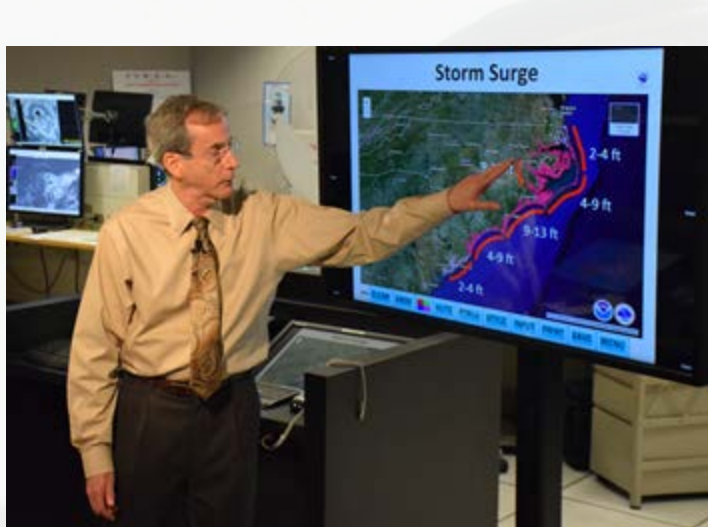


# NHC's Social Media Efforts: A Focus on Hazards



Daniel Brown, Michael Brennan & Eric Blake  
National Hurricane Center

# Outline and Objectives

- Common messaging challenges
- NHC's messaging objectives
- Examples of national level messaging during various stages of a hurricane threat
- How can we ensure that the public is taking appropriate action!

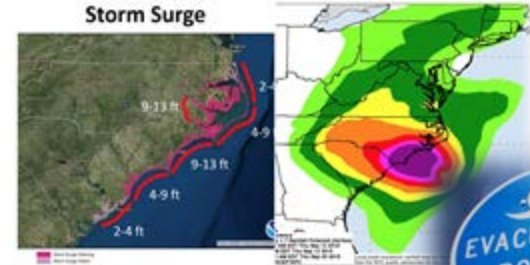
## Why Rainfall Is Hurricane Florence's Biggest Danger, Not Its Category



Marshall Shepherd Contributor   
Science



National Hurricane Center @NHC\_Atlantic · Sep 13  
Do not focus on the wind speed category of [#Hurricane #Florence!](#) Life-threatening storm surge flooding, catastrophic flash flooding and prolonged significant river flooding are still expected. More: [hurricanes.gov](#)

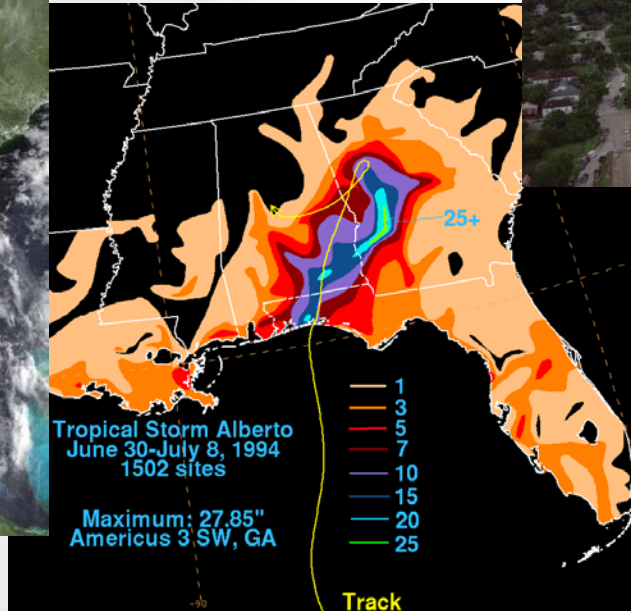


318 5.7K 17K



# Messaging Challenges

**Too much focus on category and/or storm intensity**



**“Just” a Tropical Storm**

**Alberto (94), Allison (01),  
Imelda (19) were minimal  
tropical storms that  
produced significant  
flood events.**



# Messaging Challenges

**“Only” a Category 1**

**2010-2020**

**In the U.S., Category 1  
hurricanes\* have  
caused:**

**185 direct deaths  
\$110 billion**

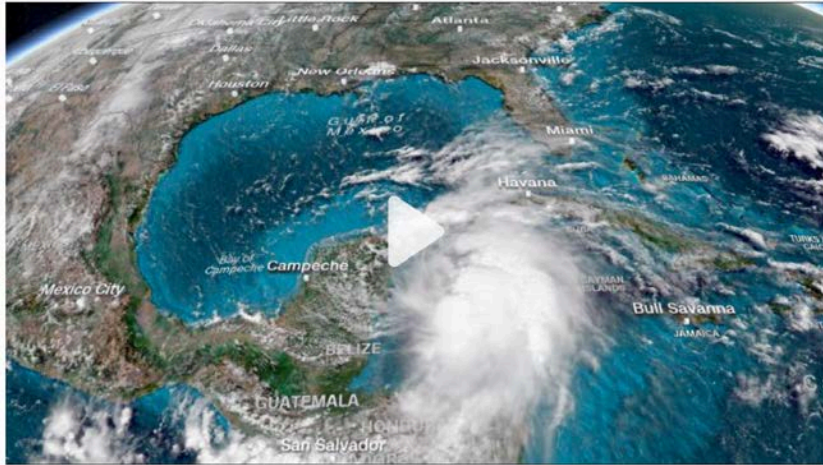
**\*Irene, Isaac, Sandy, Hermine,  
Matthew, Nate, Florence,  
Barry, Hanna, and Isaias**



# Messaging Challenges

Categories – Only Based on Wind

**Michael, now a  
Category 1 hurricane,  
expected to**



**Why Rainfall Is Hurricane  
Florence's Biggest Danger, Not  
Its Category**



Marshall Shepherd Contributor ©  
Science

**Category can be useful when  
storms are strengthening but  
make hazard communication  
more difficult when storms  
are weakening**

# Messaging Challenges

Using “Downgraded” – No!!!

Keep Focus on Life-Threatening Hazards

## The Latest: Florence Downgraded to a Category 1 Hurricane

Florence downgraded to a Category 1 hurricane with top sustained winds of 90 mph (150 kph).

Sept. 13, 2018



National Hurricane Center @NHC\_Atlantic · Sep 13

Do not focus on the wind speed category of #Hurricane #Florence! Life-threatening storm surge flooding, catastrophic flash flooding and prolonged significant river flooding are still expected. More: [hurricanes.gov](https://www.hurricanes.gov)

### Storm Surge



NHC\_Surge and NWS WPC



316



5.7K



17K



Stay focused on hazards!!!



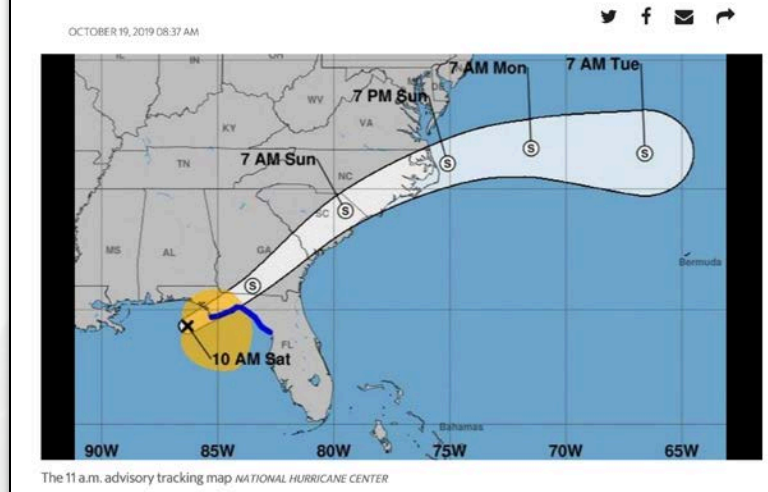
# Messaging Challenges

## No Need to Focus on Storm Status

### Tropical storm watches issued for Florida as system strengthens



### Different designation for Nestor, but the same storm surge and winds hitting Florida

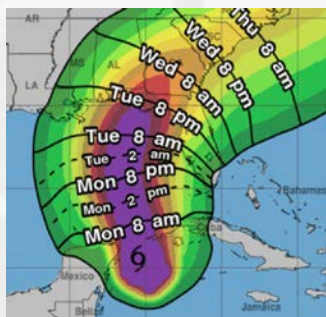


Great examples of keeping focus on impacts of developing and transitioning storms!

# Messaging Challenges

## Too Much Focus on Exact Forecast Track and Timing of Landfall

Hurricane Michael:  
Where is it going;  
what time will it make  
landfall?



The current model has Michael heading north up the eastern side of the Gulf of Mexico early Wednesday.

