UNIT TWO

There is a Storm. What’s the info?
TROPICAL CYCLONES

NHC provides the ‘big picture’ that complements and guides local NWS forecast office products.
NATIONAL WEATHER SERVICE
Tropical Cyclone Products

> 5 Days
Few products
Large uncertainty

3-5 Days
More products
Forecast hazards

2-3 Days
Detailed products

1-2 Days
Warnings

Outlook

5 Day Forecast
Public Advisory
Wind Speed %
Forecast Discussion

TS/Hurricane Watches

TS/Hurricane Warnings
TS/Hurricane Local Statements
Operational Storm Surge Products
FAQs

• What’s going on in the tropics?
• Any potential for development?
• Should we be concerned?

• Tropical Outlook
OUTLOOK SCHEDULE

- Issued May 15 through November 30
- A *Special Tropical Outlook* can be issued at anytime for significant or unexpected changes

- 2 am – Tropical Outlook
- 8 am – Tropical Outlook
- 2 pm – Tropical Outlook
- 8 pm – Tropical Outlook

*TIMES IN EDT*
For the North Atlantic...Caribbean Sea and the Gulf of Mexico:

Bay of Campeche:
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 5 days...medium...60 percent.

Forecaster Brown
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Forecaster Brown
TROPICAL OUTLOOK
2-Day Formation Potential

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

- CATEGORICAL
  (Low, Medium, and High)
- PROBABILITIES
Should we be concerned?
Initial location of disturbance (x) indicated.

Formation potential during the next 5 days.

Shading represents formation area.

What’s the chance this area forms during the next 5 days?
TROPICAL OUTLOOK
5-Day Formation Potential

October 3 @8am
2 Day – 0%
5 Day – 30%

October 6 @8am
2 Day – 80%
5 Day – 90%

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.
Special outlook issued to update discussion of the area of low pressure east of Florida.

Updated: An Air Force Reserve unit reconnaissance aircraft is investigating the area of low pressure centered about 110 miles east of Melbourne, Florida. While the low is well defined, the associated thunderstorm activity is just below the organizational threshold required to initiate tropical cyclone advisories. Environmental conditions continue to be favorable for development, and only a slight increase in the organization and persistence of the thunderstorm activity would result in the formation of a tropical depression.

Data from the reconnaissance aircraft indicate that peak sustained winds with the low are about 30-35 mph. The low is moving southwestward at around 5 mph, but is expected to turn westward tonight and northward by Wednesday when it will be near the east coast of Florida. If this system becomes a tropical cyclone, a tropical storm watch could be required for portions of the central or northern Atlantic coast of Florida. A turn toward the northeast near the southeastern U.S. coast is expected by Thursday.
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...MICHAEL ALMOST A HURRICANE... ...HURRICANE WATCH ISSUED FOR THE FLORIDA PANHANDLE AND FLORIDA BIG BEND...

<table>
<thead>
<tr>
<th>Time</th>
<th>Public Advisory #7</th>
<th>Aviso Publico #7</th>
<th>Forecast Advisory #7</th>
<th>Forecast Discussion #7</th>
<th>Wind Speed Probabilities #7</th>
</tr>
</thead>
<tbody>
<tr>
<td>04:00 AM CDT Mon Oct 8</td>
<td>400 AM CDT</td>
<td>0900 UTC</td>
<td>400 AM CDT</td>
<td>0900 UTC</td>
<td>400 AM CDT</td>
</tr>
</tbody>
</table>

NWS Local Products
613 AM CDT

US Watch/Warning
452 AM CDT

Tropical Storm Michael

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

www.hurricanes.gov
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)
FAQs

• When is new information available?
• When is a good time for a conference call?

