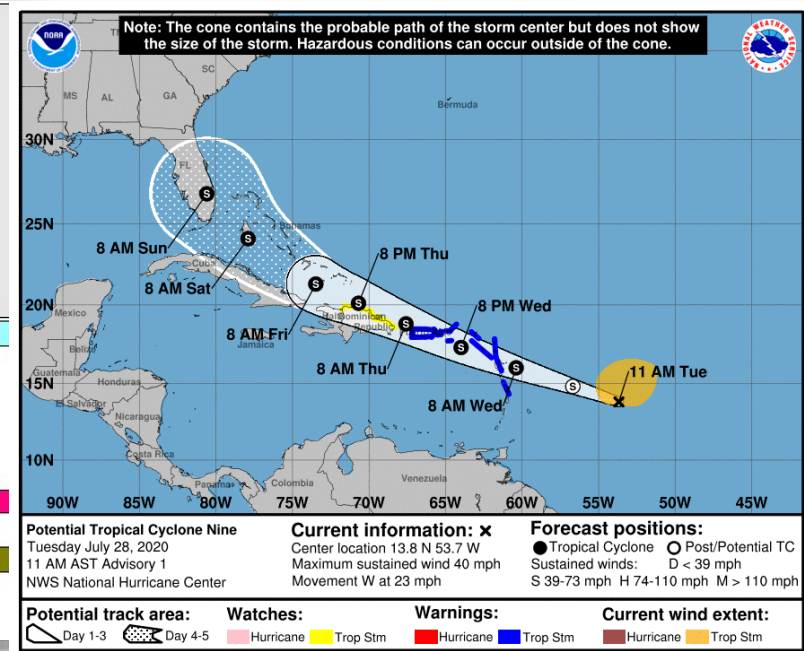
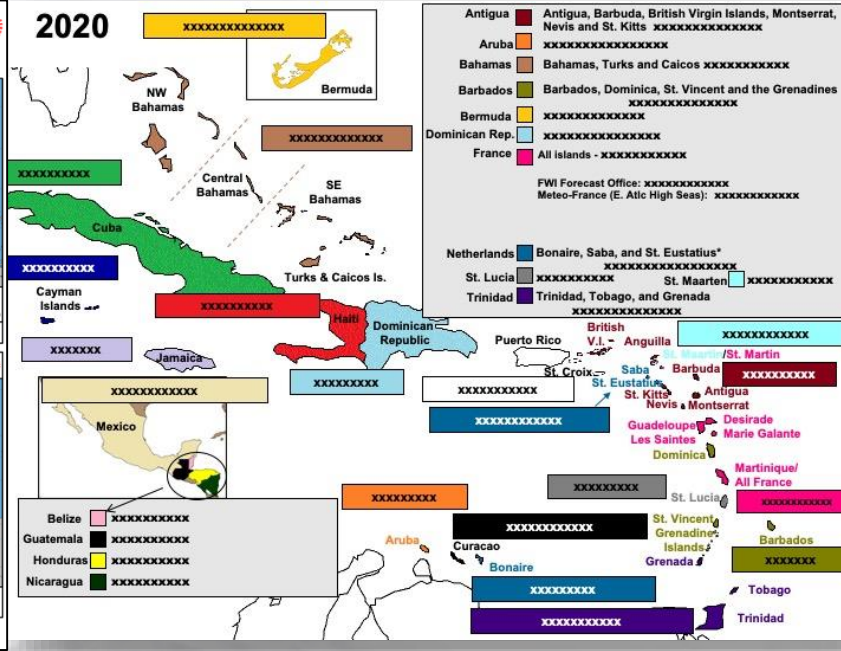
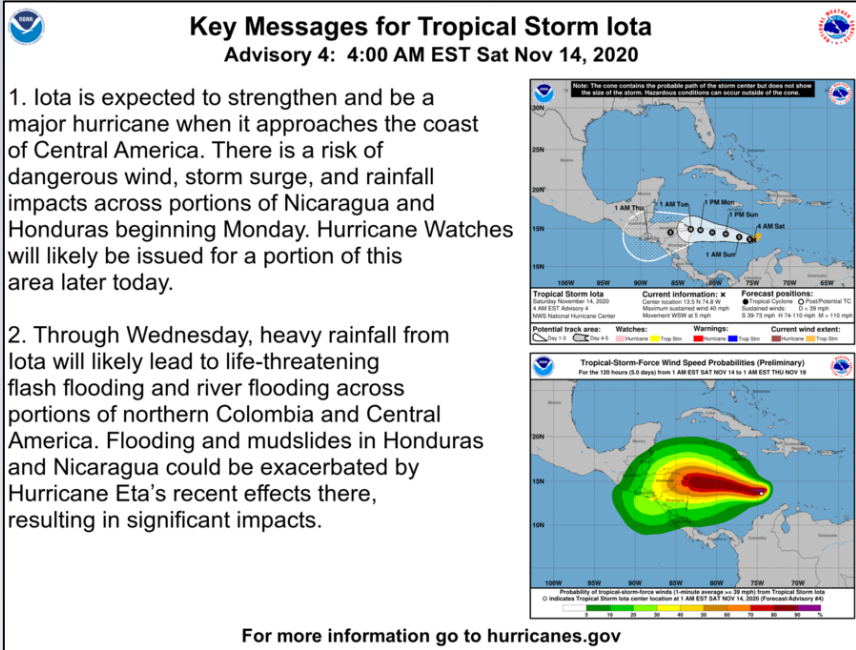


