



# Jessica Schauer

## NWS Tropical Services Program Leader

# NWS Webinar for Tropical Product Users – March 23, 2017



# Meeting Agenda

## **NWS 2017 Tropical Product and Service Changes**

- Weather Forecast Office (WFO) Tropical Product Suite Overview
- Miscellaneous changes to NHC/CPHC Products and Services
- Watches and Warnings for Potential Tropical Cyclones
- Experimental Arrival of Tropical-Storm-Force Winds Products from NHC
- Changes to the NHC/CPHC Forecast Graphics
- Storm Surge Products and Services including new Watches and Warnings for the Gulf and East Coast of the Contiguous United States
- FCC Approval of the Extreme Wind Warning and Storm Surge Watch and Warning Event Codes
- New Format for the National Tropical Cyclone Watch/Warning VTEC Product for the Atlantic Basin (TCVAT#)
- Resources and Sample Data



# Acronyms

**CAP** – Common Alerting Protocol

**CPHC** – Central Pacific Hurricane  
Center

**EAS** – Emergency Alert System

**FEMA** - Federal Emergency  
Management Agency

**HLS** – Hurricane/Tropical Cyclone  
Local Statement Product

**NOAA** – National Oceanic and  
Atmospheric Administration

**NHC** – National Hurricane Center

**NOS** – National Ocean Service

**NWR** – NOAA Weather Radio All  
Hazards

**NWS** – National Weather Service

**SSWW** – Storm Surge Watch/Warning

**TC** – Tropical Cyclone

**TCV** – Tropical Cyclone  
Watch/Warning VTEC Product

**TS** – Tropical Storm

**UGC** – Universal Geographic Code

**VTEC** – Valid Time Event Code

**WEA** – Wireless Emergency Alerts

**WFO** – Weather Forecast Office



## WFO Tropical Product Suite Overview: TCV Product (Atlantic/WFO Honolulu)

### WFO Tropical Cyclone Local Watch/Warning Product (TCV) at Atlantic basin WFOs and WFO Honolulu

- Produced at **Atlantic** basin offices
- WFO Honolulu (HFO) will add a TCVHFO product in 2017
- Product contains the tropical cyclone watch/warning [Valid Time Event Code \(VTEC\)](#)
- Largely automated and includes all local land-based tropical watches and warnings and detailed information in a one zone-one segment basis
- For each geographic segment, the content also includes headlines, forecast, threat, and impact information for the 4 major tropical cyclone hazards:
  - Wind
  - Storm Surge (when applicable)
  - Flooding Rain
  - Tornadoes



# TCVWFO Example

(a single zone segment shown)

WTUS82 KMHX 111342  
TCVMHX

**URGENT - IMMEDIATE BROADCAST REQUESTED**

Irene Local Watch/Warning Statement/Advisory Number 22  
National Weather Service Newport/Morehead City NC AL092017  
926 AM EST Wed Jan 11 2017

NCZ104-112145-

/O.NEW.KMHX.HU.W.1009.170111T1426Z-000000T0000Z/

/O.UPG.KMHX.HU.A.1009.000000T0000Z-000000T0000Z/

Outer Banks Hyde-

926 AM EST Wed Jan 11 2017

...HURRICANE WARNING IN EFFECT...

A Hurricane Warning means Hurricane wind conditions are expected somewhere within this area and within the next 36 hours

**\* LOCATIONS AFFECTED**

- Ocracoke

**\* WIND**

- LATEST LOCAL FORECAST: Equivalent Cat 1 Hurricane force wind
  - Peak Wind Forecast: 75-95 mph with gusts to 115 mph
  - Window for Tropical Storm force winds: Thursday morning until Friday afternoon
  - Window for Hurricane force winds: Thursday evening until Friday afternoon

**- CURRENT THREAT TO LIFE AND PROPERTY: Extreme**

- Emergency plans should include a reasonable threat for major hurricane force wind greater than 110 mph of equivalent Category 3 intensity or higher.

**- POTENTIAL IMPACTS: Devastating to Catastrophic**

- Structural damage to sturdy buildings, some with complete roof and wall failures. Complete destruction of mobile homes. Damage greatly accentuated by large airborne projectiles. Locations may be uninhabitable for weeks or months.

**\* STORM SURGE**

- LATEST LOCAL FORECAST: Life-threatening storm surge possible
  - Peak Storm Surge Inundation: The potential for 2-4 feet above ground somewhere within surge prone areas
  - Window of concern: Begins early Thursday afternoon

**- CURRENT THREAT TO LIFE AND PROPERTY: Moderate**

- To be safe, earnestly prepare for the potential of significant storm surge flooding impacts. Evacuation efforts should now be brought to completion. Evacuations must be complete before driving conditions become unsafe.

**- POTENTIAL IMPACTS: Significant**

- Areas of inundation with storm surge flooding accentuated by waves. Damage to several buildings, mainly near the coast.

**\* FLOODING RAIN**

**- LATEST LOCAL FORECAST:**

- Peak Rainfall Amounts: 4-8 inches, with locally higher amounts

**- CURRENT THREAT TO LIFE AND PROPERTY: Moderate**

- Emergency plans should include a reasonable threat for moderate flooding where peak rainfall totals notably exceed amounts conducive for flash flooding and rapid inundation. Rescues and emergency evacuations are possible.

**- POTENTIAL IMPACTS: Significant**

- Rivers and tributaries may quickly become swollen with swifter currents and overspill their banks in a few places.

**\* TORNADO**

**- LATEST LOCAL FORECAST:**

- Situation is favorable for tornadoes

**- CURRENT THREAT TO LIFE AND PROPERTY: Moderate**

- To be safe, earnestly prepare for the potential of significant tornado impacts.

**- POTENTIAL IMPACTS: Significant**

- Several places may experience tornado damage with a few spots of considerable damage, power loss, and communications failures.

**\* FOR MORE INFORMATION:**

- <http://ready.gov/hurricanes>
- <http://www.weather.gov/mhx/Tropical>

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# WFO Tropical Product Suite Overview: HTI Graphics from WFOs that Issue TCVs

## Hurricane Threats and Impacts: HTI Graphics

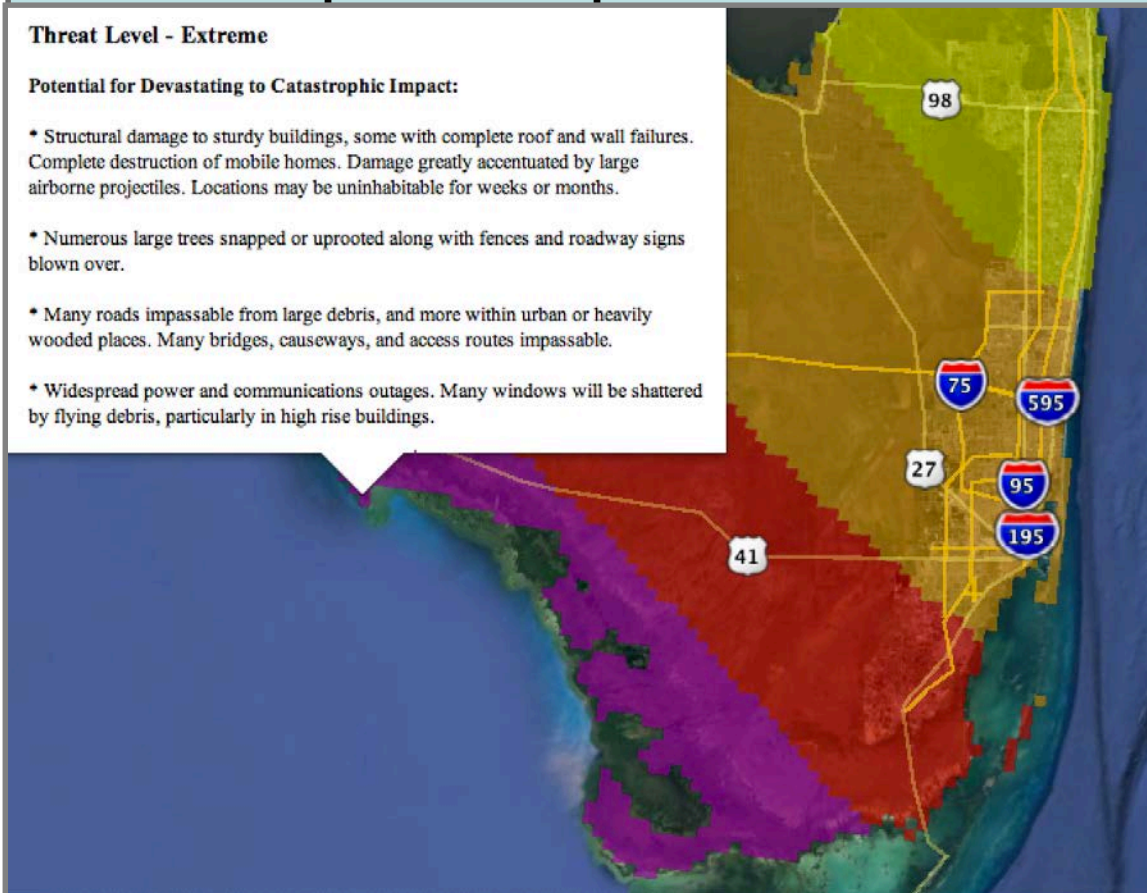
- Communicates threats & potential impacts for each tropical hazard
  - ✓ Wind
  - ✓ Storm Surge
  - ✓ Flooding Rain
  - ✓ Tornadoes
- Helps communicate degree of preparation needed with a safety margin factored in
- kml files (mosaic of affected coastal CWAs) available at: [weather.gov/hti](https://weather.gov/hti)
- Also available in GRIB2 format (delayed) from the [National Digital Forecast Database](#)

## Each kml file includes a graphic with threat levels and potential impacts for each hazard

### Threat Level - Extreme

#### Potential for Devastating to Catastrophic Impact:

- Structural damage to sturdy buildings, some with complete roof and wall failures. Complete destruction of mobile homes. Damage greatly accentuated by large airborne projectiles. 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, and more within urban or heavily wooded places. Many bridges, causeways, and access routes impassable.
- Widespread power and communications outages. Many windows will be shattered by flying debris, particularly in high rise buildings.



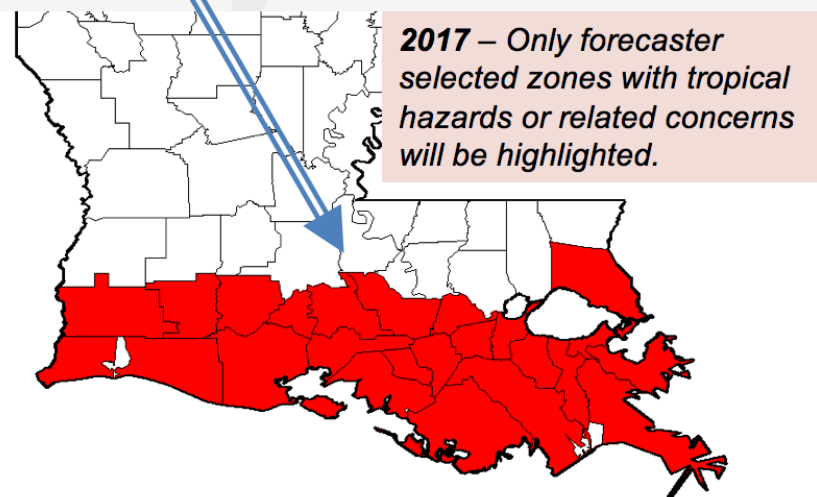
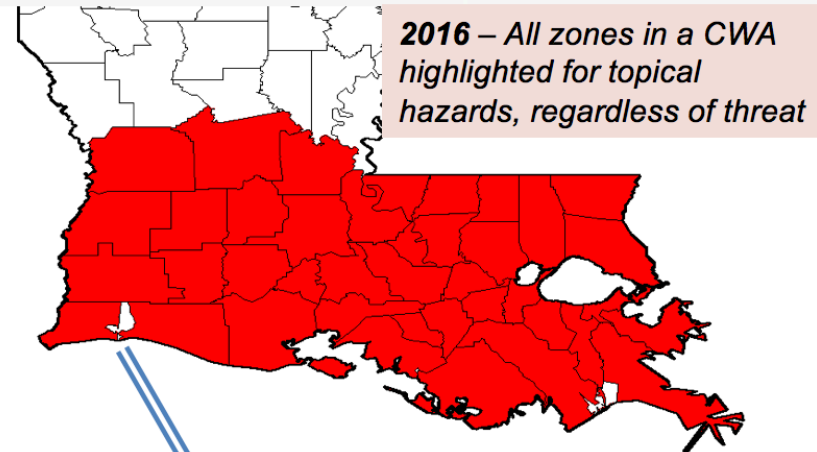
Intended to serve as a companion graphic  
to the TCVWFO product



# WFO Tropical Product Suite Overview: HLS Product (Atlantic/WFO Honolulu)

## Atlantic/WFO Honolulu Hurricane Local Statement (HLS)

- Discussion focused on preparedness and conveying a succinct message on threats and impacts across the WFO county warning area
- Does not contain VTEC
- The product is not segmented by zone
- **NEW FOR 2017:** WFOs can now select specific [Universal Geographic Code \(UGC\)](#) to determine which zones to alert with an HLS. Previously, an entire WFO county warning area would alert if an HLS was issued
- **NEW FOR 2017:** WFO Honolulu will issue the HLS in this format





# HLSWFO Example: Atlantic WFOs and WFO Honolulu

WTUS82 KMHX 111443  
HLSMHX  
NCZ029-044>047-079>081-090>095-098-103-104-112245-

Hurricane Irene Local Statement Advisory Number 22  
National Weather Service Newport/Morehead City NC AL092017  
943 AM EST Wed Jan 11 2017

This product covers Eastern North Carolina

**\*\*DANGEROUS HURRICANE IRENE FORECAST TO APPROACH EASTERN NORTH CAROLINA COAST ON THURSDAY\*\***

## NEW INFORMATION

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### \* CHANGES TO WATCHES AND WARNINGS:

- A Hurricane Watch has been upgraded to a Hurricane Warning for Pitt, Duplin, Lenoir, Jones, and Martin
- A Tropical Storm Watch has been upgraded to a Tropical Storm Warning for Greene

### \* CURRENT WATCHES AND WARNINGS:

- A Hurricane Warning is in effect for Pitt, Duplin, Lenoir, Jones, and Martin
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### \* STORM INFORMATION:

- About 580 miles south of Buxton NC or About 530 miles south of Morehead City NC
- 27.0N 77.3W
- Storm Intensity 115 mph
- Movement North-northwest or 335 degrees at 14 mph

## SITUATION OVERVIEW

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When making decisions...do not focus on the exact forecast track. There is a potential for devastating impacts from wind across eastern North Carolina as well as significant to extensive impacts from storm surge along portions of the coast Thursday into Friday. Residents of eastern North Carolina need to heed the advice of their local emergency officials and complete their preparedness actions today.

