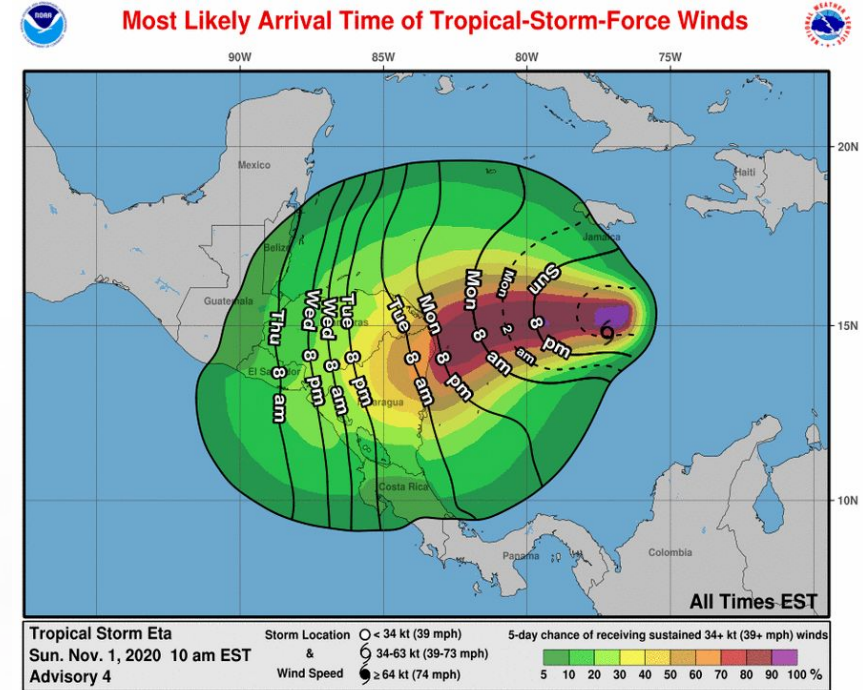
Initial advisory on PTC 9 on 28 July 2020

You are an NHC forecaster. A TC is situated south of Jamaica. Based on these forecast products, what is the best representation of hurricane and tropical storm watches and warnings that you would recommend for Central America? Select the best option.

A

B

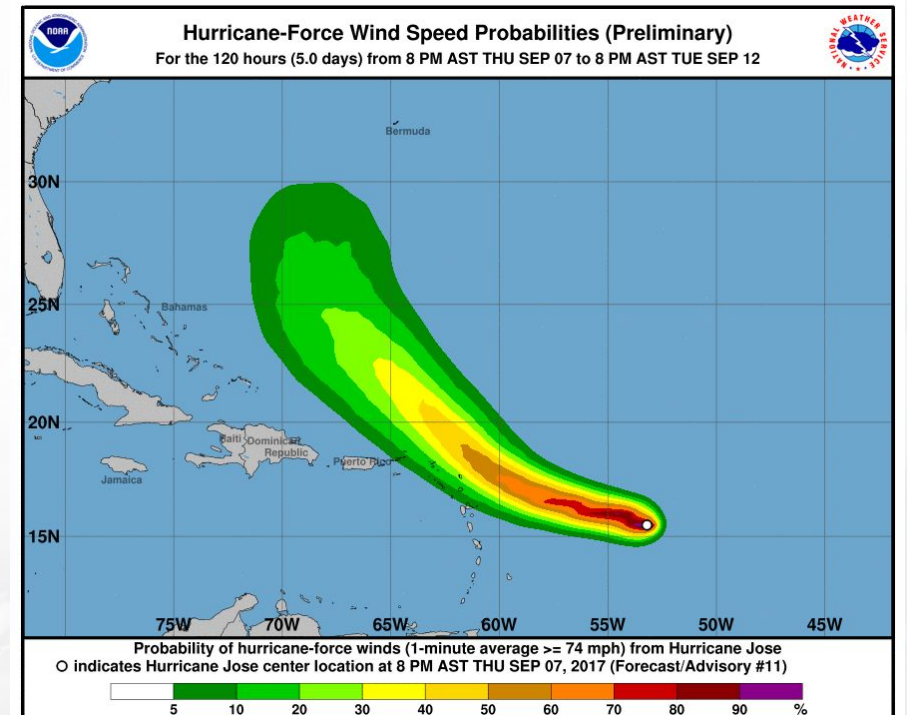
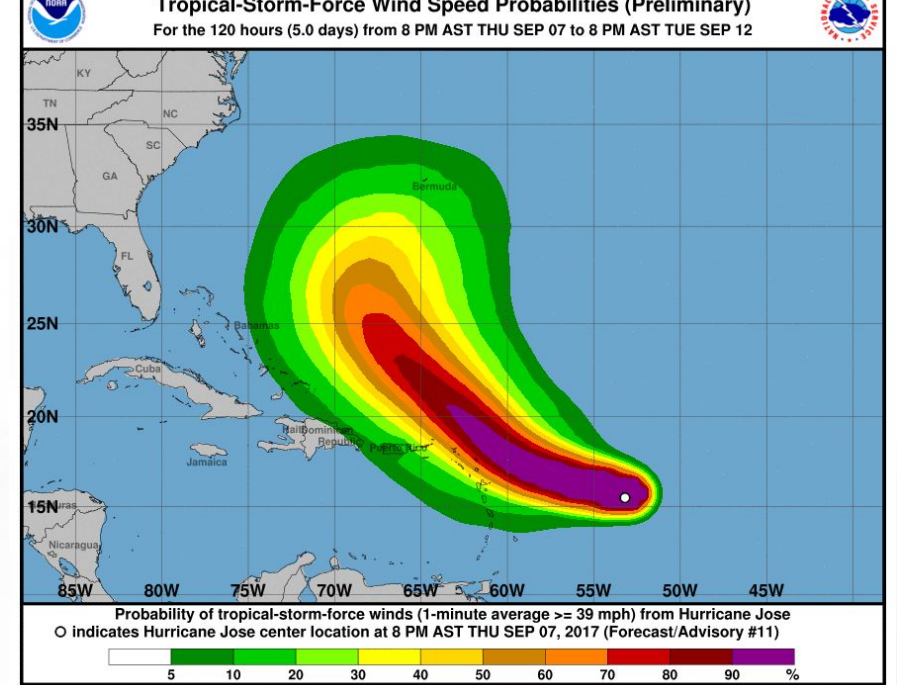
C



How will you communicate the threat of potential hurricane conditions to agencies preparing for the approaching storm on the islands of Barbuda and Antigua?

Select the best answer.

- A.** A Hurricane Warning is in effect along the islands of Barbuda, Antigua, and Anguilla. Hurricane conditions are expected somewhere within this area, with tropical-storm-force winds arriving within 36 hours.
- B.** Hurricane conditions are expected at all locations along the Barbuda, Antigua, and Anguilla coastlines, with tropical-storm-force winds arriving within 36 hours. A Hurricane Warning has been issued.
- C.** Tropical storm and hurricane conditions are anticipated everywhere in the tropical storm and hurricane warning areas within 36 hours. That's why a Hurricane Warning is in effect for the islands of Barbuda, Antigua, and Anguilla.



Poll questions: Which choice would you make?

A. Receive \$100 guaranteed

B. Flip a coin, “heads” you win \$200, “tails” you win nothing

Which choice would you make?

A. Flip a coin, “heads” you lose \$200, “tails” you lose nothing

B. Lose \$100 guaranteed