Watch/Warning Philosophy and Coordination and TC Messaging

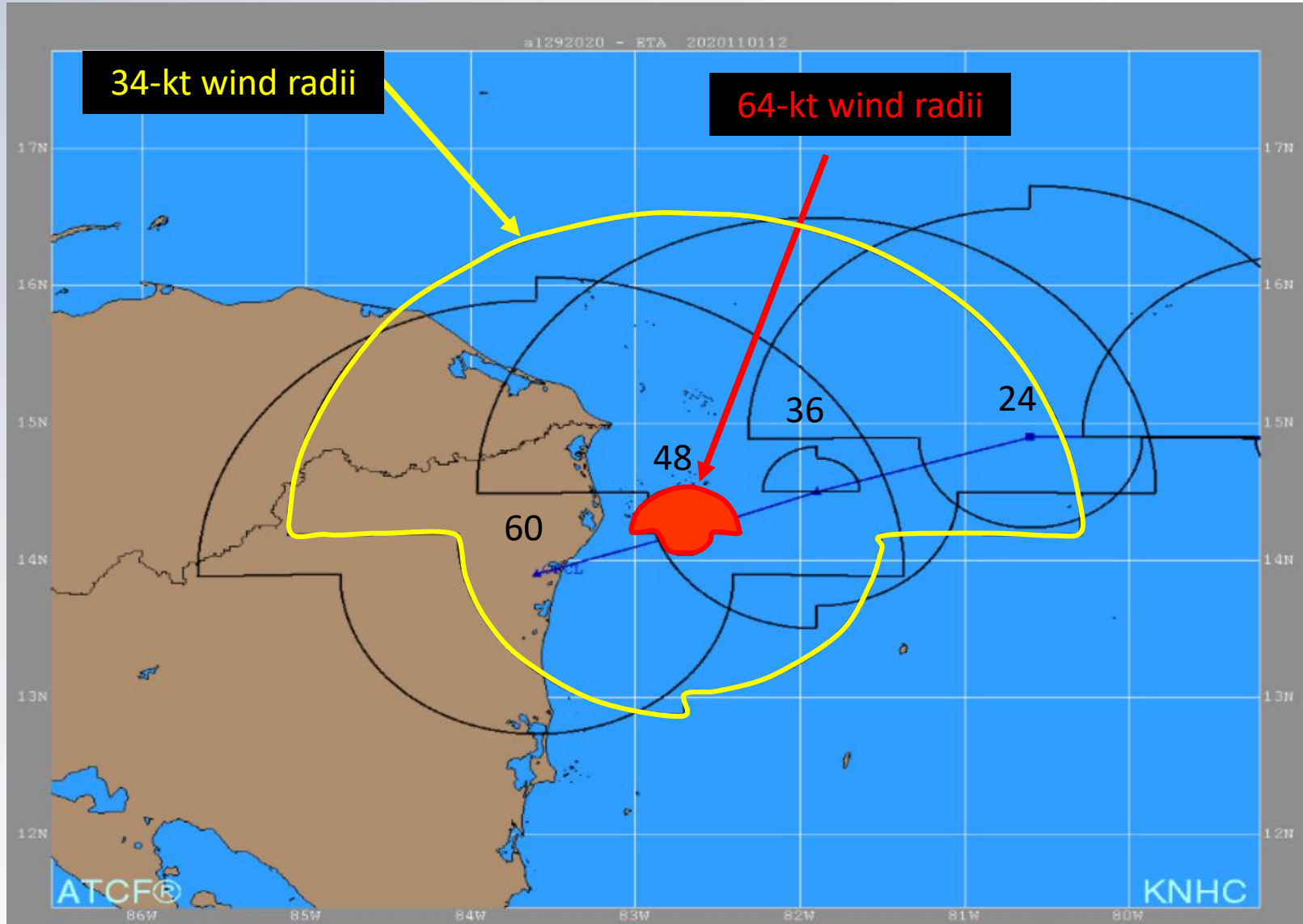


Michael Brennan and Dan Brown

NHC

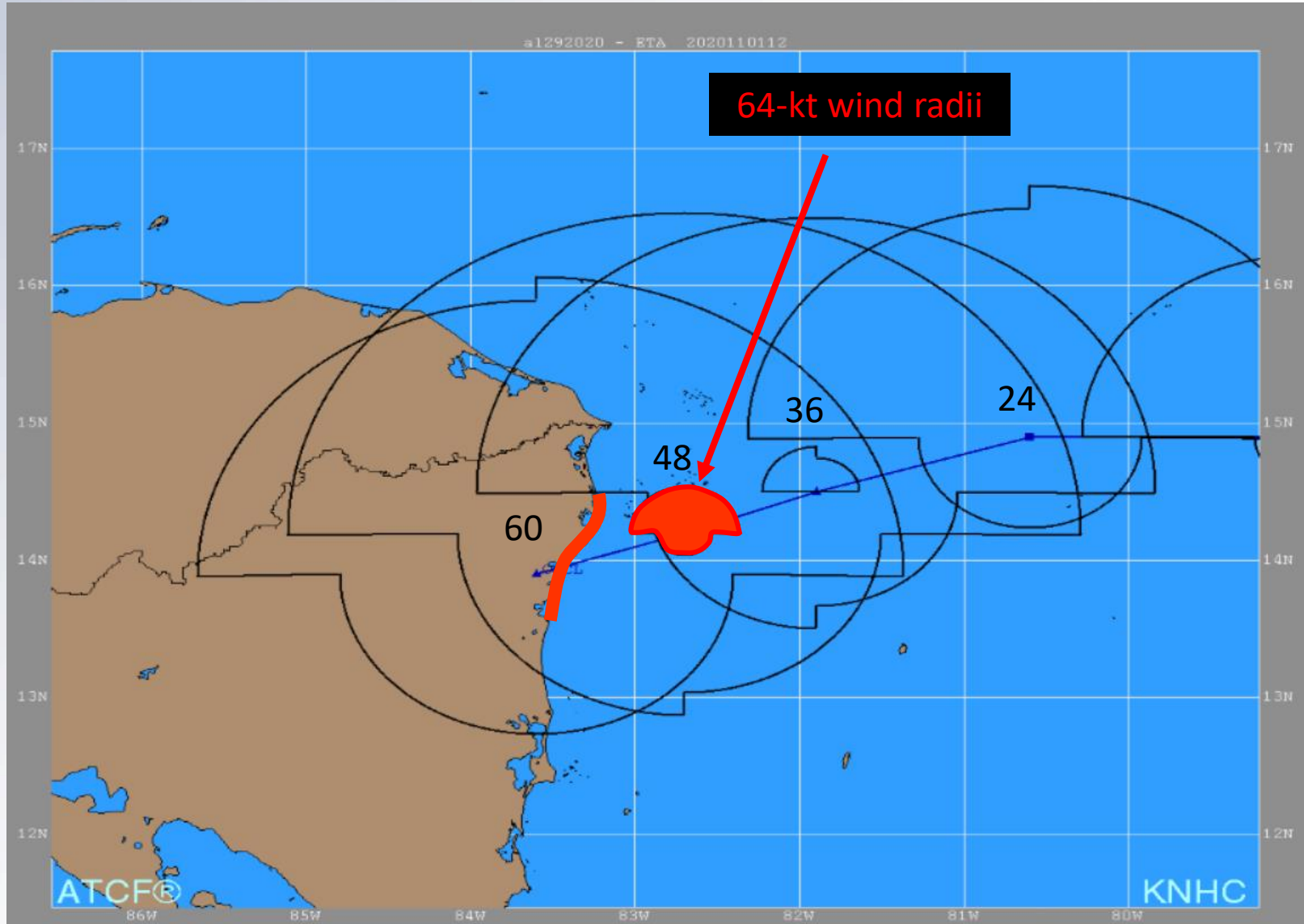
29 April 2021

Where Would You Issue the Warning?



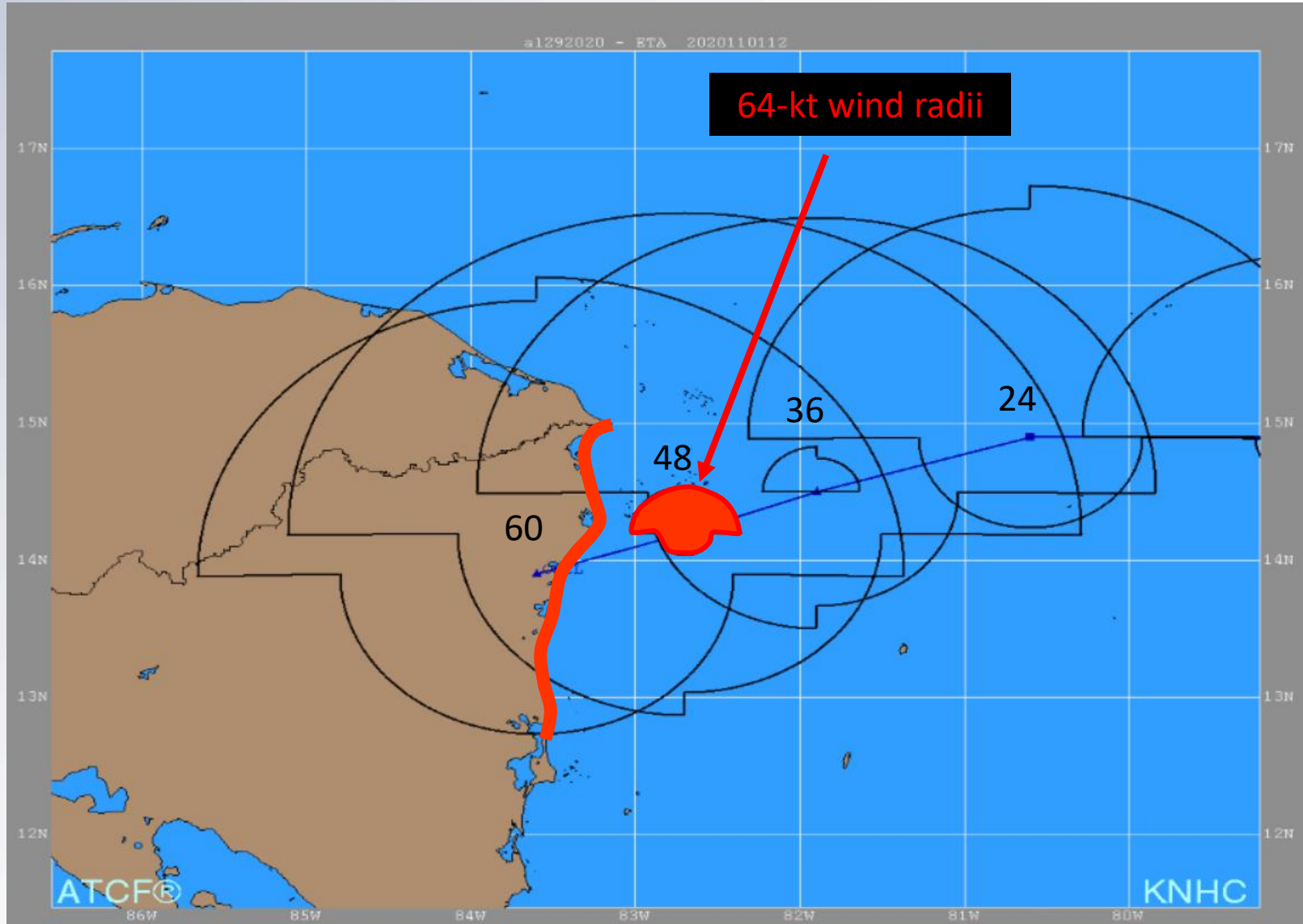
- Hurricane forecast to reach the coast of Nicaragua in 48-60 h
- 34-kt winds arrive on the coast in about 36 h
- Where would you issue a Hurricane Warning?

Where Would You Issue the Warning?