## POTENTIAL IMPACTS

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### \* WIND:

Protect against life-threatening wind having possible devastating impacts across portions of eastern North Carolina. Potential impacts in this area include:

- Numerous large trees snapped or uprooted along with fences and roadway signs blown over.

### \* SURGE:

*Similar format to Wind section*

### \* FLOODING RAIN:

*Similar format to Wind section*

### \* TORNADOES:

*Similar format to Wind section*

## PRECAUTIONARY/PREPAREDNESS ACTIONS

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### \* EVACUATIONS:

For those under evacuation orders, leave as soon as practical with a destination in mind. Gas up your vehicle well ahead of time. Be sure that you take all essential materials from your emergency supplies kit. Let others know where you are going and when you intend to arrive.

### \* OTHER PREPAREDNESS INFORMATION:

Now is the time to bring to completion all preparations to protect life and property in accordance with your emergency plan.

### \* ADDITIONAL SOURCES OF INFORMATION:

- For information on appropriate preparations see [ready.gov](http://ready.gov)
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## NEXT UPDATE

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The next local statement will be issued by the National Weather Service in Newport/Morehead City NC around NOON, or sooner if conditions warrant.

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## WFO Tropical Product Suite Overview: HLS at Pacific WFOs (except WFO Honolulu)

### **Pacific Tropical Cyclone Local Statement (HLS) (except WFO Honolulu)**

- Contains VTEC
- The Pacific basin HLS product is segmented by zone
- There is no companion TCV product or HTI graphics from these WFOs
- WFOs who only issue HLS products include:
  - WFO San Diego
  - WFO Oxnard
  - WFO Guam
  - WSO American Samoa





# HLSWFO Example: Pacific WFOs (except WFO Honolulu)

WTPQ81 PGUM 192201  
HLSPQ1

URGENT - IMMEDIATE BROADCAST REQUESTED  
TROPICAL CYCLONE LOCAL STATEMENT  
NATIONAL WEATHER SERVICE TIYAN GU  
801 AM CHST FRI NOV 20 2015

...TYPHOON IN-FA MOVING OUT OF CHUUK STATE...

.NEW INFORMATION...  
THE TYPHOON WARNING HAS BEEN CANCELED FOR ULUL IN CHUUK STATE.

.AREAS AFFECTED...  
THIS LOCAL STATEMENT PROVIDES INFORMATION AND RECOMMENDED ACTIONS  
FOR PEOPLE IN GUAM AND THE SURROUNDING WATERS OUT TO 40 NM...AND  
ON ULUL IN CHUUK STATE.

.WATCHES/WARNINGS...  
THE TYPHOON WARNING HAS BEEN CANCELED FOR ULUL IN CHUUK STATE.  
TYPHOON CONDITIONS ARE NO LONGER EXPECTED.

A TROPICAL STORM WATCH REMAINS IN EFFECT FOR GUAM. TROPICAL STORM  
CONDITIONS...INCLUDING DAMAGING WINDS OF 39 MPH OR MORE...ARE  
POSSIBLE WITHIN 36 HOURS.

.STORM INFORMATION...  
AT 700 AM CHST...2100 UTC...THE CENTER OF TYPHOON IN-FA WAS  
LOCATED NEAR LATITUDE 10.0 DEGREES NORTH AND LONGITUDE 148.9 DEGREES  
EAST. THIS IS ABOUT 110 MILES NORTH-NORTHWEST OF ULUL AND 270 MILES  
NORTHWEST OF CHUUK. IN-FA WAS MOVING NORTHWEST AT 13 MPH WITH MAXIMUM  
SUSTAINED WINDS OF 85 MPH.

.SITUATION OVERVIEW...  
TYPHOON IN-FA IS MOVING OUT OF CHUUK STATE INTO THE OPEN WATERS  
SOUTHEAST OF THE MARIANAS. THE CURRENT FORECAST TRACK BRINGS IN-FA  
ABOUT 140 MILES SOUTH-SOUTHWEST OF GUAM EARLY SATURDAY MORNING.

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...ULUL...  
.PRECAUTIONARY/PREPAREDNESS ACTIONS...  
THE TYPHOON WARNING HAS BEEN CANCELLED FOR ULUL IN CHUUK STATE.  
LISTEN TO INSTRUCTIONS AND UPDATES FROM YOUR LOCAL LEADERS.

...WIND INFORMATION...  
SOUTHWEST WINDS OF 25 TO 35 MPH THIS MORNING WILL STEADILY SUBSIDE TO  
BETWEEN 10 AND 20 MPH TONIGHT.

...STORM SURGE AND SURF INFORMATION...  
COMBINED SEAS OF 10 TO 12 FEET AND HAZARDOUS SURF OF 11 TO 14 FEET  
ALONG SOUTH AND WEST FACING SHORES THIS MORNING WILL GRADUALLY  
SUBSIDE TODAY. MINOR COASTAL INUNDATION IS POSSIBLE BEFORE NOON.

...OTHER STORM EFFECTS...  
RAINFALL OF 1 TO 2 INCHES IS POSSIBLE THROUGH TONIGHT.

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GUZ001-PMZ151-200615-  
/O.CON.PGUM.TR.A.0005.000000T0000Z-000000T0000Z/  
GUAM-GUAM COASTAL WATERS-  
801 AM CHST FRI NOV 20 2015

...TROPICAL STORM WATCH REMAINS IN EFFECT...

...PRECAUTIONARY/PREPAREDNESS ACTIONS...  
STAY INFORMED AND LISTEN FOR CHANGES TO THE FORECAST. REVIEW YOUR  
DISASTER PREPAREDNESS PLAN. PREPARATIONS FOR THE POSSIBILITY OF  
DAMAGING WINDS FROM TYPHOON IN-FA SHOULD BE MADE TODAY.

&&

...WINDS AND SEAS...  
TROPICAL STORM FORCE WINDS ARE POSSIBLE FOR SOUTHERN COASTAL  
WATERS AND THERE IS STILL A THREAT FOR TROPICAL STORM FORCE WINDS OVER  
THE ISLAND OF GUAM IF IN-FA DEVIATES TO THE NORTH AS IT APPROACHES.

SEAS OF 8 TO 10 FEET THIS MORNING WILL BUILD TO BETWEEN 12 AND 16  
FEET BY SATURDAY AS TROPICAL STORM IN-FA PASSES TO THE SOUTH.

...OTHER STORM EFFECTS...  
RAINFALL OF 2 TO 4 INCHES IS POSSIBLE THROUGH SATURDAY EVENING.

&&

.NEXT UPDATE...  
THE NEXT LOCAL STATEMENT WILL BE ISSUED BY THE NATIONAL WEATHER  
SERVICE AROUND 3 PM CHST...OR SOONER IF CONDITIONS WARRANT.



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AT 700 AM CHST...2100 UTC...THE CENTER OF TYPHOON IN-FA WAS LOCATED NEAR LATITUDE 10.0 DEGREES NORTH AND LONGITUDE 148.9 DEGREES EAST. THIS IS ABOUT 110 MILES NORTH-NORTHWEST OF ULUL AND 270 MILES NORTHWEST OF CHUUK. IN-FA WAS MOVING NORTHWEST AT 13 MPH WITH MAXIMUM SUSTAINED WINDS OF 85 MPH.

## **.SITUATION OVERVIEW...**

TYPHOON IN-FA IS MOVING OUT OF CHUUK STATE INTO THE OPEN WATERS SOUTHEAST OF THE MARIANAS. THE CURRENT FORECAST TRACK BRINGS IN-FA ABOUT 140 MILES SOUTH-SOUTHWEST OF GUAM EARLY SATURDAY MORNING.

&&

...ULUL...

...PRECAUTIONARY/PREPAREDNESS ACTIONS...  
THE TYPHOON WARNING HAS BEEN CANCELLED FOR ULUL IN CHUUK STATE. LISTEN TO INSTRUCTIONS AND UPDATES FROM YOUR LOCAL LEADERS.

**Segmented portion**

...WIND INFORMATION...

SOUTHWEST WINDS OF 25 TO 35 MPH THIS MORNING WILL STEADILY SUBSIDE TO BETWEEN 10 AND 20 MPH TONIGHT.

...STORM SURGE AND SURF INFORMATION...

COMBINED SEAS OF 10 TO 12 FEET AND HAZARDOUS SURF OF 11 TO 14 FEET ALONG SOUTH AND WEST FACING SHORES THIS MORNING WILL GRADUALLY SUBSIDE TODAY. MINOR COASTAL INUNDATION IS POSSIBLE BEFORE NOON.

...OTHER STORM EFFECTS...

RAINFALL OF 1 TO 2 INCHES IS POSSIBLE THROUGH TONIGHT.

&&

GUZ001-PMZ151-200615-

/O.CON.PGUM.TR.A.0005.000000T0000Z-000000T0000Z/

GUAM-GUAM COASTAL WATERS-

801 AM CHST FRI NOV 20 2015

...TROPICAL STORM WATCH REMAINS IN EFFECT...

...PRECAUTIONARY/PREPAREDNESS ACTIONS...

STAY INFORMED AND LISTEN FOR CHANGES TO THE FORECAST. REVIEW YOUR DISASTER PREPAREDNESS PLAN. PREPARATIONS FOR THE POSSIBILITY OF DAMAGING WINDS FROM TYPHOON IN-FA SHOULD BE MADE TODAY.

&&

...WINDS AND SEAS...

TROPICAL STORM FORCE WINDS ARE POSSIBLE FOR SOUTHERN COASTAL WATERS AND THERE IS STILL A THREAT FOR TROPICAL STORM FORCE WINDS OVER THE ISLAND OF GUAM IF IN-FA DEVIATES TO THE NORTH AS IT APPROACHES.

SEAS OF 8 TO 10 FEET THIS MORNING WILL BUILD TO BETWEEN 12 AND 16 FEET BY SATURDAY AS TROPICAL STORM IN-FA PASSES TO THE SOUTH.

...OTHER STORM EFFECTS...

RAINFALL OF 2 TO 4 INCHES IS POSSIBLE THROUGH SATURDAY EVENING.

&&

## **.NEXT UPDATE...**

THE NEXT LOCAL STATEMENT WILL BE ISSUED BY THE NATIONAL WEATHER SERVICE AROUND 3 PM CHST...OR SOONER IF CONDITIONS WARRANT.



# HLSWFO Example: Pacific WFOs (except WFO Honolulu)

WTPQ81 PGUM 192201

**HLSPQ1**

URGENT - IMMEDIATE BROADCAST REQUESTED

**TROPICAL CYCLONE LOCAL STATEMENT**

NATIONAL WEATHER SERVICE TIYAN GU

801 AM CHST FRI NOV 20 2015

...TYPHOON IN-FA MOVING OUT OF CHUUK STATE...

.NEW INFORMATION...

THE TYPHOON WARNING HAS BEEN CANCELED FOR ULUL IN CHUUK STATE.

.AREAS AFFECTED...

THIS LOCAL STATEMENT PROVIDES INFORMATION AND RECOMMENDED ACTIONS FOR PEOPLE IN GUAM AND THE SURROUNDING WATERS OUT TO 40 NM...AND ON ULUL IN CHUUK STATE.

.WATCHES/WARNINGS...

THE TYPHOON WARNING HAS BEEN CANCELED FOR ULUL IN CHUUK STATE. TYPHOON CONDITIONS ARE NO LONGER EXPECTED.

A TROPICAL STORM WATCH REMAINS IN EFFECT FOR GUAM. TROPICAL STORM CONDITIONS...INCLUDING DAMAGING WINDS OF 39 MPH OR MORE...ARE POSSIBLE WITHIN 36 HOURS.

.STORM INFORMATION...

AT 700 AM CHST...2100 UTC...THE CENTER OF TYPHOON IN-FA WAS LOCATED NEAR LATITUDE 10.0 DEGREES NORTH AND LONGITUDE 148.9 DEGREES EAST. THIS IS ABOUT 110 MILES NORTH-NORTHWEST OF ULUL AND 270 MILES NORTHWEST OF CHUUK. IN-FA WAS MOVING NORTHWEST AT 13 MPH WITH MAXIMUM SUSTAINED WINDS OF 85 MPH.

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**GUZ001-PMZ151-200615-**

**/O.CON.PGUM.TR.A.0005.000000T0000Z-000000T0000Z/**

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&&

.NEXT UPDATE...

THE NEXT LOCAL STATEMENT WILL BE ISSUED BY THE NATIONAL WEATHER SERVICE AROUND 3 PM CHST...OR SOONER IF CONDITIONS WARRANT.