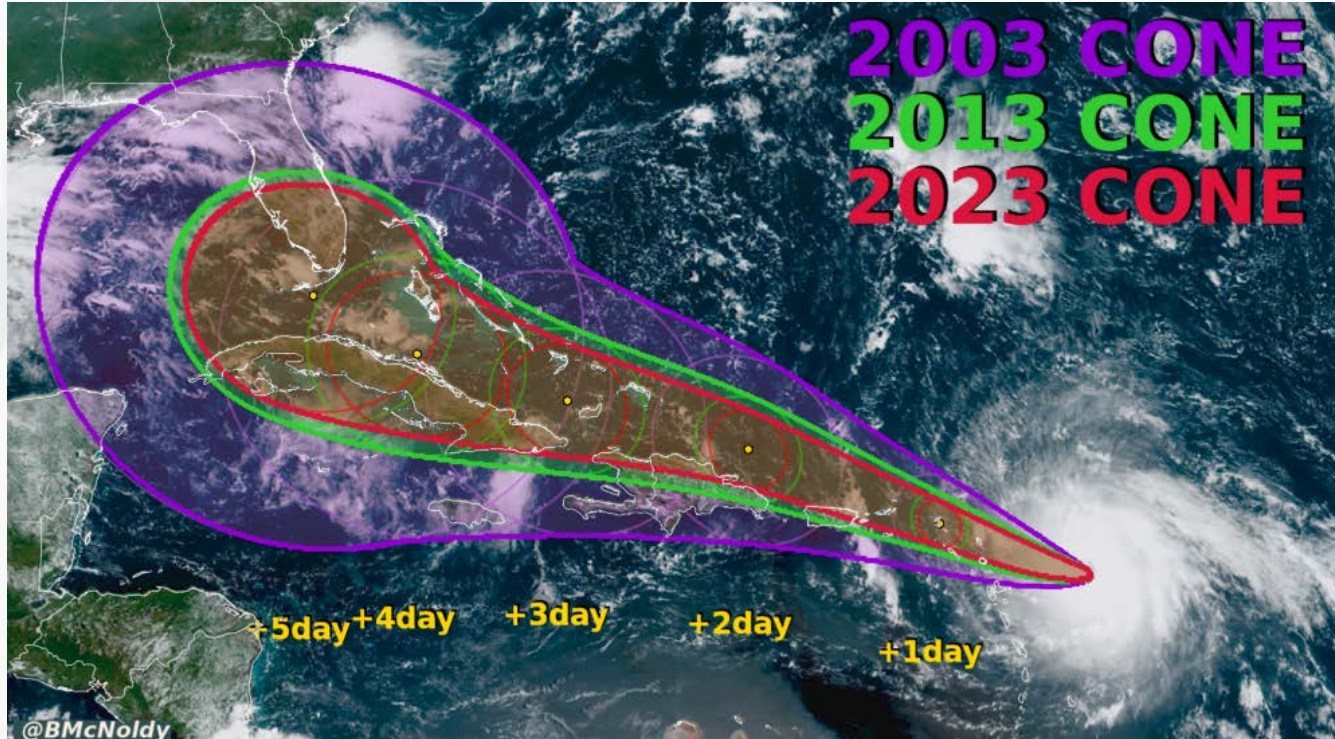
Forecasters say that Michael is expected to begin making a turn toward the northeast sometime on Wednesday morning. That turn would bring Michael into Florida somewhere near Panama City Beach around 2 p.m. Wednesday, according to the NHC.

**Use New Time of Arrival Graphics**



# Messaging Challenges

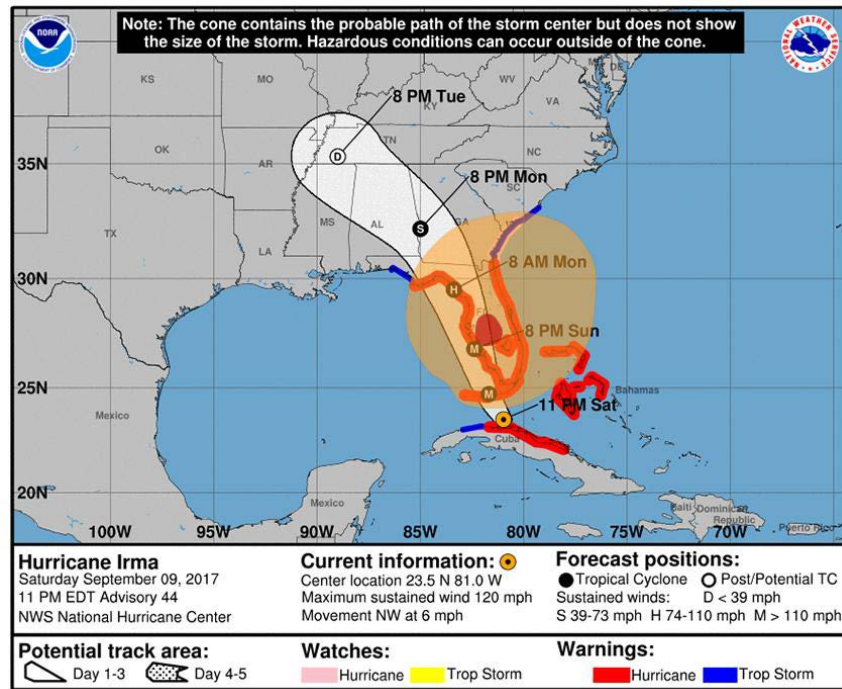
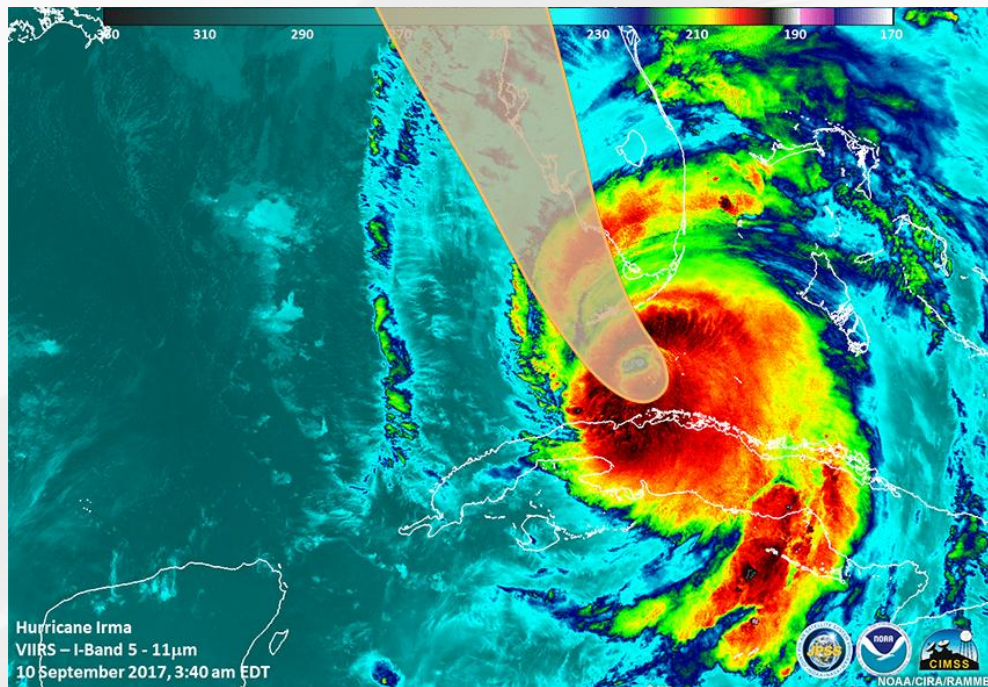
Cone on a diet – but storm size unchanged!  
More impacts outside the cone!



# Messaging Challenges

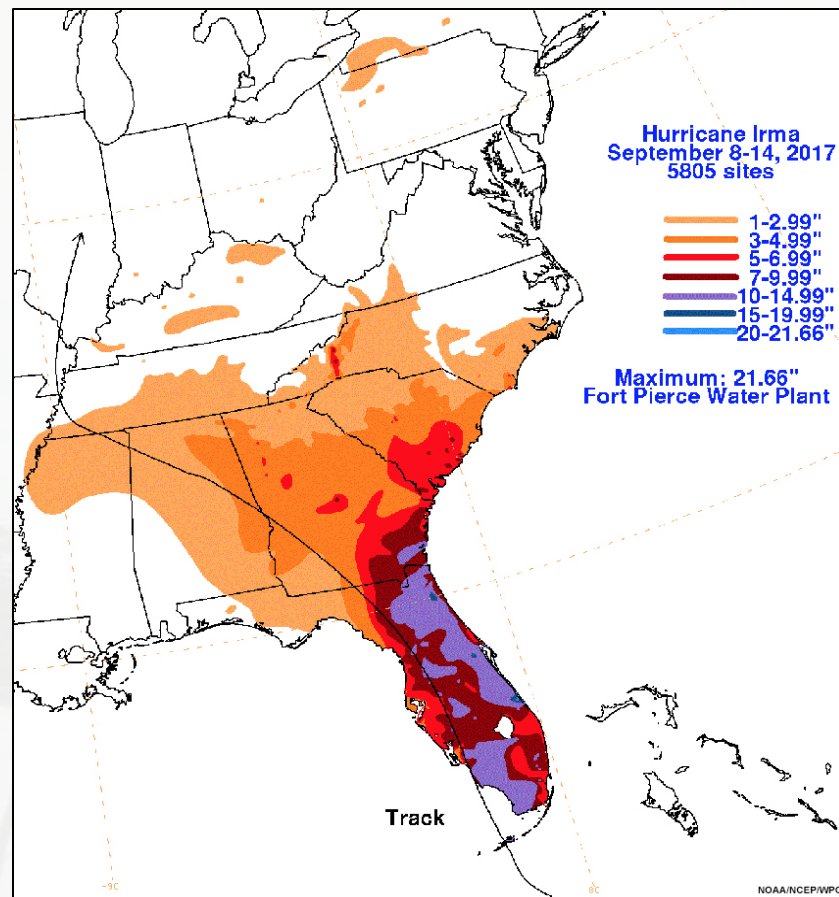
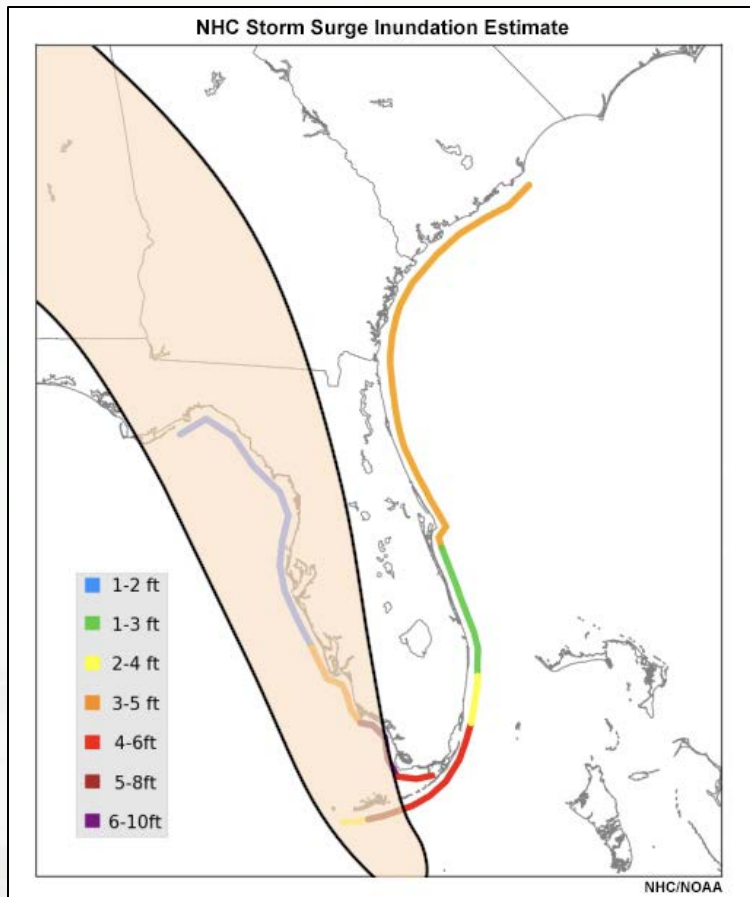
## Hazards Extend Far From the Center!