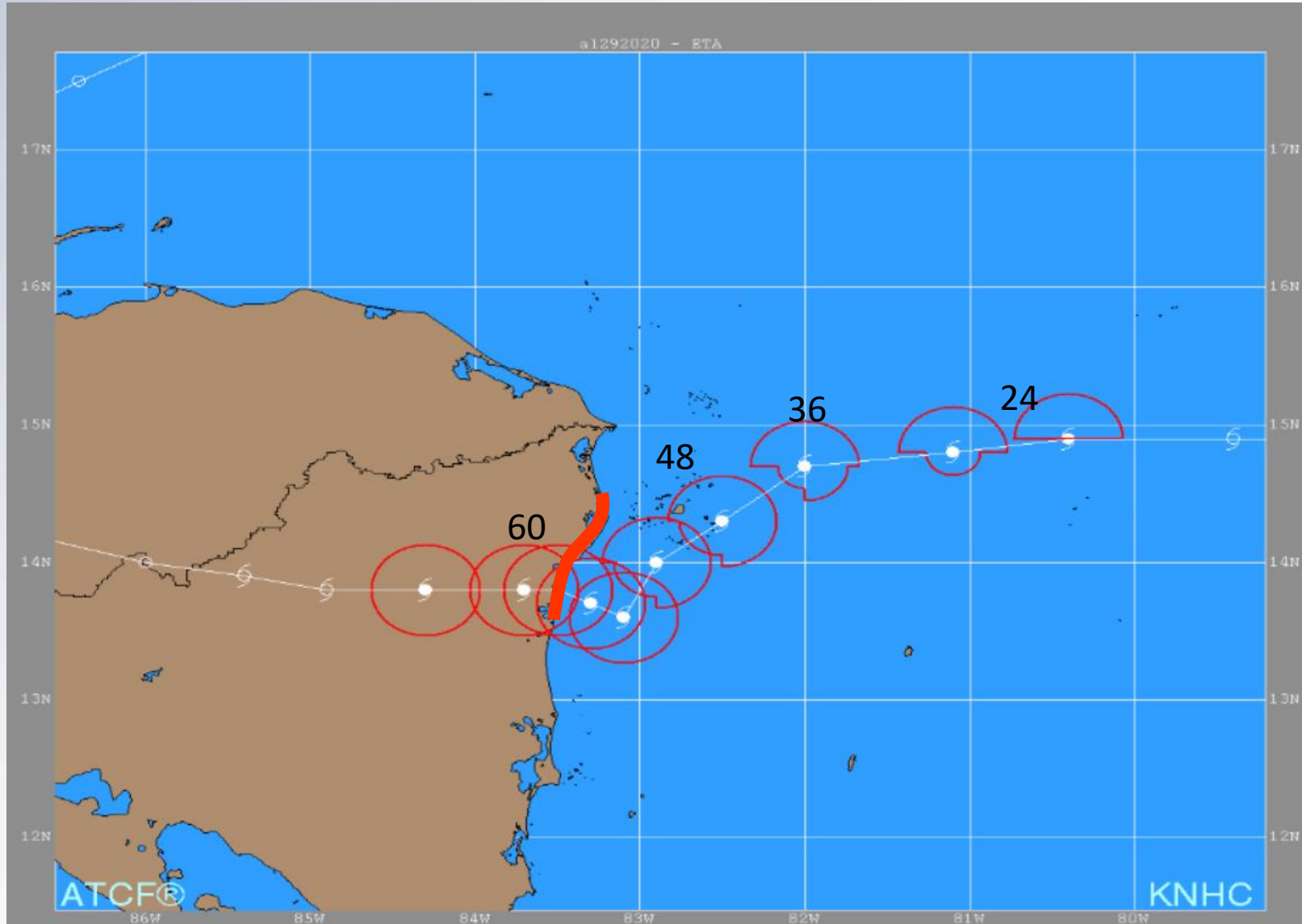
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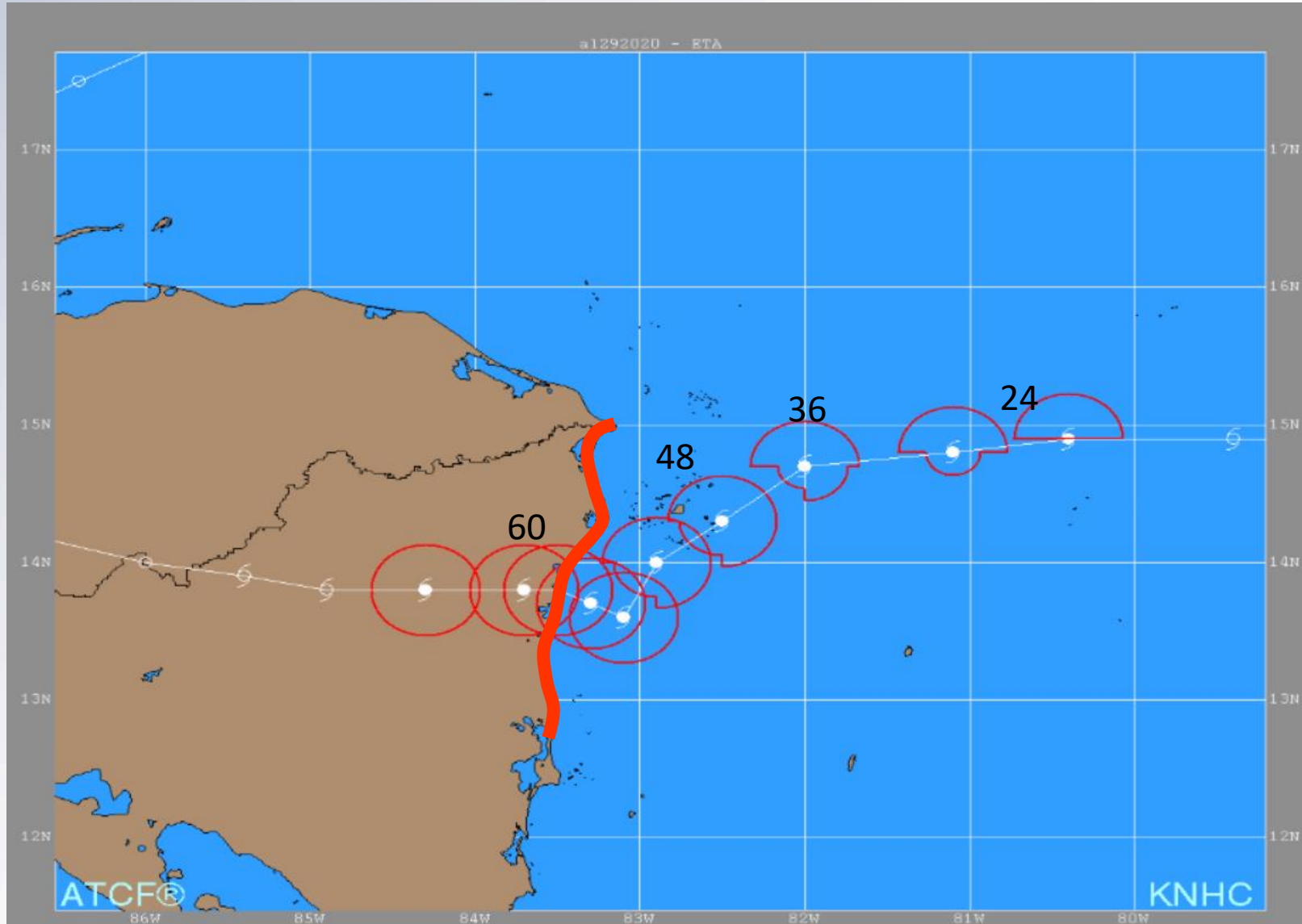
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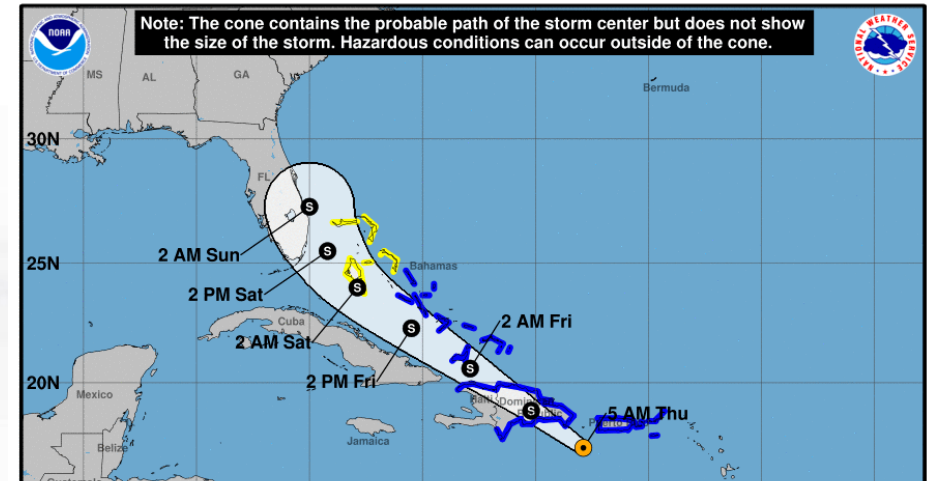
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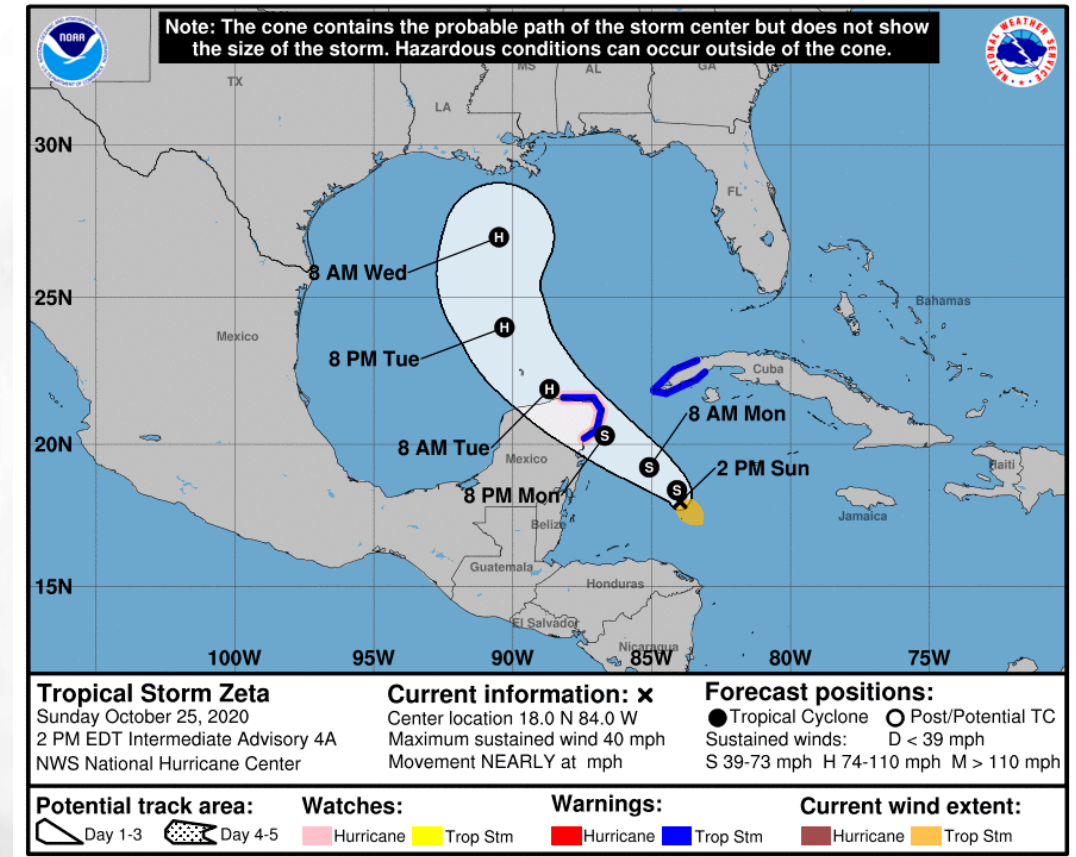
Watch/Warning Philosophy

- Watches and warnings are tools used to *convey risk* – telling users what they should be *prepared for* in terms of hazards
- Proper issuance of tropical storm and hurricane watches and warnings must account for uncertainty in the forecast and be issued with enough lead time for preparations to occur before the onset of hazards
- Considerations include:
 - Maintaining continuity, expectations of future changes to the forecast, assessment of forecast uncertainty, vulnerability of the area, time of day/day of week, and other non-meteorological factors