• NHC Advisory Timeline
NO WATCHES/WARNINGS

NHC ADVISORY
- Public Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Forecast Cone

NHC ADVISORY
- Public Advisory
- Forecast Discussion
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NHC ADVISORY TIMELINE
Scheduled Updates

WATCHES/WARNINGS in effect

NHC ADVISORY
- Public Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Forecast Cone
- Storm Surge Products (possible)

NHC ADVISORY
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NOT A NEW FORECAST TRACK

5AM  8AM  11AM  2PM  5PM  8PM  11PM  2AM  5AM
NHC ADVISORY TIMELINE
Scheduled Updates

WACHES/WARNINGS in effect and eye tracked by radar

NHC ADVISORY
• Public Advisory
• Forecast Discussion
• Wind Speed Probabilities
• Forecast Cone
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Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update • Tropical Cyclone Update

5AM 11AM 5PM 11PM 5AM
SPECIAL ADVISORIES

• Issued at any time whenever an unexpected significant change has occurred
  – Aircraft or satellite estimate finds storm is stronger than forecast

• When U.S. watches or warnings are issued between regularly scheduled advisories
  – Watches or Warnings may be discontinued on intermediate Public Advisories
FAQs

• How strong is the storm?
• What are the hazards?
• Are there any warnings?

• Public Advisory
Where is the storm located?

Tropical Storm Michael Advisory Number 7
NWS National Hurricane Center Miami FL
400 AM CDT Mon Oct 08 2018

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

SUMMARY OF 400 AM CDT...0900 UTC...INFORMATION

LOCATION...20.6N 85.5W
ABOUT 90 MI...145 KM E OF COZUMEL MEXICO
ABOUT 100 MI...155 KM SSW OF THE WESTERN TIP OF CUBA
MAXIMUM SUSTAINED WINDS...70 MPH...110 KM/H
PRESENT MOVEMENT...N OR 360 DEGREES AT 7 MPH...11 KM/H
MINIMUM CENTRAL PRESSURE...983 MB...29.03 INCHES

WATCHES AND WARNINGS

A Storm Surge Watch is in effect for...
* Navarre Florida to Anna Maria Island Florida, including Tampa Bay

A Hurricane Watch is in effect for...
* Alabama-Florida border to Suwanee River Florida

A Tropical Storm Watch is in effect for...
* Suwanee River to Anna Maria Island Florida, including Tampa Bay
* Alabama-Florida border to the Mississippi-Alabama border
Tropical Storm Michael Advisory Number 7
NWS National Hurricane Center Miami FL AL142018
400 AM CDT Mon Oct 08 2018

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DISCUSSION AND OUTLOOK
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At 400 AM CDT (0900 UTC), the center of Tropical Storm Michael was located by an Air Force Reserve Hurricane Hunter aircraft near latitude 20.6 North, longitude 85.5 West. Michael is moving toward the north near 7 mph (11 km/h). A northward motion at a slightly faster forward speed is expected through Tuesday night, followed by a northeastward motion on Wednesday and Thursday. On the forecast track, the center of Michael will move northward across the Yucatan Channel later today, and then across the eastern Gulf of Mexico this evening through Wednesday. Michael is expected to move inland over the Florida Panhandle or Florida Big Bend area on Wednesday, and then move northeastward across the southeastern United States Wednesday night and Thursday.

Data from the Hurricane Hunter aircraft indicate that maximum sustained winds have increased to near 70 mph (110 km/h) with higher gusts. Additional strengthening is forecast, and Michael is expected to become a hurricane later today. Michael is forecast to be near or at major hurricane strength when it reaches the northeastern Gulf of Mexico Tuesday night and Wednesday.

Tropical-storm-force winds extend outward up to 175 miles (280 km) from the center.

The minimum central pressure based on aircraft data is 983 mb (29.03 inches).
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HAZARDS AFFECTING LAND
----------------------

STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters moving inland from the shoreline. The water has the potential to reach the following heights above ground if peak surge occurs at the time of high tide...

