NOAA NATIONAL WEATHER SERVICE HURRICANE FORECAST INFORMATION SURVEY

INTRODUCTION

Does your organization, company, or agency work in the **marine, transportation, energy and utilities, or tourism and recreation sectors** and use information from NOAA's National Weather Service (NWS) in its decision-making in advance of a hurricane?[1]

If yes, please consider taking this survey.

We need feedback from people like you about how you use forecast information from NWS offices such as the National Hurricane Center (NHC) and the Central Pacific Hurricane Center (CPHC) who predict the likely path, intensity, and impacts of hurricanes in the Atlantic Ocean, the Eastern North Pacific Ocean, and the Central Pacific Ocean.

Completing this online survey is voluntary, and your responses are anonymous. Please note that the "save and continue" feature allows you to exit the survey and return to it later. Your responses will be saved for one week.

To begin this survey, click "Next."

Paperwork Reduction Act Statement: Public reporting burden for this collection of information is estimated at 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other suggestions for reducing this burden to Jen Hilderbrand, NOAA National Weather Service, SSMC 2, Room 17205, 1325 East West Highway, Silver Spring, MD. Notwithstanding any other provisions of the law, no person is required to respond to, nor shall any person be subjected to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

1 The term "hurricane" is used in this survey generically to refer to all tropical cyclones, including tropical depressions, tropical storms, typhoons, and super typhoons.

ORGANIZATIONAL INFORMATION

1. **Please SELECT ALL of the following sectors that <u>best</u> describe your organization's primary area of employment:**
    - Tourism and recreation
        - [Mouseover description: Travel, food and hospitality, sports, hotels and motels, other accommodations, scenic and sightseeing services, etc.]
    - Energy and utilities
        - [Mouseover description: Oil and gas production, pipeline and refining, electricity or natural gas facilities, water and wastewater utilities, etc.]
    - Marine
        - [Mouseover description: Shipping, water transportation, boat building, support for oil and gas operations, commercial fishing, etc.]
    - Transportation
        - [Mouseover description: Air, water, transit, rail, and truck transportation; pipeline transportation; scenic and sightseeing transportation; couriers and messengers; warehousing and storage; etc.]
    - City, state, or county emergency management
        - [Exit to disclaimer: "Thank you for your interest in this survey. At this time, NOAA is primarily interested in learning about how the tourism and recreation, energy and utilities, marine, and transportation sectors interact with the Cone of Uncertainty. We look forward to receiving your feedback in future research efforts."]
    - Other _____
        - [Exit to disclaimer]

2. **How would you describe your business/operation more specifically? [open-ended]**
   _____

3. **In which states or areas does your organization primarily work? (check all that apply)**

   {List of states with selection boxes, as well as "Atlantic Ocean," "Gulf of Mexico," "Caribbean Sea," "Pacific Ocean," and "Country other than the United States"}

4. **Approximately how many people work for your business or organization?**
   ____ employees

5. **What is the geographic scope of the stakeholders or customers you serve?**
    a. International
    b. National
    c. Regional
    d. Local

HURRICANE EXPERIENCE

6. **Was your organization impacted by one or more hurricanes in 2017–2019?**
   - o Yes [Go to Q7]
   - o No [Go to Q8]

7. **If yes, please rate the extent of the damage and/or adverse effects, including monetary impacts, to your organization:**

Name (if named)	Date	Extent of Damage and/or Adverse Effects			
		Extensive – The storm caused significant disruptions of our operations that lasted several days after the storm	**Moderate – There were some disruptions, but we were back to normal operations within a few days at most**	**Little if any – The storm caused minor disruptions but we were back to normal quickly.**	**None- The storm did not affect our operations at all.**
o Harvey	August 17-September 1, 2017				
o Irma	August 30-September 12, 2017				
o Jose	September 5-22, 2017				
o Maria	September 16-30, 2017				
o Nate	October 4-8, 2017				
o Alberto	May 25-31 2018				
o Gordon	September 3-6, 2018				
o Florence	August 31 - September 17, 2018				
o Michael	October 7-11,				

	2018				
o Hector	July 31-August 16, 2018				
o Lane	August 15-18, 2018				
o Olivia	September 1-14, 2018				
o Mangkhut	September 7-17, 2018				
o Gita	February 3-22, 2018				
o Barry	July 11-15, 2019				
o Dorian	August 24-September 6, 2019				
o Imelda	September 17-21, 2019				

HURRICANE PREPARATION

8. To what extent does your organization rely on the following sources for forecast information?

	Not at all	To a small extent	To a moderate extent	To a large extent	Not sure/Don't know
National Hurricane Center (NHC) or Central Pacific Hurricane Center (CPHC)					
Local National Weather Service (NWS) Weather Forecast Office					
Private meteorological service [Show Q9]					
Private meteorologist on staff [Show Q9]					

Tools such as Hurrevac or other tracking applications [Show Q9]					
Local broadcast meteorologists [Show Q9]					
National broadcast meteorologists [Show Q9]					
Other [Show Q9]					

9. You indicated that your organization relies on forecast information from sources other than the NHC, the CPHC, or other NWS offices. Please describe them here: [open-ended]
_____

10. What forecast parameters do you consider in setting criteria for use in your decision-making before/during a hurricane? (Select ALL that apply)

- o Storm track
- o Storm intensity
- o Storm size
- o Sustained wind speed at a specific location
- o Wind gusts at a specific location
- o Time of onset of sustained tropical-storm-force winds
- o Duration of sustained tropical-storm-force winds
- o Storm surge heights
- o Time of onset of storm surge flooding
- o Duration of storm surge flooding
- o Offshore wave heights
- o Offshore wave period
- o Rainfall amounts
- o Rainfall intensity
- o Time of onset of rainfall
- o Rainfall duration
- o River stage
- o Other _____