**VTEC found in segments with active or recently canceled watches/warnings**



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



# NWS 2017 Tropical Product and Service Changes

## NEW FOR 2017

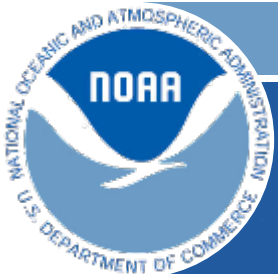


# Proposed Retirement of NHC Guidance Messages

Retired Product Name	WMO Header	AWIPS ID
Geophysical Fluid Dynamics Lab (GFDL) Hurricane Model Message	WHXX04 KWBC	CHGQLM
Tropical Cyclone Guidance Message (Atlantic basin)	WHXX01 KWBC	CHGHUR
Tropical Cyclone Guidance Message (Eastern and Central Pacific basins)	WHXX01 KMIA	CHGE77

- The GFDL Hurricane Model as well as the Beta Advection (BAM) and the Limited Barotropic (LBAR) tropical cyclone track models that make up the bulk of the guidance in these messages will be discontinued before the start of the 2017 hurricane season
- See [Public Information Statement \(PNSWSH\) 17-09](#). Comment period ends today
- Users can access a comprehensive real-time database of tropical cyclone guidance models, which includes the SHIPS model and other models that provide tropical cyclone track and intensity guidance at: [ftp://ftp.nhc.noaa.gov/atcf/aid\\_public/](ftp://ftp.nhc.noaa.gov/atcf/aid_public/)





# Getting the Message Out

## Enhanced Messaging from NHC

Special messages that are posted to the NHC website and Twitter simultaneously to indicate when advisories will be initiated



**NEW FOR 2017:** NHC now has a Public Information Statement (PNSNHC) product to provide information to users on delays, updates, etc.



# Changes to the CPHC Tropical Weather Outlook

- CPHC will expand the valid time of their Tropical Weather Outlook (TWO) product to 5 days
- Formation chances will be provided in 10 percent increments for the next
  - 48 hours
  - 5 days
- CPHC will also add a 5-day companion graphic
- These changes will allow CPHC TWO products to match the forecast period of the TWO products issued by NHC

ACPN50 PHFO 030540

TWOCP

Tropical Weather Outlook

NWS Central Pacific Hurricane Center Honolulu HI

740 PM HST Fri Sep 2 2017

For the central North Pacific...between 140W and 180:

1. A weak area of low pressure associated with former tropical cyclone Madeline is located around 200 miles east of Johnston Island. Scattered thunderstorms associated with this remnant low continue to develop, but show little signs of organization. Environmental conditions are expected to inhibit redevelopment.

\* Formation chance through 48 hours...low...near 0 percent

\* Formation chance through 5 days...low...near 0 percent

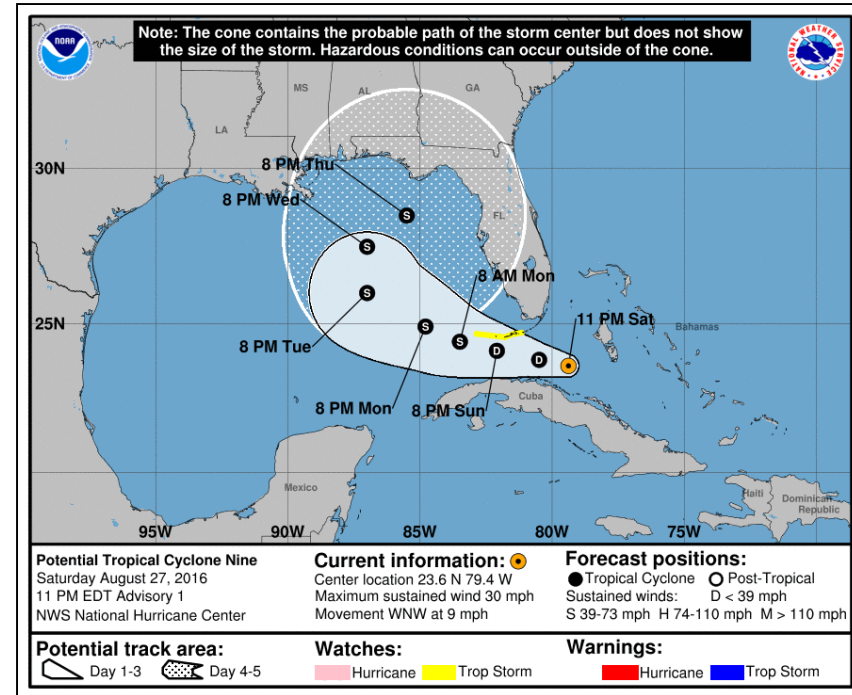
Elsewhere, no tropical cyclones are expected through Sunday evening.

\$\$

Gibbs

# Potential Tropical Cyclones

- The NWS now has the option to issue watches and warnings for disturbances that are not yet a tropical cyclone but pose a threat of bringing tropical cyclone conditions to land within 48h.
- Tropical Cyclone Watch and Warning criteria will not change
  - Watch – conditions possible within 48 h
  - Warning – conditions expected within 36 h
- Systems would be identified as *Potential Tropical Cyclones*
  - Same numbering system as depressions – “One”, “Two”, etc.
  - The standard suite of WFO and NHC/CPHC tropical cyclone products will be issued for Potential Tropical Cyclones





# Potential Tropical Cyclones

- *Issued only for systems threatening land within the watch/warning time frame*
- Advisory packages will be discontinued when watches and warnings are no longer necessary on land. This could result in occasional gaps in product issuance when the threat to land is not imminent
- See [Service Change Notice 17-28](#) for more information



## NATIONAL HURRICANE CENTER

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Potential Tropical Cyclone One Public Advisory Number 1  
NWS National Hurricane Center Miami FL AL012016  
400 PM CDT Wed Jun 5 2017

...TROPICAL DISTURBANCE OVER THE EAST-CENTRAL GULF OF MEXICO  
EXPECTED TO BECOME A TROPICAL STORM...  
...TROPICAL STORM WARNING ISSUED FOR PORTIONS OF THE WEST  
COAST OF FLORIDA...

### SUMMARY OF 400 PM CDT...2100 UTC...INFORMATION

-----  
LOCATION...25.3N 86.5W  
ABOUT 310 MI...500 KM SW OF TAMPA  
ABOUT 320 MI...510 KM SSW OF APALACHICOLA FLORIDA  
MAXIMUM SUSTAINED WINDS...35 MPH...55 KM/H  
PRESENT MOVEMENT...N OR 360 DEGREES AT 3 MPH...6 KM/H  
MINIMUM CENTRAL PRESSURE...1010 MB...29.92 INCHES

### WATCHES AND WARNINGS

-----  
CHANGES WITH THIS ADVISORY...

A Tropical Storm Warning has been issued from the west coast of Florida from Boca Grande to Ochlockonee River.

### SUMMARY OF WATCHES AND WARNINGS IN EFFECT...

A Tropical Storm Warning is in effect for...  
\* The west coast of Florida from Boca Grande to Ochlockonee River

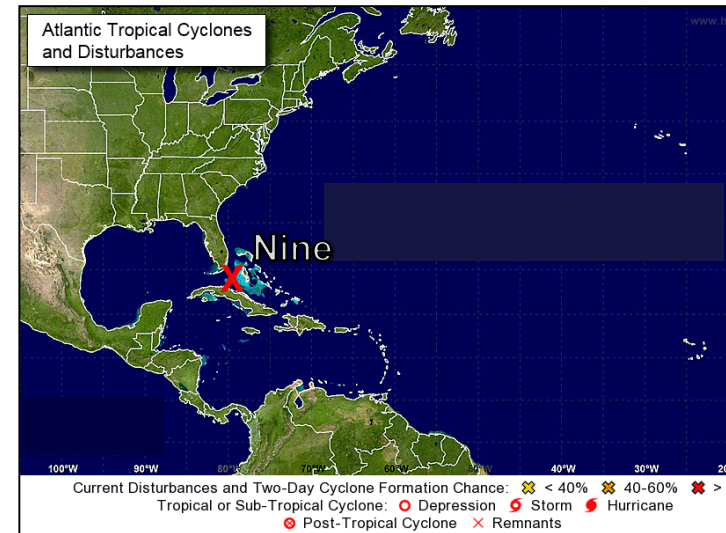
A Tropical Storm Warning means that tropical storm conditions are expected somewhere within the warning



# Potential Tropical Cyclones

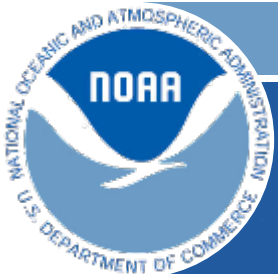
## NHC/CPHC Products

- The standard suite of NHC/CPHC advisory products at standard advisory times used for Potential TCs
  - Public Advisory (including Intermediates)
  - Forecast Advisory
  - Discussion
  - Wind Speed Probabilities
  - Cone graphic
  - Storm surge products, as needed
- Genesis probabilities will appear in both the Tropical Weather Outlook and the Public Advisory
- The Graphical TWO will no longer display a formation area for these systems, to avoid confusion with the (now available) 5-day track forecast and cone graphic



- Changes to the Graphical TWO for 2017 are noted in [PNSWSH 17-30](#)





# Potential Tropical Cyclones

## Automated TC Forecast Database (ATCF)

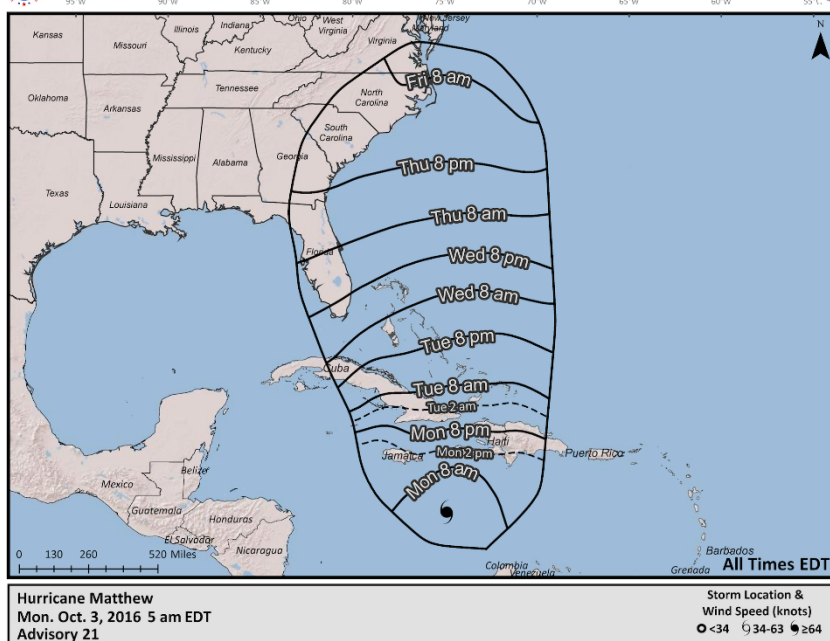
- No new storm type will be added to the ATCF for Potential Tropical Cyclones.
- Potential Tropical Cyclones could be associated with several existing non-tropical system types, most commonly:
  - "LO" (for low pressure system)
  - "DB" (for disturbance)
  - "EX" (for an extratropical system transitioning to tropical)
  - "WV" (for tropical wave)
- INVEST systems will continue to be given ID numbers in the 90s. They will be renumbered to the next sequential tropical cyclone number for the basin for that season when advisory packages from NHC or CPHC are issued

**EXAMPLE: AL93 "INVEST" becomes AL02 "Two"**

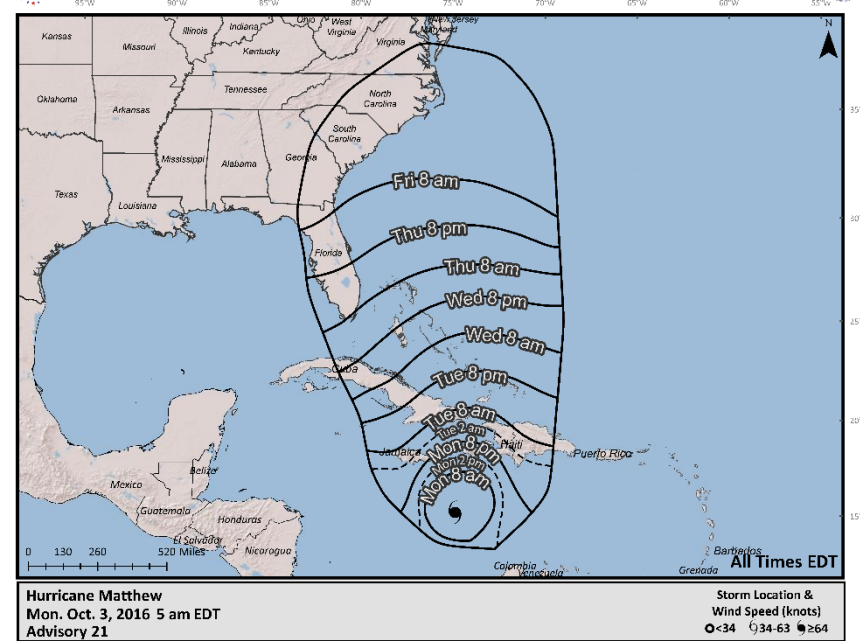
- Potential Tropical Cyclones will use ATCF numbers from 01-49 just like tropical cyclones