- Indian Pass to Crystal River...7-11 ft
- Crystal River to Anclote River...4-6 ft
- Okaloosa/Walton County Line to Indian Pass...4-7 ft
- Anclote River to Anna Maria Island including Tampa Bay...2-4 ft
- Navarre to Okaloosa/Walton County Line...2-4 ft

WIND: Hurricane conditions are expected across the far western part of the Cuban province of Pinar del Rio later today. Tropical storm conditions are expected across the remainder of the warning areas in Cuba and the Yucatan Peninsula later today.

Hurricane conditions are possible within the hurricane watch area along the U.S. Gulf coast by Wednesday, with tropical storm conditions possible by Tuesday night or early Wednesday. Tropical storm conditions are possible within the tropical storm watch area by Tuesday night or early Wednesday.

RAINFALL: Michael is expected to produce the following rainfall amounts through Wednesday night...
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Hurricane conditions are possible within the hurricane watch area along the U.S. Gulf coast by Wednesday, with tropical storm conditions possible by Tuesday night or early Wednesday. Tropical storm conditions are possible within the tropical storm watch area by Tuesday night or early Wednesday.

RAINFALL: Michael is expected to produce the following rainfall amounts through Wednesday night...

Florida Panhandle and Big Bend into southern Georgia...4 to 8 inches, with isolated maximum amounts of 12 inches. This rainfall may lead to life threatening flash floods.

Florida Keys...2 to 4 inches.

Yucatan Peninsula...1 to 2 inches.

NEXT ADVISORY
--------------
Next intermediate advisory at 700 AM CDT.
FAQs

• How confident are the forecasters?
• Key messages?

• Forecast Discussion
An Air Force Reserve Hurricane Hunter aircraft made several passes through the system and found that the central pressure has fallen to about 983 mb and maximum winds have increased to near 60 kt. This increase in intensity indicates that despite the shear, Michael has by definition rapidly intensified during the past 24 hours. Decreasing vertical shear and very warm sea surface temperatures are expected to support continued strengthening, and due to the favorable conditions, the NHC intensity forecast follows a blend of the IVCN consensus and the HCCA model. This new official forecast brings the intensity to just below major hurricane strength in 48 hours, and since the storm will still be over water for a time between 48 and 72 hours, there is a real possibility that Michael will strengthen to a major hurricane before landfall.

Nearly all of the track models have shifted westward after 24 hours, which left the previous forecast near the eastern edge of the guidance envelope. Due to this shift, the new NHC track forecast has also been adjusted westward close to the consensus aids. Overall the track guidance is in fairly good agreement up until landfall along the Florida Panhandle or Florida Big Bend, which has yielded a fairly confident track forecast.
Key Messages:

1. Hurricane conditions are expected over portions of western Cuba, where a hurricane warning is now in effect. Tropical storm conditions are expected over the northeastern Yucatan Peninsula and the Isle of Youth today.

2. Michael is expected to produce heavy rainfall and flash flooding over portions of western Cuba and the northeastern Yucatan Peninsula of Mexico during the next couple of days.

3. Michael is forecast to be a hurricane, and possibly a major hurricane, when it reaches the northeastern Gulf Coast by mid-week, and storm surge and hurricane watches are now in effect for portions of the area. Some areas along the Florida Gulf Coast are especially vulnerable to storm surge, regardless of the storm's exact track or intensity. Residents in the watch areas should monitor the progress of this system and follow any advice given by local officials.
Key Messages for Tropical Storm Michael
Advisory 7: 4:00 AM CDT Mon Oct 08, 2018

