

Effective Messaging:

Changing the Outcome of the Event



Hurricane Katrina (2005)



Communicating Hurricane Threats & Impacts

David Sharp
Meteorologist-in-Charge
NOAA/National Weather Service
Melbourne, FL

August 24, 1992



August 24, 1992



Communicating Hurricane Threats & Impacts

David Sharp
Meteorologist-in-Charge
NOAA/National Weather Service
Melbourne, FL

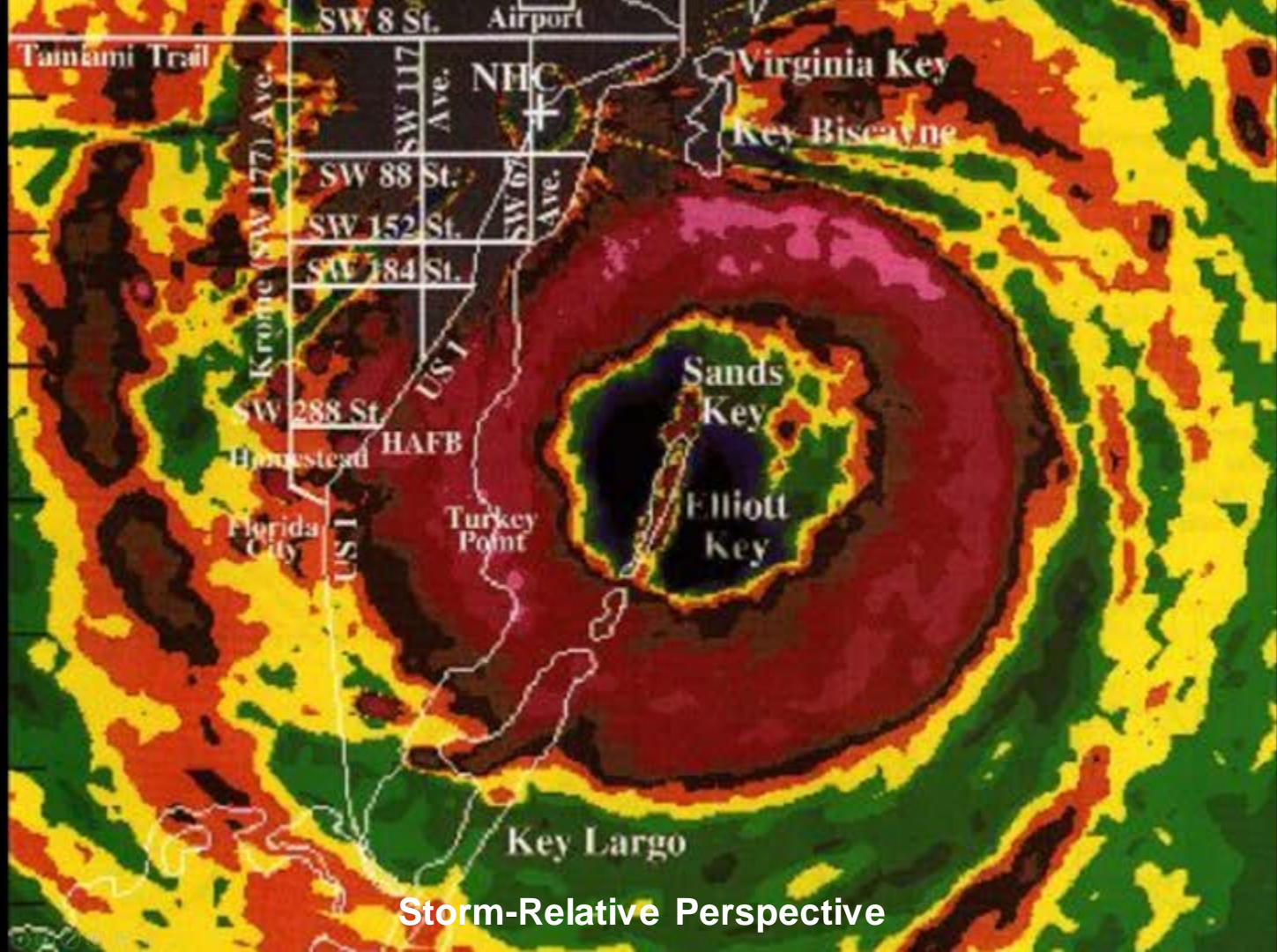


August 24, 1992



Communicating Hurricane Threats & Impacts

David Sharp
Meteorologist-in-Charge
NOAA/National Weather Service
Melbourne, FL



Storm-Relative Perspective

Tamiami Trail SW 8 St. Airport
NHC Virginia Key



Location Relative Perspective



Ultimately, it's about people!

People Relative Perspective



QUESTION: If you could go back in time to about 12-18 hours before Hurricane Andrew's landfall and take with you the knowledge of the wind impacts about to be realized, what **main message** would you have for the people of Homestead, FL?





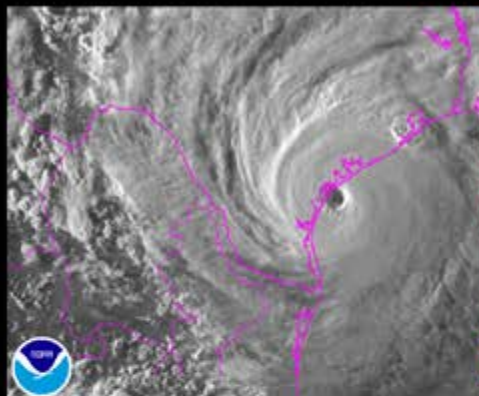
QUESTION: If you could go back in time to about 12-18 hours before Hurricane Andrew's landfall and take with you the knowledge of the wind impacts about to be realized, what **main message** would you have for the people of Homestead, FL?

- "The probability of hurricane force winds is increasing for Homestead."
- "A hurricane warning remains in effect for South Florida, which includes the town of Homestead."
- "Act now to protect your life! This is an extremely dangerous and potentially catastrophic wind situation for Homestead."

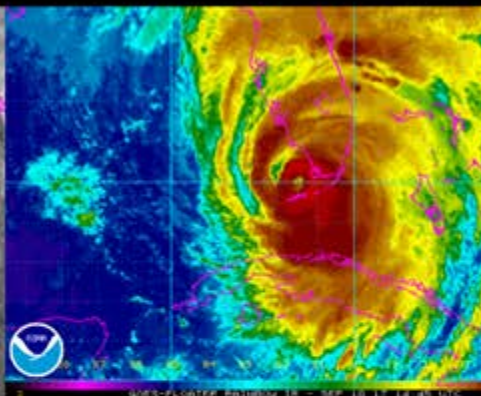


Now consider recent seasons ...

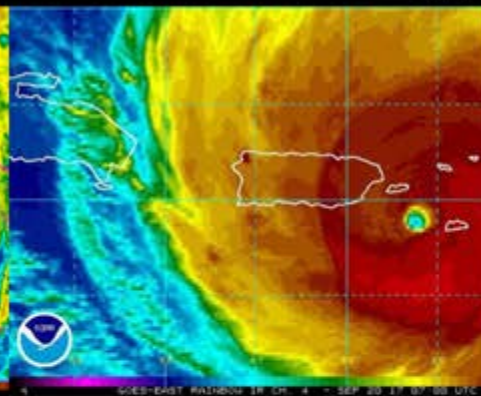
2017



Hurricane Harvey



Hurricane Irma



Hurricane Maria



Hurricane Michael (2018)

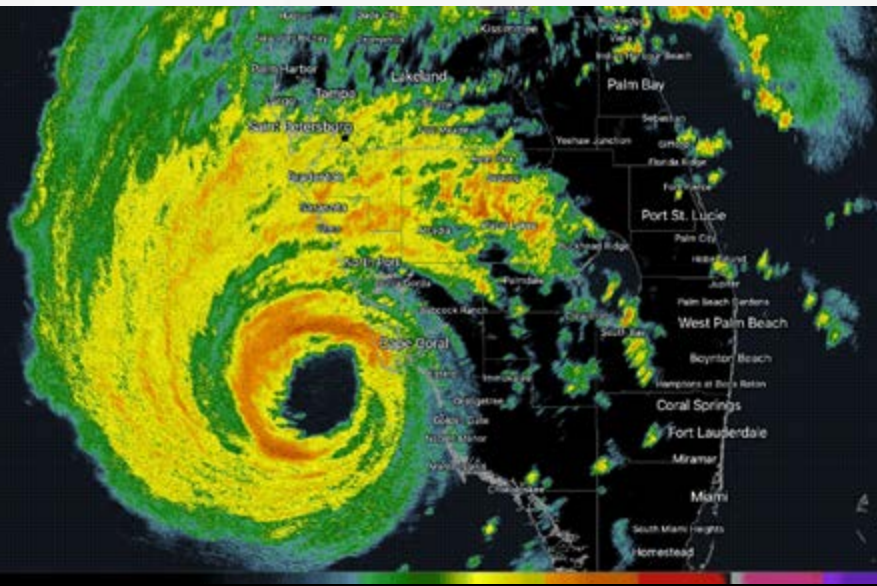





Hurricane Ian (2022)



Associated Press



Associated Press

A satellite image of Hurricane Dorian (2019) in its peak intensity as a Category 5 storm. The hurricane is characterized by a very well-defined, circular eye and a dense, swirling cloud structure. The storm is positioned over the Atlantic Ocean, with the Florida peninsula visible on the left side of the frame. The surrounding ocean is a deep blue, and the clouds are a bright white, indicating intense convection. The text "Hurricane Dorian (2019)" is overlaid in the top right corner.

Hurricane Dorian (2019)

Category 5: 185 mph

Nearing the Abaco Islands and
Grand Bahama Island



It's about people!





It's All About Impacts

"The Impact Footprint"



- **Hurricane Hazards:**

- High Wind
- Storm Surge & Tide
- Flooding Rain
- Pounding Surf/Dangerous Seas
- Tornadoes & Waterspouts



Every event is unique!



THINKING AND FEELING



Thinkers
focus first on the
use of things



THINKING AND FEELING



Thinkers

Focus first on the
use of things

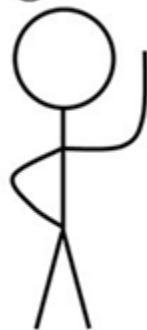


Feelers

Focus first on the
meaning of things



THINKING AND FEELING



Thinkers

Focus first on the
use of things



Feelers

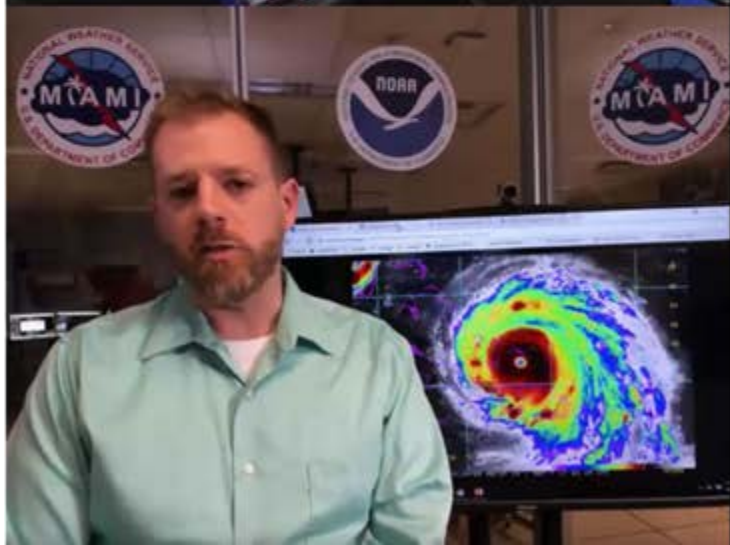
Focus first on the
meaning of things

*"Act now to protect your life!
This is an extremely dangerous
and potentially catastrophic
wind situation for Homestead."*



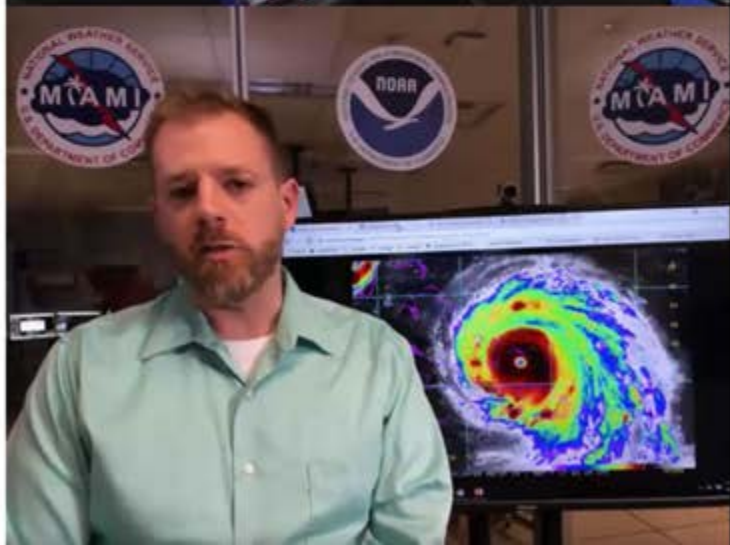
Messaging Types

- **Community Decision-making**
 - Emergency Managers
 - Community plans
 - Potential impacts relative to established weather/water thresholds and triggers



Messaging Types

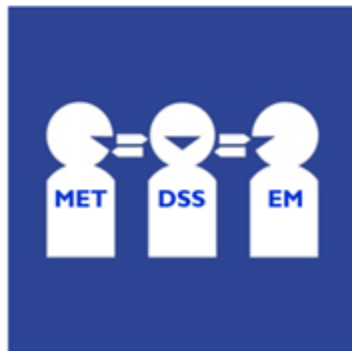
- **Community Decision-making**
 - Emergency Managers
 - Community plans
 - Potential impacts relative to established weather/water thresholds and triggers
 - **Personal Decision-making**
 - Public; Individuals/Families; Small Businesses
 - Personal plans
 - Potential impacts relative to local watches/warnings; any orders issued from local officials
- *Limited sophistication with some safety instruction included*





Making Things Simple

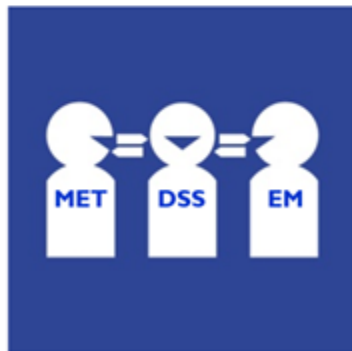
- **FACT:** The majority of our customers are not meteorologists, hydrologists, or oceanographers.
 - *"Some are weather-wise; most are other-wise."*
- To effectively communicate, we must learn to speak the language of the customer.
 - *Especially during emergencies when lives are imperiled.*





Making Things Simple

- Our science-based hurricane information must be:
 - **Distilled** ... *focused and succinct; nice and concise*
 - **Translated** ... *put in customer-speak*
 - **Interpreted** ... *maintain message meaning*

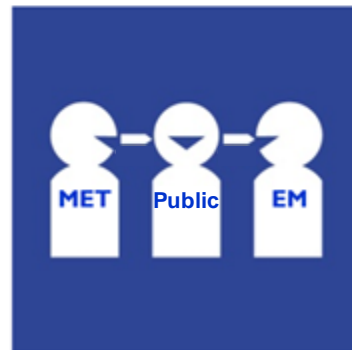




Making Things Simple

- Our science-based hurricane information must be:
 - **Distilled** ... *focused and succinct; nice and concise*
 - **Translated** ... *put in customer-speak*
 - **Interpreted** ... *maintain message meaning*

**When messaging to the public,
speak in plain language using
relatable terms.**



Communication of Weather-related Hurricane Emergency Information

3 Routes



From *Social and Behavior Influences on Weather-Driven Decisions* (Galluppi et al. 2013)

Public Safety Messaging

An aerial photograph of a long, multi-lane bridge spanning a body of water. The bridge has multiple support pillars and stretches from the bottom left towards the top right of the frame. The water is a light blue-grey color, and the sky is a pale, hazy blue.