# NHC Experimental Arrival of Tropical Storm Force Winds Graphics

Earliest Reasonable Arrival Time of Tropical-Storm-Force Winds



Most Likely Arrival Time of Tropical-Storm-Force Winds

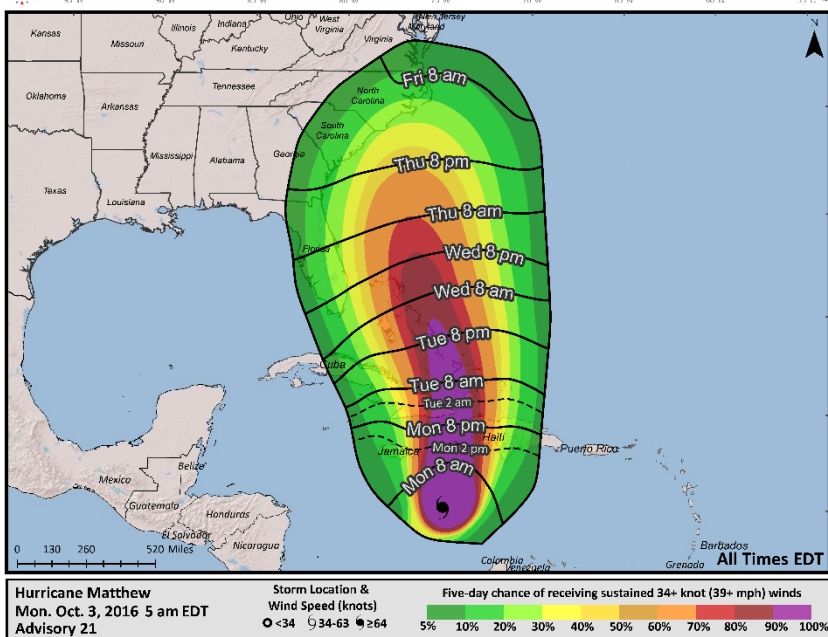


- Arrival of Tropical-Storm (TS)-force winds is a critical planning threshold. Preparations become dangerous once winds reach TS force
- These graphics account for forecast uncertainty (track/intensity/size) from the same realizations used to create the wind speed probability products
- Users have the option to display graphics with or without the underlying wind speed probabilities

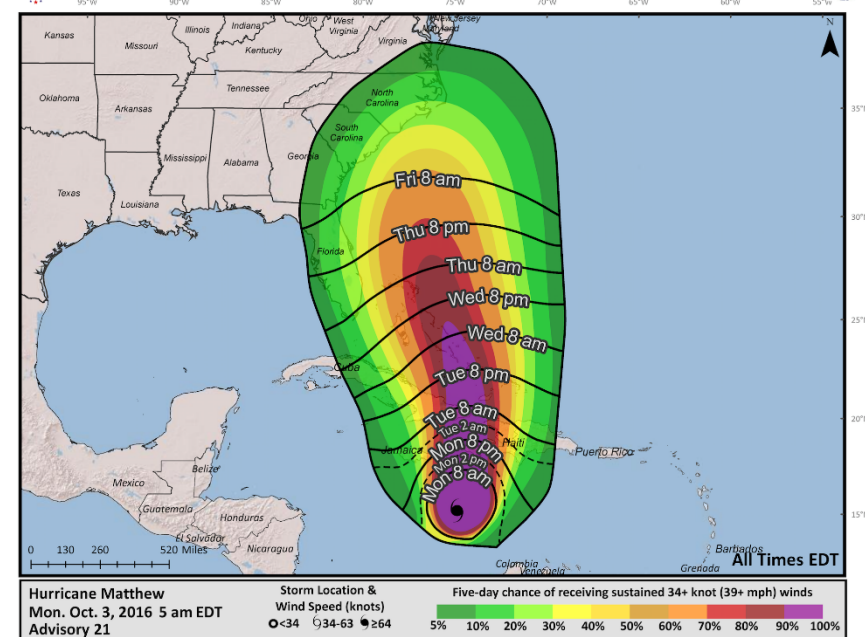


# NHC Experimental Arrival of Tropical Storm Force Winds Graphics

Earliest Reasonable Arrival Time of Tropical-Storm-Force Winds



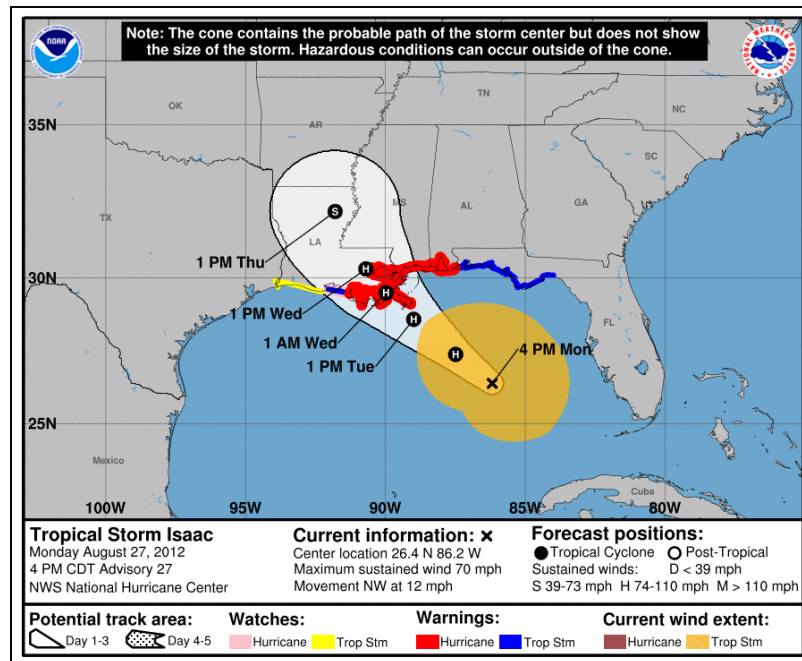
Most Likely Arrival Time of Tropical-Storm-Force Winds



- Primary graphic depicts the time window that individuals can safely assume will be free from tropical-storm-force winds (“earliest reasonable” arrival time - no more than a 10% chance of onset).
- A secondary graphic will show the “most likely” arrival time – the time before or after which the onset of TS-force winds is equally likely.
- Available on [hurricanes.gov](http://hurricanes.gov) with the tropical cyclone graphics in 2017

# Proposed Changes to NHC/CPHC Tropical Cyclone Graphics

- NHC/CPHC plan to update the look of the tropical cyclone advisory graphics
- Graphics suite would have consistent background maps and colors and a “cleaner” look and feel
- Storm size information (initial wind field) could now be toggled onto the cone graphic. This would reinforce the fact for users that hazardous conditions occur outside the cone



- The static URLs of the latest-available graphics from NHC for a given tropical cyclone would change. A complete list of proposed URL changes:  
<http://www.nhc.noaa.gov/new-tc-graphics/>
- CPHC products are provided on dynamic URLs that change for each tropical cyclone. The graphics for active tropical cyclones can be found on the CPHC webpage: <http://www.prh.noaa.gov/cphc/>



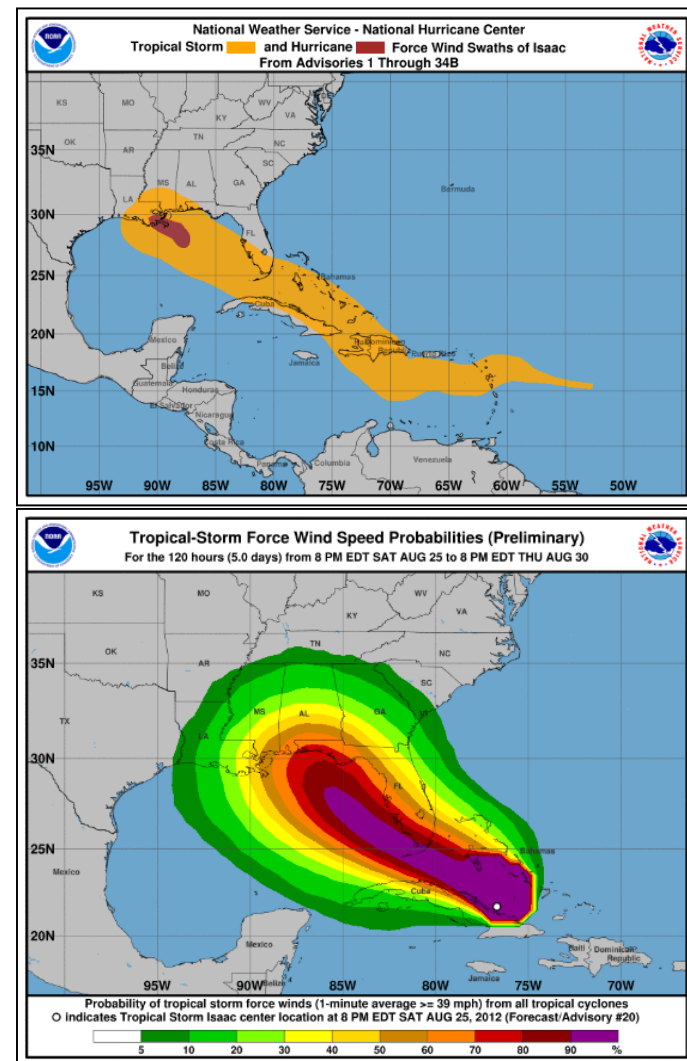
# NHC Tropical Cyclone Graphics: Shapefile and kml formats

The following kml files and shapefiles are proposed to be available in 2017 at:

[www.nhc.noaa.gov/gis/](http://www.nhc.noaa.gov/gis/)

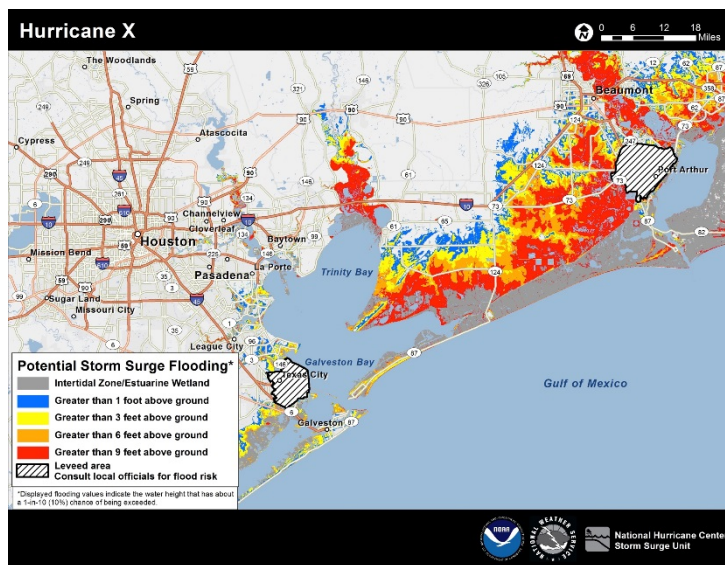
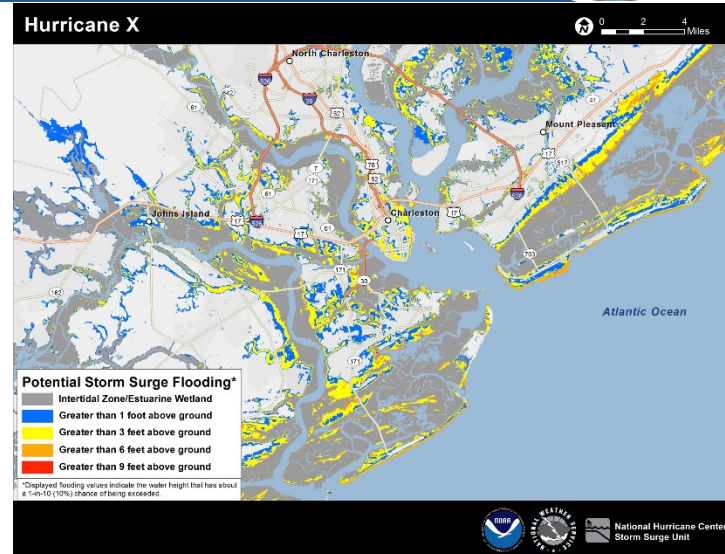
- The estimated extent of 34-kt, 50-kt, and 64-kt winds at advisory time, as well as the forecast extent of 34-kt, 50-kt, and 64-kt winds
- The estimated cumulative wind swath of hurricane-force and tropical-storm-force winds
- The 5-day probability of 34-kt, 50-kt and 64-kt winds would be available on a 5 km grid (*previously, these files used 10 km grid spacing. The resolution of the model used to generate the input data has not changed*)

Comments collected on proposed TC Graphics changes through April 9 ([PNSWSH 17-10](#))



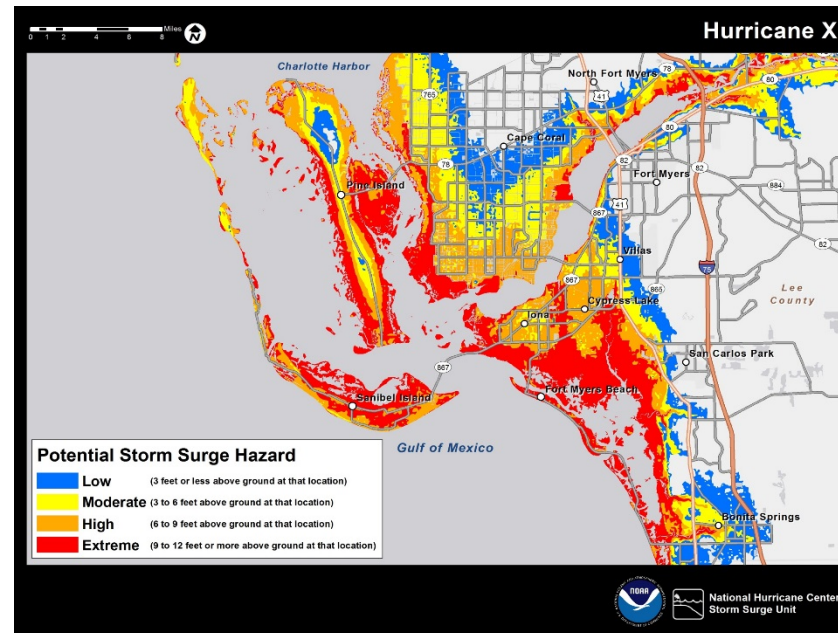
# Inundation Graphic (Potential Storm Surge Flooding Map)

- **For the U.S. Gulf and East Coast only**
- Became operational in 2016
- Provides a quantitative risk assessment for decision makers
- Shows height above ground that the water could reach
  - Depicts the “reasonable worst-case scenario” at any individual location
  - Shows inundation levels that have a 10% chance of being exceeded
- First map generally issued with the initial hurricane or storm surge watch/warning or at other times as appropriate (i.e, with a tropical storm watch/warning)