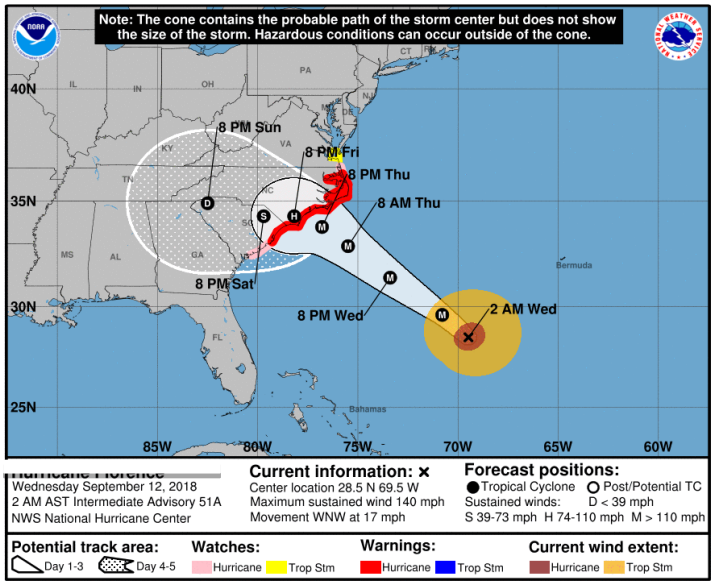
11. To what extent does your organization use the following hurricane products issued by National Weather Service offices when making preparation decisions?

National Hurricane Center/Central Pacific Hurricane Center Products					
	Not at all	To a small extent	To a moderate extent	To a large extent	Not familiar with this product
Tropical Cyclone Track and Error Cone Graphic (Cone Graphic)					
Wind Speed Probability Products (graphical or text)					
Time of Arrival of Tropical-Storm-Force-Winds Graphics					
Public Advisory Text Product (TCP)					
Forecast/Advisory Text Product (TCM)					
Tropical Cyclone Discussion Text Product (TCD)					
2-Day and 5-Day Tropical Weather Outlooks (graphical or text)					
Tropical Cyclone Danger Graphic					
Key Messages Graphic					
Weather Forecast Office (WFO) Products					
	Not at all	To a small extent	To a moderate extent	To a large extent	Not familiar with this product
Tropical Cyclone Local Watch/Warning VTEC text product (TCV)					
Hurricane Local Statement Text Product (HLS)					
Hurricane Threats and Impacts Graphics					
Wind (hurricane, typhoon, or tropical storm) Watch and Warning Graphics					
Storm Surge Watch and Warning Graphic					

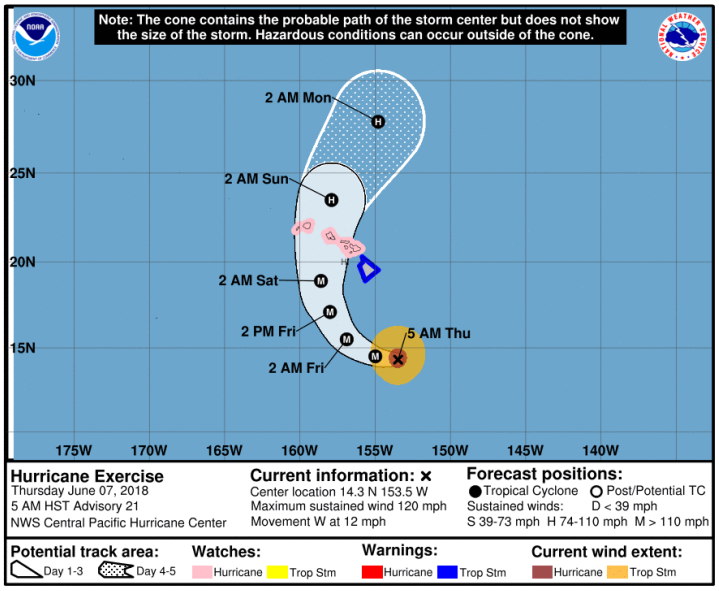
FORECAST TRACK CONE

Now we'd like to ask you some questions about the Forecast Track Cone (Cone Graphic) issued by **divisions of the U.S. National Weather Service.**

[If participant selected Atlantic Ocean, Gulf of Mexico, Caribbean Sea, and Country other than the United States in Q3, show this graphic]



[If participant selected Pacific Ocean in Q3, show this graphic]



[Note: One of the graphics on p. 7 will appear on screen for the respondent as the following questions, 12–18, are asked.]

12. How familiar are you with the Cone Graphic, as shown in the example on the screen?

- o Not at all familiar
- o Slightly familiar
- o Moderately familiar
- o Very familiar
- o Extremely familiar

13. Where have you seen this Cone Graphic (or some version of it) used in forecasts? Check all that apply.

- o hurricanes.gov (the NHC and CPHC website)
- o Local/national news
- o Cable TV news
- o Cable weather channels
- o Private vendor websites
- o Tools or applications such as Hurrevac
- o Social media
- o Other (specify): _____

14. Please indicate the extent to which you agree or disagree with the following statements about the Cone Graphic: [random order?]