1. **Coordinate Public Safety Messages**
 - in conjunction with emergency management partners
2. **Communicate Public Safety Messages**
 - in conjunction with media partners

An integrated approach

Messaging in ways:

*“To help get the right people...
to do the right things...
at the right time.”*



Messaging in ways:

*“To help get the right people... **TARGETED**
to do the right things... **ACTIONABLE**
at the right time.” **TIMELY***



Hurricane Ian's Killer Water

The Story of Mitch & Mary:
Residents of Fort Myers Beach, FL

Tampa Bay Times

The cost of staying

Many Floridians, like **Mitch and Mary**, made what felt like a rational decision.

They stayed because hotels were expensive, already booked or far away. They stayed because decades of hurricane experience made them sure they could ride out a storm. They stayed because leaving meant missing work. They stayed because the neighbors were, too. They stayed because they'd heard rumors there could be looters. They stayed because it was late, the roads were jammed and the gas pumps were empty.

They stayed because home felt safest.



Mitch & Mary's Home Washed Away

Hurricane Ian's Killer Water

The Story of Mitch & Mary:
Residents of Fort Myers Beach, FL

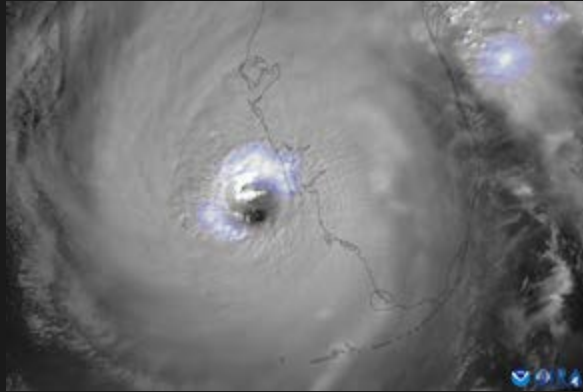
Tampa Bay Times

The cost of staying

Many Floridians, like **Mitch and Mary**, made what felt like a rational decision.

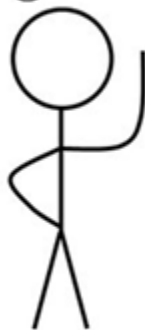
They stayed because hotels were expensive, already booked or far away. They stayed because decades of hurricane experience made them sure they could ride out a storm. They stayed because leaving meant missing work. They stayed because the neighbors were, too. They stayed because they'd heard rumors there could be looters. They stayed because it was late, the roads were jammed and the gas pumps were empty.

They stayed because home felt safest.



Mitch drowned even as Mary clung for dear life.

THINKING AND FEELING



Thinkers
Focus first on the
use of things



Feelers
Focus first on the
meaning of things

*"Act now to protect your life!
This is an extremely dangerous
and potentially catastrophic
surge situation for Fort Myers."*



August 26, 2011
8:00 AM Advisory
Cat 2 (marginal Cat 3)
Large cyclone
Moving north at 14 mph.



Potential Impacts



Realized Impacts

Impacts = Customer Language

Relatable Information = Actionable Information

August 26, 2011

8:00 AM Advisory

Cat 2 (marginal Cat 3)

Large cyclone

Moving north at 14 mph.



Potential Impacts



Realized Impacts

Impacts = Customer Language



Impact Recognition: Bridges the latest threat assessment to a well-calibrated message by considering the imperilment to life and/or potential property damage ... according to locally established thresholds and community impact descriptions.



Societal Vulnerability to Hurricanes

Exposure:

Incidence:



Pielke & Pielke 1997

Societal Vulnerability to Hurricanes

Exposure:

Populations at Risk

Properties at Risk

Community Preparedness

Incidence:



Pielke & Pielke 1997

Societal Vulnerability to Hurricanes

Exposure:

Populations at Risk

Properties at Risk

Community Preparedness

Incidence:

Frequency / Return Period

Intensity



Pielke & Pielke 1997

Societal Vulnerability to Hurricanes

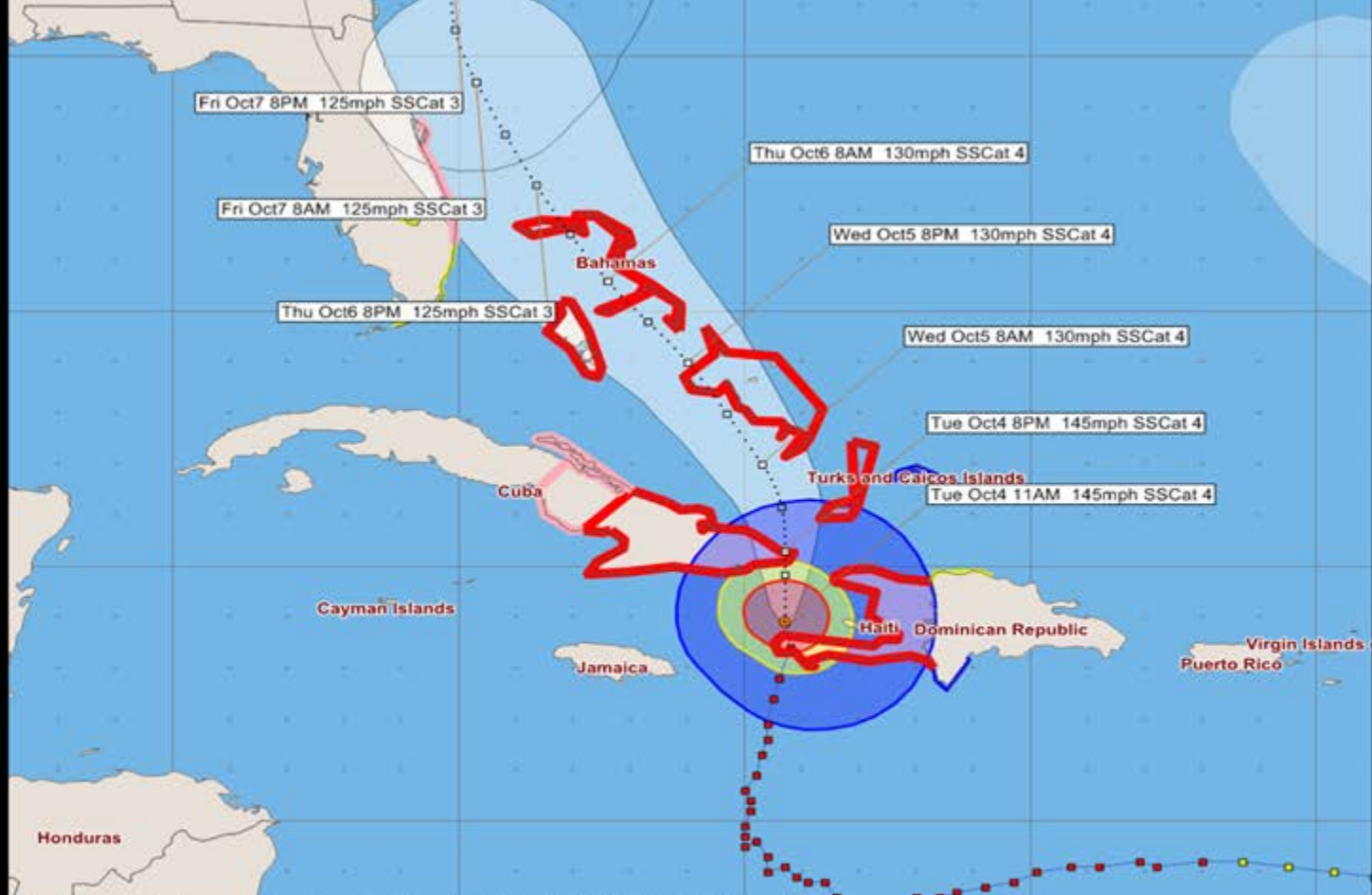
READINESS

RESPONSIVENESS

RESILIENCY



Pielke & Pielke 1997



Hurricane Matthew - Tuesday, October 4, 2016 11 AM EDT Advisory #26

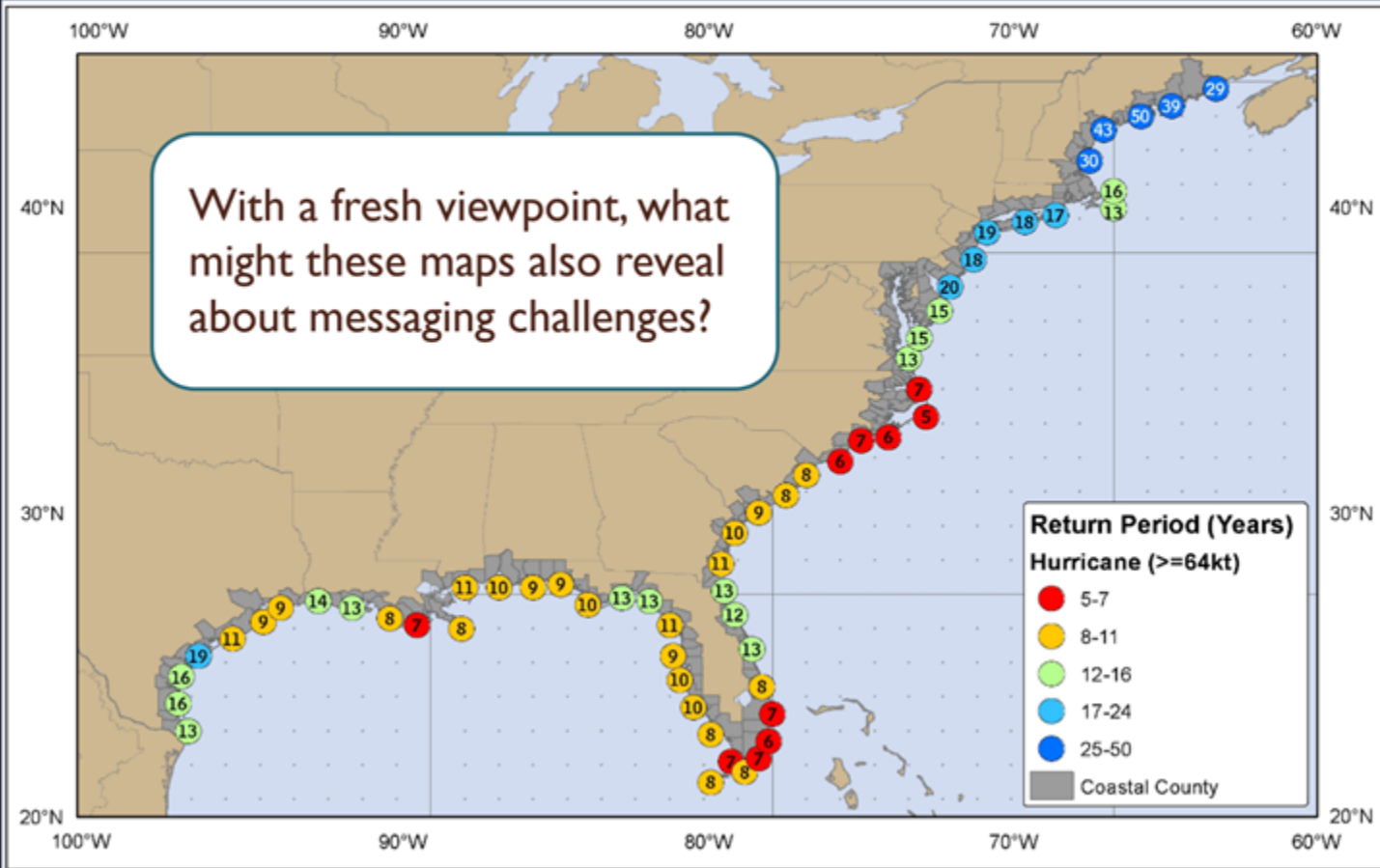
Center Location: 18.9 N 74.3 W Maximum Sustained Winds: 145 mph (Cat 4) Movement: 10 mph N

forecast positions Potential Track Area: day 1-3 day 4-5 Surface Wind Field: at current location