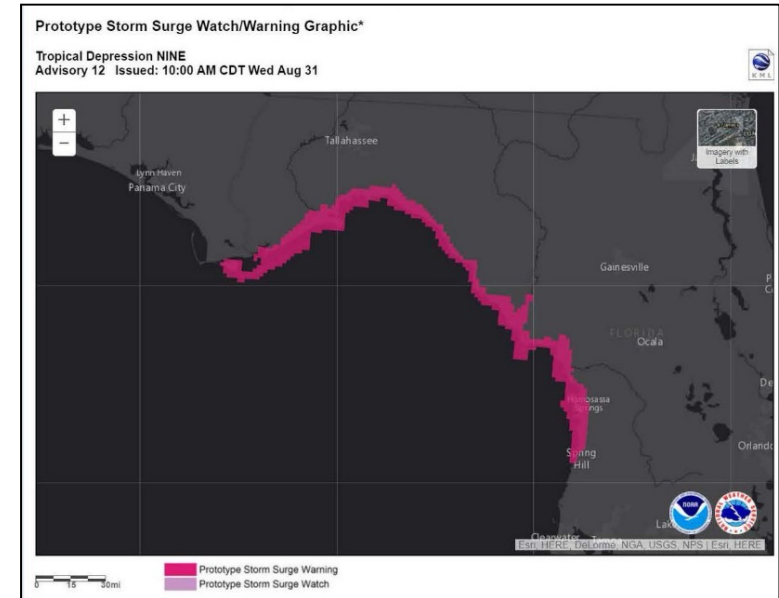
# Inundation Graphic Availability



- Available on [hurricanes.gov](https://hurricanes.gov) about 60 to 90 minutes following the advisory release
- NHC provides downloadable datasets in GeoTIFF format at: <http://www.nhc.noaa.gov/gis/>
- Map Services provided on the NOAA [nowCOAST](https://nowcoast.noaa.gov) webpage (delayed)

# Storm Surge Watch and Storm Surge Warning (SSWW)

- Storm Surge Watches and Warnings will become operational for the U.S. Gulf and East Coast in 2017
- The first gridded watches/warnings from the NWS
- SSWW will be communicated using:
  - Graphic on NHC website, including downloadable kml file
  - NDFD grid (delayed availability)
  - Approximate representation in terms of zones in National and WFO TCV products
  - Approximate representation using coastal breakpoints in the
    - NHC Public Advisory
    - NWS WFO Hurricane Local Statement



## SUMMARY OF WATCHES AND WARNINGS IN EFFECT:

A Hurricane Warning is in effect for...

\* Anclote River to Indian Pass Florida

A Storm Surge Warning is in effect for...

\* Aripeka to Indian Pass Florida



# Storm Surge Watch and Storm Surge Warning – Definitions

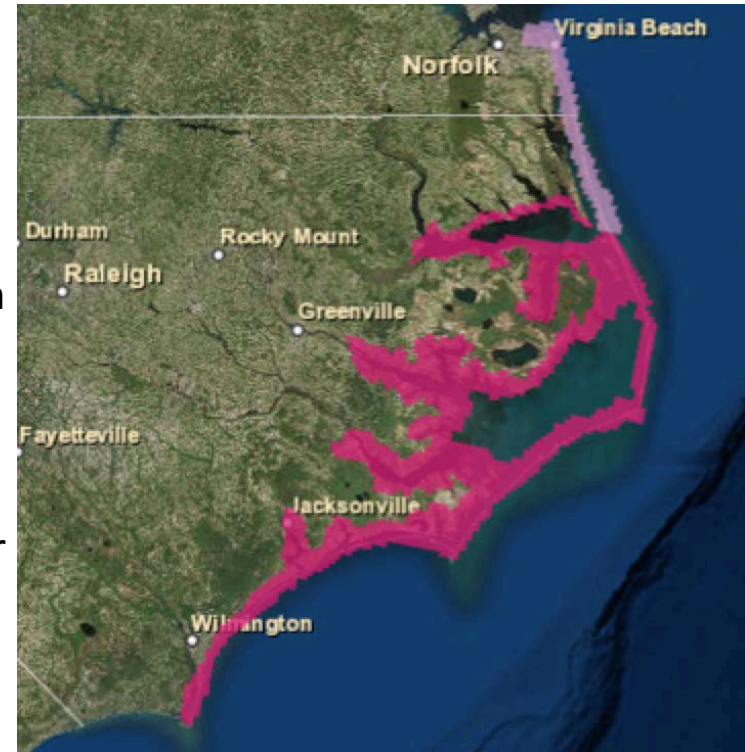
**Issued only for Atlantic basin tropical cyclones affecting the U.S. Gulf and East Coast**

## **Storm Surge Watch (SS.A)**

The possibility of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 48 hours, in association with a potential or ongoing tropical, subtropical, or post-tropical cyclone

## **Storm Surge Warning (SS.W)**

The danger of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within 36 hours, in association with a potential or ongoing tropical, subtropical, or post-tropical cyclone

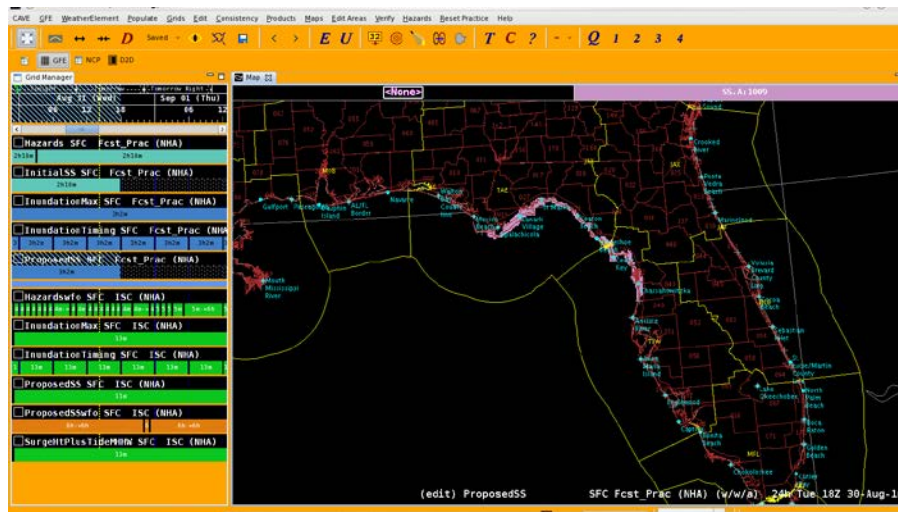


***May be issued earlier if other hazards may hinder evacuations.***



# Storm Surge Watch/Warning (SSWW)

## The NWS' First Grid-Based Warning



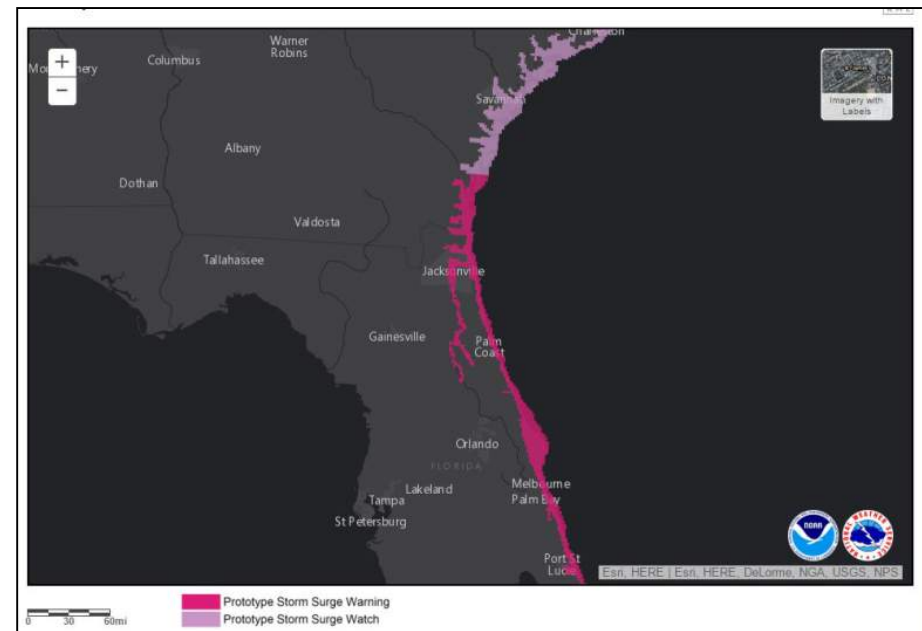
- The SSWW is the first NWS watch/warning that is native to a 2.5 km grid
- **The SSWW is grid-based because the area being warned is generally confined to areas bordering coasts and estuaries**
- The SSWW is generated through inter-site collaboration of grids between the National Hurricane Center (NHC) and Weather Forecast Offices (WFOs)
- Dissemination methods that alert the entire zone or county will over-warn the SSWW
- See [Service Change Notice 17-16](#) for more information



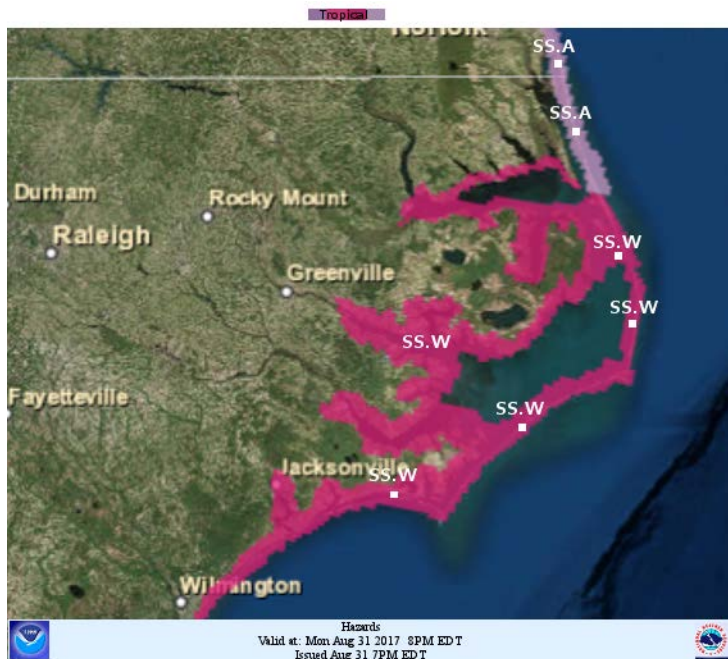
# Storm Surge Watch/Warning (SSWW) Graphic

## The SSWW Graphic

- Shows the collaborated gridded watch and warning areas for the storm surge hazard
- Graphic will appear with the active storm information on the NHC website
- SSWW graphic kml file available at:
  - NHC website: [nhc.noaa.gov/gis](https://nhc.noaa.gov/gis)
- GRIB2 (delayed):
  - [National Digital Forecast Database](#)
- Prototype graphics were produced in real-time during Hurricanes Hermine and Matthew



# National Digital Forecast Database (NDFD): Hazard Grid and HTI grids



- Two new hazard codes (SS.W, SS.A) added to NDFD Hazard element grids (see [https://graphical.weather.gov/docs/grib\\_design.html#hazard\\_keys](https://graphical.weather.gov/docs/grib_design.html#hazard_keys) for a list of NDFD hazard codes)
  - New version of NDFD GRIB2 decoder includes new Hazard codes is now available ([http://www.weather.gov/mdl/degrib\\_download](http://www.weather.gov/mdl/degrib_download))
  - Sample NDFD GRIB2 file with new Hazard codes can be downloaded at <http://www.nhc.noaa.gov/2017examples>
- 
- NDFD web graphics (<https://digital.weather.gov/>) updated to include SS.W and SS.A
  - NDFD Web Services (XML/SOAP/REST) Hazards updated to include SS.W and SS.A
  - NDFD begins production of Hurricane Threats and Impacts (HTI) grids for Hawaii on June 1, 2017
  - NDFD only updates for the days 1-3 time period (W/W period) every 30 minutes

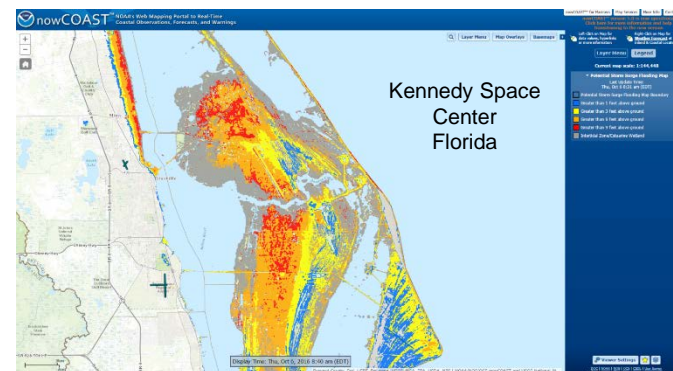




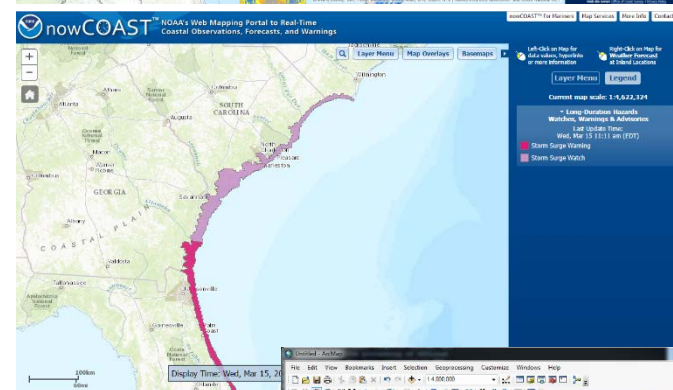
# Map Services for the Storm Surge Watch/Warning Graphic and Inundation Graphic

## NOAA/NOS nowCOAST

- The Inundation Graphic became available via [nowCOAST's map services & map viewer](#) in Sept. 2016 just prior to Hurricane Matthew
- Storm Surge Watch/Warning Graphic at native 2.5 km resolution will be available on nowCOAST for the 2017 Hurricane Season
- Similar to the Inundation Graphic, the SSWW Graphic will be available via both GeoServices REST Map Services & OCG Web Map Services, allowing users to view via desktop and server-based GIS and overlay with evacuation routes, critical infrastructure, etc.
- Products available 10-20 minutes after posting on the NHC website