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Not sure/ Don't know
It provides **all** the information needed for preparation decisions						
It shows where the storm is likely to go						
It covers the area of all possible tracks for a storm						
It is easy to understand the different symbols and labels on the map						
It is hard to understand the legend						
It is useful in deciding when and whether to prepare						
I do not get all the information I need from this graphic						
It provides too much information						

15. To what extent do you agree/disagree with the following statements about the Cone Graphic's features?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Not sure/ Don't know
The Cone Graphic depicts storm surge						
The Cone Graphic indicates whether a storm is a tropical storm or hurricane						
The Cone Graphic depicts areas that could experience strong winds						
The Cone Graphic indicates when strong winds are likely to arrive						
The cone size depends on the degree of uncertainty in the track forecast for a storm						
The cone size depends on the level of accuracy in previous track forecasts						

16. How effective are these elements of the Cone Graphic in communicating information?

	Very effective	Somewhat effective	Not effective	No opinion
Labels				
Colors				
Cone				
Center track line				
Disclaimer				
Forecast position symbols				

17. Do you have any suggestions for improving the Cone Graphic? _____

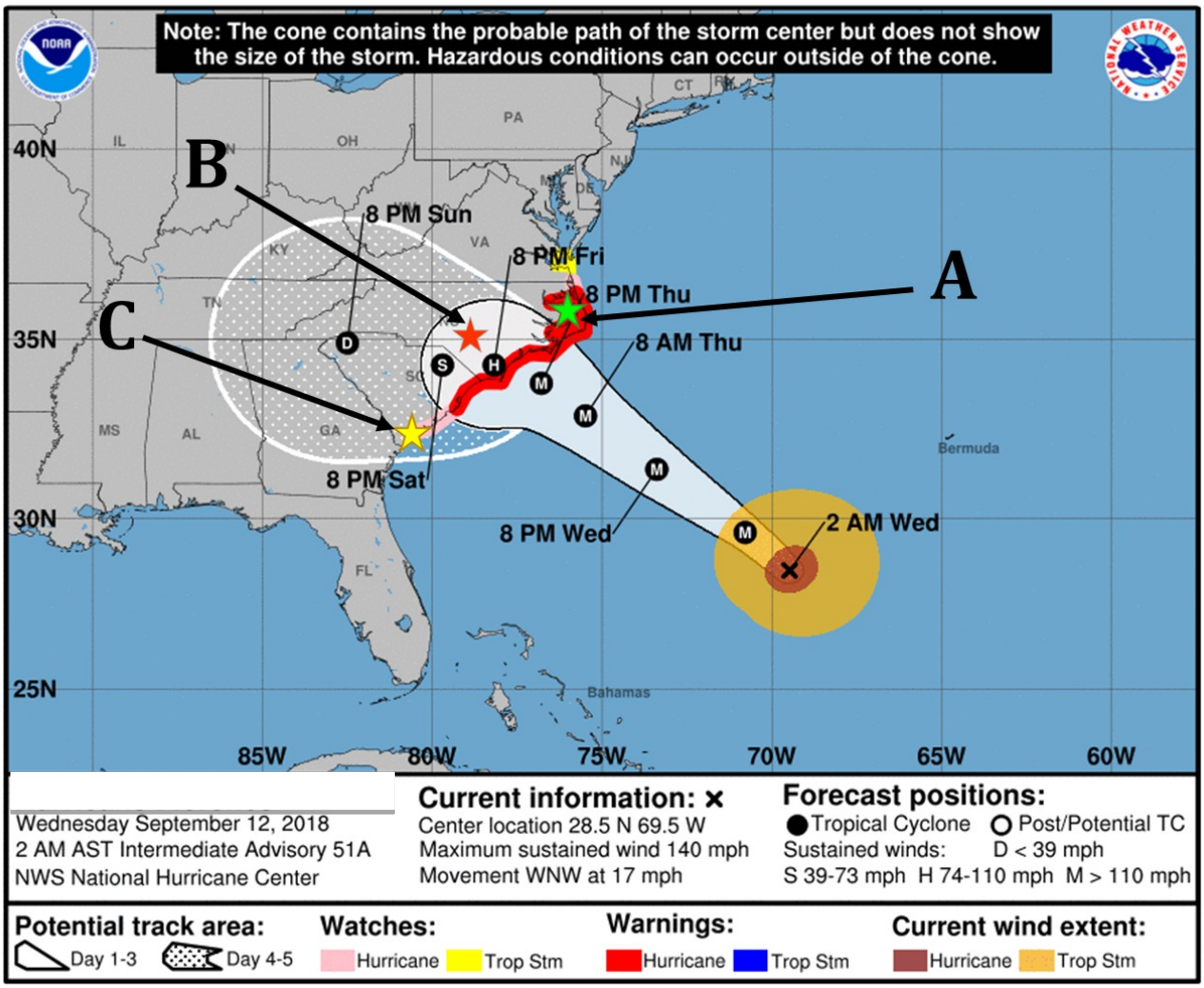
18. How important would you say the Cone Graphic is to your organization's activities, operations, or decision-making on when to begin preparing for a hurricane?