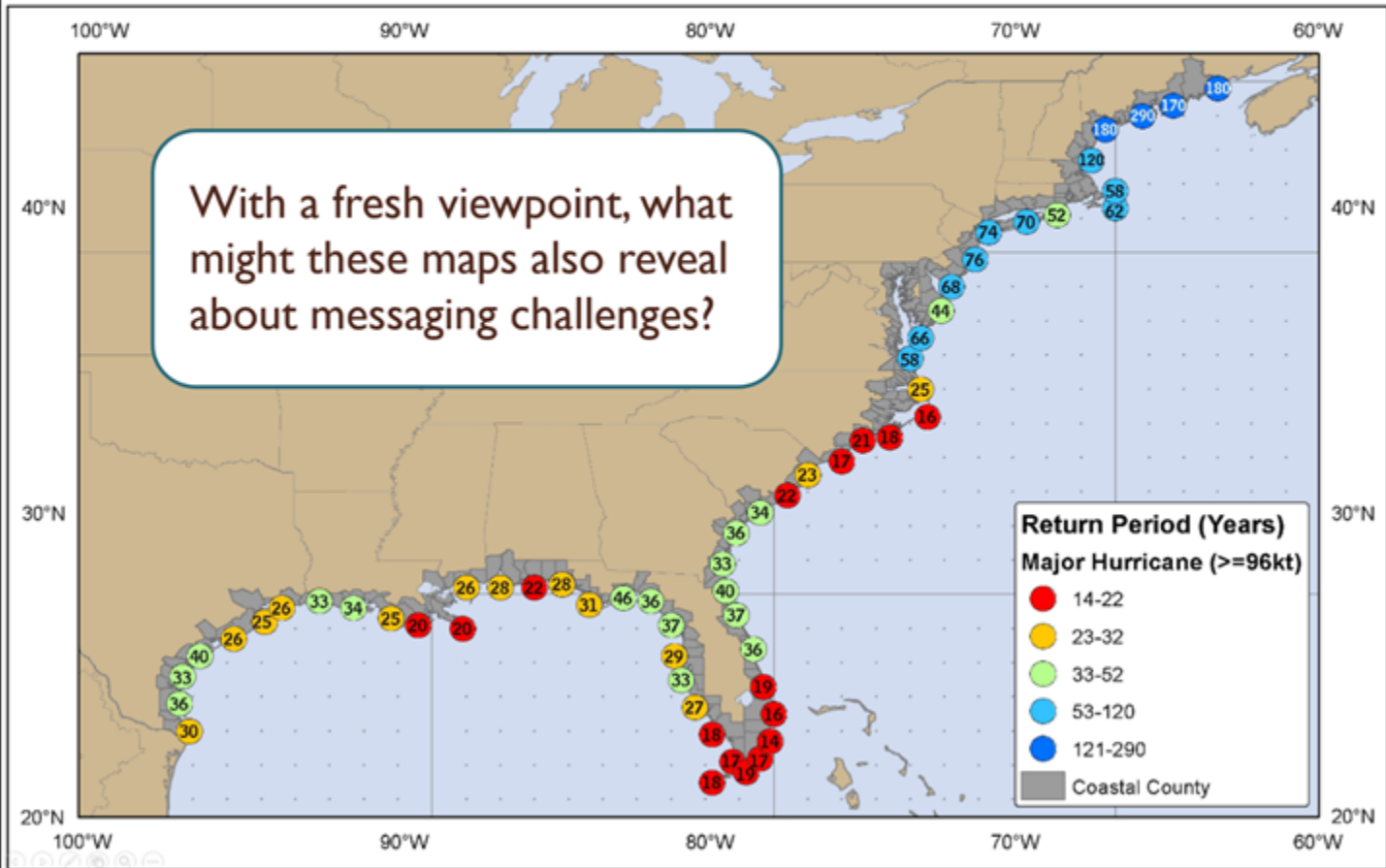
Watches: hurricane tropical storm Warnings: hurricane tropical storm

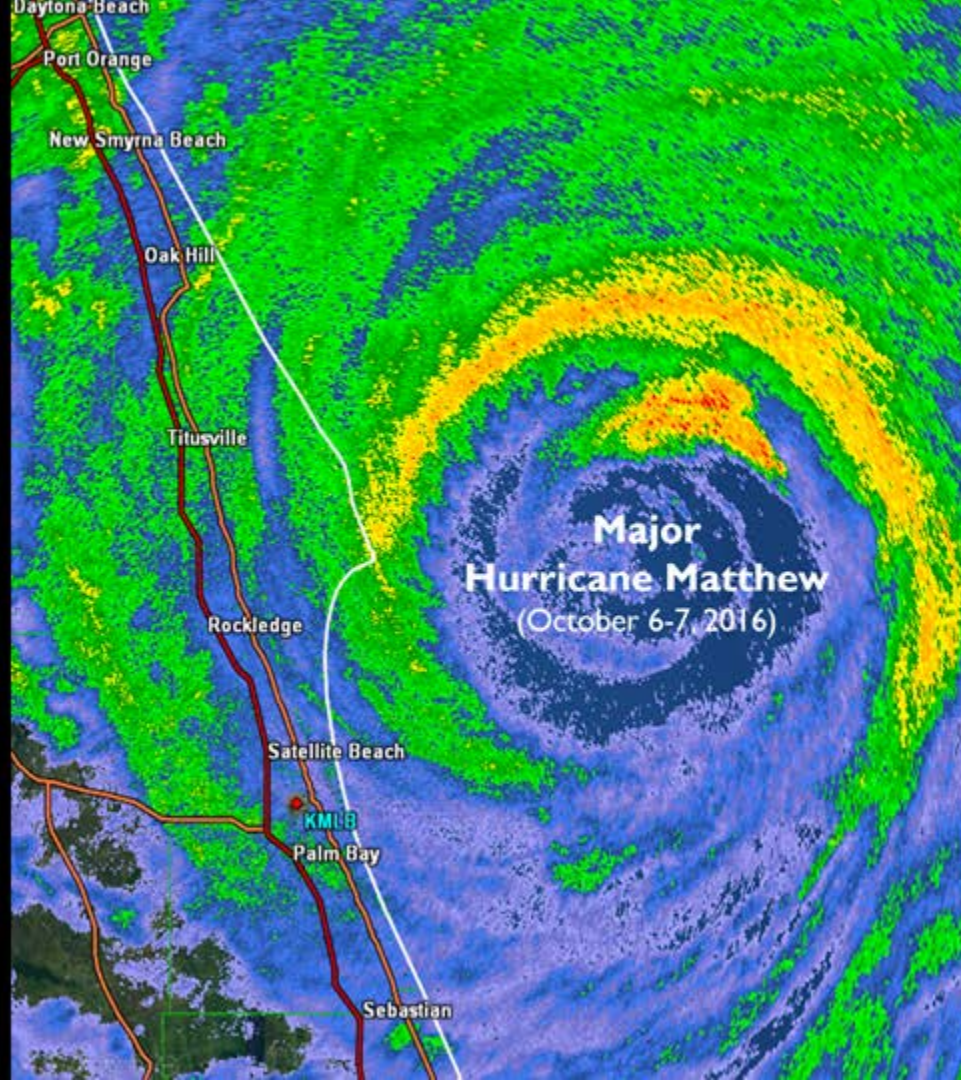
Sustained Wind Speeds: tropical storm ≥ 34 kt/39mph strong tropical storm ≥ 50 kt/58mph hurricane ≥ 64 kt/74mph

Return Frequencies



Return Frequencies







It is important to maintain a full appreciation of the precarious nature of low probability (or frequency) vs. high impact events.

Steps To Effective Warning Response



from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response

Steps To Effective Warning Response



from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response

Steps To Effective Warning Response



from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response

Steps To Effective Warning Response



from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response

Steps To Effective Warning Response

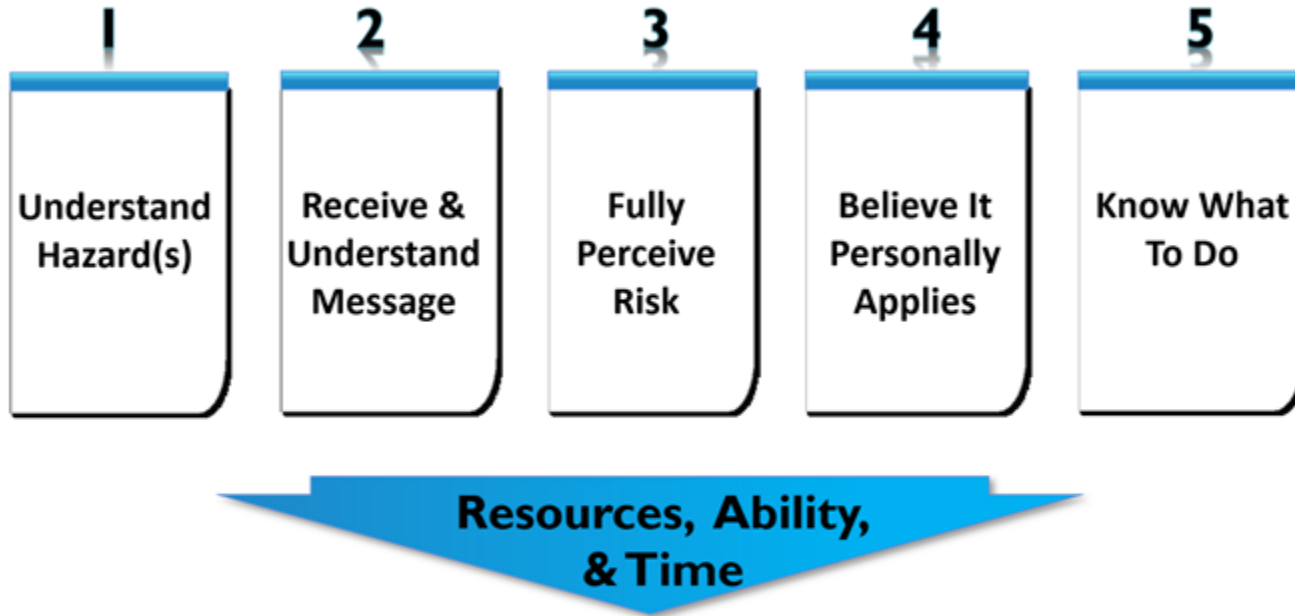


from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response

Steps To Effective Warning Response



from Morrow; adapted Sharp

Appropriate Protective Action

Considerations for Public Safety Messaging to evoke Desired Societal Response



The Nature of Information



- **A Danger of the Information Age** - we can now yield an overwhelming volume of weather/water data and information.
 - But, are we simply adding to the *information fire hose*?





The Nature of Information



- Providing increasingly more information of ambiguous utility is not helpful.
- ***This neither helps community decision-makers nor serves the public!***
 - “Drowning in Information”
 - “Information Overload & Paralysis”
 - “Over-Anxiety & Hurricane Fatigue ”





The Nature of Information



- Providing increasingly more information of ambiguous utility is not helpful.
- ***This neither helps community decision-makers nor serves the public!***
 - “Drowning in Information”
 - “Information Overload & Paralysis”
 - “Over-Anxiety & Hurricane Fatigue ”

“If we don’t want people to drown in the coming flood waters, then we shouldn’t drown them with information ahead of time.”





The Nature of Information



- Providing increasingly more information of ambiguous utility is not helpful.
- ***This neither helps community decision-makers nor serves the public!***
 - “Drowning in Information”
 - “Information Overload & Paralysis”
 - “Over-Anxiety & Hurricane Fatigue ”

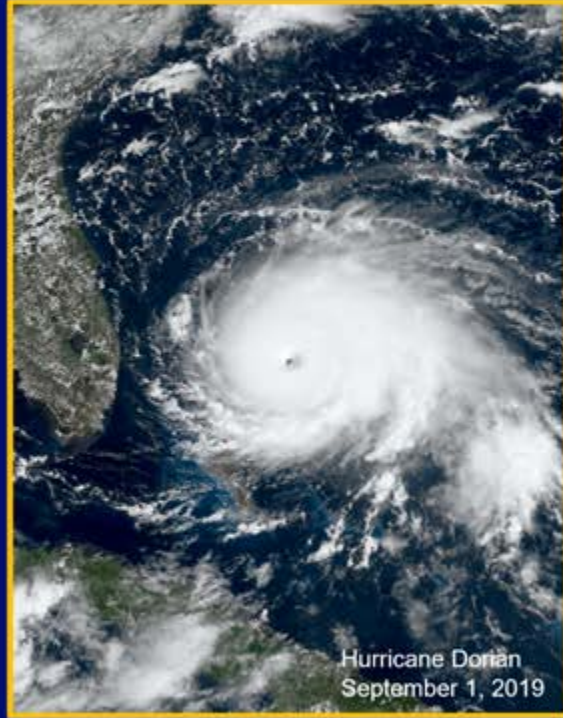
Then there is ...

**Cascading Events
& Mega-Crises**



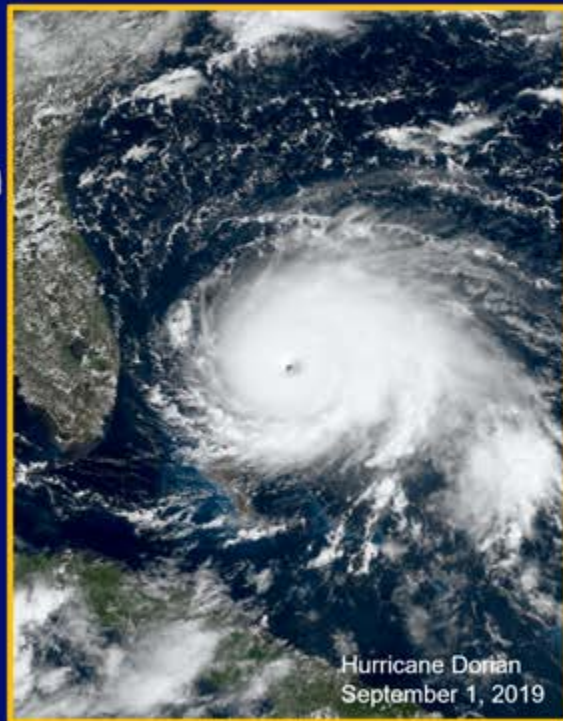
Mental Noise Model

- ❑ Stress affects information processing



Mental Noise Model

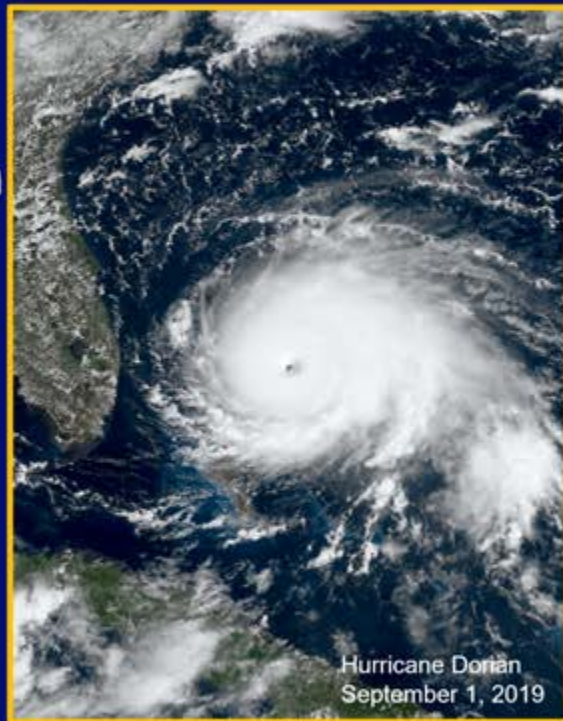
- ❑ **Stress affects information processing**
- ❑ **Impact of stress on attention**
(Covello)
 - High stress conditions: people lose 80 – 90% of what they hear
 - Scientific facts account for less than 5%



Hurricane Dorian
September 1, 2019

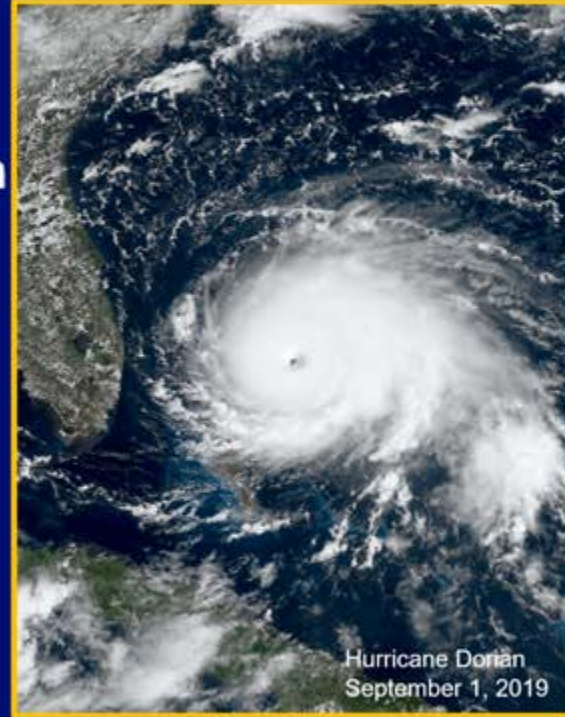
Mental Noise Model

- ❑ **Stress affects information processing**
- ❑ **Impact of stress on attention**
(Covello)
 - High stress conditions: people lose 80 – 90% of what they hear
 - Scientific facts account for less than 5%
- ❑ **Effect of emotion on information seeking**
(Turner, et al, 2006)
 - Greater emotion = less information retention



Mental Noise Model

- ❑ **Stress affects information processing**
- ❑ **Impact of stress on attention**
(Covello)
 - High stress conditions: people lose 80 – 90% of what they hear
 - Scientific facts account for less than 5%
- ❑ **Effect of emotion on information seeking**
(Turner, et al, 2006)
 - Greater emotion = less information retention



Stay connected with your FEELERS



The Nature of Information



- **Information Management Age** - we must move beyond the information age and onward to the *information management* & *decision support* age.
 - Providing **targeted**, **actionable**, and **timely** information
 - While remaining a **trusted** source



Being a Trusted Source Makes the Difference



- Plan for Threats
- Prepare for Impacts
- Act on Thresholds

Supporting Both Community Actions & Family Actions



Why Should I Listen To You?