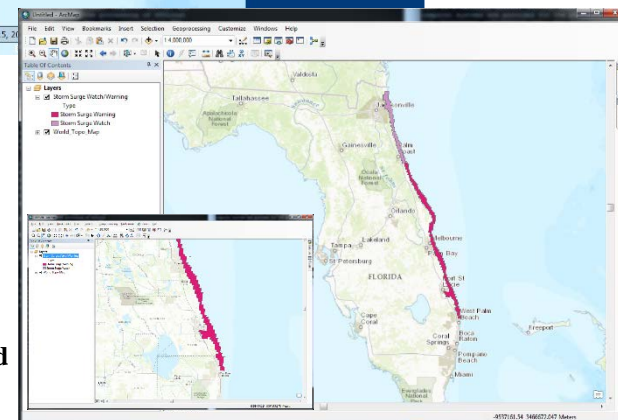


**Inundation Map displayed on nowCOAST's map viewer during Hurricane Matthew**



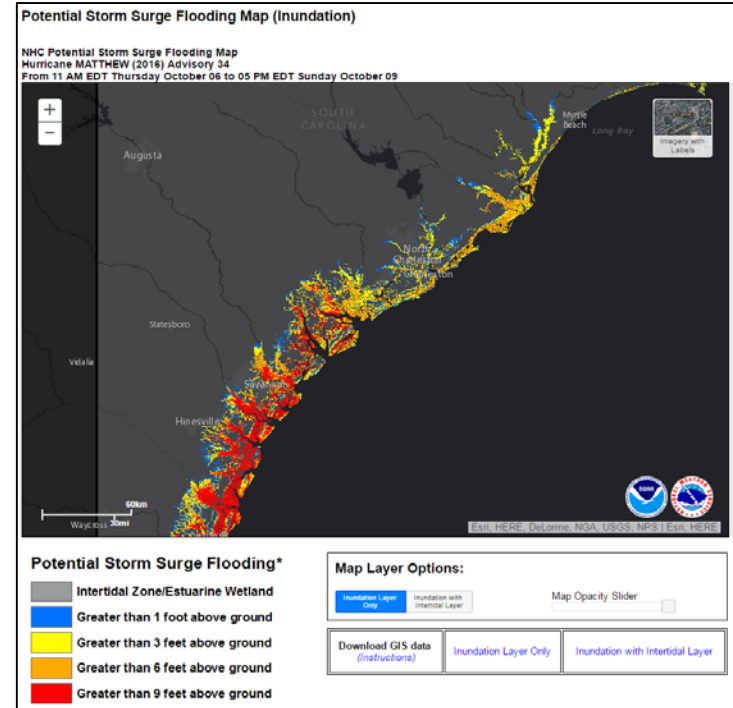
**Simulated SS W/W map displayed on nowCOAST's map viewer**

**Simulated SS W/W map obtained from nowCOAST's map services and displayed on ArcGIS Desktop**



# How does the Inundation Graphic differ from the SSWW Graphic?

- The Inundation Graphic provides objective quantitative guidance on where inundation *could* occur.
- The Storm Surge Watch/Warning is based on objective guidance but is subjectively adjusted by the forecaster. It is not quantitative. It simply identifies those areas at risk for life-threatening inundation.
- The Inundation Graphic was created with decision makers in mind, whereas the Storm Surge Watch/Warning is intended for the general public.





# Storm Surge Values in NWS Products

## The inundation values in the NWS products will be different

### **NHC Tropical Cyclone Public Advisory** (*TC-scale product*)

Provides the highest expected surge values within the area noted between coastal points

### **NHC Inundation Graphic** (*Point-specific product*)

Provides the “reasonable worse-case scenario” given historical forecast errors in hurricane track, size, and intensity at a given point

### **WFO TCV Product** (*WFO County-Warning-Area-scale product*)

As the event draws nearer, values in the WFO TCV trend toward expected values (for rescue/recovery decisions) rather than the “reasonable worst case scenario” (for evacuations decisions)

# Storm Surge Watch/Warning (SSWW) Dissemination

- The Storm Surge Watch/Warning is issued on a grid and is not tied to entire counties or NWS zones
- Users are highly encouraged to use the Keyhole Markup Language (kml) files available on the NHC website rather than the Valid Time Event Code (VTEC)
- *The geographical area associated with a Storm Surge Watch or Warning using the zones alerted by VTEC from the TCV products will be larger than the actual area of the watch or warning as depicted by the grid*

Post-Tropical Cyclone **HERMINE**  
Advisory 25 Issued: 11:00 AM EDT Sat Sep 3



- The following VTEC phenomenon and significance codes will be used:  
**SS.A** - Storm Surge Watch      **SS.W** - Storm Surge Warning
- VTEC will continue to be used to activate some dissemination systems, including the Emergency Alert System (EAS) and NOAA Weather Radio All-Hazards (NWR)



# 2017 TCV Product from the WFOs

## TCVWFO

The 2017 WFO-issued TCV will include storm surge watch/warning VTEC (SS.A and SS.W), when applicable, in addition to the tropical cyclone wind watch/warning VTEC

- Only WFOs on the Gulf and East Coast of the contiguous U.S. will issue storm surge watches and warnings
- If you use the VTEC to display the area under a SSWW, you will alert areas that are not under a warning
- ***To correctly show the warning area, partners are encouraged to use the kml files provided on the NHC website. These files are available when the SSWW graphic is issued***





# 2017 TCVWFO Truncated Example With a Storm Surge Watch

WTUS82 KMHX 251259  
TCVMHX

URGENT - IMMEDIATE BROADCAST REQUESTED  
IRENE LOCAL WATCH/WARNING STATEMENT/ADVISORY NUMBER 20  
NATIONAL WEATHER SERVICE NEWPORT/MOREHEAD CITY NC AL092011  
859 AM EDT Thu Aug 25 2011

NCZ103-252100-  
/O.NEW.KMHX.SS.A.1009.110825T1259Z-000000T0000Z/  
/O.NEW.KMHX.HU.A.1009.110825T1259Z-000000T0000Z/  
OUTER BANKS DARE-  
859 AM EDT Thu Aug 25 2011

...HURRICANE WATCH IN EFFECT...  
...STORM SURGE WATCH IN EFFECT...

A HURRICANE WATCH MEANS HURRICANE WIND CONDITIONS ARE POSSIBLE  
SOMEWHERE WITHIN THIS AREA AND WITHIN THE NEXT 48 HOURS

A STORM SURGE WATCH MEANS LIFE THREATENING INUNDATION LEVELS ARE  
POSSIBLE SOMEWHERE WITHIN THIS AREA AND WITHIN THE NEXT 48 HOURS





# 2017 TCVWFO Truncated Example With a Storm Surge Watch

WTUS82 KMHX 251259  
TCVMHX

URGENT - IMMEDIATE BROADCAST REQUESTED  
IRENE LOCAL WATCH/WARNING STATEMENT/ADVISORY NUMBER 20  
NATIONAL WEATHER SERVICE NEWPORT/MOREHEAD CITY NC AL092011  
859 AM EDT Thu Aug 25 2011

NCZ103-252100-  
**/O.NEW.KMHX.SS.A.1009.110825T1259Z-000000T0000Z/**  
/O.NEW.KMHX.HU.A.1009.110825T1259Z-000000T0000Z/  
OUTER BANKS DARE-  
859 AM EDT Thu Aug 25 2011

...HURRICANE WATCH IN EFFECT...  
**...STORM SURGE WATCH IN EFFECT...**

A HURRICANE WATCH MEANS HURRICANE WIND CONDITIONS ARE POSSIBLE  
SOMEWHERE WITHIN THIS AREA AND WITHIN THE NEXT 48 HOURS

A STORM SURGE WATCH MEANS LIFE THREATENING INUNDATION LEVELS ARE  
POSSIBLE SOMEWHERE WITHIN THIS AREA AND WITHIN THE NEXT 48 HOURS

# Alerting the Storm Surge Watch/Warning

Prototype Storm Surge Watch/Warning Graphic\*

Tropical Depression NINE  
Advisory 12 Issued: 10:00 AM CDT Wed Aug 31



All possible alerting areas for a SSWW



- **Pink** = Storm Surge Warning Area
- **Green** = All areas that are vulnerable to tropical cyclone storm surge inundation (Category 5 MOM)
- **Red** = NWS zones that are vulnerable to tropical cyclone storm surge inundation somewhere in the zone

# Alerting the Storm Surge Watch/Warning

Prototype Storm Surge Watch/Warning Graphic\*

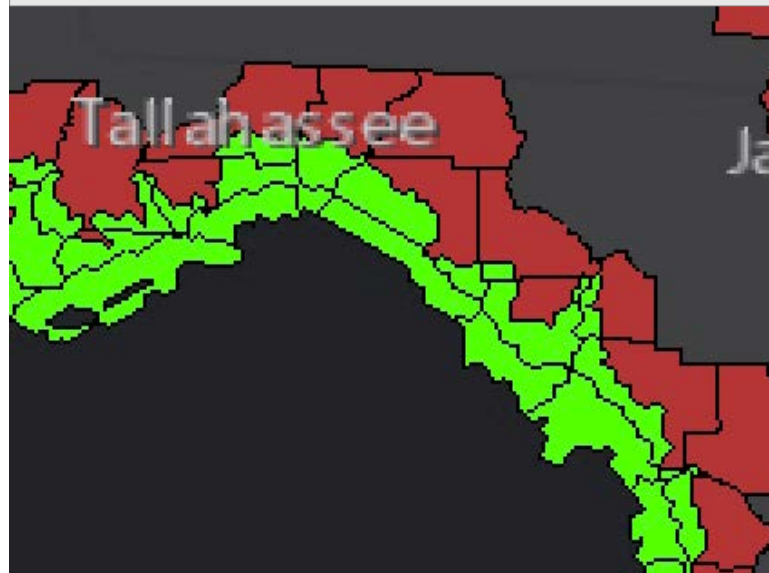
Tropical Depression NINE  
Advisory 12 Issued: 10:00 AM EDT 11/24/2004

Click icon on the NHC site to get the kml file



Prototype Storm Surge Warning  
Prototype Storm Surge Watch

All possible alerting areas for a SSWW



Some SS.W alerts are triggered for the entire NWS zone (red) included in the WFO TCV. Other alerts are triggered only for the areas of each NWS zone included in the WFO TCV that are vulnerable to tropical cyclone storm surge inundation (green)

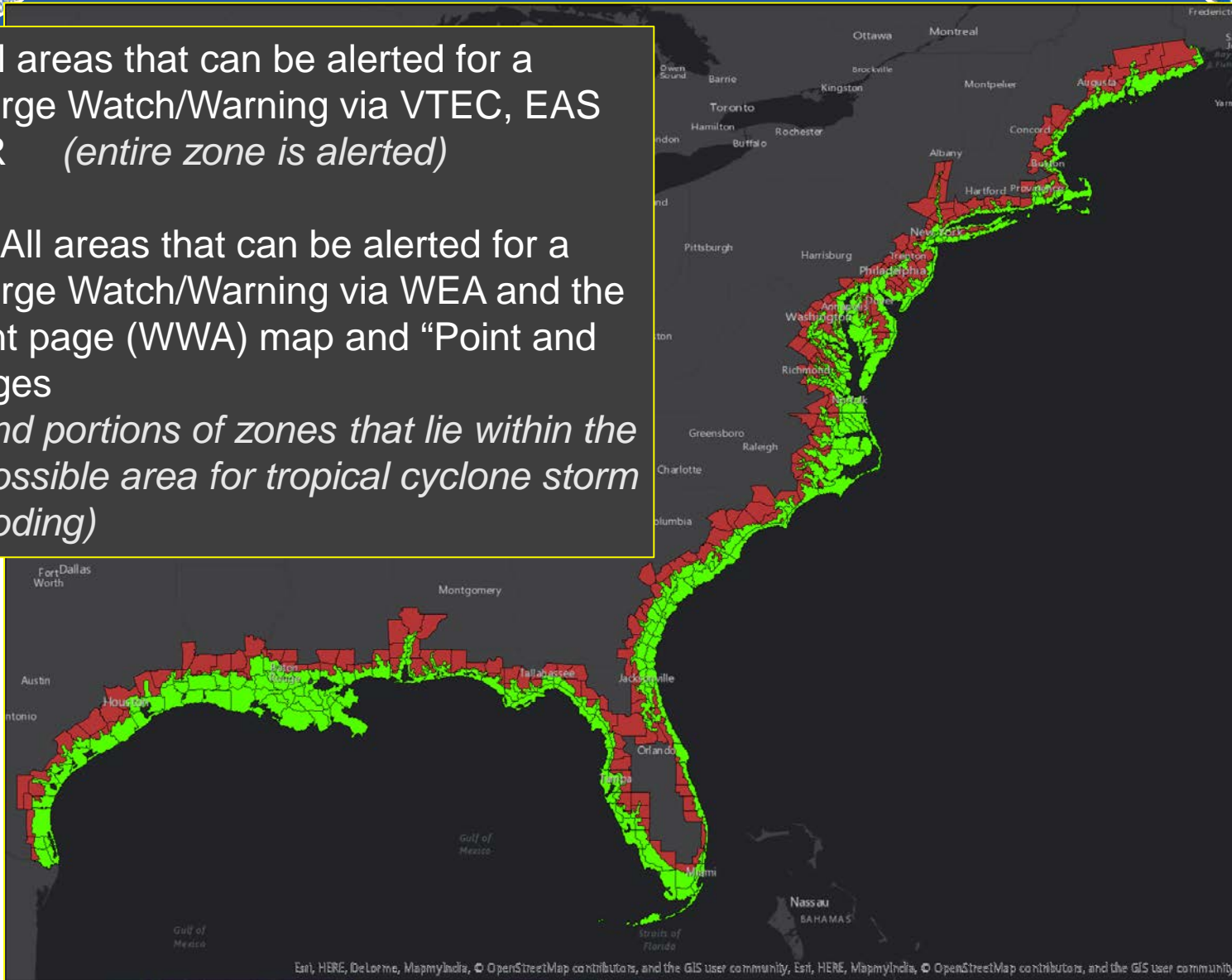
- Red = NWR and EAS alerts
- Green = WEA (Wireless Emergency Alert), NWS Front Page (WWA) Map and Point and Click area



# All Possible Areas Alerted to a Storm Surge Watch or Warning

**Red** = All areas that can be alerted for a Storm Surge Watch/Warning via VTEC, EAS and NWR *(entire zone is alerted)*

**Green** = All areas that can be alerted for a Storm Surge Watch/Warning via WEA and the NWS front page (WWA) map and “Point and Click” pages  
*(zones and portions of zones that lie within the largest possible area for tropical cyclone storm surge flooding)*

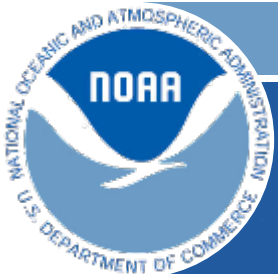




# EAS Code Approval by the FCC for SSA, SSW, and EWW

- Beginning with the 2017 hurricane season, WFOs may request EAS activation using the SSW event code /SSW/. WFOs will broadcast Storm Surge Warnings, preceded by the SAME and 1050 Hz tones.
- There are no immediate plans for the NWS to tone the Storm Surge Watch (SSA event code)
- The Extreme Wind Warning (EWW) is an existing operational warning issued for advance notice of sustained surface winds of 115 mph or great associated with major hurricanes.
- Beginning with the 2017 hurricane season, NWS will request EAS activations using the EWW event code /EWW/. The warning will be broadcast on NWR, preceded by the SAME and 1050 Hz tones.