## A Hurricane is Not a Point!



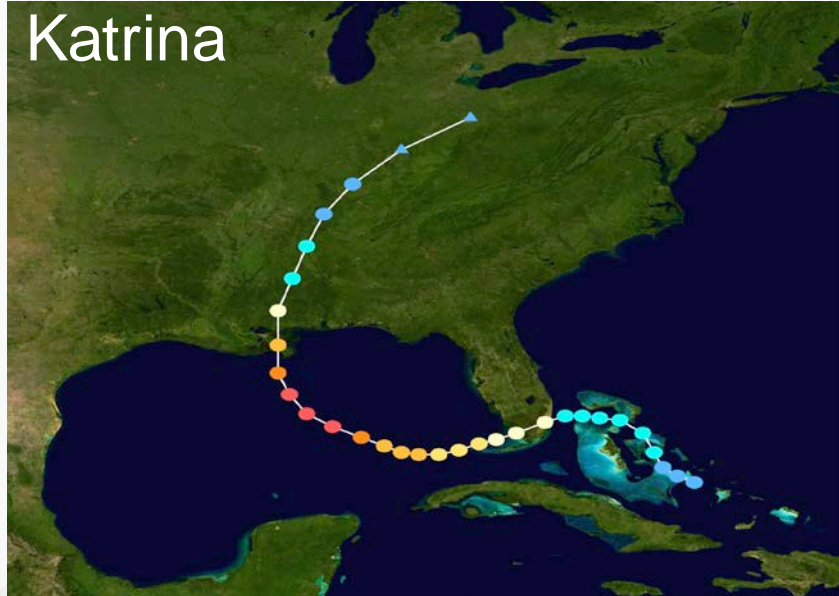


# Messaging Challenges





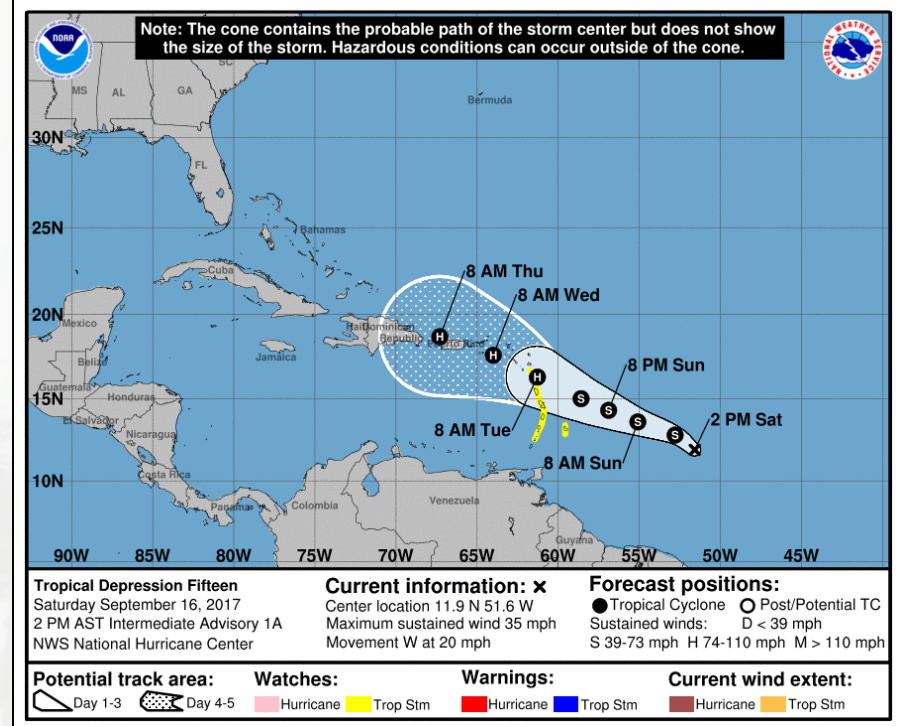
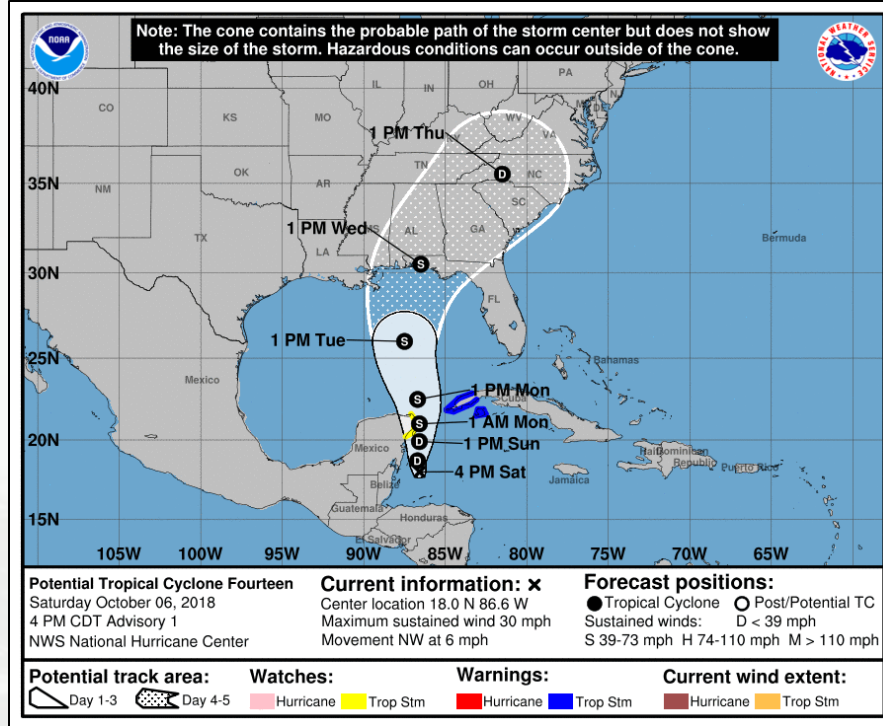
# Careful with Analogs



**Every storm is different (size, intensity, structure, angle of approach). Analogs can be carefully used to explain how this storm is going to be different than a past one.**

# Anchoring

Tendency to “anchor” on one piece of information in decision making  
– not accounting for forecast changes



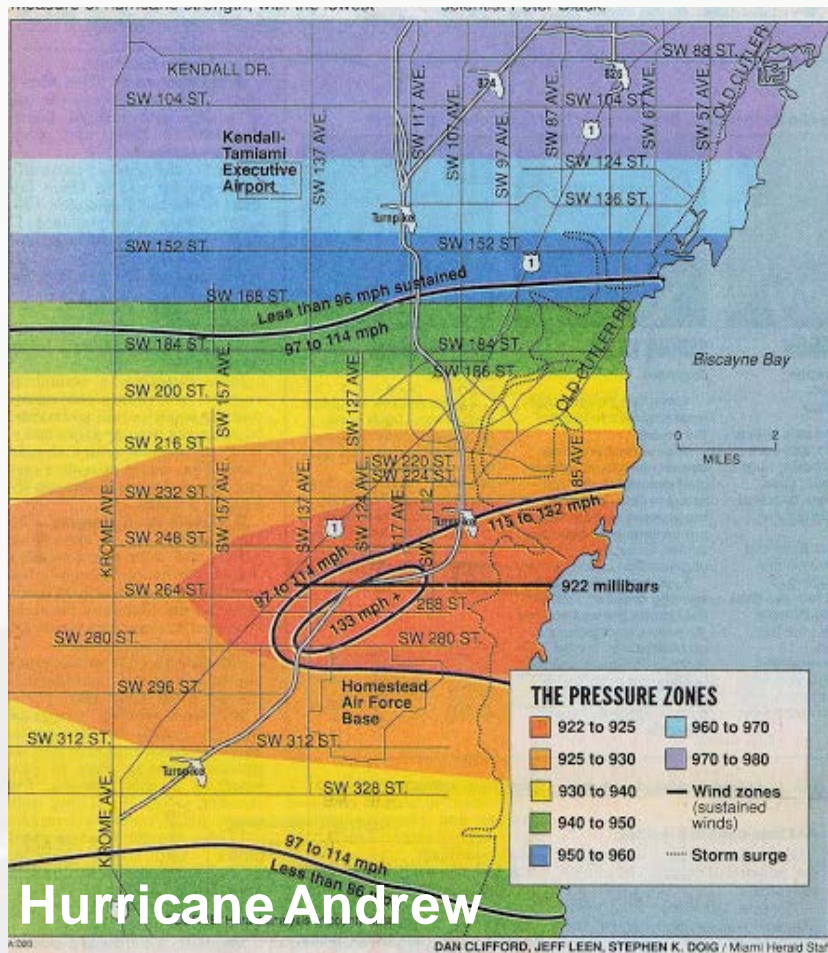
Conservative initial intensity forecasts for Michael and Maria



# Past Experience

“Didn’t think it would be that bad!”