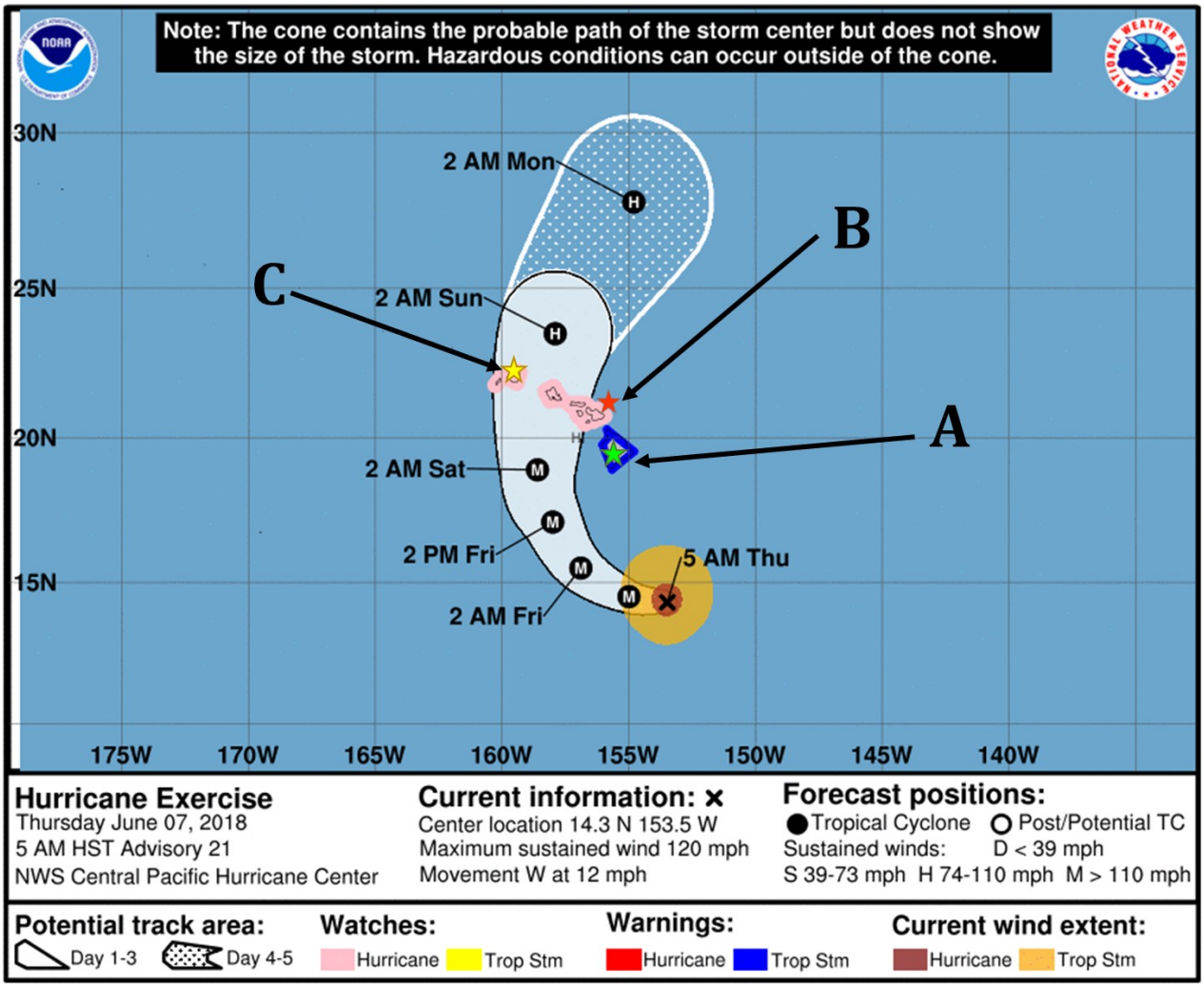
- o Extremely important
- o Very important
- o Somewhat important

- o A little important
- o Not at all important [Skip to question 23]
- o Not sure/Don't know [Skip to question 23]

Now we'd like to ask you a few questions related to the following example of the Cone Graphic. Please answer these questions as if your organization was located within the points indicated by the three stars (A, B, C). Assume that it is Tuesday evening at 6 pm.

[If participant selected Atlantic Ocean, Gulf of Mexico, Caribbean Sea, and Country other than the United States in Q3, show graphic on this page; if selected Pacific, show graphic on page 11]




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.
30N
25N
20N
15N
175W
170W
165W
160W
155W
150W
145W
140W
2 AM Mon
2 AM Sun
2 AM Sat
2 PM Fri
2 AM Fri
5 AM Thu
A
B
C
Hurricane Exercise
Thursday June 07, 2018
5 AM HST Advisory 21
NWS Central Pacific Hurricane Center
Current information:
Center location 14.3 N 153.5 W
Maximum sustained wind 120 mph
Movement W at 12 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

19. Based on this graphic, if your organization was in the following locations, indicated by the stars, HOW LIKELY do you think it is that you would be affected by this hurricane at any time during the next 5 days?

	Not at all likely	Slightly likely	Moderately likely	Very likely	Certain	Not enough information from graphic to know
[If selected Atlantic, Gulf of Mexico, Caribbean Sea, and Country other than the United States in Q3, show following points:]						
Point A: Nags Head, NC						
Point B: Fayetteville, NC						
Point C: Charleston, SC						
[If selected Pacific in Q3, show following points:]						
Point A: Kailua-Kona (Big Island)						
Point B: Kahului (Maui)						
Point C: Lihue (Kauai)						

20. Based on this graphic, what level of possible impacts would your organization likely prepare for in the following locations?

	None	Minimal	Moderate	Very High	Extreme	Not enough information from graphic to know
[If selected Atlantic, Gulf of Mexico, Caribbean Sea, and Country other than the United States in Q3, show following points:]						
Point A: Nags Head, NC						
Point B: Fayetteville, NC						
Point C: Charleston, SC						
[If selected Pacific in Q3, show following points:]						
Point A: Kailua-Kona (Big Island)						
Point B: Kahului (Maui)						
Point C: Lihue (Kauai)						