# Changes for NOAA Weather Radio All-Hazards

- Broadcasters in geographic areas potentially impacted by tropical cyclones should contact their EAS equipment manufacturer if they need instructions for updating equipment
- If EAS equipment is not updated and the WFO requests EAS activation using the new Event Codes, the EAS encoder/decoder equipment will usually decode the information received as an *"UNKNOWN" Event Code* and the EAS will not automatically activate

**Existing SAME receivers, including Public Alert™ receivers,  
will process the new event codes**

- For those receivers providing a limited, caption-like message display, the receiver will likely show wording such as *"UNKNOWN WATCH" or "UNKNOWN WARNING"*; however, NWR SAME and Public Alert™ receivers should activate
- NWR tone alert receivers should activate with the 1050 Hz tone for the warnings
- NWS Headquarters is working with the receiver manufacturers to ensure the new codes are added to newly manufactured receivers





# EWV Example

WFUS52 KMLB 070926  
EWWMLB  
FLC009-071115-  
/O.NEW.KMLB.EW.W.0001.161007T0926Z-161007T1115Z/

BULLETIN - EAS ACTIVATION REQUESTED  
EXTREME WIND WARNING  
NATIONAL WEATHER SERVICE MELBOURNE FL  
526 AM EDT FRI OCT 7 2016

THE NATIONAL WEATHER SERVICE IN MELBOURNE HAS ISSUED A

\* EXTREME WIND WARNING FOR...  
NORTHEASTERN BREVARD COUNTY IN FLORIDA...

\* UNTIL 715 AM EDT

\* AT 521 AM EDT...SURFACE OBSERVATIONS AND DOPPLER RADAR INDICATED  
EXTREME WINDS... ASSOCIATED WITH THE EYEWALL OF HURRICANE MATTHEW  
WERE ABOUT TO MOVE ONSHORE CAPE CANAVERAL INCLUDING PORT CANAVERAL  
AND MOVING NORTH-NORTHWEST AT 15 MPH. THIS IS AN EXTREMELY  
DANGEROUS AND LIFE-THREATENING SITUATION!

PRECAUTIONARY/PREPAREDNESS ACTIONS...

FREQUENT DESTRUCTIVE WIND GUSTS TO AROUND 115 MPH WILL SPREAD ACROSS  
THE CAPE CANAVERAL AREA...PRODUCING SWATHS OF TORNADO-LIKE DAMAGE.  
A WIND GUST OF 100 MPH WAS RECENTLY RECORDED AT THE TIP OF CAPE  
CANAVERAL.

&&

LAT...LON 2839 8056 2837 8063 2879 8072 2878 8068  
2864 8057 2860 8055 2846 8049  
TIME...MOT...LOC 0921Z 255DEG 12KT 2849 8049 2819 8045

\$\$

CRISTALDI



# EWV Example

WFUS52 KMLB 070926

EWVMLB

FLC009-071115-

**/O.NEW.KMLB.EW.W.0001.161007T0926Z-161007T1115Z/**

BULLETIN - EAS ACTIVATION REQUESTED

EXTREME WIND WARNING

NATIONAL WEATHER SERVICE MELBOURNE FL

526 AM EDT FRI OCT 7 2016

THE NATIONAL WEATHER SERVICE IN MELBOURNE HAS ISSUED A

\* EXTREME WIND WARNING FOR...  
NORTHEASTERN BREVARD COUNTY IN FLORIDA...

\* UNTIL 715 AM EDT

\* AT 521 AM EDT...SURFACE OBSERVATIONS AND DOPPLER RADAR INDICATED  
EXTREME WINDS... ASSOCIATED WITH THE EYEWALL OF HURRICANE MATTHEW  
WERE ABOUT TO MOVE ONSHORE CAPE CANAVERAL INCLUDING PORT CANAVERAL  
AND MOVING NORTH-NORTHWEST AT 15 MPH. THIS IS AN EXTREMELY  
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PRECAUTIONARY/PREPAREDNESS ACTIONS...

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THE CAPE CANAVERAL AREA...PRODUCING SWATHS OF TORNADO-LIKE DAMAGE.  
A WIND GUST OF 100 MPH WAS RECENTLY RECORDED AT THE TIP OF CAPE  
CANAVERAL.

&&

**LAT...LON 2839 8056 2837 8063 2879 8072 2878 8068  
2864 8057 2860 8055 2846 8049**

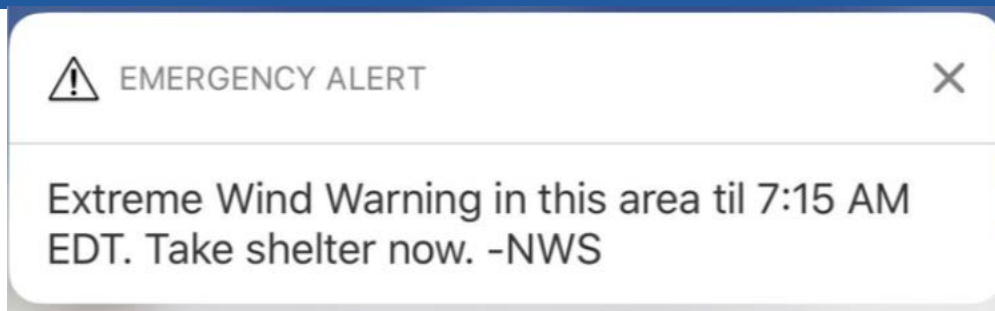
**TIME...MOT...LOC 0921Z 255DEG 12KT 2849 8049 2819 8045**

\$\$

CRISTALDI



# Wireless Emergency Alerts (WEA) for Tropical Warnings



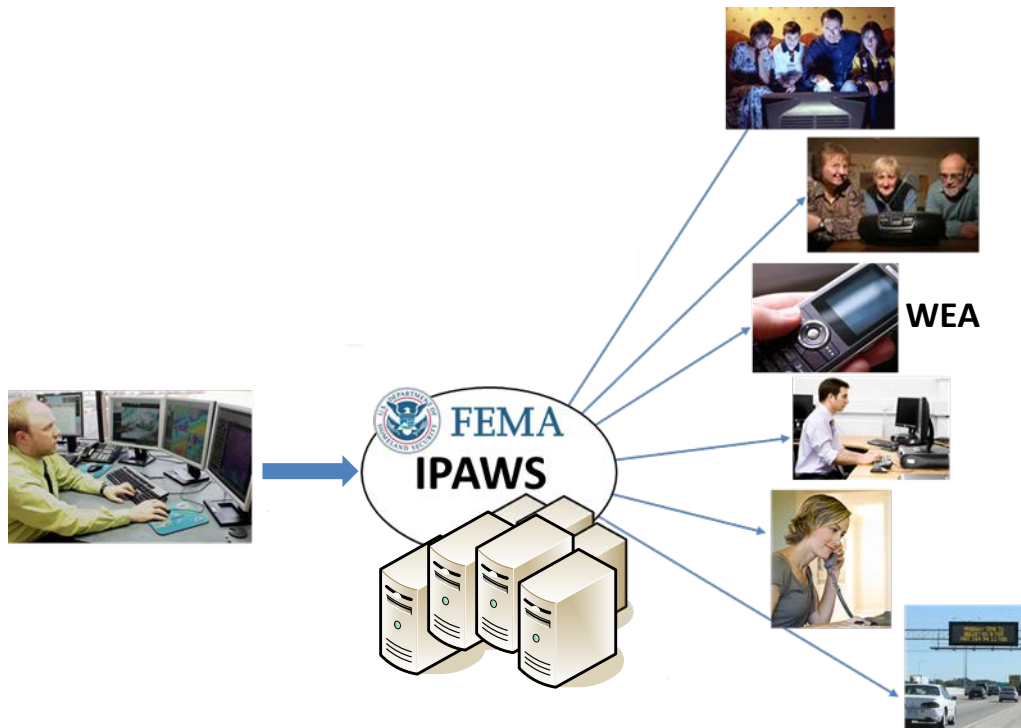
A Wireless Emergency Alert (WEA) is an emergency message broadcast to cell phones. The NWS will trigger WEA messages for NEW issuances of the following tropical warnings:

Warning Type	WEA Message
Extreme Wind Warning	Extreme Wind Warning in this area til hh:mm tzT ddd. Take shelter. -NWS
Hurricane Warning	Hurricane Warning this area. Check local media and authorities. -NWS
Storm Surge Warning	NWS: Life-threatening storm surge danger. Check for possible evacuation orders.

# FEMA IPAWS Dissemination of NWS WEA Messages

## FEMA Integrated Public Alert & Warning System (IPAWS)

- NWS products are converted to CAP messages and transmitted across NWS dissemination systems and to FEMA IPAWS for WEA activation
- Common Alerting Protocol (CAP), the standard for IPAWS and WEA, is designed for polygons, FIPS codes/counties, and circles (not NWS zones)





# Geotargeting of WEA for Tropical Warnings

- Hurricane Warnings (HU.W) are geotargeted to cell phones at the **county** level
  - FIPS codes (counties) are used, so the WEA broadcast will reach beyond intended area (NWS zones) in some places
- EW.W and SS.W geotargeted to cell phones at **polygon** level
  - The EW.W is alerted like a tornado warning. The warning polygon is in the EWW product.
  - The SS.W is alerted using static, NWS zone-based polygons that are bound to the farthest inland extent hurricane storm surge is possible. These polygons are only available in the CAP message
- To access NWS CAP 1.2 data, please see:  
<https://alerts.weather.gov/#methods-get-cap-messages>
- For information about NWS-issued CAP, please see:  
[Public Information Statement \(PNSWSH\) 16-38](#)





# Common Alerting Protocol (CAP) Facilitates Innovation in Alerting and Decision Support

XML-based industry standard = low cost of entry for commercial developers

<event>Storm Surge Warning</event>

<urgency>Expected</urgency>

<severity>Extreme</severity>

<certainty>Likely</certainty>

Alert information  
at its most  
granular levels

<headline>Storm Surge Warning issued 3:05 PM EST by NWS...</headline>

<description>A Hurricane Warning means hurricane wind conditions are expected...</description>

<instruction>Aggressively prepare for the potential of devastating to...</instruction>

WEA text

<parameter><valueName>CMAMtext</valueName>

<value>**NWS: Life-threatening storm surge danger. Check for possible evacuation orders.**</value>

</parameter>

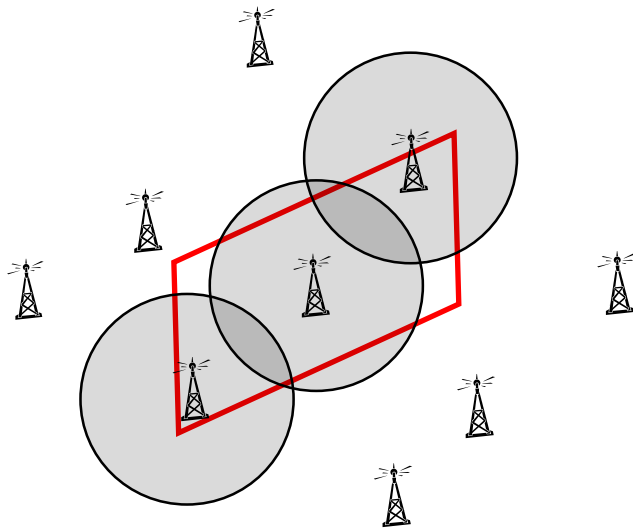
GIS friendly

<polygon>35.44,-77.26 35.43,-77.28 35.38,-77.28 35.33,-77.35 35.35,-77.39 35.41,-77.48 35.43,-77.47 35.40,-77.40 35.43,-77.36 35.41,-77.32 35.44,-77.26</polygon>