“That wasn’t bad at all!”



Depends on your perspective



# NHC Grand Challenge: Shorten Lead Times

The Nation's Strongest – 150 MPH or Greater  
All But 1 Were Tropical Storms 3 Days Before Landfall

## U.S. 150 mph+

1919 – Storm 2

1932 – Storm 2

1935 – Labor Day

1969 – Camille

1992 – Andrew

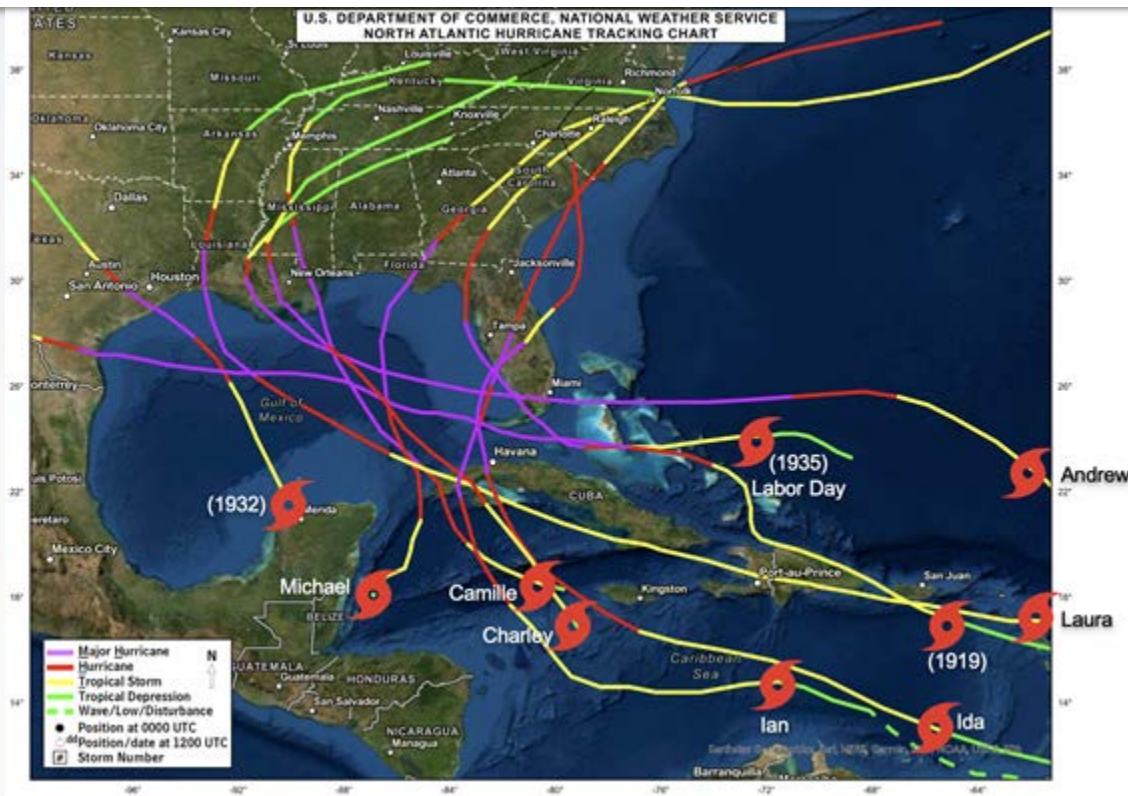
2004 – Charley

2018 – Michael

2020 – Laura

2021 – Ida

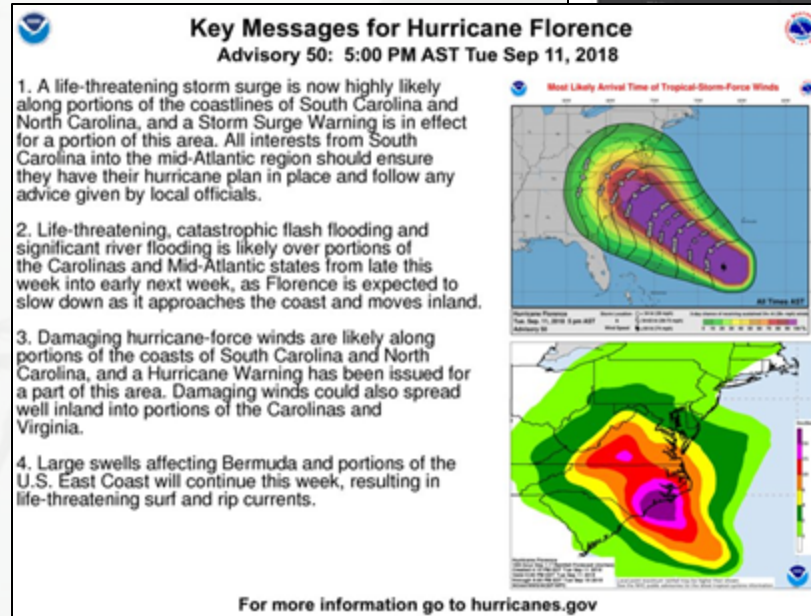
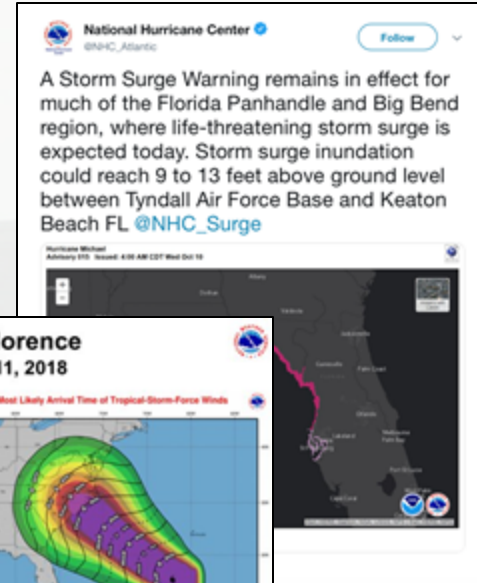
2022 – Ian



Average time to  
become a  
hurricane is  
50 h before  
landfall

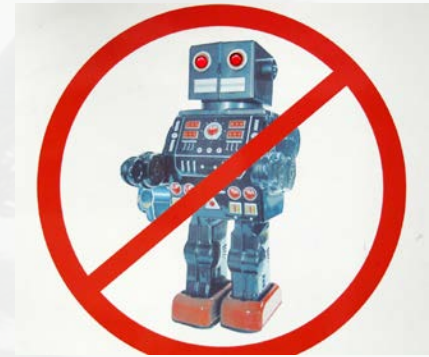
# NHC's Social Media Objectives

- Raise awareness
- Describe evolving threat
- Address uncertainty
- Focus on hazards, not storm “details”
- Encourage preparedness
- Direct users to trusted sources of information