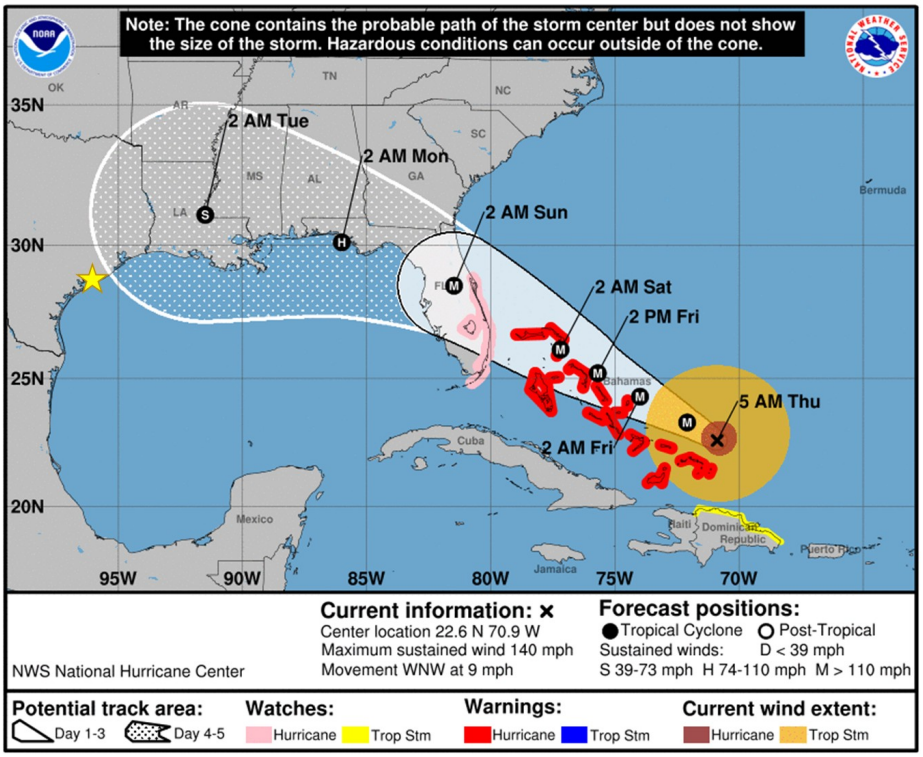
21. Suppose you were at [random scenario location; see notes on pages 15–19], indicated by the star on the graphic. How likely would you be to take the following actions?

Action	Not relevant for me	Not at all likely	Slightly likely	Moderately likely	Very likely	Not sure
Move materials and/or equipment indoors or out of the area						
Harden structures with shutters, etc.						
Make staff adjustments (placement, schedules, additions)						
Bring special supplies and/or equipment into the area						
Cancel all but critical events/ activities						
Shut down facilities						
Evacuate people or facilities						
Activate emergency operations						
Open shelters						
Activate fallback facility or alternative operations center						
Communicate and coordinate with stakeholders, partners, and/or the community						
Start tracking storm-related costs						
Other (specify): _____						

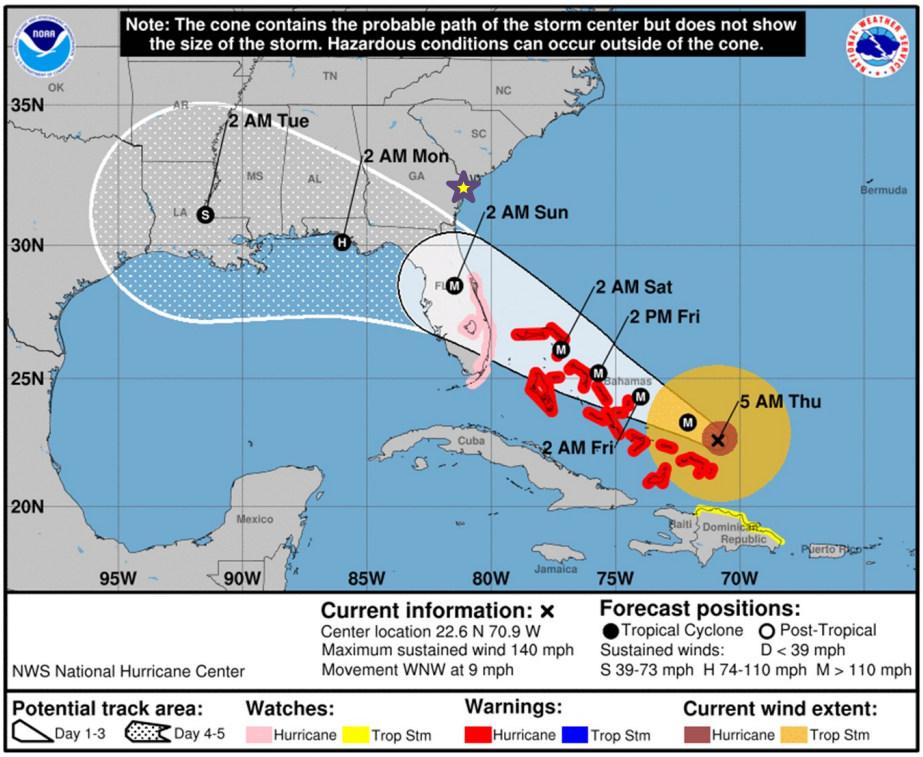
Notes for Question 21: The text inserted in Q21 will be randomly selected from one of four scenarios (graphics) with the set of 4 potential scenarios based on the respondent's selection in Q3. The table provides details on these scenarios.

Q3 Answer	Randomly Selected Scenario (see graphics below)	Timing	Inside or Outside Cone	Geographic Placement
Atlantic Ocean, Gulf of Mexico, Caribbean Sea, and Country other than the United States	A1	More than 5 days	Outside	Matagorda, TX
	A2	Within 5 days	Outside	Savannah, GA
	A3	Within 4-5 days	Inside	Mobile, AL
	A4	Within 0-3 days	Inside	Tampa, FL
Pacific	P1	More than 5 days	Outside	Honolulu, HI
	P2	Within 5 days	Outside	Honolulu, HI
	P3	Within 4-5 days	Inside	Honolulu, HI
	P4	Within 0-3 days	Inside	Honolulu, HI