Craig Fugate, FEMA Director (retired)



Why Should I Listen To You?

For community decision-making ...



Craig Fugate, FEMA Director (retired)

- I need to listen to someone who is credible.
 - **Credibility = Expertise + Trust**



Why Should I Listen To You?

For community decision-making ...



Craig Fugate, FEMA Director (retired)

- I need to listen to someone who is credible.
 - **Credibility = Expertise + Trust**
- I want to listen to someone who understands.
 - **Understanding = Empathy + Trust**



Why Should I Listen To You?

For community decision-making ...



Craig Fugate, FEMA Director (retired)

- I need to listen to someone who is credible.
 - **Credibility = Expertise + Trust**
- I want to listen to someone who understands.
 - **Understanding = Empathy + Trust**

“Things really start clicking when these are found in a common source.”



***What is the one thing everyone
wants but we cannot provide?***





***What is the one thing everyone
wants but we cannot provide?***

... a perfect forecast !!!





What, then, should be our intent?



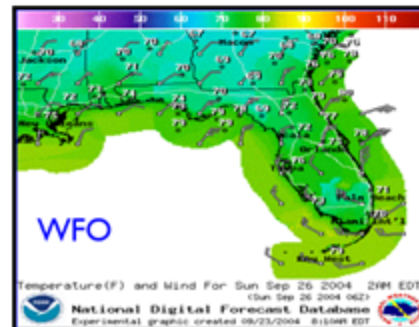
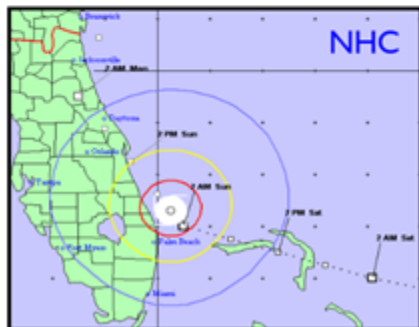
What, then, should be our intent?



“Our mutual intent is to change the outcome of the event!”

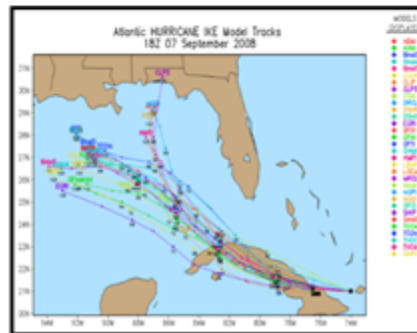
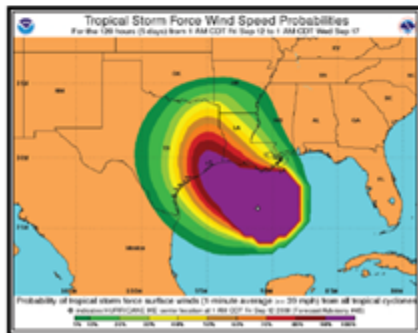
We ...

- Are comfortable with conveying our latest forecast

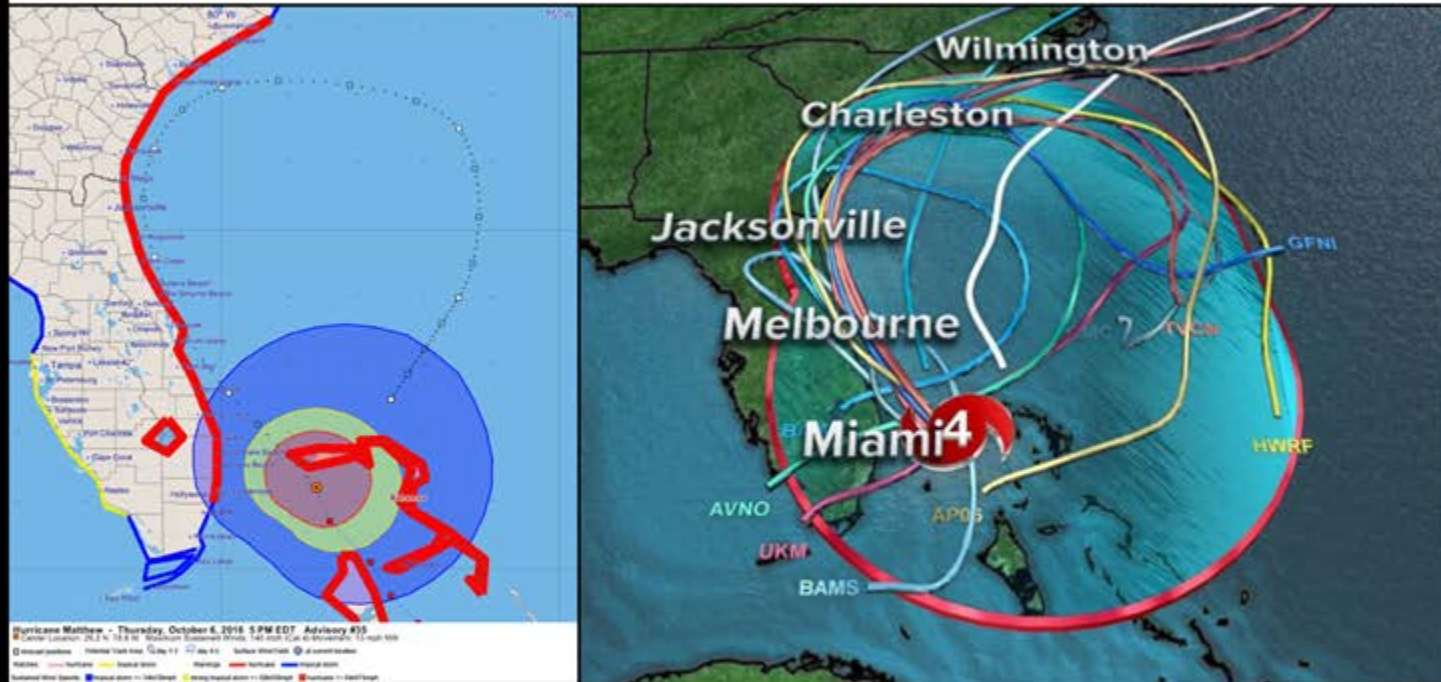


We ...

- Are comfortable with conveying our latest forecast
- But still struggle with conveying forecast uncertainty
 - Rules of Thumb (subjective; empirical)
 - Error Cone (track errors only); Spaghetti Plots (for confidence)
 - Wind Speed Probabilities (for critical thresholds)

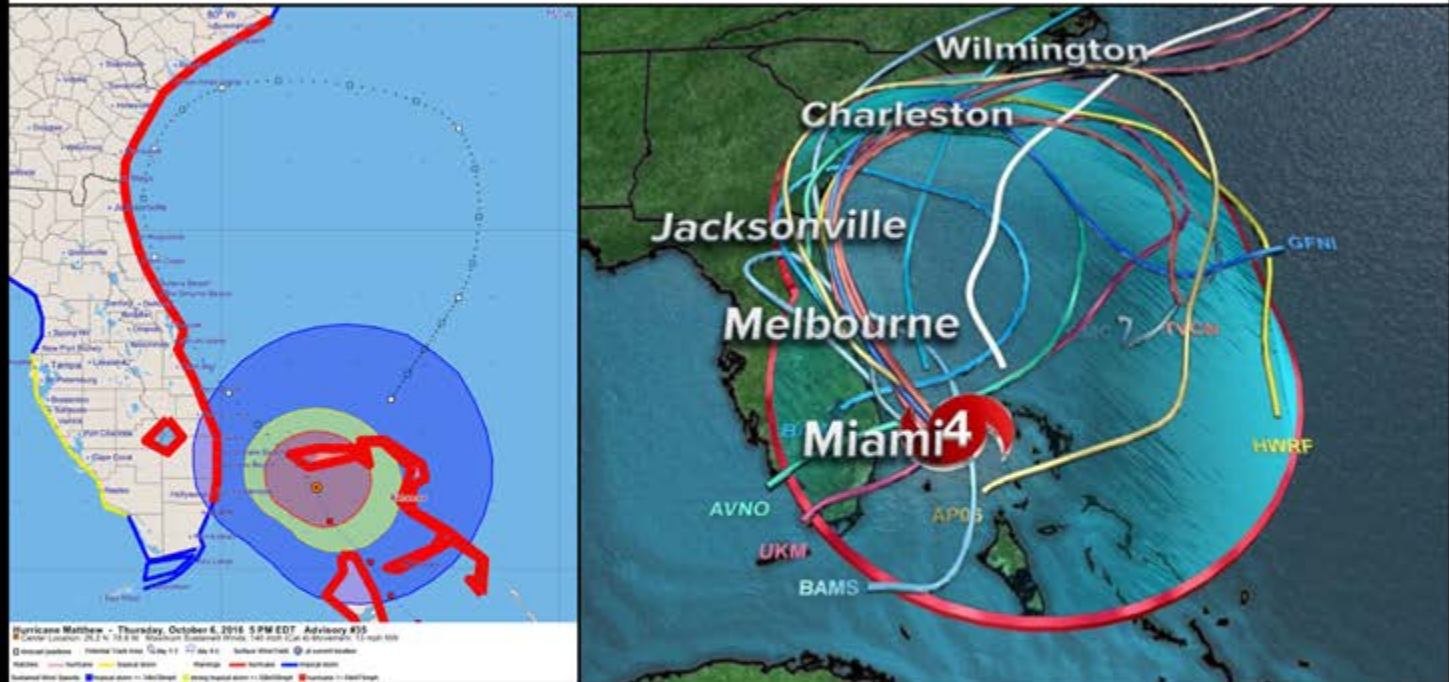


Spaghetti Plots (as seen on TV)



What's the main message?

Spaghetti Plots (as seen on TV)



What's the main message?

Helping? ... or ... Hurting?

Scenario Types for Supporting Decisions



Latest Forecast

Most Likely Scenario

Most Likely Alternate Scenario

Reasonable Worst Case Scenario

Reasonable Best Case Scenario

Scenario Types for Supporting Decisions



Simplify

Latest Forecast

Most Likely Scenario

Most Likely Alternate Scenario

Reasonable Worst Case Scenario

Reasonable Best Case Scenario



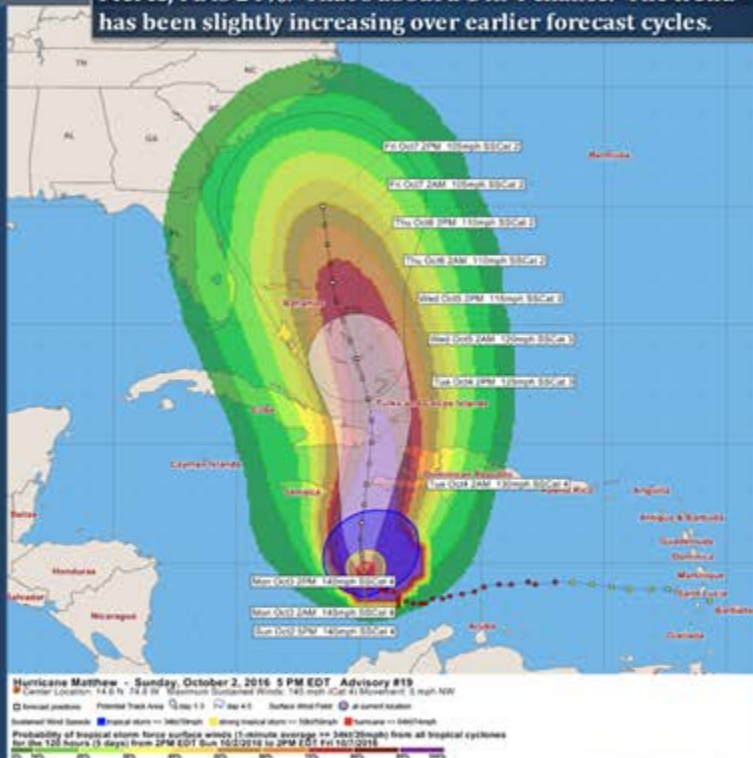
Situation Overview

East Central Florida & Adjacent Coastal Waters

The probability for tropical storm force winds at Fort Pierce, FL is 24%. That's about a 1 in 4 chance. The trend has been slightly increasing over earlier forecast cycles.

According to the latest forecast...