# Why not just use automated tweets?

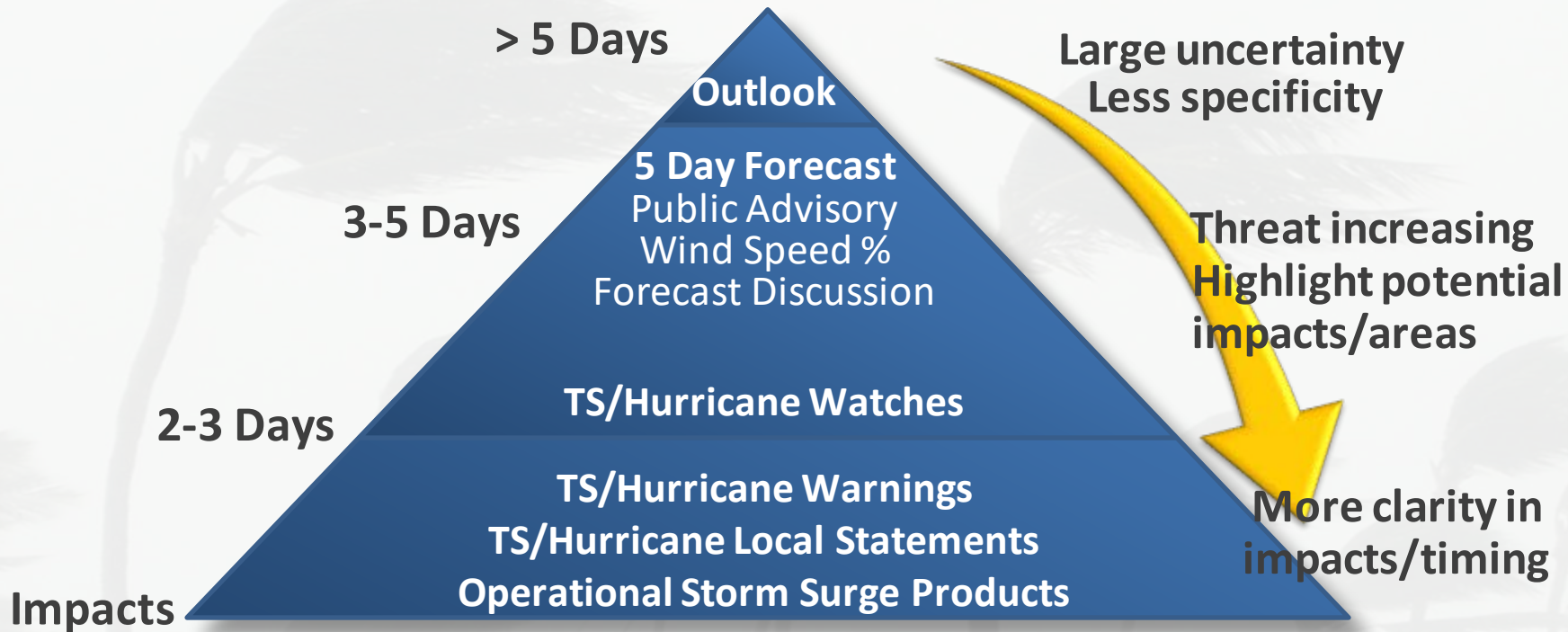
- As a rule, people are not using social media for automated information
- The general public can tell very quickly that this information is from a computer and not from a human (usage, syntax, grammar etc)
- Usage statistics show that manual tweets are viewed & shared 3-4x as much as the automated ones, even with similar information
- In Matthew, 19 of 20 top tweets were manual
- Automated tweets do not encourage people to follow NHC's message.





# NATIONAL WEATHER SERVICE

## *Tropical Cyclone Products & Messaging Strategy*



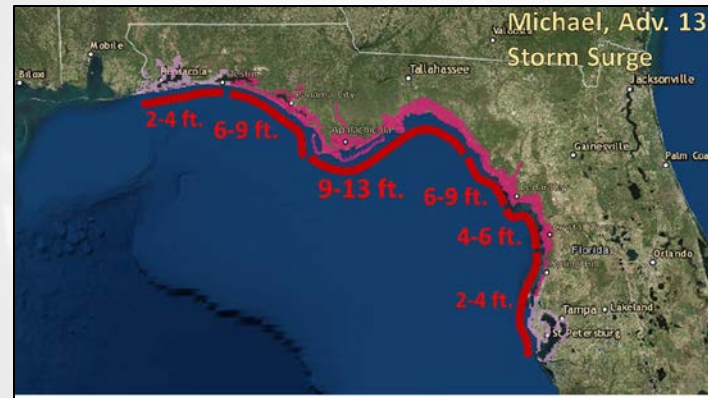
# More Products, More Specificity as Threat Materializes

- Days out, not possible to provide detailed information on specific impacts, exact locations that will be affected, and timing
- As threat increases, impact area is highlighted but information on locations that will experience the worst conditions is not yet known. Exact timing not clear.
- Focus during watch/warning phase is on potential impacts and need for preparedness actions and evacuation

4 days before Michael

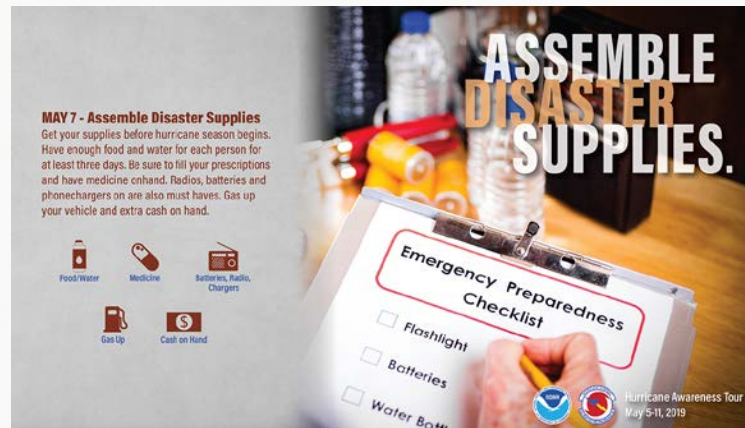
Storm Surge, rainfall, and wind impacts are possible over portions of the northern Gulf Coast by mid-week, although it is too soon to specify the exact location and magnitude of these impacts.

1 day before Michael



# 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



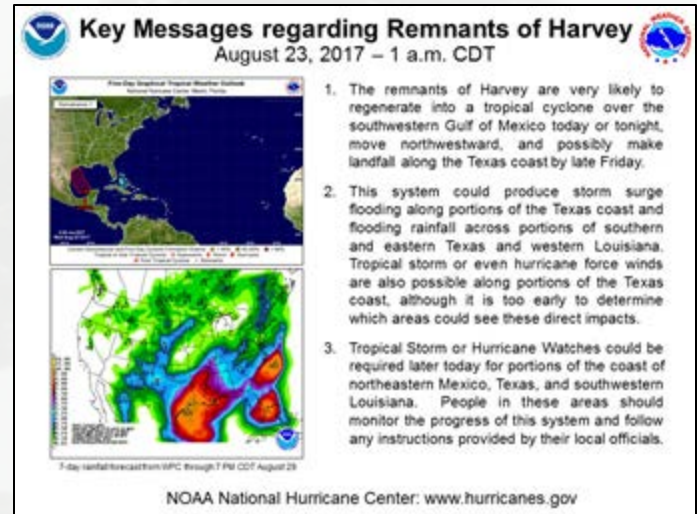


# Pre-Storm Messaging

- Strongly worded Tropical Weather Outlooks begin emphasizing hazards
  - Storm Surge
  - Tropical storm or hurricane-force winds
  - Potential for heavy rainfall
- Mention that watches or warnings could be required
- Overall focus is on potential impacts – not track or intensity

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 Five Days or More Away

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

**National Hurricane Center** @NHC\_Atlantic · 7 Sep 2018

Here are the 11 AM AST Key Messages for Tropical Storm #Florence. High surf will begin to affect the U.S. East Coast this weekend. The risk of other direct impacts has increased, but it is too early to know the specifics of these impacts. [nhc.noaa.gov/refresh/graphi...](https://nhc.noaa.gov/refresh/graphi...)

**Key Messages for Tropical Storm Florence**  
Advisory 33: 11:00 AM AST Fri Sep 07, 2018

1. Regardless of Florence's eventual track, large swells will begin to affect Bermuda later today and portions of the U.S. East Coast this weekend, resulting in life-threatening surf and rip currents.
2. The risk of other direct impacts associated with Florence along the U.S. East Coast next week has increased. However, there is still very large uncertainty in model forecasts of Florence's track beyond day 5, making it too soon to determine the exact location, magnitude, and timing of these impacts. Interests near and along the U.S. East Coast should monitor the progress of Florence through the weekend and ensure they have their hurricane plans in place.

**Tropical Storm Florence**  
Forecast track (11:00 AM AST)  
Center location (25.0 N 74.0 W)  
Maximum sustained wind (10 mph)  
Movement (10 mph)  
NHC's National Hurricane Center

**Forecast probabilities**  
Forecast track (11:00 AM AST)  
Center location (25.0 N 74.0 W)  
Maximum sustained wind (10 mph)  
Movement (10 mph)  
NHC's National Hurricane Center

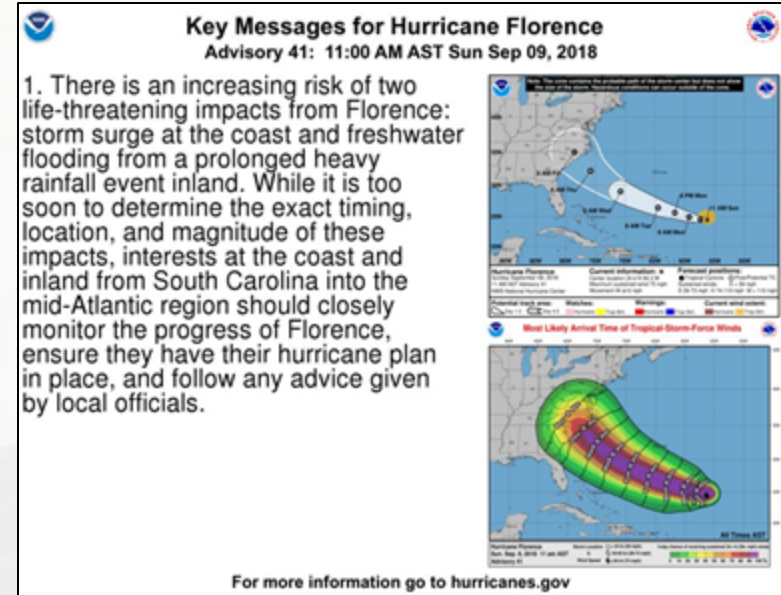
**Potential track area**  
Forecast track (11:00 AM AST)  
Center location (25.0 N 74.0 W)  
Maximum sustained wind (10 mph)  
Movement (10 mph)  
NHC's National Hurricane Center

**Most Likely Arrival Time of Tropical-Storm-Force Winds**  
Forecast track (11:00 AM AST)  
Center location (25.0 N 74.0 W)  
Maximum sustained wind (10 mph)  
Movement (10 mph)  
NHC's National Hurricane Center

For more information go to [hurricanes.gov](https://hurricanes.gov)

# 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
  - Time of Arrival graphics can be helpful!
- Life-threatening wording can be included at this stage, if confidence allows.
- Preparedness actions typically underway
  - Mention hurricane plan and to seek advice of local officials



 **National Hurricane Center** @NHC\_Atlantic · 9 Sep 2018

Here are the key messages on Hurricane #Florence as of 11 pm EDT. Florence is expected to become a major hurricane on Monday, and there is an increasing risk of coastal storm surge flooding and freshwater flooding from heavy prolonged rain when the hurricane approaches the U.S.