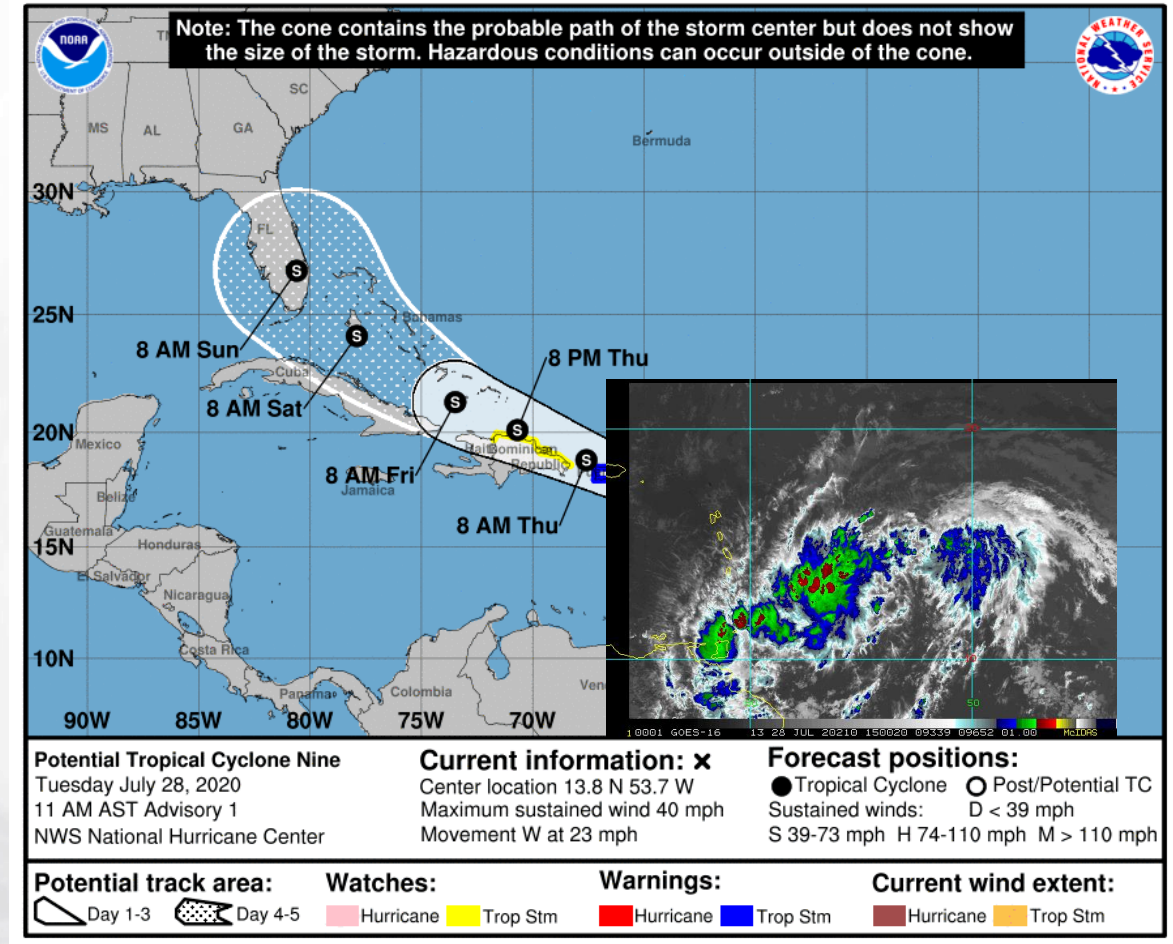
Watch/Warning Philosophy

- 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



Potential Tropical Cyclones

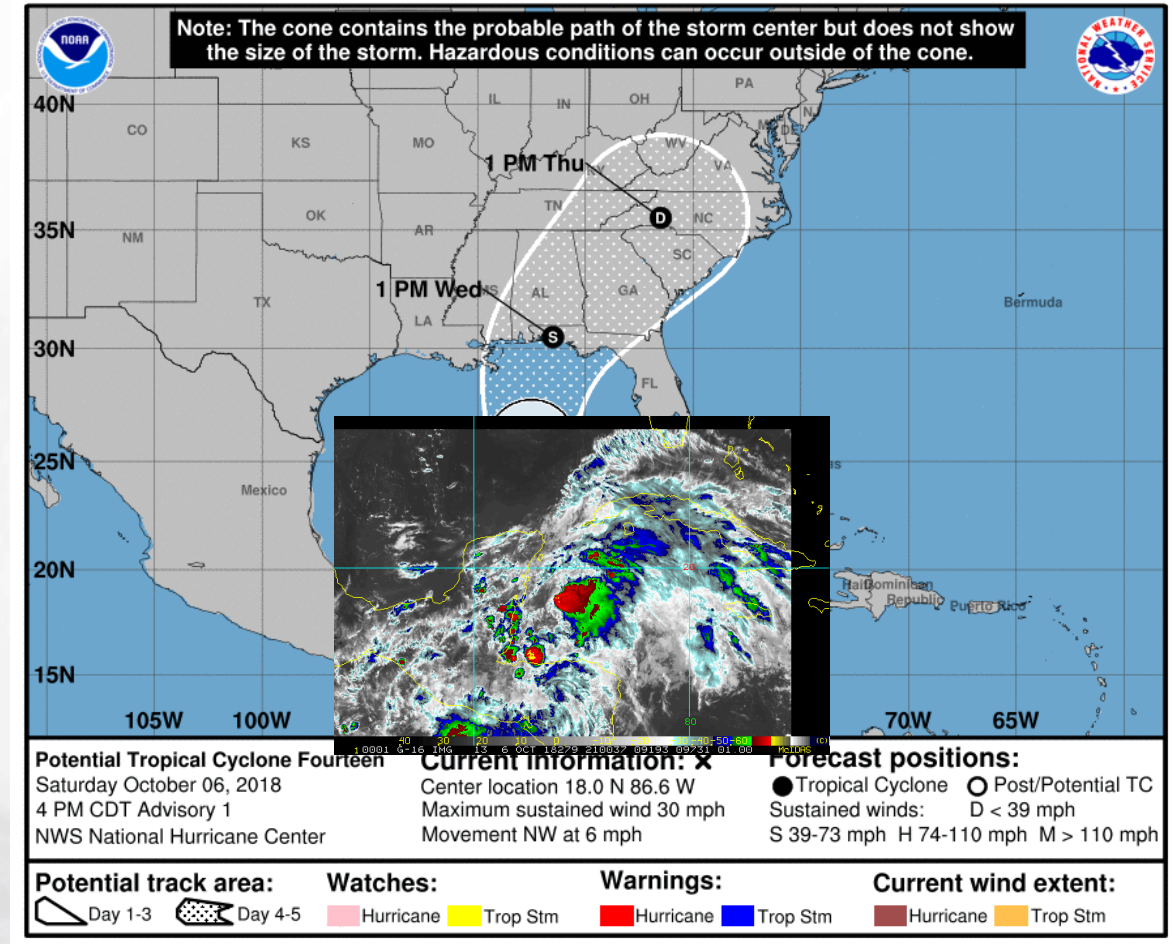
- Allows NHC to provide the same level of service for systems that are not yet tropical cyclones but could bring tropical storm conditions to land areas within 48 h
- Accompanied by the standard suite of NHC advisory products
- Initiating advisories on a PTC depends on
 - Likelihood of TS force winds 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