- A most likely scenario still keeps Matthew to the east of the Florida Peninsula.
 - Offering significant marine and coastal/beach concerns to ECFL
- Yet Matthew may move left of track as it approaches.
 - Increasing concern for tropical wind and surge impacts along the coast



Melbourne
WEATHER FORECAST OFFICE



facebook.com/NWSMelbourne



@NWSMelbourne

<http://www.weather.gov/melbourne>

October 2, 2016



Situation Overview

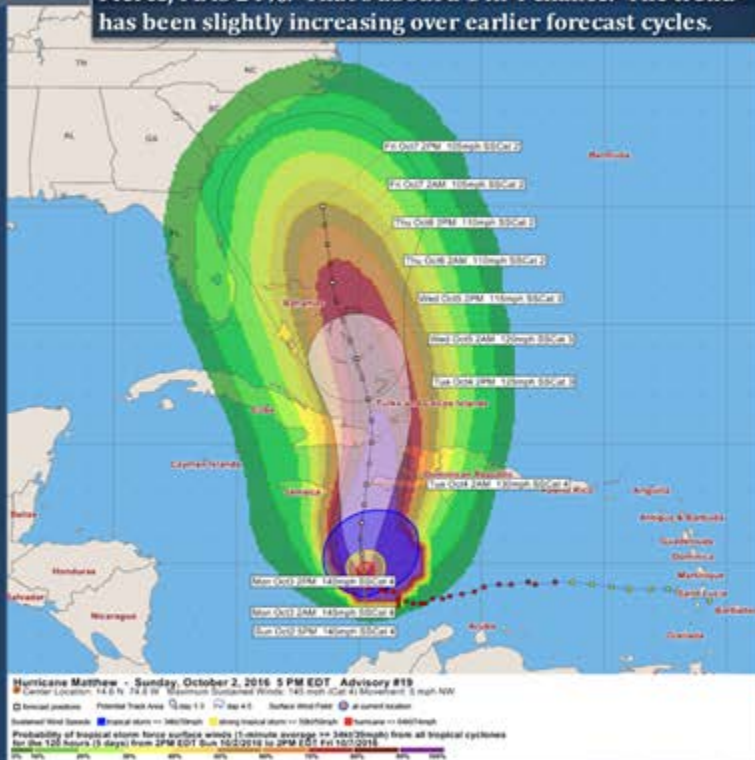
East Central Florida & Adjacent Coastal Waters

The probability for tropical storm force winds at Fort Pierce, FL is 24%. That's about a 1 in 4 chance. The trend has been slightly increasing over earlier forecast cycles.

According to the latest forecast...

- A most likely scenario still keeps Matthew to the east of the Florida Peninsula.
 - Offering significant marine and coastal/beach concerns to ECFL
- Yet Matthew may move left of track as it approaches.
 - Increasing concern for tropical wind and surge impacts along the coast

Key Point: It is possible for a major hurricane to be in our vicinity (ECFL) by mid-late week.



Melbourne
WEATHER FORECAST OFFICE

<http://www.weather.gov/melbourne>



facebook.com/NWSMelbourne



@NWSMelbourne

October 2, 2016



Situation Overview

East Central Florida & Adjacent Coastal Waters

The probability for tropical storm force winds at Fort Pierce, FL, is 24%. That's about a 1 in 4 chance. The trend is for a slight increase in the next few days.

According to

Key Point & Public Safety Message:

It is possible for a major hurricane to be in our vicinity by mid-late week.



Melbourne
WEATHER FORECAST OFFICE



[facebook.com/NWSM-Melbourne](https://www.facebook.com/NWSM-Melbourne)



[@NWSM-Melbourne](https://twitter.com/NWSM-Melbourne)

<http://www.weather.gov/melbourne>

October 2, 2016



Situation Overview

East Central Florida & Adjacent Coastal Waters

The probability for tropical storm force winds at Fort Pierce, FL is 24%. That's about a 1 in 4 chance. The trend is for a slight increase in the next few days.

Accord

- A
- to
- A
- M
- It
- m
- E
- II
- vic
- Stay

Key Point & Public Safety Message:

It is possible for a major hurricane to be in our vicinity by mid-late week.

**Stay informed of the latest forecast.
Review your hurricane emergency plan and check your seasonal supplies.**



Melbourne
WEATHER FORECAST OFFICE



[facebook.com/NWSM-Melbourne](https://www.facebook.com/NWSM-Melbourne)



[@NWSM-Melbourne](https://twitter.com/NWSM-Melbourne)

<http://www.weather.gov/melbourne>

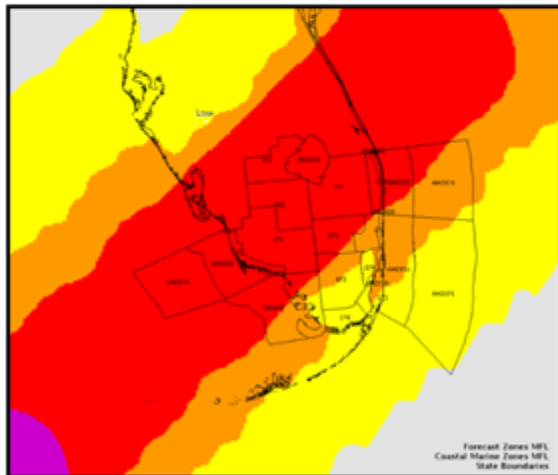
October 2, 2016



*To be safe, to what extent
should preparations be made?*

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

Forecast: **"Peak Wind Swath"**



Most Likely Scenario

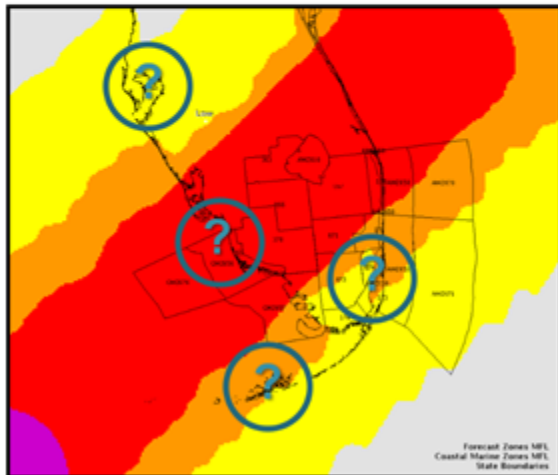
No Safety Margin



*To be safe, to what extent
should preparations be made?*

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

Forecast: **"Peak Wind Swath"**



Most Likely Scenario

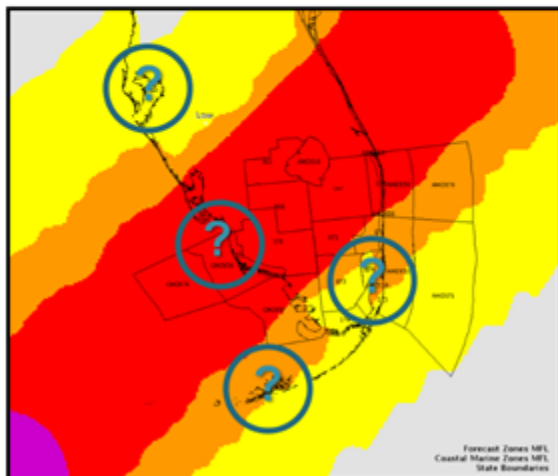
No Safety Margin



*To be safe, to what extent
should preparations be made?*

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

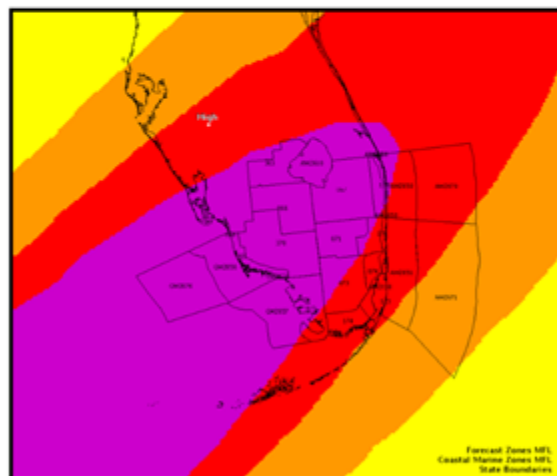
Forecast: **"Peak Wind Swath"**



Most Likely Scenario

No Safety Margin

Forecast: **"Peak Wind Threat Swath"**



Reasonable Worst Case Scenario

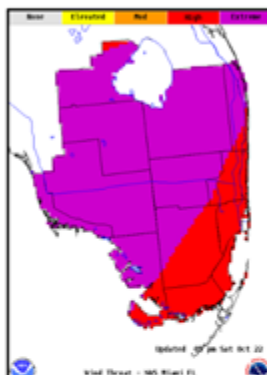
Wide Safety Margin



Threat Assessments x 4

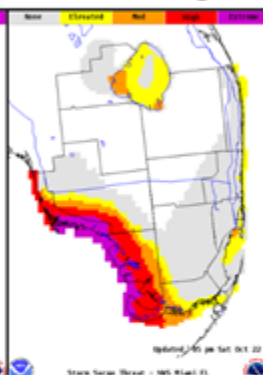
Wind

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	

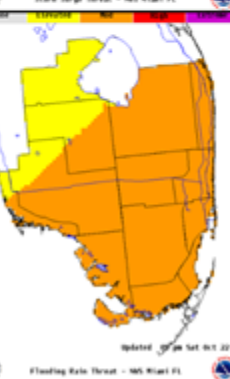
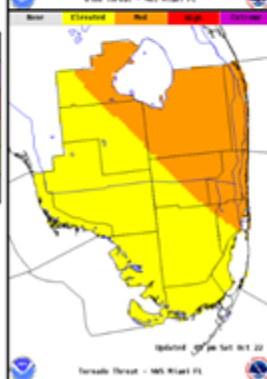


Storm Surge

Storm Surge Threat	
Potential for storm surge flooding greater than 9 ft above ground	
Potential for storm surge flooding greater than 6 ft above ground	
Potential for storm surge flooding greater than 3 ft above ground	
Potential for storm surge flooding greater than 1 ft above ground	
Little to no storm surge flooding	



Tornado Threat	
Potential for an outbreak of tornadoes	
Potential for many tornadoes	
Potential for several tornadoes	
Potential for a few tornadoes	
Tornadoes not expected	



Flooding Rain Threat	
Potential for extreme flooding rain	
Potential for major flooding rain	
Potential for moderate flooding rain	
Potential for localized flooding rain	
Little to no potential for flooding rain	

Tornadoes

Flooding Rain

To be Safe, Prepare for This



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



Hurricane Matthew - Tuesday, October 4, 2016 11 AM EDT Advisory #26

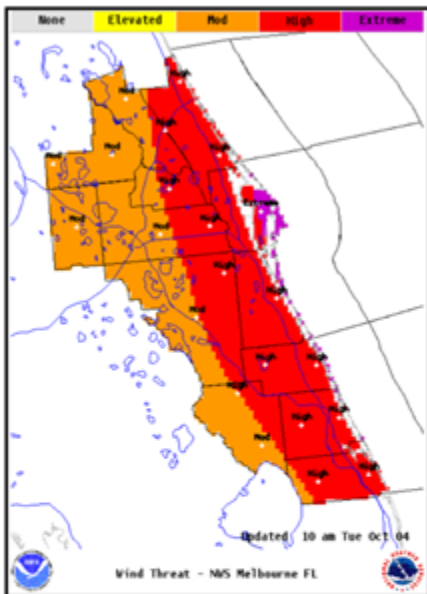
Center Location: 18.9 N 74.3 W Maximum Sustained Winds: 145 mph (Cat 4) Movement: 10 mph N

forecast positions Potential Track Area: day 1-3 day 4-5 Surface Wind Field at current location

Watches: hurricane tropical storm Warnings: hurricane tropical storm

Sustained Wind Speeds: tropical storm == 34kt/39mph strong tropical storm == 50kt/58mph hurricane == 64kt/74mph

To be Safe, Prepare for This



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

Key Point & Public Safety Message:

The threat to our area from
Hurricane Matthew has increased.
A hurricane watch is now in effect.

To be Safe, Prepare for This



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

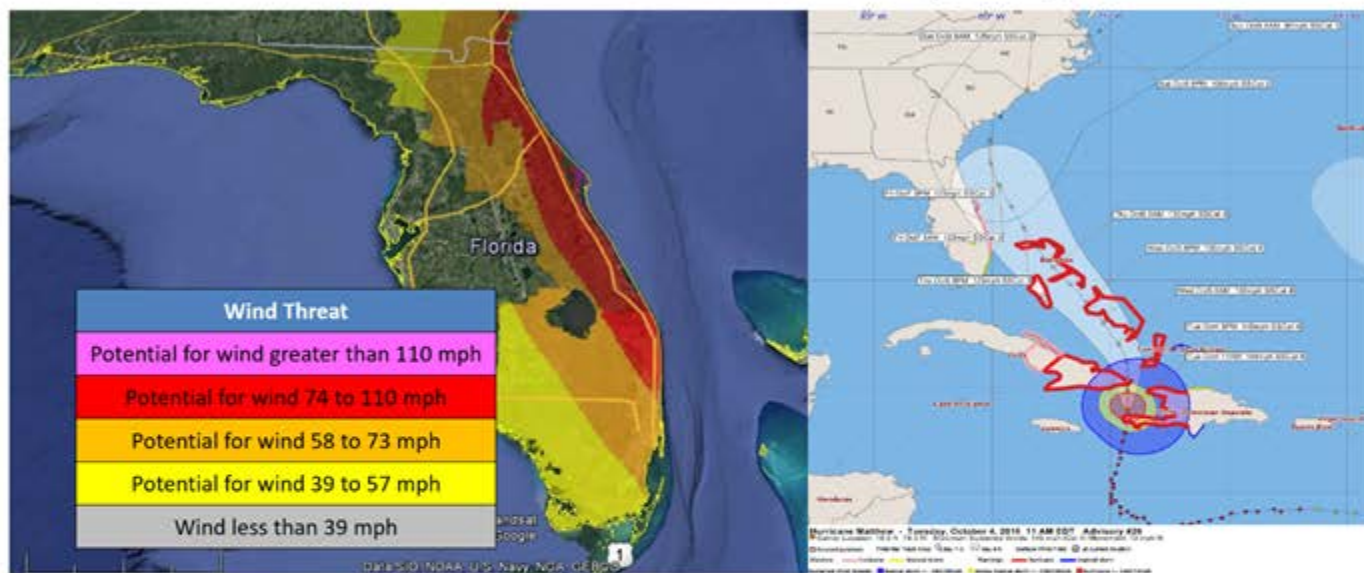
Wind less than 39 mph

Key Point & Public Safety Message:

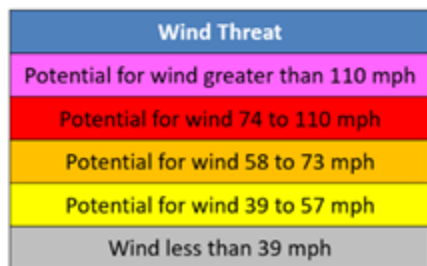
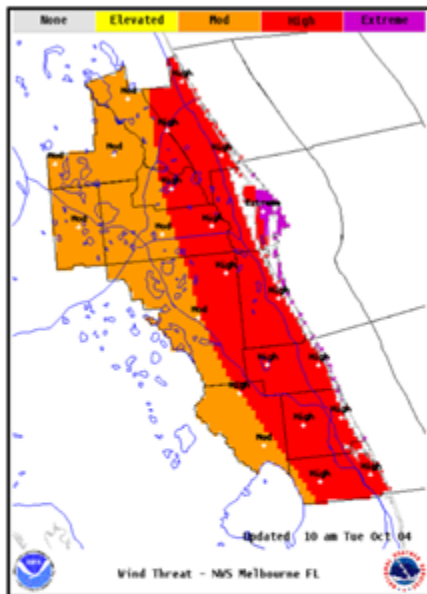
The threat to our area from Hurricane Matthew has increased. A hurricane watch is now in effect.