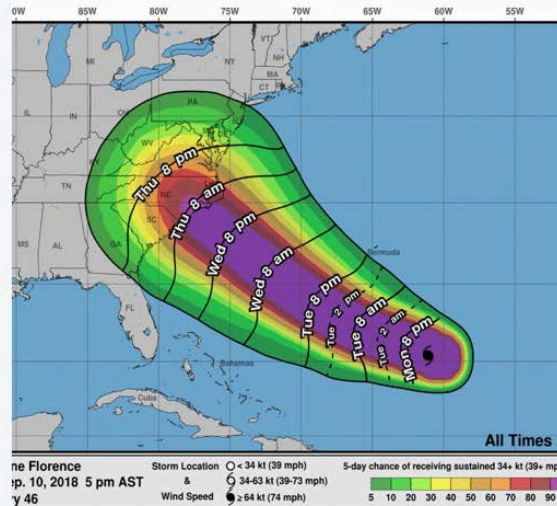
# Keeping Focus Off the Track and Awareness of Hazards Beyond the Cone



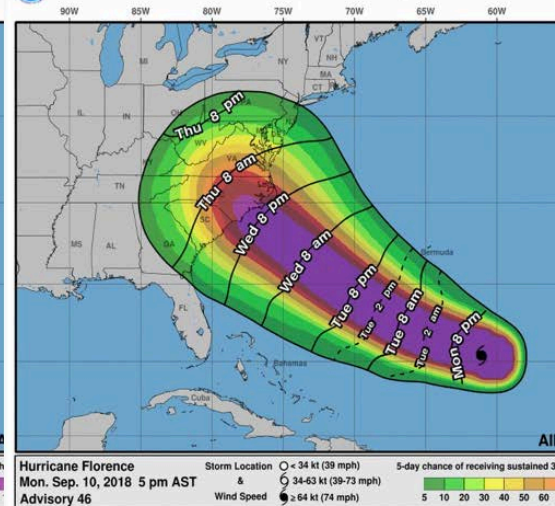
National Hurricane Center @NHC\_Atlantic · 10 Sep 2018

Don't concentrate on the exact forecast track of Hurricane #Florence. Significant effects will extend outside the cone, and will arrive at the coast sooner than the eye. For more information about impacts at your specific location, go to [weather.gov](https://www.weather.gov)

Most Likely Arrival Time of Tropical-Storm-Force Winds

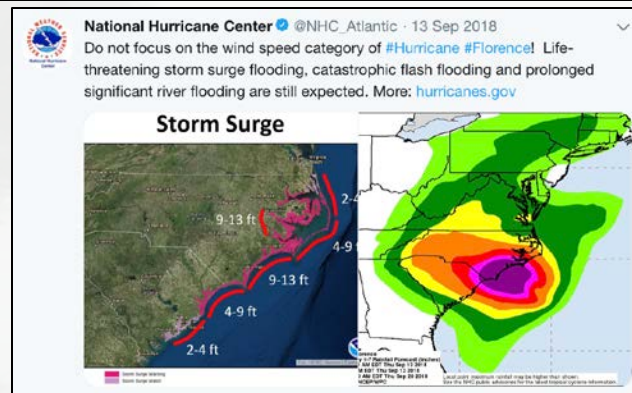
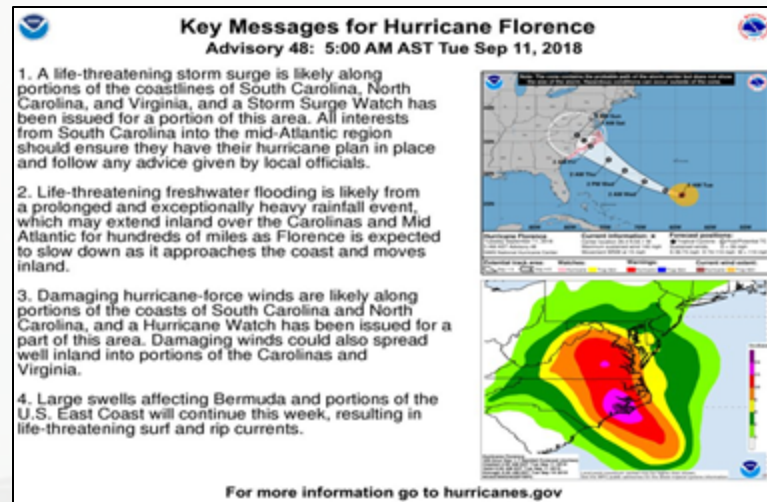


Earliest Reasonable Arrival Time of Tropical-Storm-Force



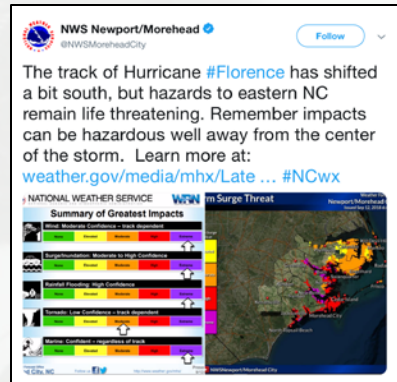
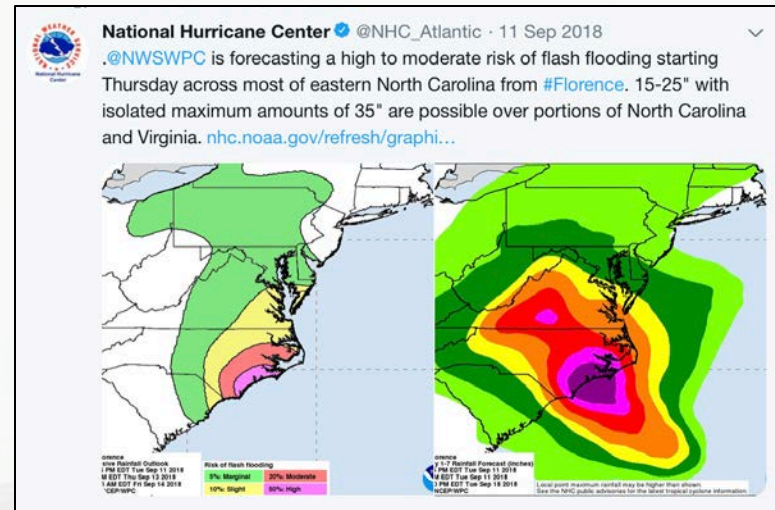
# Messaging Threats in the Watch/Warning Phase

- Important to keep messaging ***focused on hazards not track or intensity.***
- Concentrate messaging on individual hazards, with more detail provided at this stage
  - ***Life-threatening*** storm surge ***likely*** somewhere within the warning area
  - ***Life-threatening*** freshwater flooding ***likely*** for Carolinas and mid-Atlantic
  - Hurricane-force winds possible (likely) within the watch (warning) area



# Messaging Threats in the Watch/Warning Phase

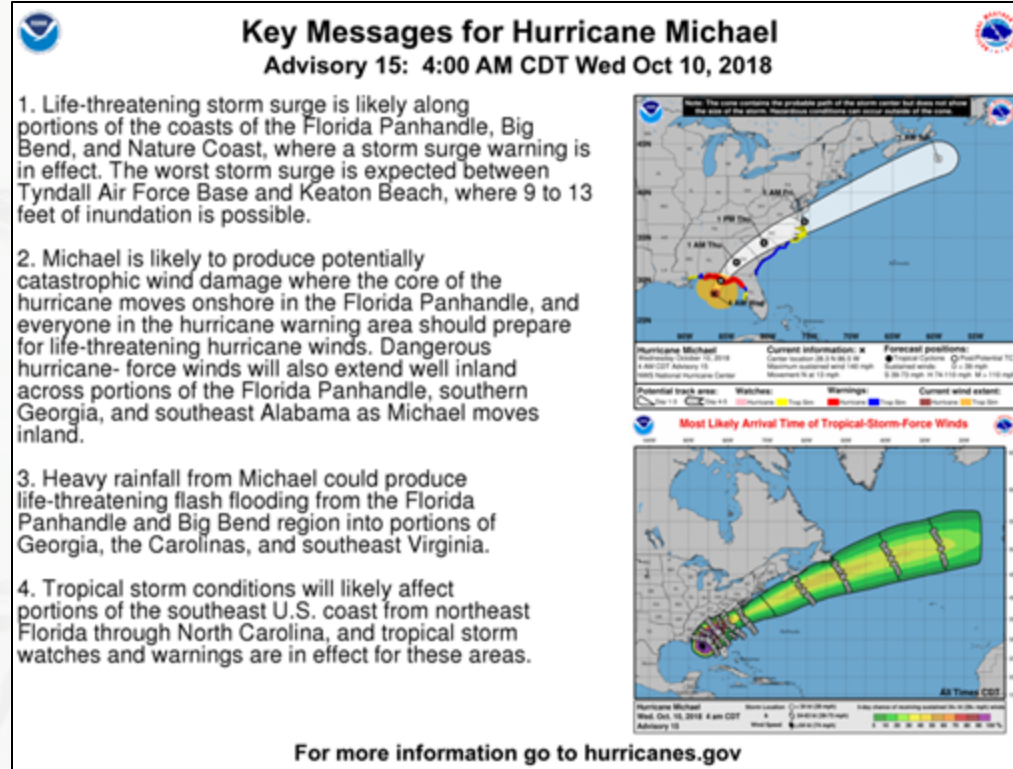
- Remember that each hazard is likely to required a different response
- Hazards also likely to occur at different locations and times
  - Harvey – storm surge and extreme wind at landfall, flooding rains days later
- Watches/Warnings and other NWS hazard-specific graphics can help to message location and timing of surge, rainfall, and wind hazards and impacts