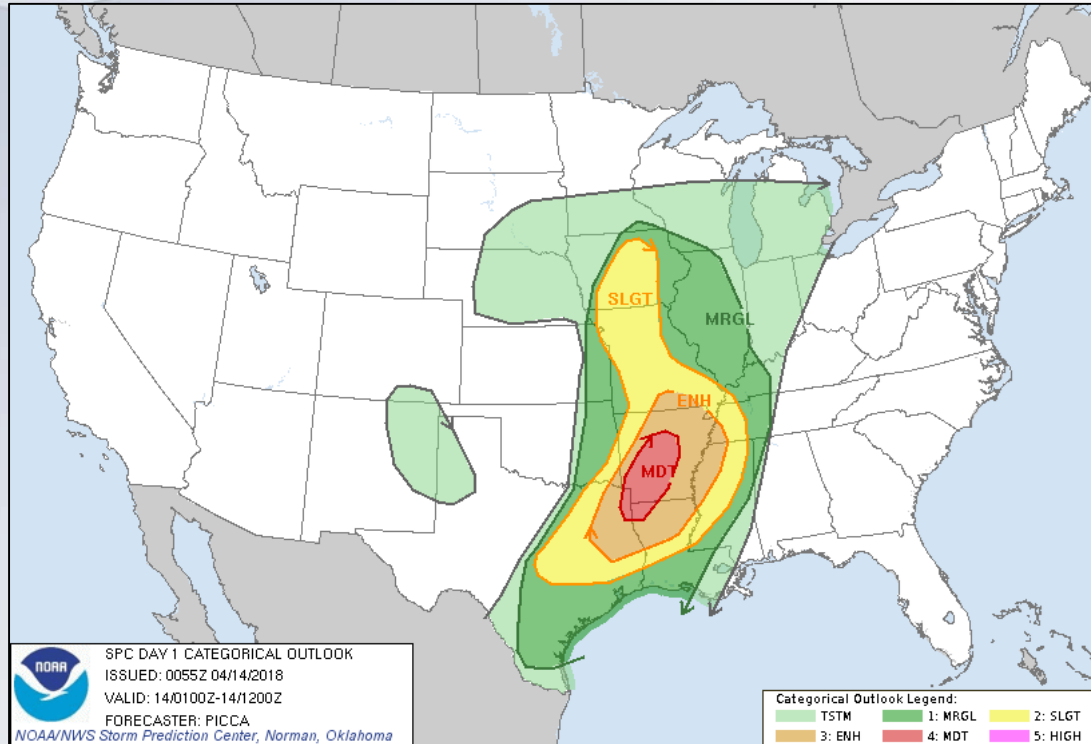
Potential Tropical Cyclones

- 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



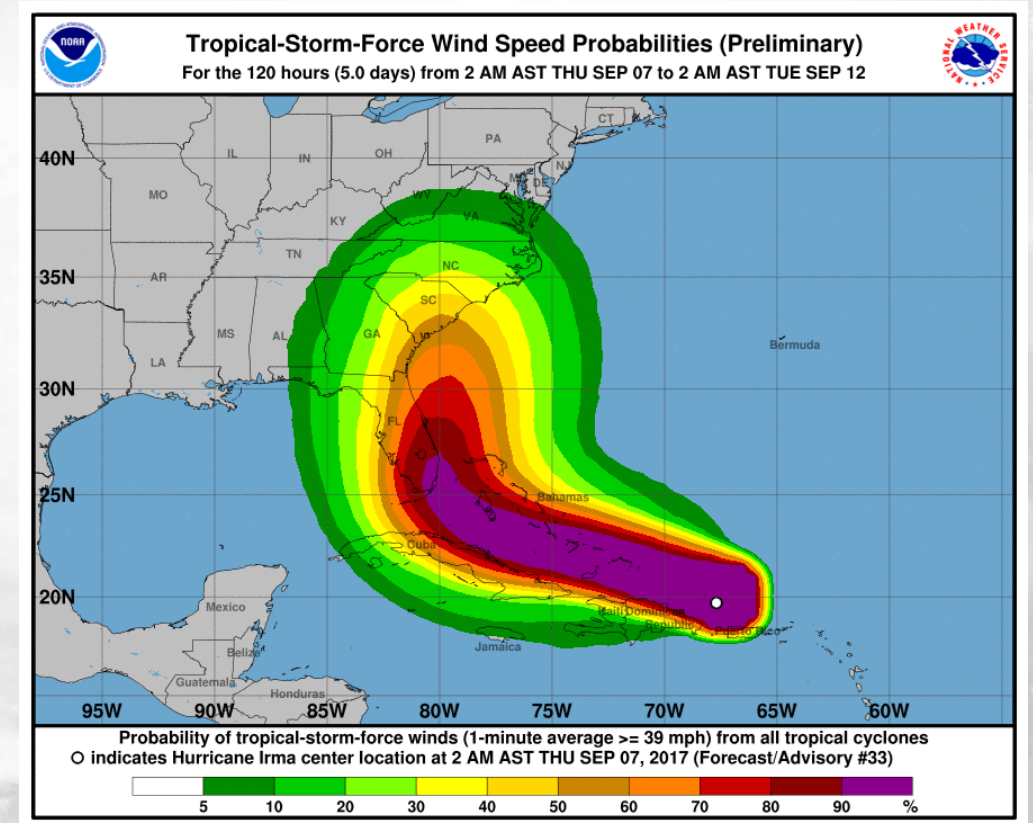
Initial advisory on PTC 14 (later Michael) on 6 October 2018, about 12 h before it became a TD

Similarities to Severe Weather Program



SPC Convective Outlook provides information on potential for severe weather. Categorical and probabilistic information available.

NHC wind and storm surge probabilities provide risk of wind and surge at individual locations.



Similarities to Severe Weather Program

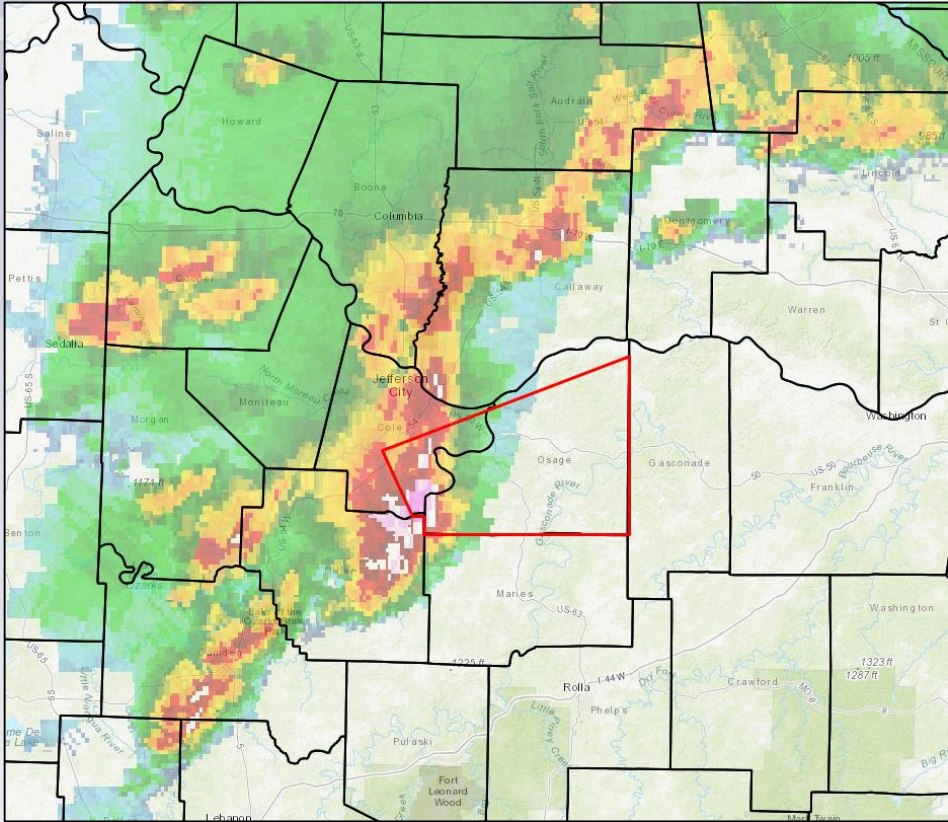


A Tornado Watch then identifies the area within which conditions are favorable for the development of severe thunderstorms and tornadoes (i.e., the area in which severe weather is *possible*).

A Hurricane Watch means that hurricane force winds are *possible* somewhere within the watch area within 48 hours.

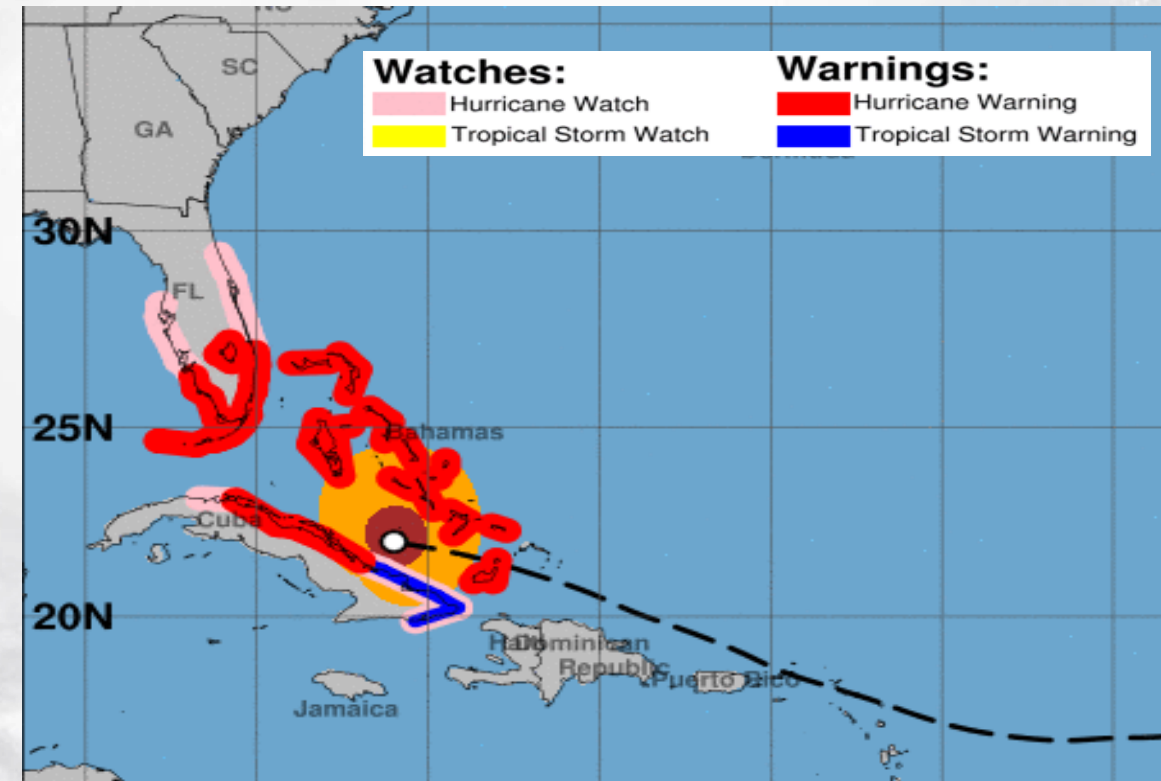


Similarities to Severe Weather Program



A Tornado Warning identifies the area within which a tornado is occurring or is *expected* to occur somewhere within the polygon. The warning expresses a danger to life and property.

A Hurricane Warning means that hurricane force winds are *expected* somewhere within the warning area within 36 hours.