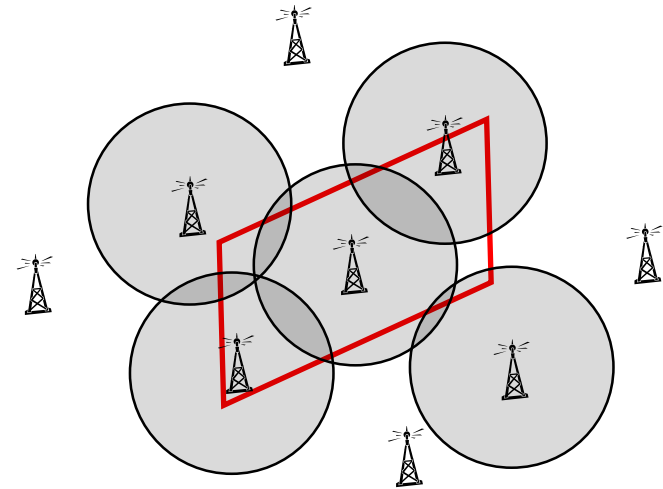
<polygon>35.48,-77.45 35.46,-77.47 35.49,-77.51 35.51,-77.50 35.48,-77.45</polygon>

# How Carriers Geotarget WEA

While efforts are underway to make NWS triggered WEA activations more targeted, there is still the potential for the message to be spread outside the intended warning area



Carriers generally broadcast WEA from cell towers within the defined warning area



They may broadcast from towers where signal overlaps the defined warning area

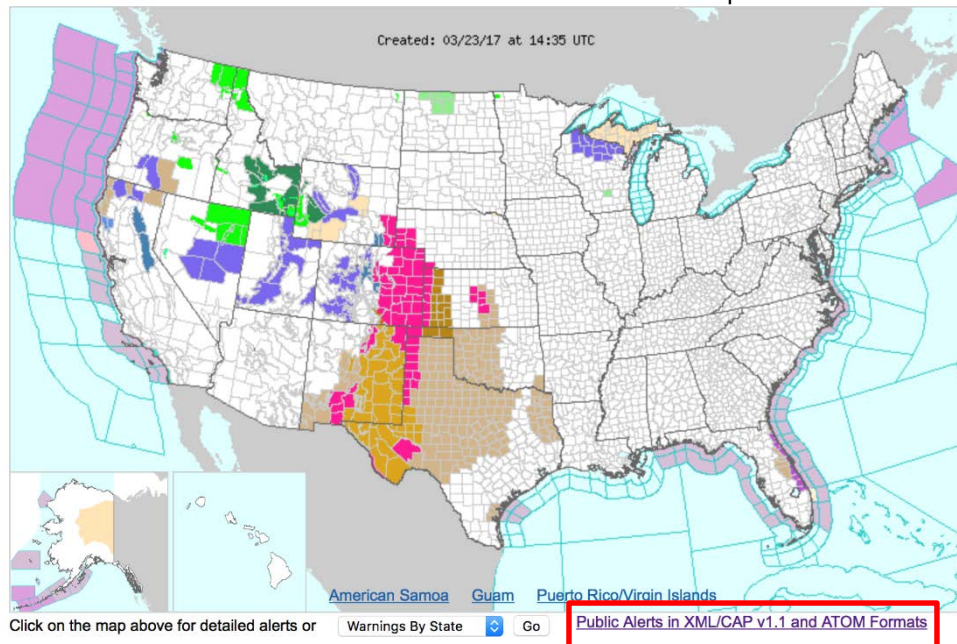


# NWS Front Page Map

## WWA (Watch/Warning/Advisory) Map

- SSWWs on the NWS' [weather.gov](https://weather.gov) Front Page (WWA) Map will be populated using CAP 1.2 data
- The WWA Map will display the geographic coverage of the entire area in each zone that is vulnerable to storm surge when the zone is included in the WFO TCV
  - It will be larger than the intended gridded warning area
  - The point forecast will be based on this area and will direct some users outside the gridded warning to the TCV for warning information
- SS Warning will be **Dark Purple**
- SS Watch will be **Light Purple**
- When you click on a warning link, only the TCV will be seen (not the CAP data)
- The CAP 1.2 data can be found on [alerts.weather.gov](https://alerts.weather.gov) or through the WWA Map legend

NOTE: There is no SSWW in this example





# Changes to the “National” TCV from NHC for the Atlantic basin

- New National TCV from NHC for the Atlantic compiles all tropical cyclone wind and surge watches and warnings into a single product
- The National TCV for the Atlantic will no longer contain breakpoints. It will list all NWS zones under a tropical cyclone watch or warning. [See SCN 17-23](#)
- ***Because of the time required to compile all of the tropical cyclone W/W information from the WFOs, the National TCV for the Atlantic will be delayed approximately 15 min relative to its previous availability, and may be issued up to 45 minutes after a special advisory***
- There will be no change in the issuance time of the WFO TCVs
- The National TCV does not contain plain language meteorological threats and potential impacts information like the local WFO TCV

Irene Watch/Warning Breakpoints/Advisory Number 22  
NWS National Hurricane Center Miami FL AL092017  
1115 AM EDT Wed Jul 12 2017

.Hurricane Irene

```
MDZ021>023-025-VAZ078-084-086-095-098-099-523>525-110830-  
/O.UPG.KNHC.SS.A.1009.000000T0000Z-000000T0000Z/  
/O.NEW.KNHC.SS.W.1009.170111T1330Z-000000T0000Z/  
/O.CON.KNHC.HU.A.1009.000000T0000Z-000000T0000Z/  
1115 AM E Wed Jul 12 2017  
$$
```

Truncated



# 2017 TCVAT# Example

WTNT81 KNHC 030123  
TCVAT1

Nate Watch/Warning Breakpoints/Advisory Number 6  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL812015  
823 PM EST WED DEC 2 2015

.Hurricane Nate.

Caution...this product only approximately conveys the extent of tropical cyclone wind and surge watches and warnings. Please see the latest Public Advisory from the National Hurricane Center for the precise lateral extent of wind watches and warnings along the coast...as well as the approximate lateral extent of surge watches and warnings. The precise extent of surge watches and warnings can be found in the NWS National Digital Forecast Database Hazard grids.

FLZ024-025-GAZ116>119-138>141-153-154-165-166-SCZ043-045-047>056-  
030930-  
/O.NEW.KNHC.HU.A.1001.151203T0123Z-000000T0000Z/  
/O.NEW.KNHC.SS.A.1001.151203T0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015

\$\$

FLZ032-033-037-038-NCZ045>047-080-081-093>095-098-103>110-030930-  
/O.NEW.KNHC.HU.A.1001.151203T0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015

\$\$

FLZ020>023-030-031-035-036-040-030930-  
/O.NEW.KNHC.TR.A.1001.151203Y0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015

\$\$

ATTN...WFO...CHS...ILM...JAX...MHX





# 2017 TCVAT# Example

WTNT81 KNHC 030123

**TCVAT1**

**Nate** Watch/Warning Breakpoints/**Advisory Number 6**  
NWS NATIONAL HURRICANE CENTER MIAMI FL **AL812015**  
823 PM EST WED DEC 2 2015

.Hurricane Nate.

Caution...this product only approximately conveys the extent of tropical cyclone wind and surge watches and warnings. Please see the latest Public Advisory from the National Hurricane Center for the precise lateral extent of wind watches and warnings along the coast...as well as the approximate lateral extent of surge watches and warnings. The precise extent of surge watches and warnings can be found in the NWS National Digital Forecast Database Hazard grids.

**FLZ024-025-GAZ116>119-138>141-153-154-165-166-SCZ043-045-047>056-030930-  
/O.NEW.KNHC.HU.A.1001.151203T0123Z-000000T0000Z/  
/O.NEW.KNHC.SS.A.1001.151203T0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015**

\$\$

**FLZ032-033-037-038-NCZ045>047-080-081-093>095-098-103>110-030930-  
/O.NEW.KNHC.HU.A.1001.151203T0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015**

\$\$

**FLZ020>023-030-031-035-036-040-030930-  
/O.NEW.KNHC.TR.A.1001.151203Y0123Z-000000T0000Z/  
823 PM EST WED DEC 2 2015**

\$\$

ATTN...WFO...CHS...ILM...JAX...MHX



## "National" TCV for the Pacific

### **No changes to the "National" TCVs for the Pacific in 2017**

- TCVEP# - Eastern North Pacific TCV from NHC will continue to supply VTEC for the coastal tropical cyclone wind warning area between coastal breakpoints only
- TCVCP# - Central North Pacific TCV from CPHC will continue to supply VTEC for islands under a tropical cyclone wind warning only



# 2017 TCVEP# and TCVCP# Examples

## TCVEP# Example

WTPZ85 KNHC 202100  
TCVEP5

TEST WATCH/WARNING BREAKPOINTS/ADVISORY NUMBER 1  
NWS NATIONAL HURRICANE CENTER MIAMI FL EP802016  
200 PM PDT WED JUL 20 2016

.TROPICAL STORM TEST

CAZ043-210300-  
/O.NEW.KNHC.TR.W.2080.160720T2100Z-000000T0000Z/  
200 PM PDT WED JUL 20 2016

SAN-ONOFRE-STATE-BEACH-CA	33.39N 117.59W
MOUTH-OF-TIJUANA-RIVER-CA	32.53N 117.12W

\$\$

CAZ041-087-552-210300-  
/O.NEW.KNHC.TR.A.2080.160720T2100Z-000000T0000Z/  
200 PM PDT WED JUL 20 2016

POINT-MUGU-CA	34.11N 119.12W
SAN-ONOFRE-STATE-BEACH-CA	33.39N 117.59W

\$\$

ATTN...WFO...LOX...SGX...

## TCVCP# Example

WTPA81 PHFO 292041  
TCVCP1

FLOSSIE WATCH/WARNING BREAKPOINTS/ADVISORY NUMBER 20  
NWS CENTRAL PACIFIC HURRICANE CENTER HONOLULU HI  
EP062013  
1100 AM HST MON JUL 29 2013

.TROPICAL STORM FLOSSIE

HIZ001-004-005-011-012-022-023-028-300300-  
/O.CON.PHFO.TR.W.2006.130729T2100Z-000000T0000Z/  
1100 AM HST MON JUL 29 2013

HAWAII	19.65N 155.50W
KAUAI-NIIHAU	22.06N 159.51W
MAUI-MOLOKAI-LANAI-KAHOOLAWE	20.80N 156.35W
OAHU	21.46N 158.00W

\$\$

ATTN...WFO...HFO...

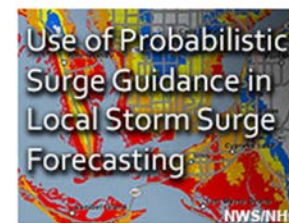


# Educational Resources

## Storm surge and tropical cyclone related COMET modules online

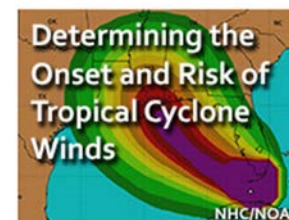
<https://www.meted.ucar.edu>

- Introduction to Tropical Cyclone Storm Surge
- Storm Surge and Datums (also in Spanish)
- Forecasting Tropical Cyclone Storm Surge (also in Spanish)
- Determining the Onset and Risk of Tropical Cyclone Winds
- Tropical Cyclone Forecast Uncertainty
- Real-Time Storm Surge Products



Use of Probabilistic Surge Guidance in Local Storm Surge Forecasting

Languages: English  
Publish Date: 2015-07-20  
Skill Level: 2  
Completion Time: .75 - 1.00 h  
Topics: Tropical/Hurricanes  
★★★★★ (0 reviews)



Determining the Onset and Risk of Tropical Cyclone Winds

Languages: English  
Publish Date: 2015-07-01  
Skill Level: 1  
Completion Time: .50 - .75 h  
Topics: Tropical/Hurricanes  
★★★★★ (0 reviews)

## Webinars sponsored by NOAA's Southeast & Caribbean Regional Team

<http://www.regions.noaa.gov/secar/#>

- Planned for May/early June
- Geared toward emergency managers and broadcast meteorologists

NOAA REGIONAL COLLABORATION  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME REGIONAL TEAM REGIONAL SNAPSHOT RESOURCES NOAA IN THE REGION REGIONS Search Here

Southeast & Caribbean Region

Hurricane Storm Surge Products Webinar

Hurricane Storm Surge Products Webinar

NHC Hurricane Specialist Robbie Berg conducted a webinar on May 20th, 2015, sponsored by NOAA's Southeast and Caribbean Regional Team. Robbie began the webinar by discussing the challenges in forecasting storm surge and communicating warnings clearly to emergency managers and the public. He provided a primer on storm surge modeling and then reviewed NHC's 2015 storm surge product changes. These changes include a new prototype Storm Surge Watch/Warning Graphic for the public, and a Potential Storm Surge Flooding map intended for decision makers. Additional information on these two products and map examples are available online at: <http://www.nhc.noaa.gov/experimental/foundation>

Users are encouraged to provide feedback on this experimental product by using the brief survey and comment form available online at: <http://www.nws.noaa.gov/survey/nws-survey.php?code=PSSFM>

Robbie's Presentation (audio and visual - note that the first 2 minutes and 9 seconds of the presentation are audio only and screen will be dark)

PPT Presentation (visual only)



# Sample Data

**Sample data is available on the NHC Website**

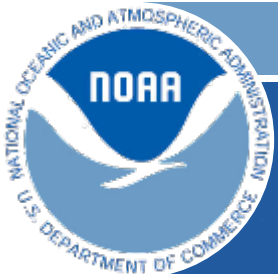
**<http://www.nhc.noaa.gov/2017examples>**

**<http://www.nhc.noaa.gov/gis/>**

**Sample data available for download include:**

- ✓ WFO TCV text file
- ✓ National TCV text file
- ✓ WFO HLS text file
- ✓ Storm Surge Watch/Warning CAP
- ✓ GRIB2 Hazard Grid including a Storm Surge Watch and Warning
- ✓ Potential TC Advisory Package
- ✓ Examples of new TC Graphics
- ✓ SSWW Graphic KML
- ✓ Inundation Graphic GeoTIFF
- ✓ Hurricane Threats and Impacts KMLs
- ✓ 34-, 50-, and 64-kt Wind Swath GRIB2 data





# Questions

NWS Tropical Services Program Leader:

Jessica Schauer

[jessica.schauer@noaa.gov](mailto:jessica.schauer@noaa.gov)

305-229-4476



NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



# Backup