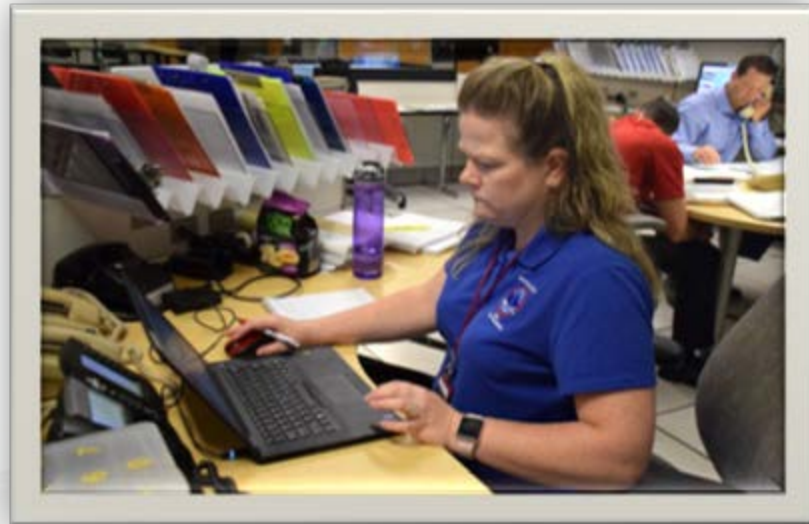
# Messaging A Quickly Evolving Threat

- ***Life-threatening*** storm surge likely - worst surge from Mexico Beach to Keaton Beach
- ***Potentially catastrophic*** wind damage where the core of Michael moves onshore
- Dangerous hurricane-force winds will extend well inland into southern GA and southeast AL



# Messaging Takes Coordination

- NWS Decision Support Services (DSS) Coordinator is initiated when threat is identified
  - Person deploys and works within NHC operations
- Facilitates communication between deployed NWS personnel, WFOs, RFC, national centers, HLT, and other parts of NOAA
- Ensures consistent messaging within the organization and assists with forecast coordination

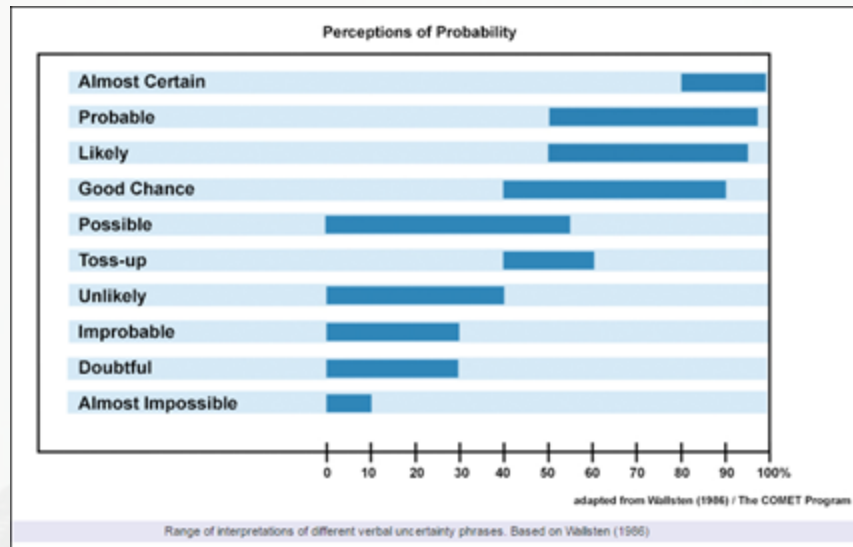


Jenifer McNatt serving as DSS Coordinator during Hurricane Irma



# Words Matter

- Choose words carefully!
  - Careful when saying weakening, downgraded – hazards often continue!
  - Careful when describing improving conditions or ending time of a particular hazard – does not necessarily mean all clear!
  - Public can perceive words related to probabilities very differently – try to be clear when describing
- Keep headlines focused on hazards and impacts not storm statistics!



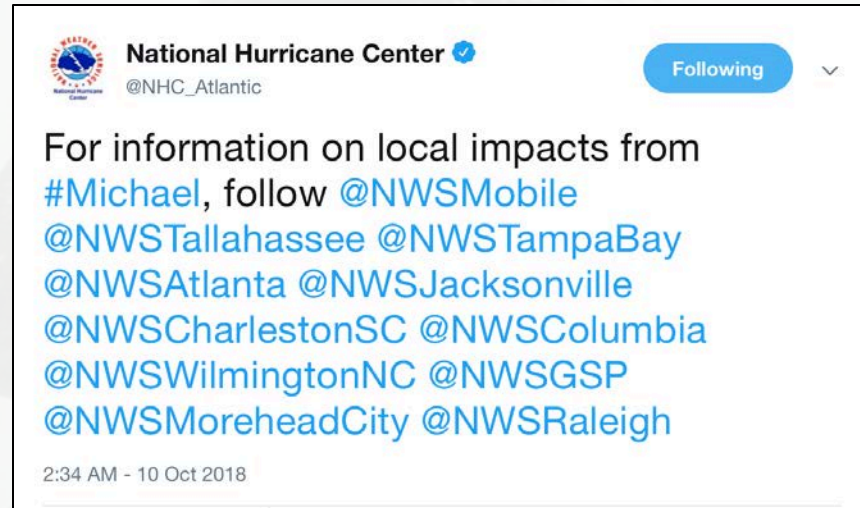
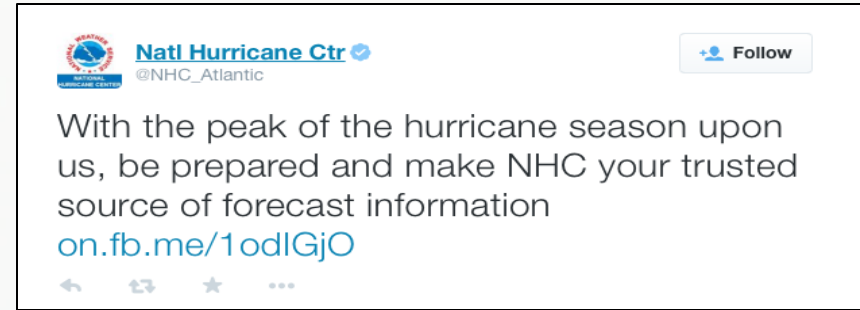
**Carolinas Brace for Hurricane Florence and Widespread Flooding**

**Hurricane Florence still poses grave threat despite weaker winds**



# Trusted Sources

- Resist posting and sharing computer model graphics
- Put out “official” information and products from trusted sources
- Share and re-tweet information from trusted sources
- Use social media to politely dispel rumors and provide general preparedness tips



# Don't Be Afraid to Dispel Rumors

- If misinformation is being spread, don't hesitate to address it!
  - Do it politely
  - Don't call out source
  - Use it as a general reminder for preparedness and/or re-direct message back to potential hazards & impacts
- Work with the entire weather enterprise (media, private sector, and EM community) to provide consistent, actionable messages!

Greater New Orleans

Ch

**Beware fake forecasts shared on social media, National Hurricane Center says**



NOAA NWS National Hurricane Center

Now that we have entered the heart of the hurricane season, there is an increase in the Internet hype around disturbances that NHC is monitoring. Given the long lead times involved, the wide range of possible outcomes, and the historically poor and erratic performance of guidance models with weak disturbances, there is no reliable science to forecast potential impacts to specific locations that would be more than a week away.

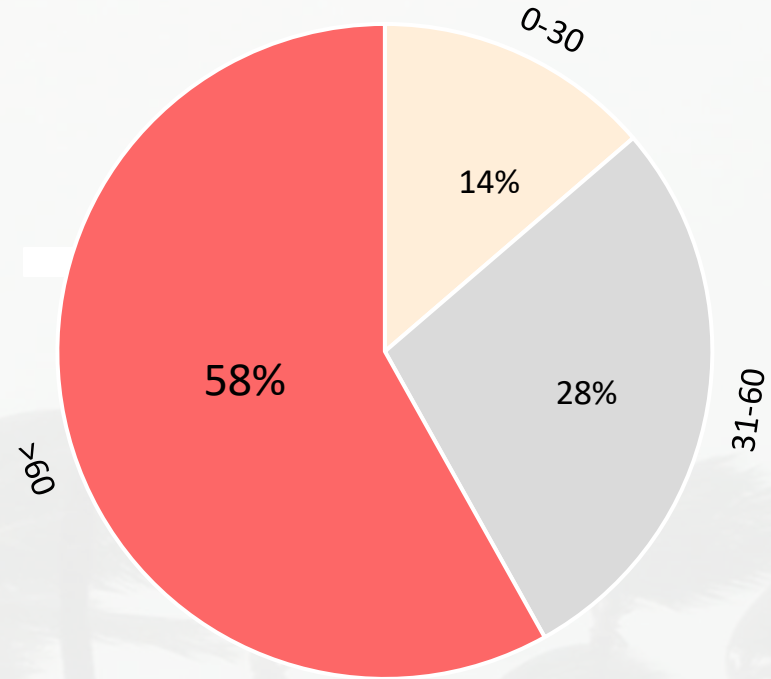
Nearly every disturbance poses some potential to become a dangerous hurricane. Folks in hurricane-prone areas should always be keeping an eye on the tropics and be prepared to respond when a true threat develops, but also remember the limitations in the science. NHC's forecasts of tropical cyclone formation and track extend out only to 5 days - because the science hasn't advanced enough to reliably forecast beyond that time frame. (We're working on internal forecasts out to 7 days, but we're a ways away from feeling comfortable making them public because the errors can be quite large.)