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For more information go to hurricanes.gov
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<thead>
<tr>
<th>FORECAST POSITIONS AND MAX WINDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>INIT 08/0900Z 20.6N 85.5W 60 KT 70 MPH</td>
</tr>
<tr>
<td>12H 08/1800Z 21.7N 85.6W 70 KT 80 MPH</td>
</tr>
<tr>
<td>24H 09/0600Z 23.5N 86.1W 85 KT 100 MPH</td>
</tr>
<tr>
<td>36H 09/1800Z 25.2N 86.7W 90 KT 105 MPH</td>
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<tr>
<td>48H 10/0600Z 27.2N 86.7W 95 KT 110 MPH</td>
</tr>
<tr>
<td>72H 11/0600Z 31.2N 84.5W 55 KT 65 MPH...INLAND</td>
</tr>
<tr>
<td>96H 12/0600Z 35.5N 77.5W 50 KT 60 MPH...INLAND</td>
</tr>
<tr>
<td>120H 13/0600Z 40.5N 64.5W 50 KT 60 MPH...POST-TROP/EXTRATROP</td>
</tr>
</tbody>
</table>

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Forecaster Berg

NNNN
FAQs

• How large is the storm?
• Where is the storm headed?

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

SUMMARY OF WATCHES AND WARNINGS IN EFFECT...

A STORM SURGE WATCH IS IN EFFECT FOR...
* NAVARRE FLORIDA TO ANNA MARIA ISLAND FLORIDA...INCLUDING TAMPA BAY

A HURRICANE WATCH IS IN EFFECT FOR...
* ALABAMA-FLORIDA BORDER TO SUWANEE RIVER FLORIDA

A TROPICAL STORM WATCH IS IN EFFECT FOR...
* SUWANEE RIVER TO ANNA MARIA ISLAND FLORIDA...INCLUDING TAMPA BAY
* ALABAMA-FLORIDA BORDER TO THE MISSISSIPPI-ALABAMA BORDER

TROPICAL STORM CENTER LOCATED NEAR 20.6N 85.5W AT 08/0900Z
POSITION ACCURATE WITHIN 15 NM

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....... 8ONE 80SE 0SW 0NW.
A TROPICAL STORM WATCH IS IN EFFECT FOR...
* SUWANEE RIVER TO ANNA MARIA ISLAND FLORIDA...INCLUDING TAMPA BAY
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POSITION ACCURATE WITHIN  15 NM

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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
MAX WIND  85 KT GUSTS 105 KT
65 KT... 30NE  30SE  0SW  0NW.
50 KT... 90NE  90SE  30SW  30NW.
34 KT...130NE 150SE  90SW 120NW.
WIND RADII

• NHC forecasts the wind radii in four quadrants

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.

Radii are the largest distance from the center in a quadrant

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

- NHC forecasts the wind radii in four quadrants

<table>
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<tr>
<th>FORECAST TIME</th>
<th>34 kt</th>
<th>50 kt</th>
<th>64 kt</th>
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<tr>
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<tr>
<td>120 hr</td>
<td>N/A</td>
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</tr>
</tbody>
</table>
FORECAST ERROR CONE
Probable Track. Watches. Warnings.

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.

Tropical Storm Michael
Monday October 08, 2018
4 AM CDT Advisory 7
NWS National Hurricane Center

Current information: x
Center location: 20.8 N 85.5 W
Maximum sustained wind: 70 mph
Movement: N at 7 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:
- Watches:
- Warnings:
- Current wind extent:
QUIZ QUESTION
Which one of the following is used to construct the size of the NHC forecast error cone?

A. Possible impact areas
B. Size of the wind field
C. Model spread
D. Past 5 years of track forecast error
**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
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

FORECAST ERROR CONE
No worries, not in the cone?
NATIONAL HURRICANE CENTER
Frequently Asked Questions

FAQs
• Chance for some effects?
• Are staging areas at risk?
• When is the earliest TS winds could begin?