Coordination of Watches and Warnings

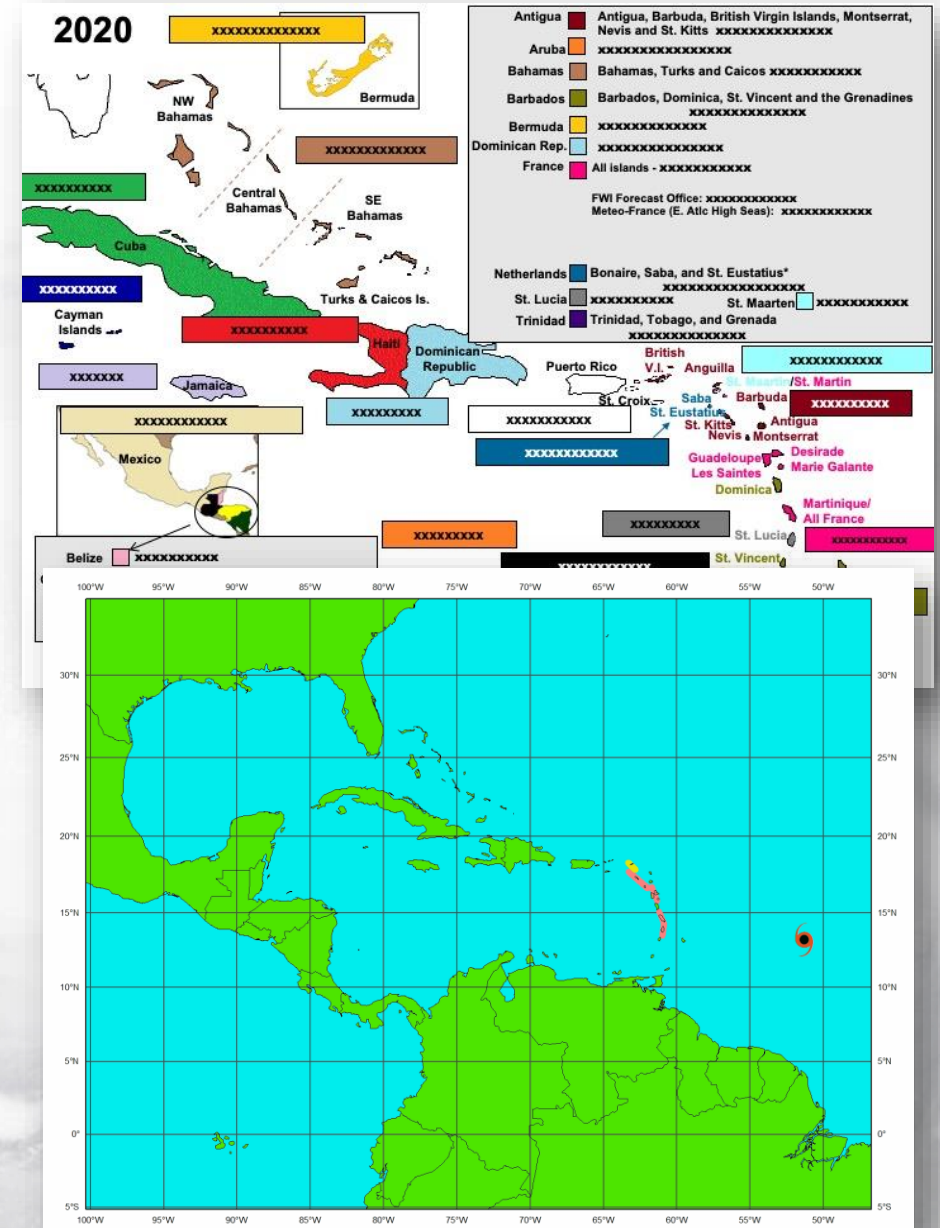
- Each country responsible for issuing watches/warning for their respective country or jurisdiction
- NHC will recommend the placement of tropical storm and hurricane watches/warnings
- Watches issued 48 h prior to the anticipated arrival of tropical-storm-force winds
- Warnings issued 36 h prior to the arrival of tropical-storm-force winds



Tropical Cyclone Breakpoints - Caribbean

Coordination of Watches and Warnings

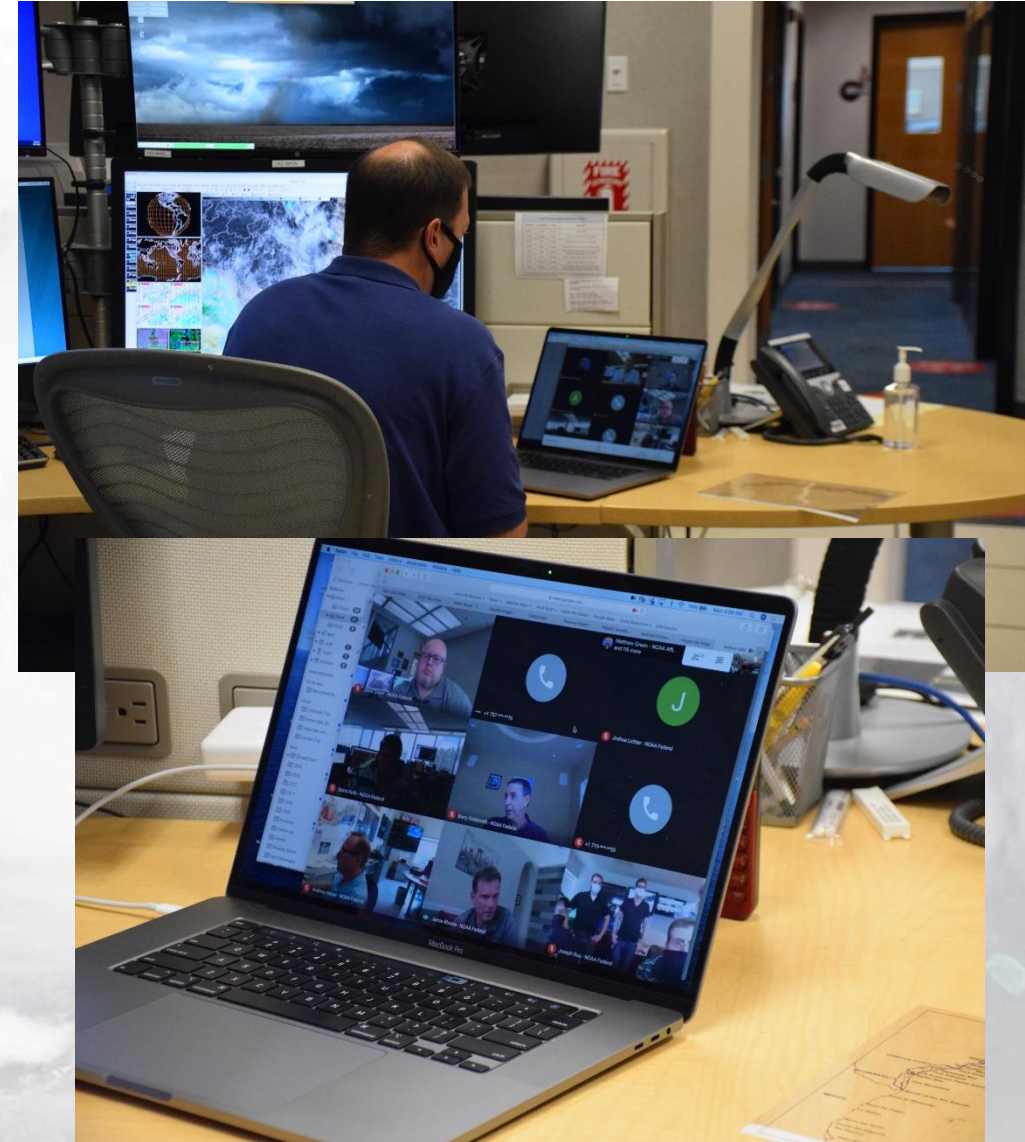
- Coordination occurs with each country's meteorological office
- Coordination can be complex when many countries are involved, especially neighboring countries or jurisdictions
- NHC always has at least two forecasters on duty during watch and warning situations
- Coordination can occur by phone or email



Enhancing Real-Time Coordination in RA-IV

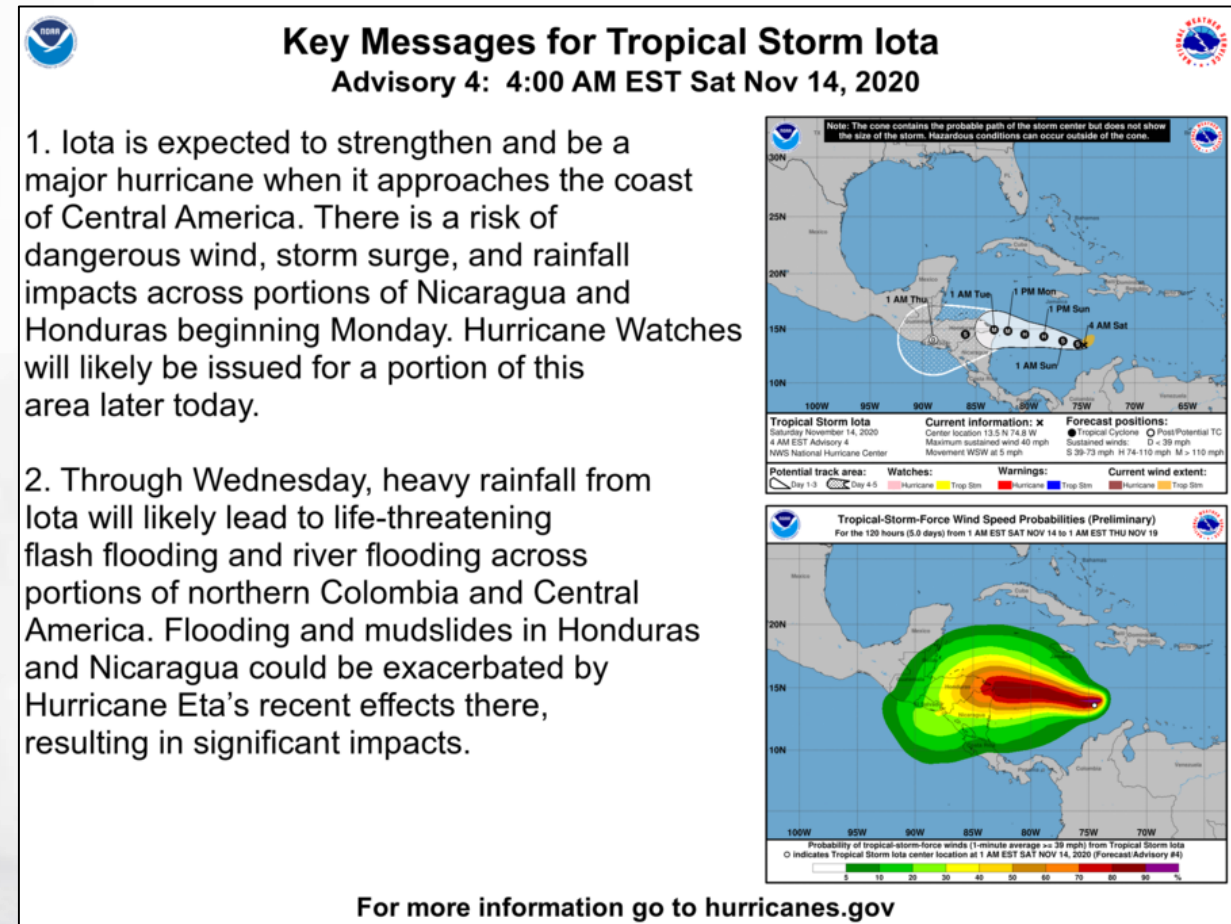
Test Video Conferencing in 2021 – Stay Tuned!