People located in coastal counties should prepare for the threat of hurricane force winds while those on barrier islands should make ready for possible extreme winds. Listen for evacuation orders, and heed them if issued.

Wind Threat Mosaic (HTI)

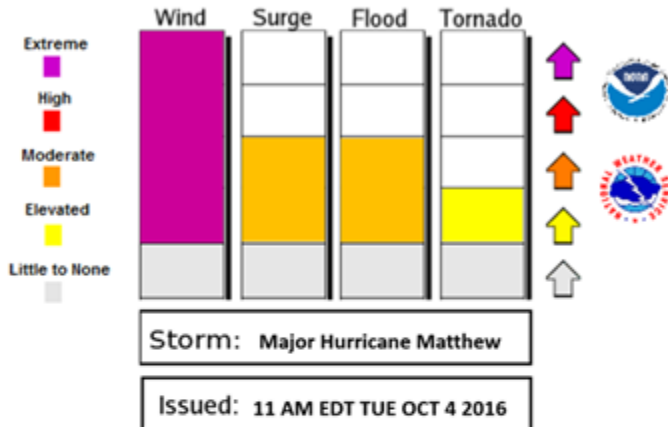


To be Safe, Prepare for This



Hurricane Hazards Threat Meter

Specific to East Central Florida



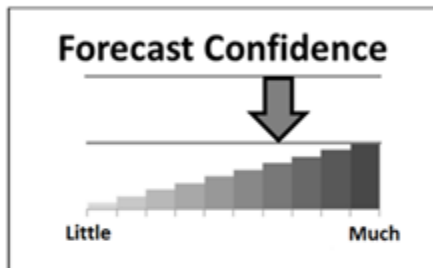
Composite Hazards Bar Chart

Hazards Assessment

Hurricane Irma



Melbourne
WEATHER FORECAST OFFICE

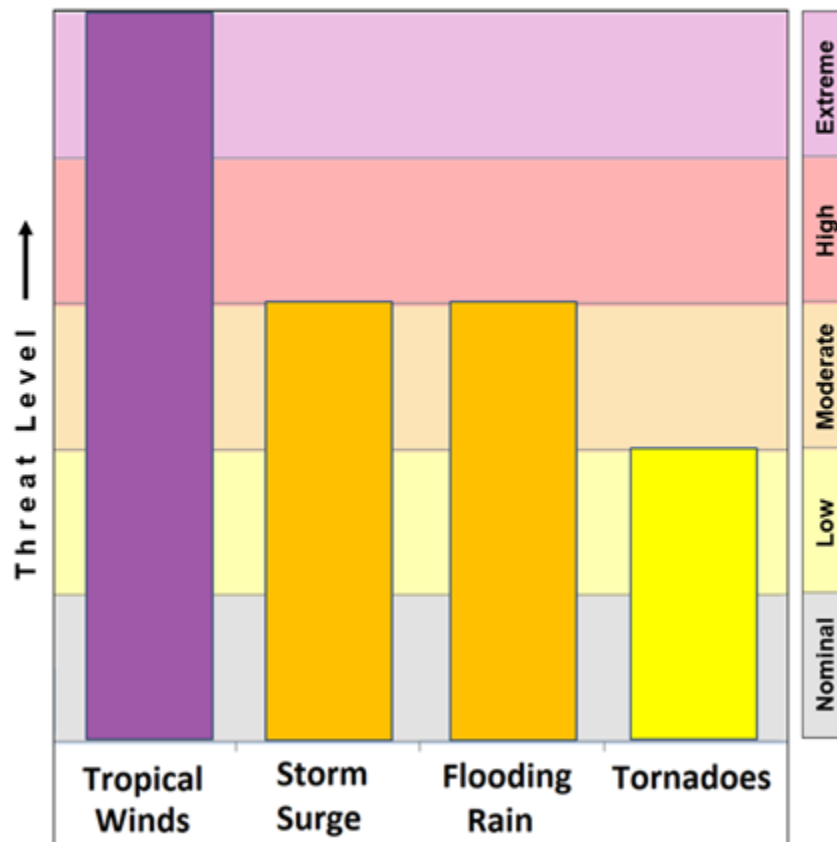


Main Hazards:

- Extreme wind threat

Other Hazards:

- Moderate threat of storm surge
- Moderate threat of flooding rain





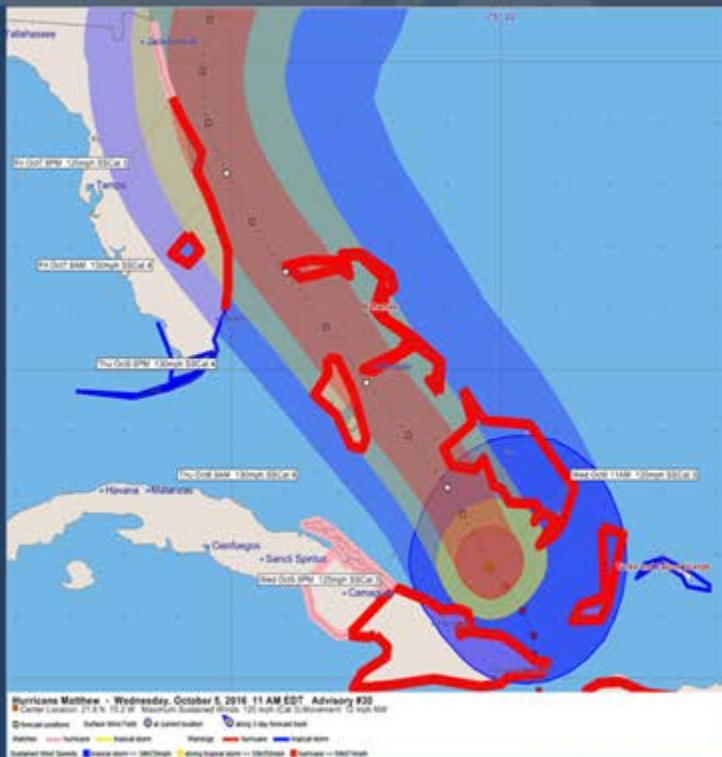
Situation Overview

East Central Florida & Adjacent Coastal Waters

- This is a very serious situation! Major Hurricane Matthew is headed for ECFL!
- Hurricane Warnings are now in effect for all ECFL counties, except for Lake County where a Tropical Storm Warning is now in effect.

Key Point: A rare and historic hurricane event in the making.

The situation is very serious!
Wind and surge impacts to coastal counties could be devastating.



Melbourne
WEATHER FORECAST OFFICE



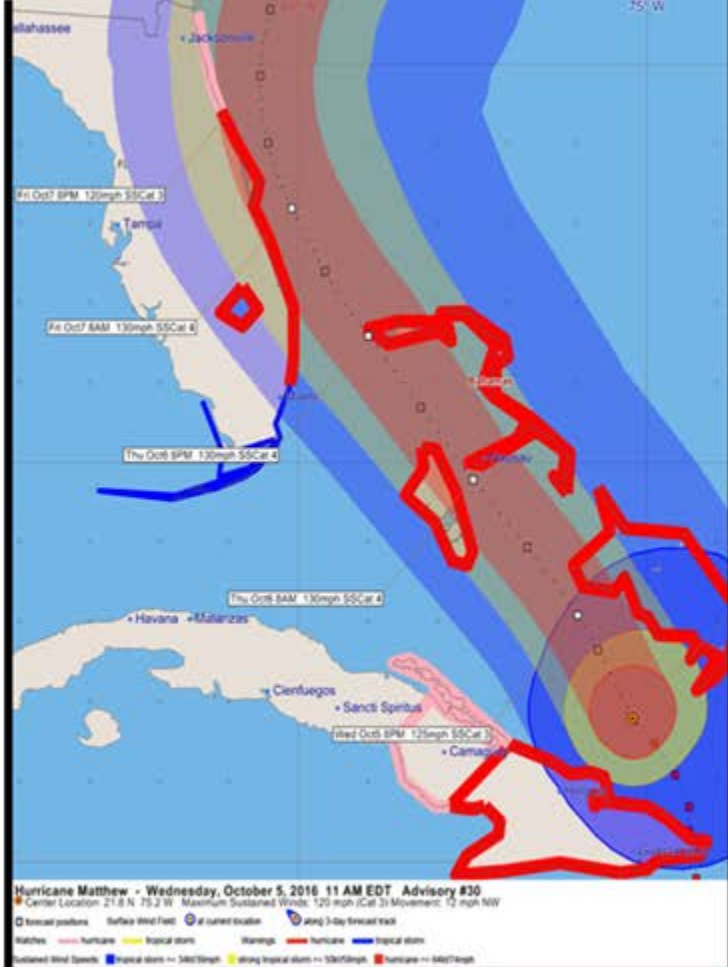
<http://www.weather.gov/melbourne>
[facebook.com/NWSMelbourne](https://www.facebook.com/NWSMelbourne)



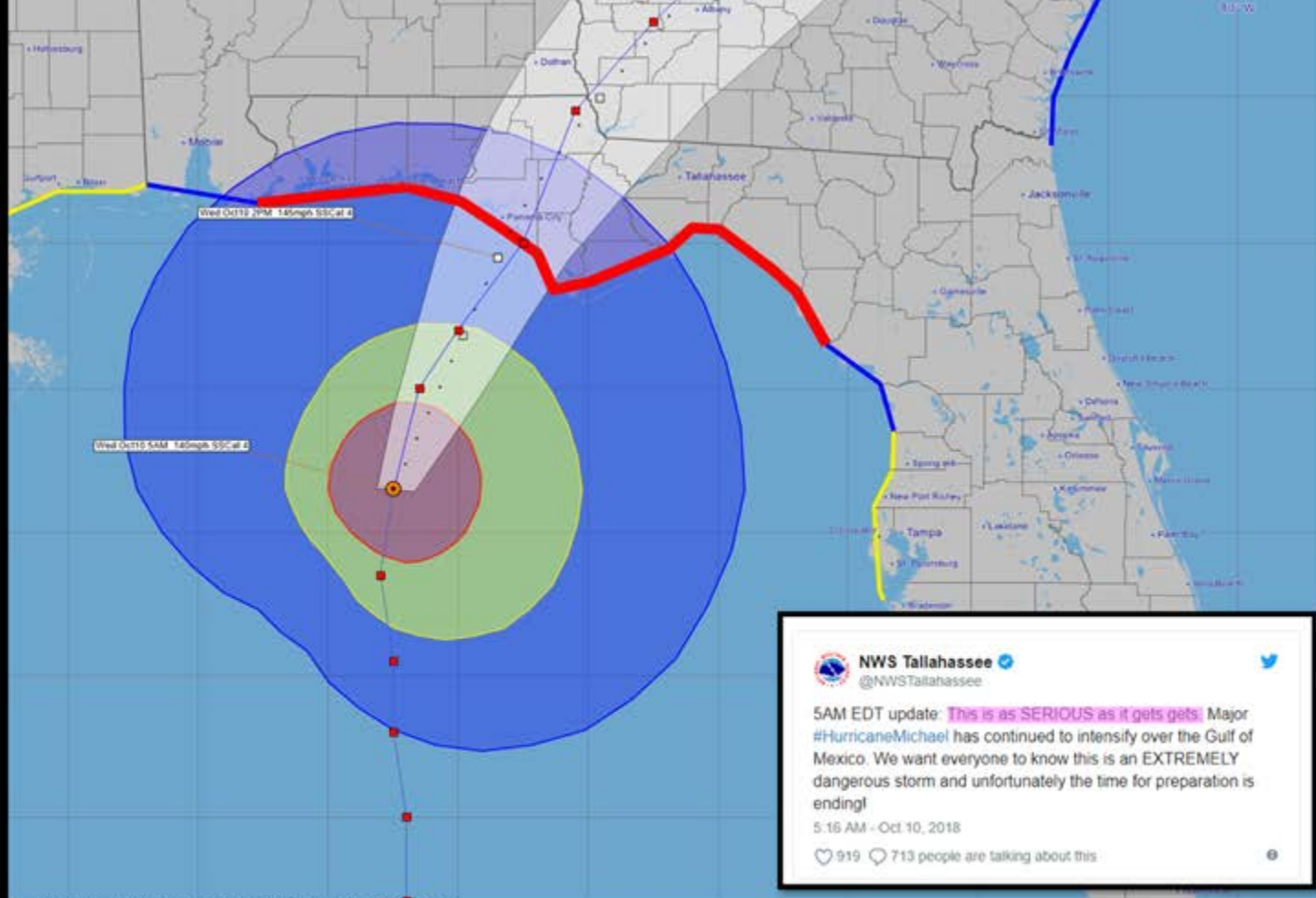
[@NWSMelbourne](https://twitter.com/NWSMelbourne)

October 5, 2016

"[Brace yourselves for a] heart-breaking loss of life. Hurricane Matthew is likely to make history ... and we don't want you to be part of that history."



...HURRICANE EMERGENCY: This is an Extremely Dangerous Situation...



Hurricane Michael - Wednesday, October 10, 2018 5 AM EDT Advisory #15

Center Location: 28.3 N 86.5 W Maximum Sustained Winds: 140 mph (Cat 4) Movement: 12 mph N

Forecast positions: Potential Track Area: day 1-3 day 4-5 Surface Wind Field: at current location

Warnings: hurricane tropical storm

Watches: hurricane tropical storm

Sustained Wind Speeds: tropical storm \Rightarrow 34kt/39mph strong tropical storm \Rightarrow 50kt/58mph hurricane \Rightarrow 64kt/74mph

Hurricane Michael (2018)

Hurricane Irma (2017)



A simple, but highly effective, hurricane message!

Cause: Extreme Wind/Surge

Effect: *"Nowhere will be safe"*



Using “**BIG**” Words

Great motivators, but use sparingly.

MEGA - DESCRIPTORS

OK

EXTREME RARE HISTORIC RECORD-BREAKING UNPRECEDENTED
DISASTROUS CATASTROPHIC EPIC OVERWHELMING CATAclysmic

NO

MEATGRINDER HELLACIOUS APOCALYPTIC

Some Things You Should Know

Hurricane Irma



- Hurricane Irma remains powerful and very dangerous !!!**
 - Irma likely to bring extreme winds to South and Central Florida late this weekend
 - Sustained winds could be greater than 110 mph along with higher gusts
- Hurricane Watches have been issued for parts of ECFL.**
 - Hurricane watches are in effect for the Treasure Coast and near Lake Okeechobee
 - Additional watches and initial warnings likely issued tomorrow
 - To be safe - evacuations/preparations should be completed before Saturday afternoon
- Lives and livelihoods are greatly imperiled !!!**
 - The threat to life and property is extreme; wind damage may be devastating
 - Potential impacts from storm surge and flooding rain are also of particular concern
 - Tornadoes will become an increasing concern with any westward shift in track

Public Safety Message: "Listen to local officials. Evacuate if ordered to do so. If you are vulnerable to high winds, make plans to relocate to safer shelter. Now is the time to ready yourself and your loved ones for a possible extreme hurricane event."