• Wind Speed Probabilities
### Wind Speed Probabilities

**Text Product**

**Tropical Storm Michael Wind Speed Probabilities Number 7**

NWS National Hurricane Center Miami FL AL142018

0900 UTC Mon Oct 08 2018

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**Wind Speed Probabilities for Selected Locations**

<table>
<thead>
<tr>
<th>Time</th>
<th>Periods</th>
<th>Forecast Hour</th>
<th>-12h</th>
<th>-24h</th>
<th>-36h</th>
<th>-48h</th>
<th>-72h</th>
<th>-96h</th>
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<td>(12)</td>
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<td>1(7)</td>
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**Location-Specific Probabilities**

- **Tropical-Storm-Force**
- **58 mph**
- **Hurricane-Force**
## WIND SPEED PROBABILITIES

### TROPICAL STORM MICHAEL WIND SPEED PROBABILITIES NUMBER 7

NWS NATIONAL HURRICANE CENTER MIAMI FL  AL142018
0900 UTC MON OCT 08 2018

---

**Location-Specific Probabilities**

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

---

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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 - - - -

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</table>

Location-Specific Probabilities
- Tropical-Storm-Force
- 58 mph
- Hurricane-Force
WIND SPEED PROBABILITIES
5-Day Cumulative Graphic

Tropical-Storm-Force Wind Speed Probabilities
For the 120 hours (5.00 days) from 1 AM CDT MON OCT 08 to 1 AM CDT SAT OCT 13

Location-Specific Probabilities
- Tropical-Storm-Force
- 58 mph
- Hurricane-Force
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
- 58 mph
- Hurricane-Force
WIND SPEED PROBABILITIES
5-Day Cumulative Graphic
EARLIEST REASONABLE

- 10% chance of onset
  - Most conservative timing

- Arrival time of TS winds
  - Black contours

- 5-day cumulative TS probabilities
  - Color fill
**Most Likely**

- 50% chance of onset
  - Equally likely to occur before as after

- Arrival time of TS winds
  - Black contours

- 5-day cumulative TS probabilities
  - Color fill
FAQs

- Where is the greatest concern?
- When will hurricane hazards begin?

- Watches and Warnings
STORM SURGE WATCH
There is the possibility of life-threatening inundation generally within 48 hours.

STORM SURGE WARNING
There is a danger of life-threatening inundation generally within 36 hours.
HURRICANE WATCH
Hurricane conditions are possible within the watch area, generally within 48 hours

HURRICANE WARNING
Hurricane conditions are expected 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.
WATCHES & WARNINGS
WARNINGS issued 36 hours prior to anticipated arrival of Tropical-Storm-Force winds.
Where would you issue the hurricane warning?
Must account for track and size (wind radii) uncertainties when issuing watches or warnings.

Where would you issue the hurricane warning?
QUIZ QUESTION
How often is a new NHC track and intensity forecast routinely issued?

A. Every 3 hours
B. Every 6 hours
C. Every 8 hours
D. Only when there is a change in the models
NO WATCHES/WARNINGS

**NHC ADVISORY**
- Public Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Forecast Cone

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- Forecast Cone

**TIMES IN EDT**
- 5AM
- 11AM
- 5PM
- 11PM
- 5AM
...MICHAEL EXPECTED TO BECOME A HURRICANE VERY SOON...

SUMMARY OF 700 AM CDT...1200 UTC...INFORMATION
----------------------------------------------
LOCATION...20.9N 85.1W
ABOUT 70 MI...115 KM S OF THE WESTERN TIP OF CUBA
MAXIMUM SUSTAINED WINDS...70 MPH...110 KM/H
PRESENT MOVEMENT...N OR 5 DEGREES AT 7 MPH...11 KM/H
MINIMUM CENTRAL PRESSURE...982 MB...29.00 INCHES

WATCHES AND WARNINGS
---------------------
SUMMARY OF WATCHES AND WARNINGS IN EFFECT:
A Storm Surge Watch is in effect for...
* Navarre Florida to Anna Maria Island Florida, including Tampa Bay

A Hurricane Watch is in effect for...
* Alabama-Florida border to Suwannee River Florida

A Tropical Storm Watch is in effect for...
* Suwannee River to Anna Maria Island Florida, including Tampa Bay
* Alabama-Florida border to the Mississippi-Alabama border
**NHC ADVISORY TIMELINE**

**Scheduled Updates**

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</table>

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**WATCHES/WARNINGS** in effect and eye tracked by radar

- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update
- Tropical Cyclone Update

**TIMES IN EDT**

- 5AM
- 11AM
- 5PM
- 11PM
- 5AM
Hurricane Michael Tropical Cyclone Update  
NWS National Hurricane Center Miami FL  
1200 PM CDT Wed Oct 10 2018

...EYEWALL OF MICHAEL COMING ASHORE...