- NHC transitioned to the use of video conferencing to coordinate forecasts & warnings within the U.S. NWS
- Enabled face-to-face coordination and data/screen sharing
- Allows nation-to-nation coordination by increased understanding of Watch/Warning decisions of neighboring countries
 - Calls will be decisional – goal is to reduce need for multiple calls and have more efficient collaboration
- Will try to test with a subset of member states in 2021 – Stay Tuned!



Key Messages

- “Key” takeaways from each NHC forecast package focused on evolving risk of hazards, not on storm “details”
- Included in the Tropical Cyclone Discussion and on graphic for dissemination via social media
 - Spanish language graphic available on hurricanes.gov
- Geared toward public, emergency managers, and media for consistent messaging of threat/impacts

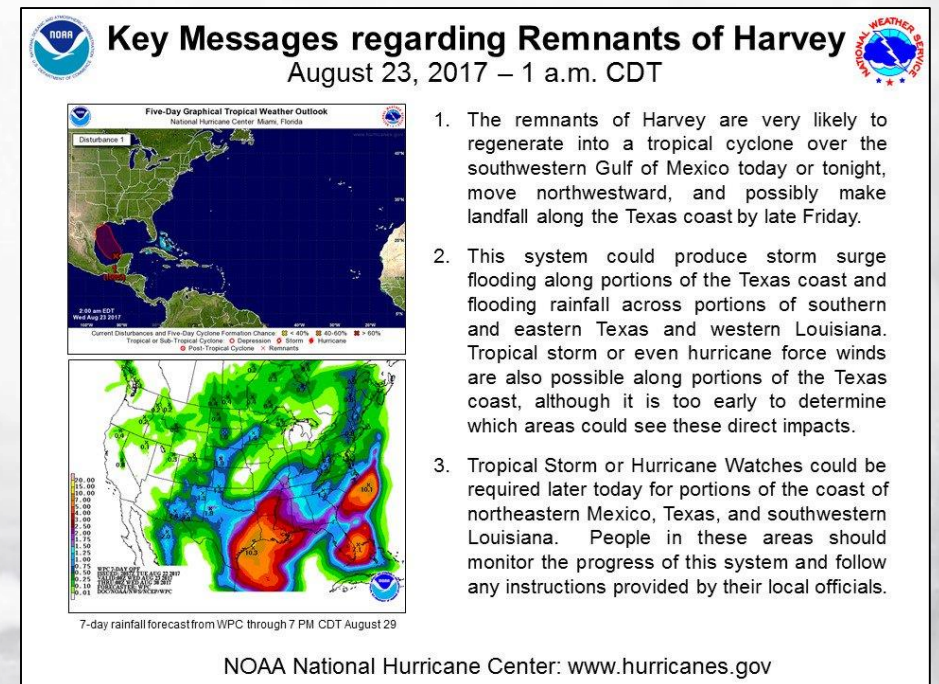


Pre-Genesis Messaging

- Strongly worded TWOs issued before Harvey's genesis mentioned:
 - Storm Surge
 - Tropical storm or hurricane-force winds
 - Very heavy rainfall across portion of central and eastern Texas
- 1 AM CDT Wednesday, August 23 TWO mentioned that tropical storm or hurricane watches could be required for a portion of TX and LA coasts later that day

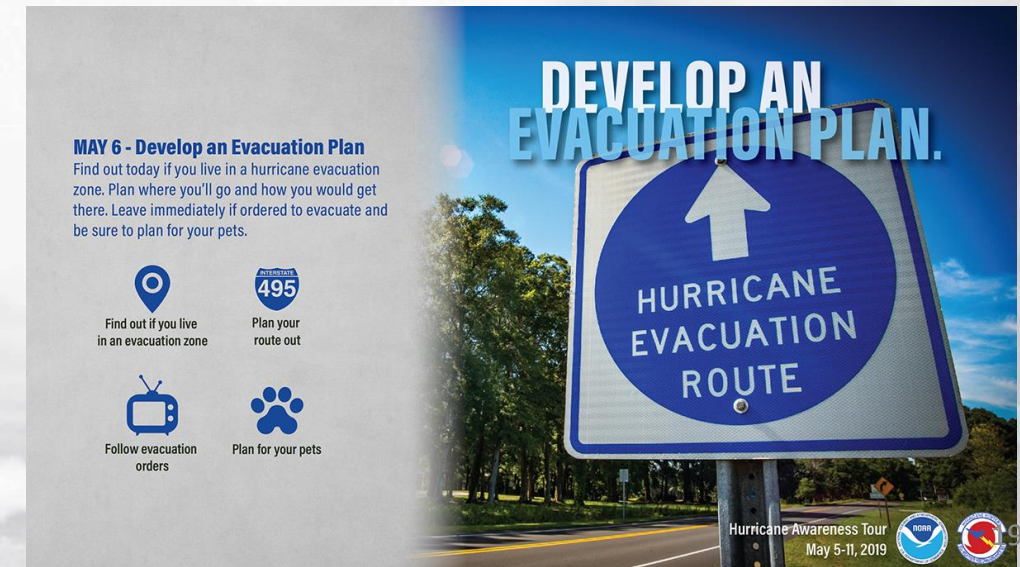
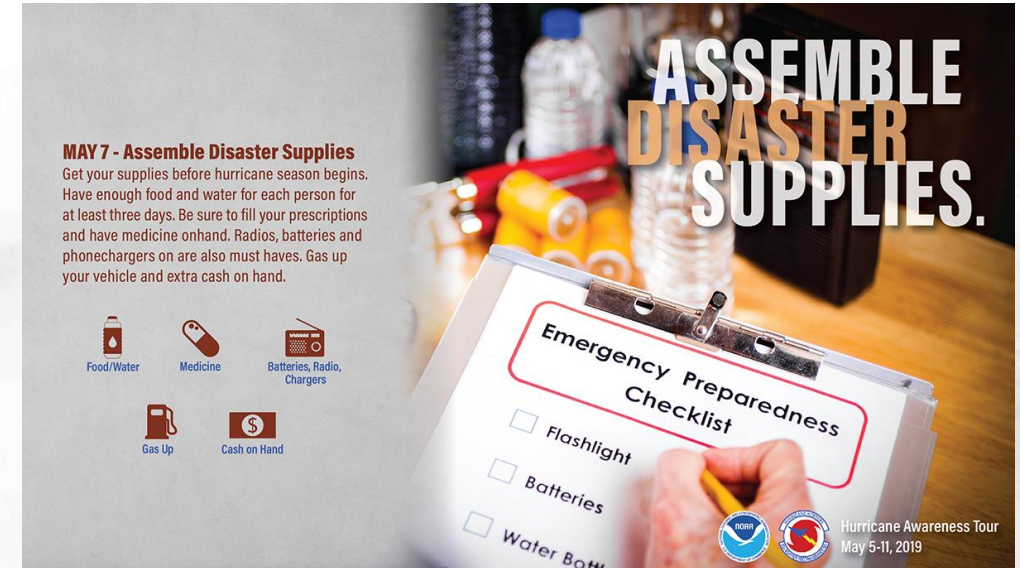
Tropical Weather Outlook
NWS National Hurricane Center Miami FL
200 PM EDT Tue Aug 22 2017

Interests in northeastern Mexico and along the Texas coast should monitor the progress of this system, as **it could produce storm surge and tropical storm or hurricane force winds along portions of the Texas coast, and very heavy rainfall across portions of central and eastern Texas from Friday through the weekend.** Please refer to products from your local National Weather Service office for more information on this system.