The bottom line really is: be alert, be prepared, but also be wary of long-range projections that go beyond what the science can offer. And make the NOAA National Hurricane Center [www.hurricanes.gov](http://www.hurricanes.gov) your calm, clear, and trusted source for official forecast and warning information on tropical cyclones.

# Post-Impact Messaging

## “The Storm is Past! I’m Safe now.”

- Nearly as many deaths occur during the preparation and recovery phase
- Many related to heart attacks, issues related to loss of electricity, accidents during cleanup and evacuation
- Disproportionately skewed toward older population
  - 8 times as many victims over the age of 60 as under 21 years old
- Generator safety is important topic!



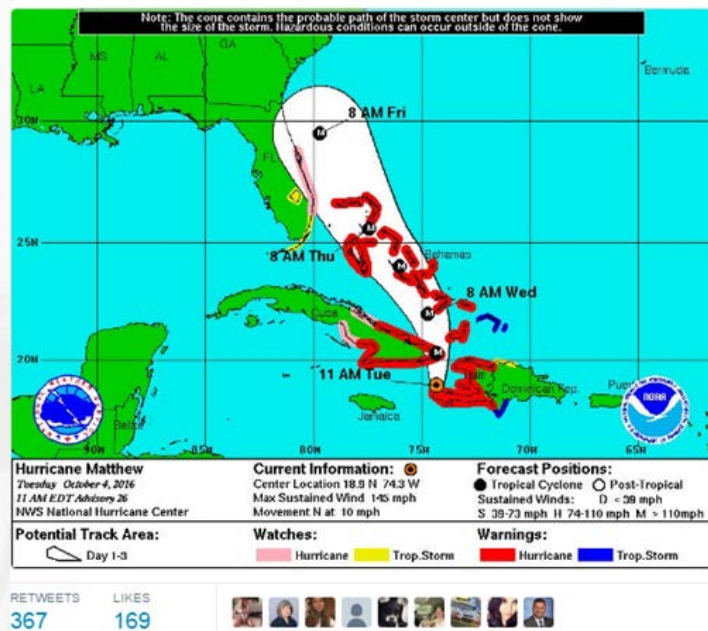
**U.S. Tropical Cyclone Indirect Deaths by Age of Victim (years)**



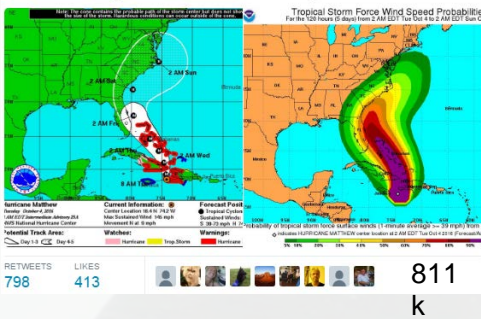
# Summary of tweet best practices

- Use a hashtag- #Matthew
- Include an image or loop
- Colors are a big plus (don't tweet out the Dvorak curve)
- Include interesting and relevant information
- Consider tweeting relevant 5 am advisory information after you finish the 8 am TWO (people miss it)
- Official links only

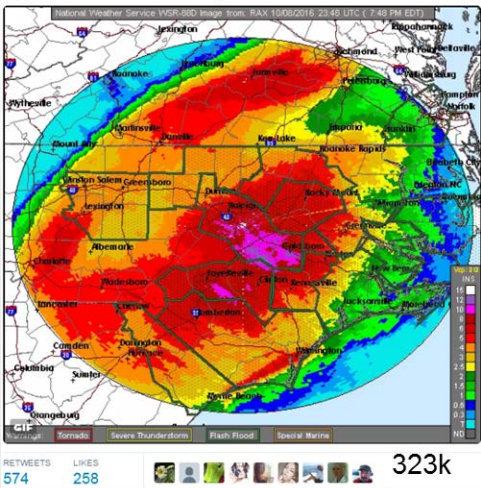
A Tropical Storm Watch has been issued for Florida from the 7 Mile Bridge to south of Deerfield Beach [#Matthew hurricanes.gov](https://www.hurricanes.gov)



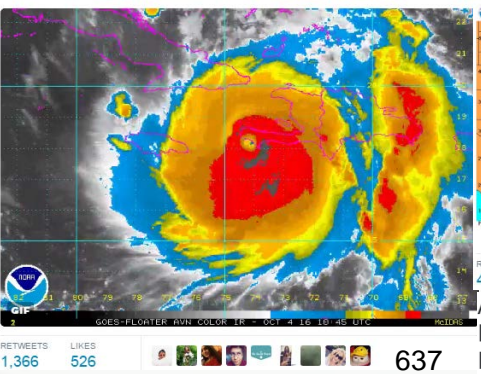
Tropical Storm and/or Hurricane Watches are likely for portions of the Florida Peninsula & Florida Keys later this morning for [#Matthew](#).



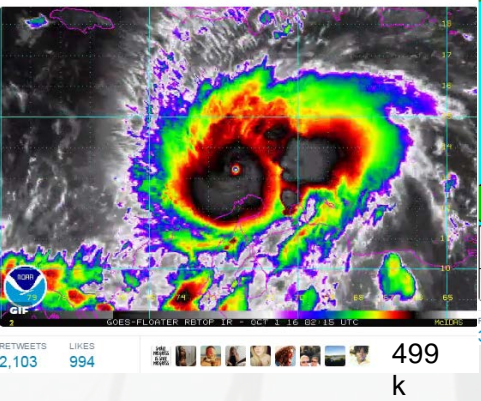
Record-breaking flooding is ongoing in North Carolina. Please see statements from [@NWSRaleigh](#) [@NWSWilmingtonNC](#) [@NWSMoreheadCity](#) [#Matthew](#)



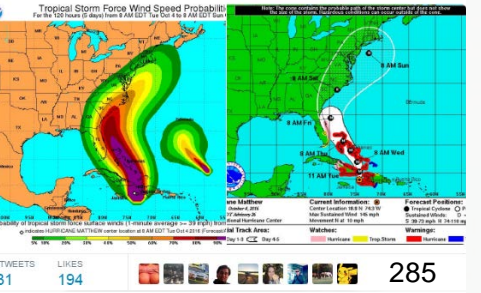
[#Matthew](#) made landfall near Les Anglais, Haiti at 7 am EDT. This is the first Category 4 [#hurricane](#) landfall in Haiti since Cleo in 1964.



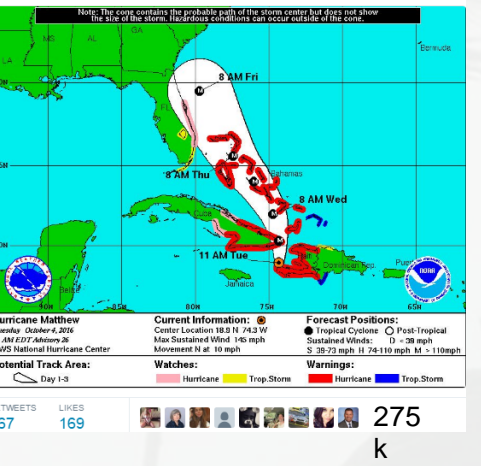
[#Matthew](#) is now a category 5 [#hurricane](#), the first in the Atlantic basin since Felix of 2007. More info: [nhc.noaa.gov/#MATTHEW](#)



Remember effects (wind, rainfall, high surf etc) will extend well outside of the forecast cone (which is only for the center of [#Matthew](#))



A Tropical Storm Watch has been issued for Florida from the 7 Mile Bridge to south of Deerfield Beach [#Matthew](#) [hurricanes.gov](#)



Top Tweets in Matthew (detailed)



# Summary

- Remain focused on hazards & impacts, not track or category
- Every storm is different
- Hurricane is not a point – significant impacts occur far from the center – outside the cone
- Consistency and words matter
- Only share information from reliable sources



**Delivering the Right Message**

**WPN**  
Building a Weather-Ready Nation  
by Improving Communication  
of Hurricane Hazards

**Emphasize the Dangers of Each Hazard**  
While wind makes headlines, nearly 90% of all deaths associated with hurricanes are from water – storm surge, surf, inland flooding.

**Focus on What's Important: Communicating Impacts**  
Focus on the area where impacts will be felt vs. the track. Hurricane impacts occur far from the eye. Avoid describing the storm as "weakening" while the danger from other hazards remains significant.

**Use the Official National Hurricane Center Forecast**  
Direct attention to the official National Hurricane Center forecast vs. sharing outlier scenarios from one model run or spaghetti plots.

**Only Share Reliable Sources**  
Avoid sources that try to create hype or make predictions beyond the limits of current science.

**Highlight Hazards that Continue After a Storm Passes**  
Rip currents, flooding and heat remain dangerous long after the storm. Health risks associated with debris, downed power lines, and carbon monoxide poisoning are serious concerns during the storm clean-up.

[weather.gov/safety/hurricane](https://weather.gov/safety/hurricane)