With the landfall of Michael's eye imminent, everyone in the landfall area is reminded not to venture out into the relative calm of the eye, hazardous winds will increase quickly as the eye passes!

A weather station at the Gulf County Emergency Operations Center in Port St. Joe recently reported a wind gust of 106 mph (171 km/h). A Weatherflow station in St. Andrew Bay recently reported a sustained wind of 62 mph (100 km/h) and a wind gust of 77 mph (124 km/h). The Apalachicola airport recently reported sustained winds of 63 mph (102 km/h) with a gust of 89 mph (143 km/h).

Water levels continue to rise quickly along the Florida Panhandle coast. A National Ocean Service water level station at Apalachicola recently reported over 6.5 feet of inundation above ground level.

SUMMARY OF 1200 PM CDT...1700 UTC...INFORMATION
-----------------------------------------------
LOCATION...29.9N 85.7W
ABOUT 15 MI...25 KM WSW OF MEXICO BEACH FLORIDA
MAXIMUM SUSTAINED WINDS...150 MPH...240 KM/H
PRESENT MOVEMENT...NNE OR 15 DEGREES AT 14 MPH...22 KM/H
MINIMUM CENTRAL PRESSURE...919 MB...27.14 INCHES

$$
Forecaster Brown/Brennan

NNNN

- Unexpected changes occur in the cyclone
- Cyclone landfall
- Issuing international watches and warnings
- 1-hourly position estimates when a cyclone with an eye is nearing land
FAQs

• What areas will flood?
• How high could the water get?

• Storm Surge Products
STORM SURGE
Potential Storm Surge Flooding Map

Potential Storm Surge Flooding*
- Intertidal Zone/Estuarine Wetland
- Greater than 1 foot above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Leveed area

*Displayed flooding values indicate the water height that has about a 1-in-10 (10%) chance of being exceeded.

Consult local officials for flood risk.

Gulf of Mexico
INUNDATION MAP

• Height above ground that the water could reach
  – Reasonable worst-case scenario for any individual location
  – Values have a 10% chance of being exceeded

• Issuance with hurricane watch
  – In some cases for a tropical storm watch

• Available 60+ minutes after the advisory release
STORM SURGE
Peak Storm Surge Forecast Graphic

EXPERIMENTAL
Peak Storm Surge Forecast Graphic

Lake Maurepas...3-5 ft
Lake Pontchartrain...4-7 ft
Vermillion Bay...6-9 ft
1-3 ft
3.5 ft
6.9 ft
10-15 ft
7-11 ft
24 ft
47 ft

Mobile Bay...2-4 ft
Houe of the Mississippi River

NOAA
NWS
NHC
FEMA
FAQs

• What areas will flood?
• How much rain is forecast?

• Rainfall Products
High Risk Days
— About 4% of days
(Includes tropical and non-tropical events)

What happens during High Risk days?
• 46% have at least 1 fatality or injury
• 62% have at least $1 million in damages

Stats from 2010 to 2020
We have a high risk for excessive rainfall due to high risk days, which are about 4% of days that include both tropical and non-tropical events.

High Risk Accounts for:
- 39% of Flood Fatalities
- 83% of Flood Damages

Stats from 2010 to 2020:

- Fatalities: 39% flood-related fatalities are high risk
- Damages: 83% flood-related damages are high risk
FAQs

• Local impacts?
• Localized forecast information?
• Inland Watches and Warnings?