9/7/2017 11:30 PM

For East Central Florida & Adjacent Coastal Waters

www.weather.gov/melbourne



The Power of 3

Some Things You Should Know

Hurricane Irma



- Hurricane Irma remains powerful and very dangerous !!!**
 - Irma likely to bring extreme winds to South and Central Florida late this weekend
 - Sustained winds could be greater than 110 mph along with higher gusts
- Hurricane Watches have been issued for parts of ECFL.**
 - Hurricane watches are in effect for the Treasure Coast and near Lake Okeechobee
 - Additional watches and initial warnings likely issued tomorrow
 - To be safe - evacuations/preparations should be completed before Saturday afternoon
- Lives and livelihoods are greatly imperiled !!!**
 - The threat to life and property is extreme; wind damage may be devastating
 - Potential impacts from storm surge and flooding rain are also of particular concern
 - Tornadoes will become an increasing concern with any westward shift in track

Public Safety Message: "Listen to local officials. Evacuate if ordered to do so. If you are vulnerable to high winds, make plans to relocate to safer shelter. Now is the time to ready yourself and your loved ones for a possible extreme hurricane event."

9/7/2017 11:30 PM

For East Central Florida & Adjacent Coastal Waters

www.weather.gov/melb

The Power of 3



Hurricane Dorian (2019)

Martin-
522 PM EDT Sun Sep 1 2019

**Martin County
Stuart, FL**

...HURRICANE WARNING IN EFFECT...
...STORM SURGE WARNING IN EFFECT...

A Hurricane Warning means hurricane-force winds are expected somewhere within this area within the next 36 hours.

A Storm Surge Warning means there is a danger of life-threatening inundation, from rising water moving inland from the coastline, somewhere within this area within the next 36 hours.

* LOCATIONS AFFECTED

- Stuart
- Hobe Sound

* WIND

- LATEST LOCAL FORECAST: Equivalent Tropical Storm force wind
- Peak Wind Forecast: 40-50 mph with gusts to 75 mph
- Window for Tropical Storm force winds: early Monday morning until early Wednesday morning

- POTENTIAL THREAT TO LIFE AND PROPERTY: Potential for wind 74 to 110 mph

- The wind threat has remained nearly steady from the previous assessment.
- PLAN: Plan for life-threatening wind of equivalent CAT 1 or 2 hurricane force due to possible forecast changes in track, size, or intensity.
- PREPARE: Remaining efforts to protect life and property should be urgently completed. Prepare for considerable wind damage.
- ACT: Move to safe shelter before the wind becomes hazardous.

- POTENTIAL IMPACTS: Extensive

- Considerable roof damage to sturdy buildings, with some having window, door, and garage door failures leading to structural damage. Mobile homes severely damaged, with some destroyed. Damage accentuated by airborne projectiles. Locations may be uninhabitable for weeks.
- Many large trees snapped or uprooted along with fences and roadway signs blown over.
- Some roads impassable from large debris, and more within urban or heavily wooded places. Several bridges, causeways, and access routes impassable.
- Large areas with power and communications outages.

Florida's Space & Treasure Coasts

- WIND
 - POTENTIAL THREAT TO LIFE AND PROPERTY: Potential for wind 74 to 110 mph
 - The wind threat has remained nearly steady from the previous assessment.
 - PLAN: Plan for life-threatening wind of equivalent CAT 1 or 2 hurricane force due to possible forecast changes in track, size, or intensity.
 - PREPARE: Remaining efforts to protect life and property should be urgently completed. Prepare for considerable wind damage.
 - ACT: Move to safe shelter before the wind becomes hazardous.



Threat Statements:

Actionable information that is proportional to the threat and according to phase of the event.

- **Media Sound Bites**
 - Interviews; Products/Services
- **Social Media Posts**
 - FaceBook; Twitter; Instagram
- **Facilitate Media Messaging**
 - NWSChat; TV Crawls
- **Facilitate EM Messaging**
 - Smart Devices/Signs
 - IDSS Briefings



Hurricane Dorian (2019)

Martin County
Stuart, FL

522 PM EDT Sun Sep 1 2019

...HURRICANE WARNING IN EFFECT...
...STORM SURGE WARNING IN EFFECT...

A Hurricane Warning means hurricane-force winds are expected somewhere within this area within the next 36 hours.

A Storm Surge Warning means there is a danger of life-threatening inundation, from rising water moving inland from the coastline, somewhere within this area within the next 36 hours.

* LOCATIONS AFFECTED

- Stuart
- Robe Sound

* WIND

- LATEST LOCAL FORECAST: Equivalent Tropical Storm force wind
 - Peak Wind Forecast: 40-50 mph with gusts to 75 mph
 - Window for Tropical Storm force winds: early Monday morning until early Wednesday morning
- POTENTIAL THREAT TO LIFE AND PROPERTY: Potential for wind 24 to 110 mph
 - The wind threat has remained nearly steady from the previous assessment.
 - PLAN: Plan for life-threatening wind of equivalent CAT 1 or 2 hurricane force due to possible forecast changes in track, size, or intensity.
 - PREPARE: Remaining efforts to protect life and property should be urgently completed. Prepare for considerable wind damage.
 - ACT: Move to safe shelter before the wind becomes hazardous.

- POTENTIAL IMPACTS: Extensive

- Considerable roof damage to sturdy buildings, with some having window, door, and garage door failures leading to structural damage. Mobile homes severely damaged, with some destroyed. Damage accentuated by airborne projectiles. Locations may be uninhabitable for weeks.
- Many large trees snapped or uprooted along with fences and roadway signs blown over.
- Some roads impassable from large debris, and more within urban or heavily wooded places. Several bridges, causeways, and access routes impassable.
- Large areas with power and communications outages.

Florida's Space & Treasure Coasts

RELATABLE INFORMATION

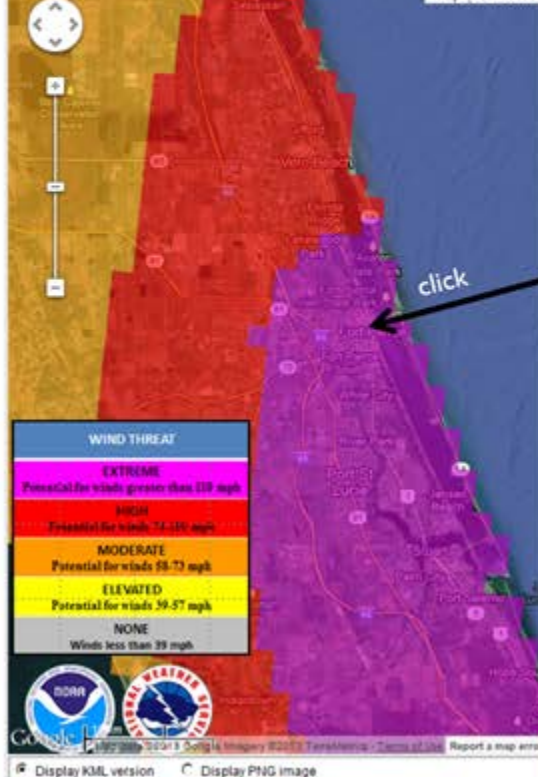
- WIND
 - POTENTIAL IMPACTS: Extensive
 - Considerable roof damage to sturdy buildings, with some having window, door, and garage door failures leading to structural damage. Mobile homes severely damaged, with some destroyed. Damage accentuated by airborne projectiles. Locations may be uninhabitable for weeks.
 - Many large trees snapped or uprooted along with fences and roadway signs blown over.
 - Some roads impassable from large debris, and more within urban or heavily wooded places. Several bridges, causeways, and access routes impassable.
 - Large areas with power and communications outages.



Hurricane Omega Exercise

[Combined](#)
[Wind](#)
[Coastal Flood](#)
[Inland Flood](#)
[Tornadoes](#)
[Marine](#)

[Map](#)
[Satellite](#)



ZOOM

Prepare for These Potential Impacts:

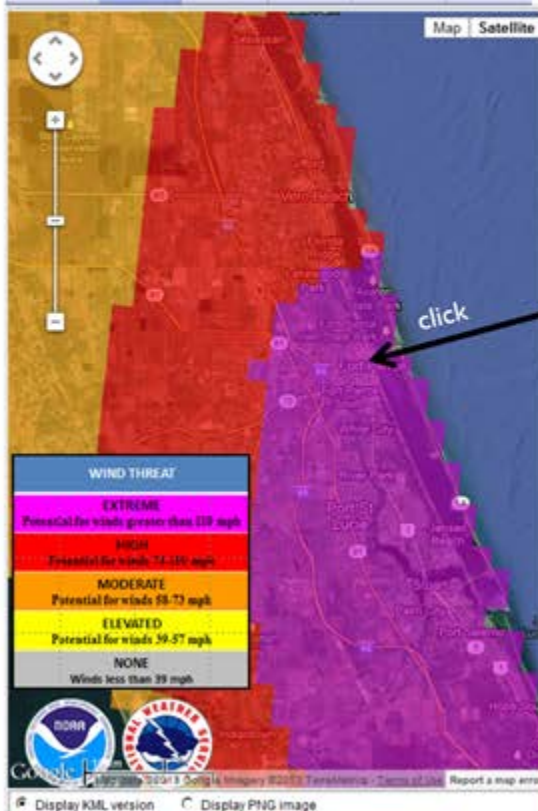
Wind Threat	Potential Wind Impacts (generalized)
EXTREME THREAT for wind greater than 118 mph	DEVASTATING TO CATASTROPHIC IMPACTS <ul style="list-style-type: none"> To be safe, aggressively prepare for the potential of devastating to catastrophic wind impacts from major hurricane force wind of equivalent Category 3 intensity or greater. Life threatening wind possible. Failure to adequately shelter from extreme wind may result in serious injury, loss of life, or immense human suffering. Structural damage to sturdy buildings with some experiencing complete roof and wall failures. Complete destruction of mobile homes. Damage greatly accentuated by large airborne projectiles. Hardest hit locations may be uninhabitable for weeks or months. Numerous large trees snapped or uprooted along with fences and roadway signs blown over. Many roads impassable from large debris. Many bridges, causeways, and access routes connecting barrier islands impassable. Widespread power and communication outages with many areas suffering extended outages.

Also good for local hurricane briefings ... with added detail.



Hurricane Omega Exercise

Combined Wind Coastal Flood Inland Flood Tornadoes Marine



ZOOM

Prepare for These Potential Impacts:

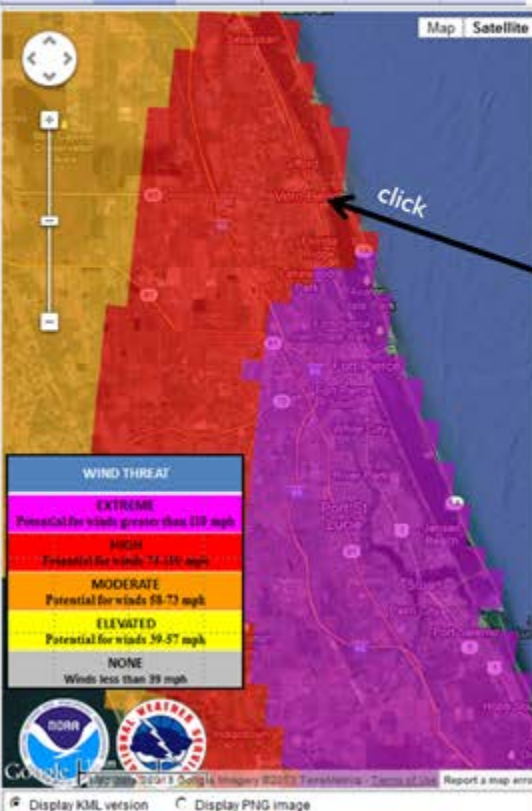
Wind Threat	Potential Wind Impacts (generalized)
EXTREME THREAT <i>for wind greater than 118 mph</i> Imperiled Lives Buildings Trees/Signs Roads/Bridges Power/Comms	DEVASTATING TO CATASTROPHIC IMPACTS <ul style="list-style-type: none"> To be safe, aggressively prepare for the potential of devastating to catastrophic wind impacts from major hurricane force wind of equivalent Category 3 intensity or greater. Life threatening wind possible. Failure to adequately shelter from extreme wind may result in serious injury, loss of life, or immense human suffering. Structural damage to sturdy buildings with some experiencing complete roof and wall failures. Complete destruction of mobile homes. Damage greatly accentuated by large airborne projectiles. Hardest hit locations may be uninhabitable for weeks or months. Numerous large trees snapped or uprooted along with fences and roadway signs blown over. Many roads impassable from large debris. Many bridges, causeways, and access routes connecting barrier islands impassable. Widespread power and communication outages with many areas suffering extended outages.

Also good for local hurricane briefings ... with added detail.



Hurricane Omega Exercise

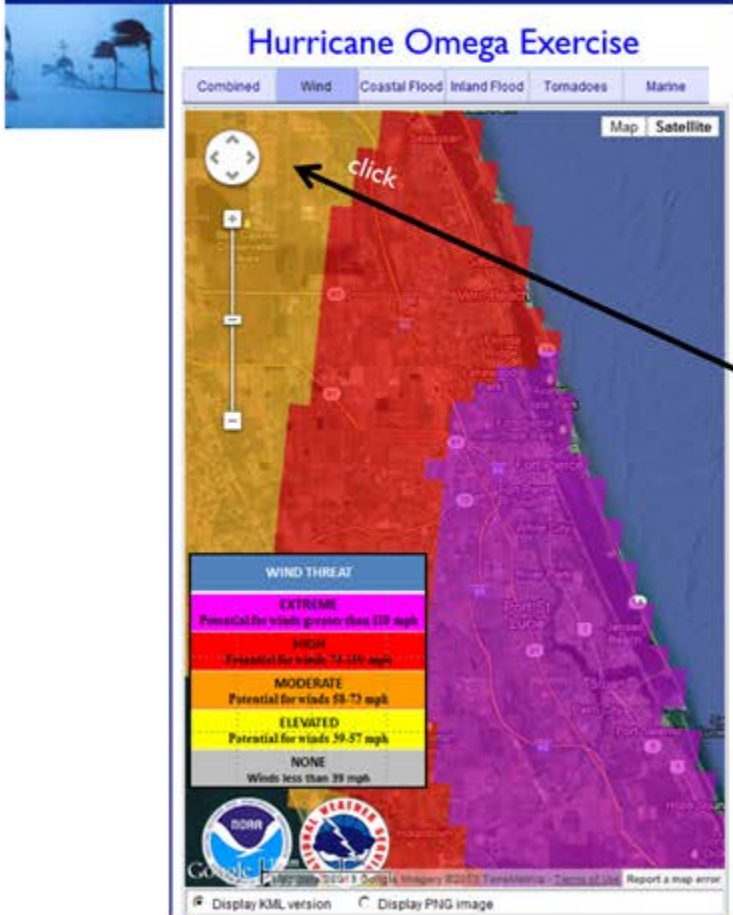
Combined Wind Coastal Flood Inland Flood Tornadoes Marine



Prepare for These Potential Impacts:

Wind Threat	Potential Wind Impacts (generalized)
HIGH THREAT for wind 74-119 mph	EXTENSIVE IMPACTS <ul style="list-style-type: none"> To be safe, aggressively prepare for the potential of extensive wind impacts from hurricane force wind of equivalent Category 1 or 2 intensity. Life threatening wind possible. Failure to adequately shelter may result in serious injury or loss of life. Considerable damage to roofing and siding materials of sturdy buildings, with some having window, door, and garage door failures leading to structural damage. Mobile homes severely damaged, with some destroyed. Damage accentuated by airborne projectiles. Hardest hit locations may be uninhabitable for weeks. Many large trees snapped or uprooted along with fences and roadway signs blown over. Some roads impassable from large debris, and more within urban or heavily wooded places. Several bridges, causeways, and access routes connecting barrier islands impassable. Power and communications outages across large areas, with several places suffering extended outages.