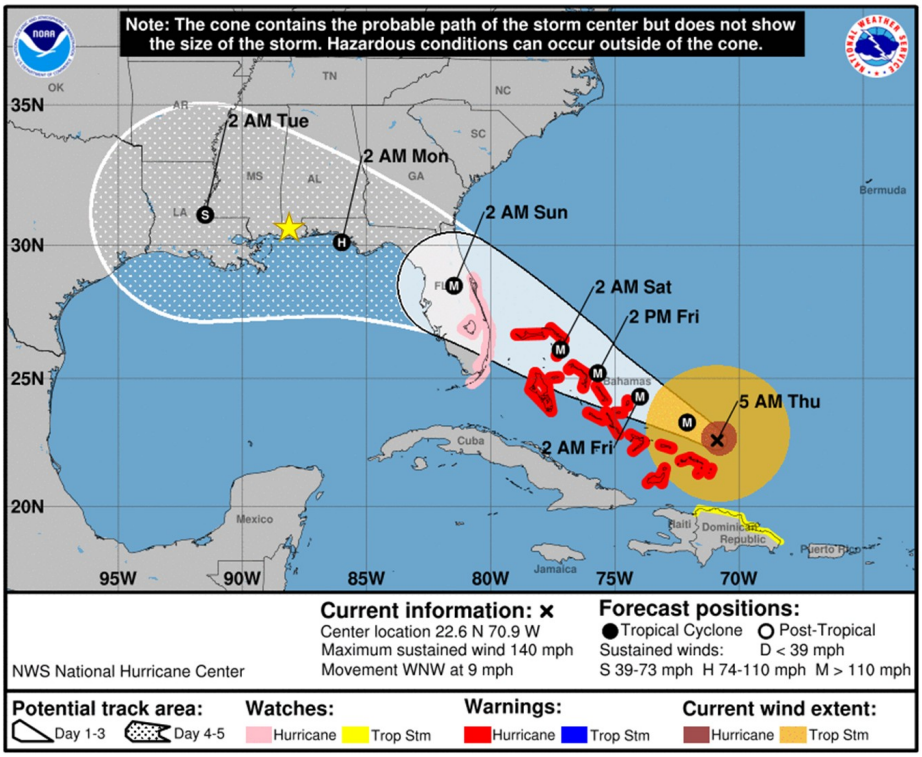
Scenario A1:



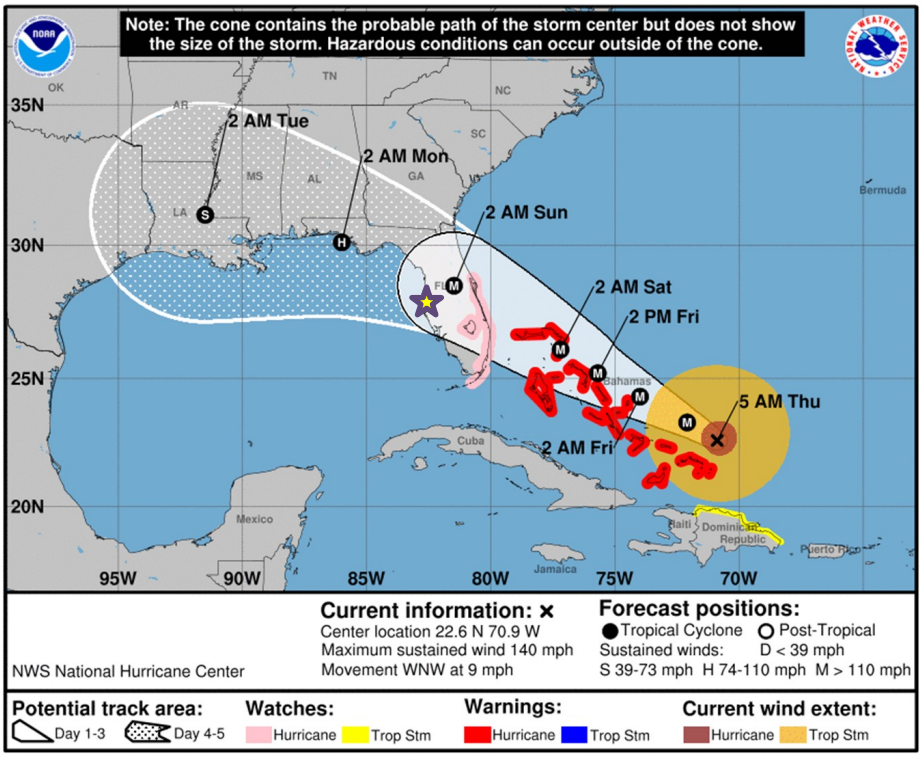
Scenario A2:



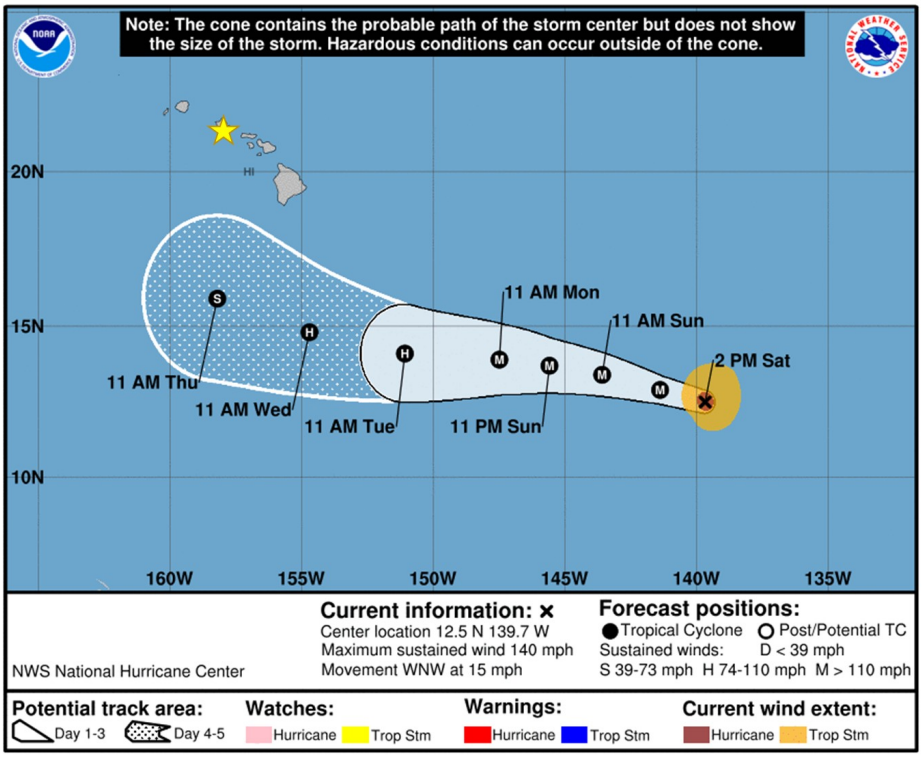
Scenario A3:



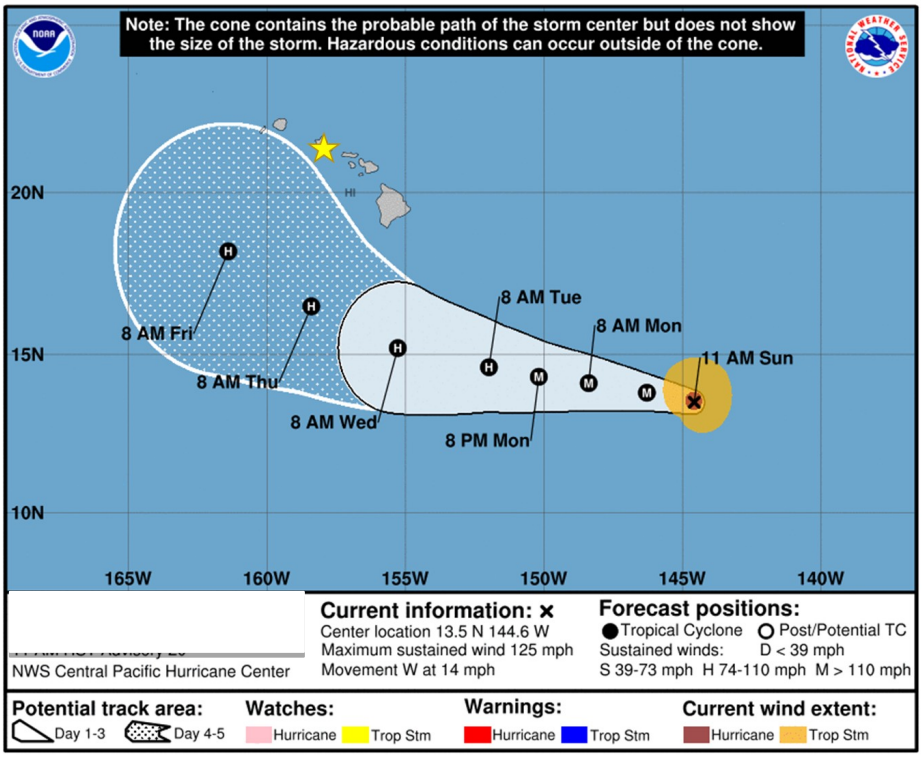
Scenario A4:



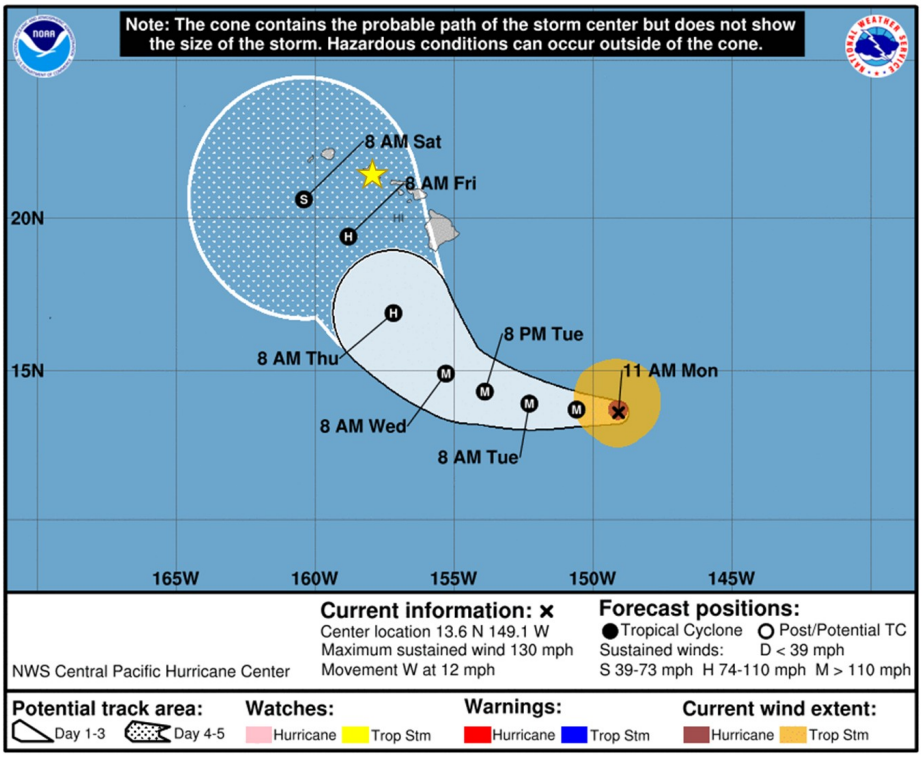
Scenario P1:



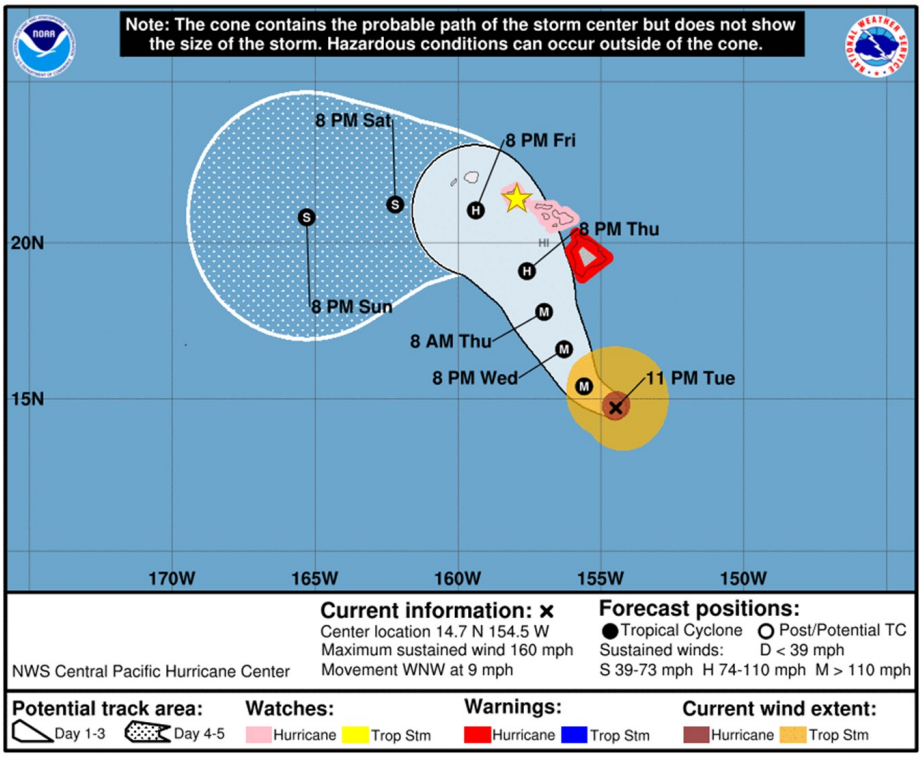
Scenario P2:



Scenario P3:



Scenario P4:

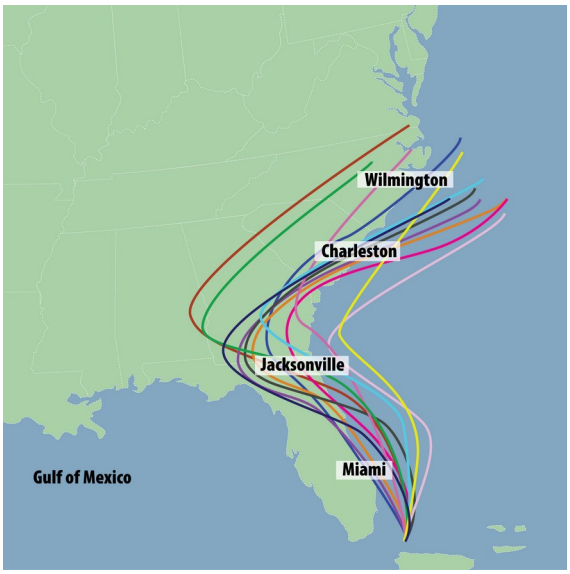

Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.
8 PM Sat
8 PM Fri
8 PM Thu
8 PM Sun
8 AM Thu
8 PM Wed
11 PM Tue
20N
15N
170W
165W
160W
155W
150W
Current information:
Center location 14.7 N 154.5 W
Maximum sustained wind 160 mph
Movement WNW 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
NWS Central Pacific Hurricane Center
Potential track area:
Day 1-3
Day 4-5
Watches:
Hurricane
Trop Stm
Warnings:
Hurricane
Trop Stm
Current wind extent:
Hurricane
Trop Stm

OTHER TRACK FORECAST GRAPHICS

The following three questions refer to a type of graphic that illustrates various track forecasts resulting from different computer models, sometimes known as a "spaghetti graphic."

22. How familiar are you with this type of graphic (see example to the right)?

- o Not at all familiar
- o Slightly familiar
- o Moderately familiar
- o Very familiar
- o Extremely familiar
- o Not sure/don't know



23. How important would you say this type of graphic is to your organization's preparation for decision-making?

- o Not at all important
- o Slightly important
- o Moderately important
- o Very important
- o Extremely important
- o It is not available for our area of operations
- o Not sure/don't know

24. What can you get out of this type of graphic that you can't get from the National Weather Service Cone Graphic or other NWS products, such as Watches/Warnings, Wind Speed Probability Products, etc. ___ [open ended]

25. Do you have any further suggestions related to hurricane forecast information or graphics that you would like to share with the National Weather Service? _____[open ended]

DEMOGRAPHICS

26. How many years of work experience do you have in your current industry?

- o 0 to 10 years
- o 11 to 20 years
- o 21 to 30 years
- o 31 to 40 years
- o More than 40 years

27. How would you describe your level of expertise in your current position?

- o Novice
- o Advanced beginner
- o Competent
- o Proficient
- o Expert

28. What best describes your role in deciding if and when your organization needs to prepare for a hurricane?

- o Primary decision-maker
- o Part of top group of decision-makers
- o Adviser to decision-maker(s)
- o Little or no role in these decisions

29. What is your job title? _____

Thank you for participating in this NWS survey. If you would like more information about this project, please visit: [insert link].