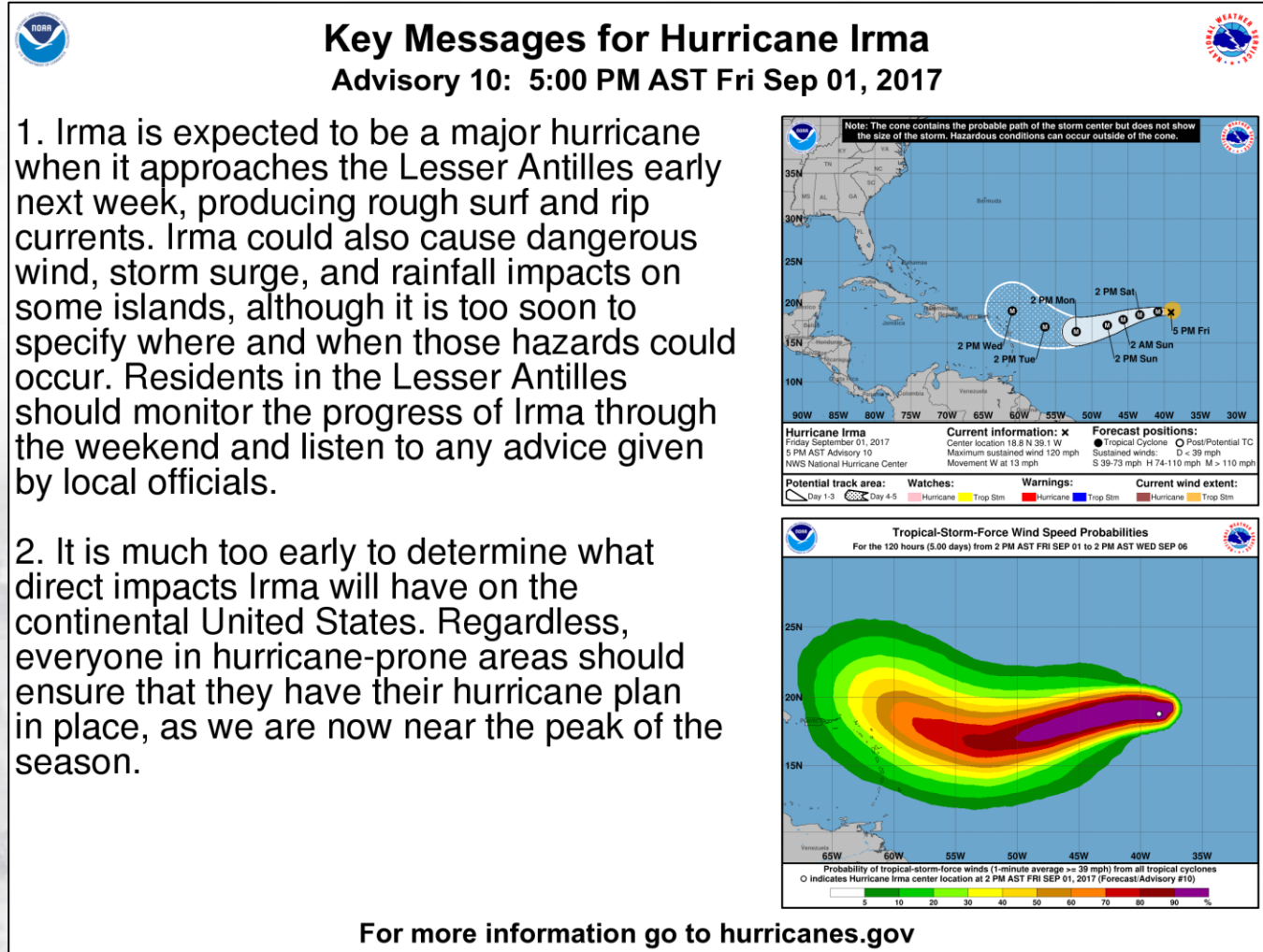
Messaging Threats Many Days Away

- Mention ***potential for impacts***, but no specific information on timing, magnitude and location of impacts
- Encourage interests to ***monitor*** the storm and ensure they have a ***hurricane plan*** in place
- As event approaches and confidence increases, messaging becomes more specific and focused



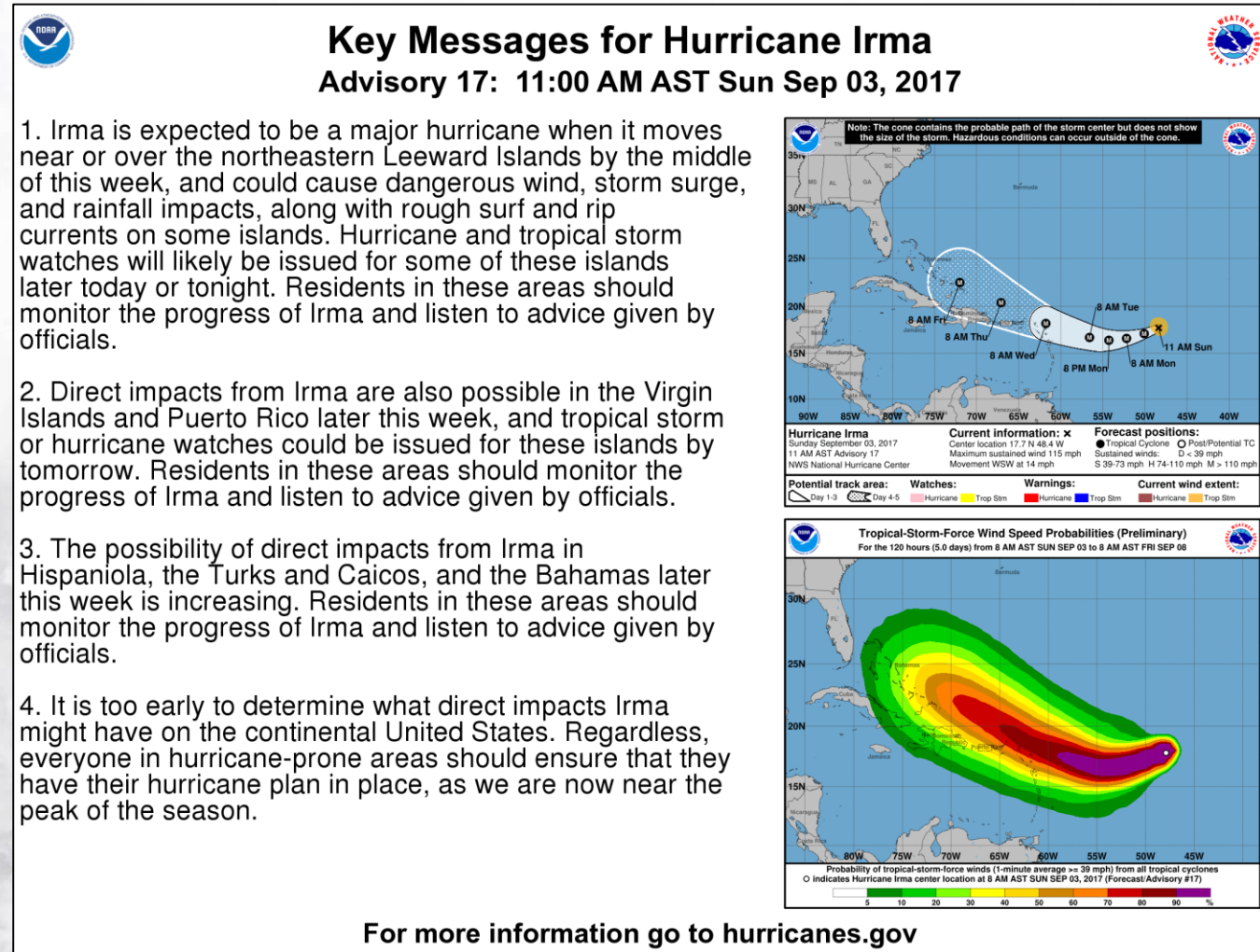
Messaging Threats Five or More Days Away

- Key Messages can be introduced during this phase
- Emphasis on preparedness and broad areas that could be impacted
- Storm surge, rainfall, and wind impacts mentioned - too early for details



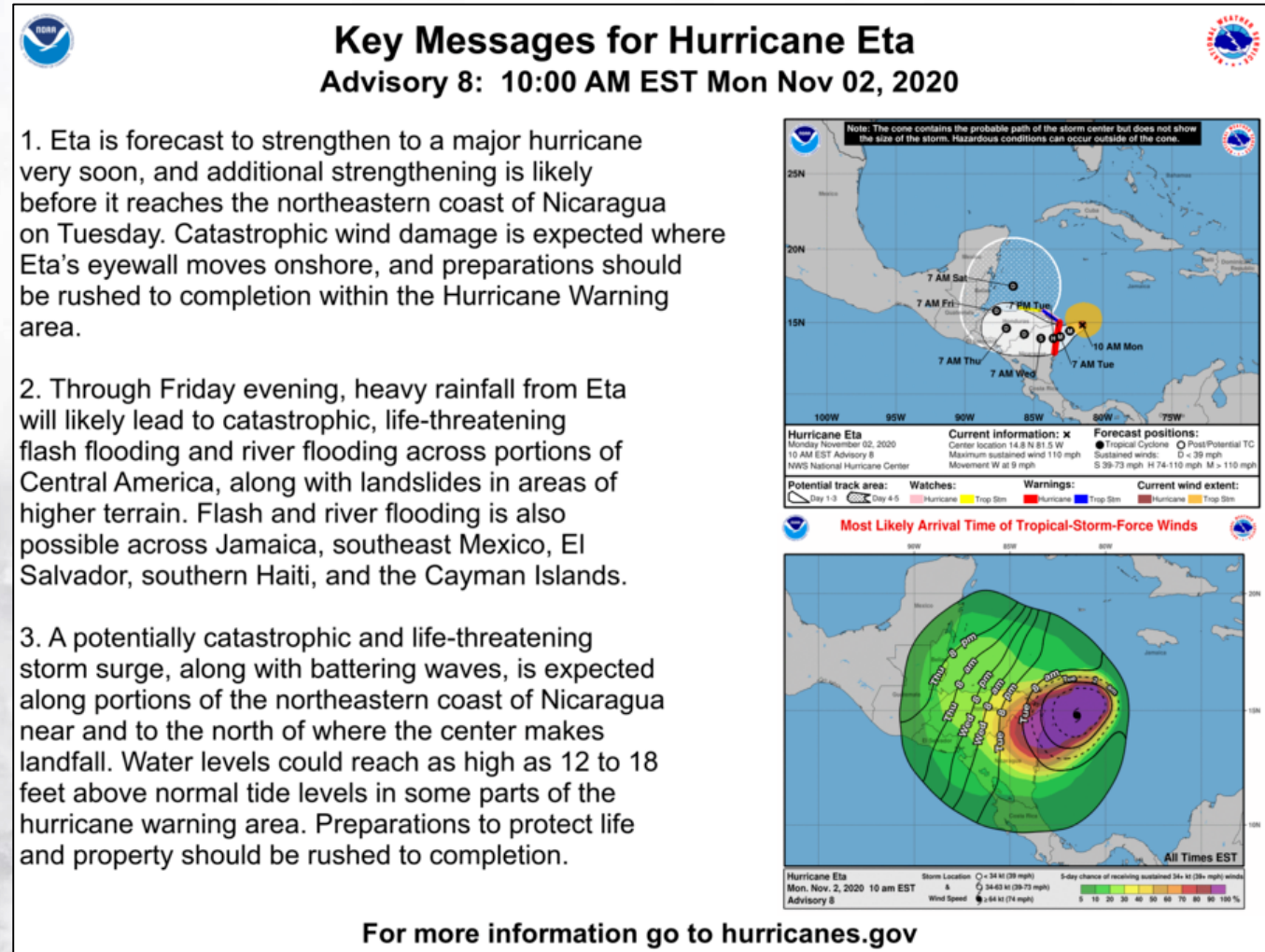
Messaging Threats Three to Five Days Out

- Messaging begins to focus on area where impacts could occur
- Risk of impacts continues to increase, but uncertainty still too large to get specific about timing and magnitude
- Life-threatening wording can be included at this stage, if confidence allows
- Preparedness actions typically underway



Messaging Threats in the Watch/Warning Phase

- Important to keep messaging ***focused on hazards not track or intensity***
- Concentrate messaging on individual hazards, with more detail provided at this stage



A satellite image of a hurricane serves as the background. In the top-left corner, there is a blue logo consisting of a semi-circle above a stylized, curved line. The text "Questions/Discussion?" is centered in a large, bold, black font.

Questions/Discussion?