Also good for local hurricane briefings ... with added detail.



Prepare for These Potential Impacts:

Wind Threat	Potential Wind Impacts (generalized)
MODERATE THREAT for wind 58-73 mph	SIGNIFICANT IMPACTS <ul style="list-style-type: none">To be safe, earnestly prepare for the potential of significant wind impacts from strong tropical storm force wind.Dangerous wind possible. Failure to adequately shelter may result in serious injury, and in some cases loss of life.Some damage to roofing and siding materials, along with damage to porches, awnings, carports, and sheds. A few buildings experiencing window, door, and garage door failures. Mobile homes damaged, especially if unanchored. Unsecured lightweight objects become dangerous projectiles.Several large trees snapped or uprooted, but with greater numbers in places where trees are shallow rooted. Several fences and roadway signs blown over.A few roads impassable from large debris, and more within heavily wooded places. A few bridges, causeways, and access routes connecting barrier islands impassable.Scattered power and communications outages, but more prevalent in areas with above ground lines.

Also good for local hurricane briefings ... with added detail.

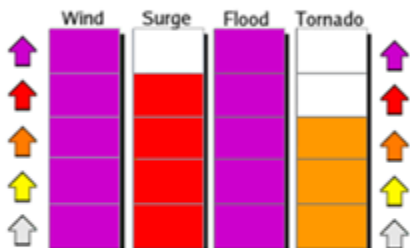


All Hazards Assessments



Hurricane Frances - All Hazards

Saint Lucie County, FL

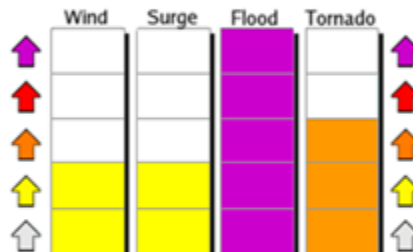


Storm: **Hurricane Frances**

Issued: **4 September 2004**

Tropical Storm Fay - All Hazards

Lat/Lon 28.12N 80.62W



Storm: **Tropical Storm Fay**

Issued: **19 August 2008**

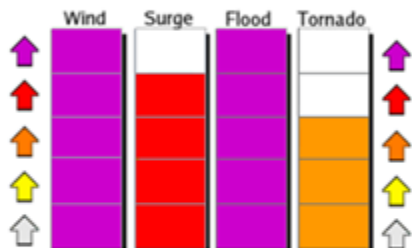


All Hazards Assessments



Hurricane Frances - All Hazards

Saint Lucie County, FL

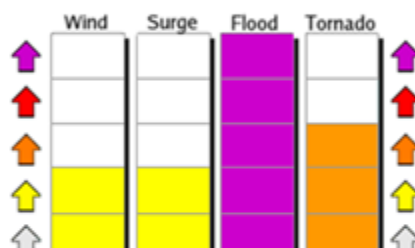


Storm: **Hurricane Frances**

Issued: **4 September 2004**

Tropical Storm Fay - All Hazards

Lat/Lon 28.12N 80.62W



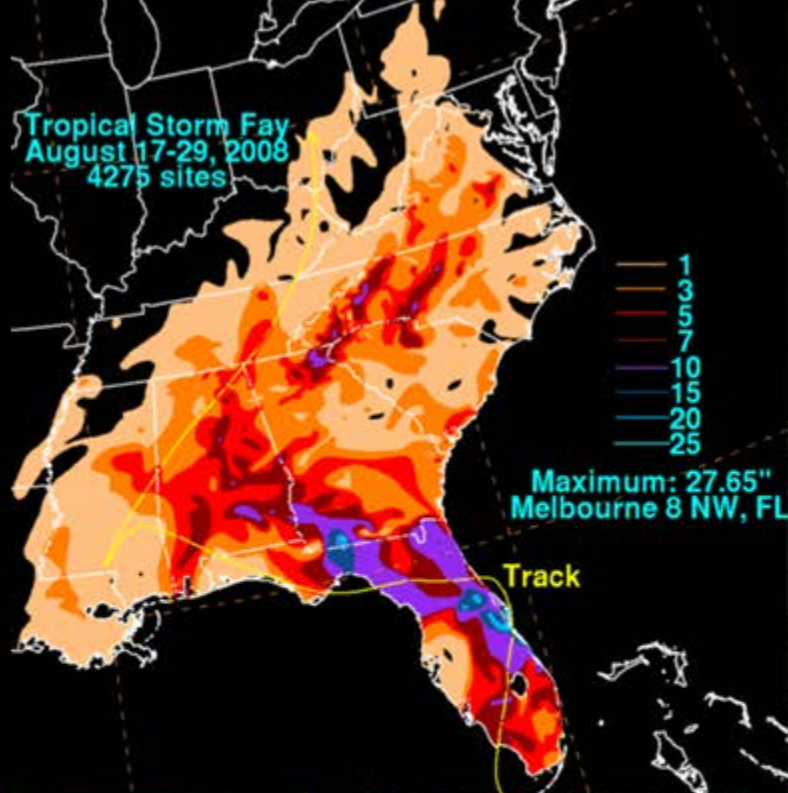
Storm: **Tropical Storm Fay**

Issued: **19 August 2008**

*"Emoticons"
to help overcome
language barriers?*



Community Distress Index



Using Social Media to Communicate Public Safety Messages

Kimberly Prosser, Former Director
Brevard County Emergency Management

- EM & WFO sharing and commenting on each others' Facebook posts and re-tweeting on Twitter increases the ...
 - **Timeliness** of information received
 - **Visibility** of posts and agencies themselves
 - **Credibility** as one agency bolsters credibility of the other
 - **Accuracy** as EMs no longer need to rewrite WFO alerts/emails
 - **Interaction** public is likely to interact with both entities
 - **Reach** each agency's audience is largely unique
 - **Opportunity** to inform one more citizen.

NWSChat

Use of NWSChat to keep the media “on message” during the event.

The screenshot shows the NWSChat Live web application running in Internet Explorer. The browser's address bar displays <https://nwschat.weather.gov/live/>. The application interface is divided into several sections:

- Left Panel:** Contains a 'Buddies' list with groups like 'SR SOO Group' and 'WDTB Group', and individual users such as 'nwsfwd-soo', 'nwsibx-soo', 'nwsffc-soo', 'nwsmeg-soo-Tom S.', 'wdtb-elliott', 'nws-wdtb-don', 'nws-wdtb-chris-spannagle', 'Southern Region HQ', 'Southern Region - Regional Op', 'NWSChat Admin Team', 'Daryl Herzmann', and 'nwsbot'. There are also 'Chatroom Bookmarks' and 'Chatrooms' sections at the bottom left.
- Map Panel:** The central area features a map of Florida with labels for cities like Sarasota, Port Charlotte, Cape Coral, Bonita Springs, Naples, Port St. Lucie, West Palm Beach, Wellington, Fort Lauderdale, Miami, Kendall, Homestead, and Freeport. It also shows 'Everglades National Park'. The map includes navigation controls and a 'Map Valid: 3:20 PM' indicator.
- Right Panel:** The 'Layers Control' section allows users to toggle various map layers, including 'Base Layer' (Blank, Google Street), 'Satellite' (GOES Water, GOES West V, GOES East Vi, GOES Visible, GOES IR), and 'Precip/RADAR' (NMQ Q2 3 Da, NMQ Q2 2 Da, NMQ Q2 1 Da).
- Bottom Panel:** Displays a chat window titled 'mlbchat' with tabs for 'Help', 'All Chats', 'sr-roc', 'mlbchat', 'mlbemchat', 'tbwchat', and 'tbwemchat'.

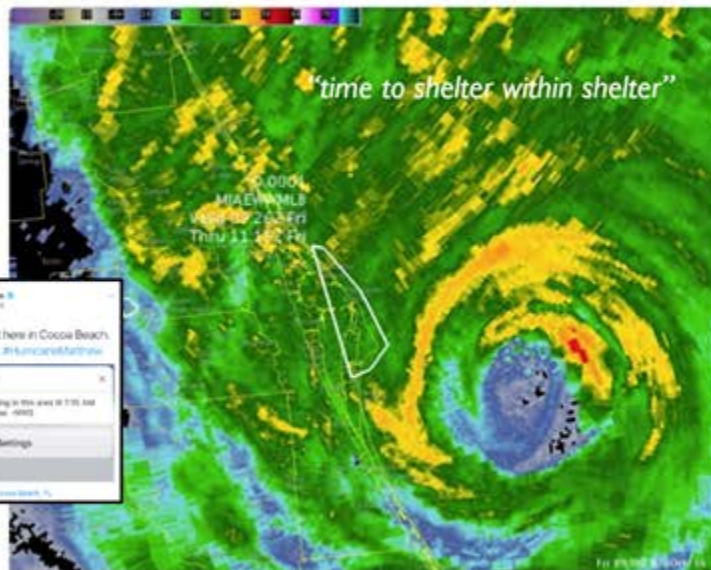
nws-david.sharp: If an **EWB** is issued, it means that it is time to shelter within shelter. The message - move now to the safest place within your shelter and protect your head and body from extreme winds.



NWS Melbourne @NWSMelbourne · Oct 7

543 am | Extreme Wind Warning for
Brevard [FL] till Oct 7, 7:15 AM EDT

[forecast.weather.gov/product.php?si ...](https://forecast.weather.gov/product.php?si...)



59 32

Fact Sheet:

Extreme Wind Warnings



Severe damage to a building, FL after Hurricane Michael (2018)

Extreme hurricane winds ... are associated with the eyewall of major hurricanes of Category 3, 4, or 5 intensity. When they threaten, lives are greatly imperiled even for those who have already sheltered from the storm. For any given city or town along the coast, the occurrence of such deadly winds is rare. However, when they do occur skies become filled with flying debris as large objects become airborne. Damage can be devastating to catastrophic as buildings once thought to be safe are blown apart by winds exceeding 110 mph. During Hurricane Andrew (1992), the winds reached 165 mph in South Florida and caused many to scramble in search of a safer place within whatever was left of their home or shelter as extreme winds blew all around them.

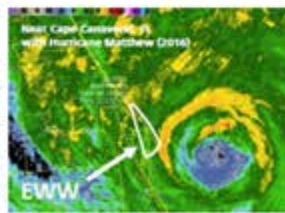
Whenever extreme hurricane winds threaten, the local National Weather Service office now issues an **Extreme Wind Warning (EWW)** at the imminent onset (about 1 hour before arrival) of winds greater than 110 mph. The intent is to leverage the final opportunity to save lives by encouraging people to move to the safest place within their home or shelter. Since it's hard to know exactly when or where the narrow path of extreme winds will ultimately occur with a major hurricane, the EWW offers last chance information to save lives.



When extreme wind warnings are issued ...

- Move to the safest place within your home or shelter such as a small interior room or hallway.
- If possible, take your flashlight and cell phone with you. Keep your shoes on (closed-toe).
- Protect your head and body making good use of pillows, cushions, helmets, etc.
- Take the same protective action as if a violent tornado was approaching.

Shelter within Shelter ... the recommendation to urgently move to the safest place within your hurricane shelter.

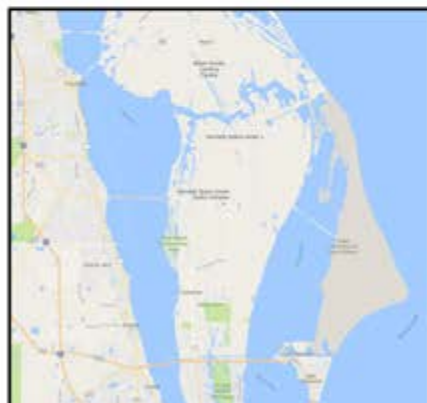
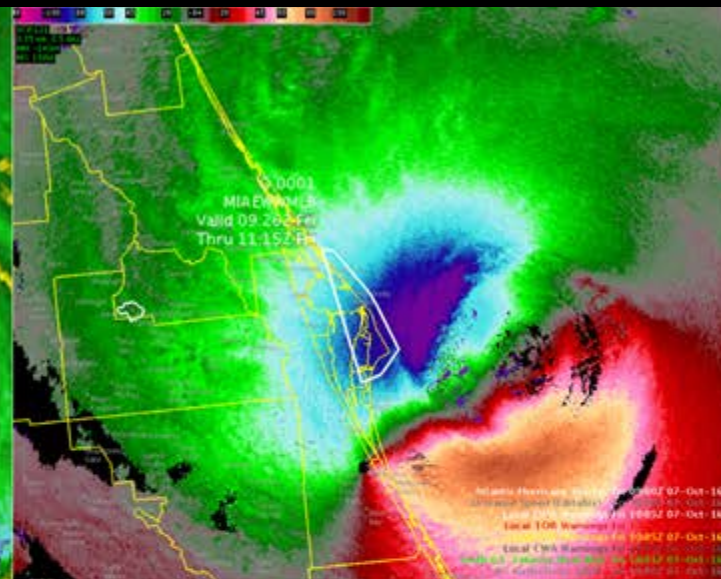


National Weather Service
Melbourne, FL
www.weather.gov/mli/

Local Fact Sheets

Pre-made hand-outs;
ready to give to reporters





Extreme Winds & Major Hurricane Matthew



Major Hurricanes & Societal Impacts:

- Lives greatly imperiled
- Devastating to catastrophic damage
- Increased projectile loading
- Numerous rescues
- Difficult initial response
- Community infrastructure collapsed
- Long-term recovery



Extreme Wind Warning

- **Issuance Criteria:** An EWW is issued when both of the following criteria are met:
 - The tropical cyclone is a CAT 3 or greater.
 - Sustained winds of 100 kt (115 mph) or greater are expected to occur in a WFO's county warning area within 1 hour; product valid time is not to exceed 2 hours.

Message: Shelter within shelter

Sage Advice

Breathe!

Stay Calm

Stay Focused

Be the Voice
of Reason

Stay Connected

Follow Through





Thank You