• NWS Forecast Offices
Hurricane Irma Local Statement Advisory Number 44
National Weather Service Miami FL  AL112017
1153 PM EDT Sat Sep 9 2017

This product covers SOUTH FLORIDA

**MAJOR HURRICANE IRMA CONTINUING TO INCH TOWARD SOUTH FLORIDA**

NEW INFORMATION
---------------
* CHANGES TO WATCHES AND WARNINGS:
  - The Storm Surge Warning has been cancelled for Coastal Broward, Coastal Palm Beach, and Metro Miami-Dade

* CURRENT WATCHES AND WARNINGS:
  - A Storm Surge Warning and Hurricane Warning are in effect for Coastal Collier, Coastal Miami-Dade, Far South Miami-Dade, Inland Collier, Inland Miami-Dade, and Mainland Monroe

* STORM INFORMATION:
  - About 160 miles south-southwest of Miami FL
  - 23.5N 81.0W
  - Storm Intensity 120 mph
  - Movement Northwest or 305 degrees at 6 mph

SITUATION OVERVIEW
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Major Hurricane Irma remains a very dangerous threat for all of South Florida, with a direct major hurricane impact expected over Southwest Florida.
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SITUATION OVERVIEW

------------------
Major Hurricane Irma remains a very dangerous threat for all of South Florida, with a direct major hurricane impact expected over Southwest Florida.
HAZARDS
• Wind
• Storm Surge
• Flooding Rain
• Tornadoes

THREAT & IMPACTS
• Elevated (yellow)
• Moderate (orange)
• High (red)
• Extreme (magenta)

Hurricane Irma (2017)

Wind Threat
- Potential for wind greater than 110 mph
- Potential for wind 74 to 110 mph
- Potential for wind 58 to 73 mph
- Potential for wind 39 to 57 mph
- Wind less than 39 mph
EXTREME WIND WARNING

“Inform the public of the need to take immediate shelter in an interior portion of a well-built structure due to the onset of extreme tropical cyclone winds.”

Issuance criteria:
- Category 3 or greater
- Valid time 2 hours or less
# NWS PRODUCTS

*When is key information available?*

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<th>Elevated Threat</th>
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**Hurricane Evacuation Study (HES) products**
(Surge MOMs, Surge Maps, Evacuation Zones, Clearance times, other planning data)

**Coastal Flood Loss Atlas**

**NWS PRODUCTS**
When is key information available?

**TIME**
## NWS PRODUCTS

**When is key information available?**

<table>
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<th>HAZUS output</th>
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**TIME**

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- [Image of FEMA logo]
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<tr>
<td>Year Round</td>
<td>Hurricane Season</td>
<td>120hr - 72hr</td>
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<td>36hr - Landfall</td>
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**Hurricane Evacuation Study (HES) products**
(Surge MOMs, Surge Maps, Evacuation Zones, Clearance times, other planning data)

**Coastal Flood Loss Atlas**

**Tropical Weather Outlook**
- Public Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Track and Cone
- Probabilistic wind timing via Hurrevac

**TIME**
## NWS PRODUCTS

**When is key information available?**

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**HAZUS output**

**NWS PRODUCTS**

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- Flash Flood Warnings
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River Forecasts
- Flood Outlooks
- River Flood Warnings

TS/Hurricane Watches
- TS/Hurricane Warnings

Hurricane Local Statements

Storm Surge Probabilities & Inundation Map

Storm Surge Watch
- Storm Surge Warning

Tornado Watches & Warnings

TIME
NATIONAL WEATHER SERVICE
Tropical Cyclone Products

> 5 Days
Few products
Large uncertainty

3-5 Days
More products
Forecast hazards

2-3 Days
Detailed products

1-2 Days
Warnings

5 Day Forecast
Public Advisory
Wind Speed %
Forecast Discussion

TS/Hurricane Watches

TS/Hurricane Warnings
TS/Hurricane Local Statements
Operational Storm Surge Products
Questions/Comments?