NHC Forecasts
There is a Storm. What’s the Info?

National Weather Service
Tropical Cyclone Products
NHC provides the “big picture” that complements and guides local NWS forecast office products.
National Weather Service

Tropical Cyclone Products

> 5 Days
Few products
Large uncertainty

3-5 Days
More products
Forecast hazards

2-3 Days
Detailed products

1-2 Days

Outlook

5 Day Forecast
Public Advisory
Wind Speed %
Forecast Discussion

TS/Hurricane Watches

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

Warnings
What’s going on in the Tropics?
Anything to worry about?
How many days out is the storm?
How strong?
What do the forecasters really think?
National Hurricane Center
Text Products

- Tropical Weather Outlook
- Public Advisory
- Forecast Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Tropical Cyclone Update
- Tropical Cyclone Reports
- Monthly Tropical Weather Summary
Situational Awareness

What’s going on in the tropics?

• Tropical Weather Outlook
Tropical Outlook

Scheduled Updates

• 2 am – Tropical Outlook
• 8 am – Tropical Outlook
• 2 pm – Tropical Outlook
• 8 pm – Tropical Outlook

Time in EDT
For the North Atlantic...Caribbean Sea and the Gulf of Mexico:

Showers and thunderstorms associated with an area of low pressure located over the southwestern Bay of Campeche have changed little in organization since this afternoon. This system has the potential to become a tropical cyclone during the next couple of days while it moves slowly eastward across the southern Bay of Campeche. Later in the week, the low is forecast to interact and possibly merge with a frontal system over the southeastern Gulf of Mexico or northwestern Caribbean Sea. An Air Force Reserve reconnaissance aircraft is scheduled to investigate the disturbance tomorrow afternoon, if necessary. Interests in the Yucatan Peninsula should monitor the progress of this system.

* Formation chance through 48 hours...medium...50 percent.
* Formation chance through 5 days...medium...60 percent.

Forecaster Brown
For the North Atlantic...Caribbean Sea and the Gulf of Mexico:

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Forecaster Brown
Situational Awareness

Do we need to be concerned?

• Graphical Tropical Outlook
  (Tropical Outlook Probabilities)
Tropical Outlook
2-Day Formation Potential

Current location of disturbances (discussed in the Tropical Weather Outlook)

Formation chance during the next 48 hrs

- Categorical (Low, Medium, and High)
- Probabilities
Tropical Outlook

2-Day Formation Potential

Should we be concerned?
Tropical Outlook
5-Day Formation Potential

- Formation potential during the next 5 days
- Initial location of disturbance (X) indicated
- Shading represents potential formation area

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

8 AM Sat
8 PM Fri
8 PM Thu
8 PM Wed
8 PM Tue
8:00 am EDT Thu Jul 31 2014

Tropical Storm Bertha
Thursday July 31, 2014
11 PM AST Advisory 1
NWS National Hurricane Center

Current information: x
Center location 12.3 N 55.5 W
Maximum sustained wind 45 mph
Movement WNW at 20 mph

Forecast positions: Tropical Cyclone Post-Tropical
Sustained winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110 mph

Potential track area:

Day 1-3 Day 4-5

Watches:

Hurricane Trop Stm

Warnings:

Hurricane Trop Stm

Current wind extent:

Experimental 5-Day Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida

Note: The cone contains the probable path of the storm center but does not show the size of the storm. Hazardous conditions can occur outside of the cone.
Special outlook issued to update discussion of the area of low pressure east of Florida.

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

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

Significant or unexpected changes

SPECIAL TROPICAL WEATHER OUTLOOK
NWS NATIONAL HURRICANE CENTER MIAMI FL
430 PM EDT MON JUN 30 2014

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

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* For more information, call 410-634-1793 or visit www.nhc.noaa.gov.

Watches possible?
Tropical Cyclones
- Tropical Depressions
- Tropical Storms
- Hurricanes

Post-Tropical Cyclones
- Remains a threat to land (e.g., Sandy & Hermine)

Potential Tropical Cyclones
- Systems not yet a tropical cyclone
- Threat of TS-force winds to land within 48 hours. (New for 2017)
There is a storm.

What’s the info?

Hurricane ISAAC

...ISAAC DRENCHING SOUTHEASTERN LOUISIANA...DANGEROUS STORM SURGE AND FLOOD THREAT FROM HEAVY RAINS LIKELY TO CONTINUE THROUGH TONIGHT... ...U.S. Warnings in Effect...

10:00 AM CDT Wed Aug 29
Location: 29.6°N 90.7°W
Moving: NW at 6 mph
Min pressure: 972 mb
Max sustained: 75 mph

Public Advisory #10
1000 AM CDT

Aviso Publico #10
1000 AM EDT

Forecast Advisory #10
1500 UTC

Forecast Discussion #10
1000 AM CDT

Wind Speed Probabilities #10
1500 UTC

NWS Local Statements
US Watch/Warning 1000 AM EDT

Hurricane Wind Speed Probability
50-knot Wind Speed Probability
Trop Storm Wind Speed Probability
Wind History

Warnings/Cone Interactive Map
Warnings/Cone Static Images
Warnings and Surface Wind
Mariner’s 1-2-3 Rule

Storm Surge Inundation
U.S. Rainfall Potential
There is a storm.

How strong?
What are the hazards?
Any warnings?

• Public Advisory
HURRICANE ISAAC ADVISORY NUMBER 34
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092012
1000 AM CDT WED AUG 29 2012

... ISAAC DRENCHING SOUTHEASTERN LOUISIANA...DANGEROUS STORM SURGE AND FLOOD THREAT FROM HEAVY RAINS LIKELY TO CONTINUE THROUGH TONIGHT...

SUMMARY OF 1000 AM CDT...1500 UTC...INFORMATION
-----------------------------------------------
LOCATION...29.6N 90.7W
ABOUT 0 MI...0 KM N OF HOUMA LOUISIANA
ABOUT 45 MI...75 KM SW OF NEW ORLEANS LOUISIANA
MAXIMUM SUSTAINED WINDS...75 MPH...120 KM/H
PRESENT MOVEMENT...NW OR 310 DEGREES AT 6 MPH...9 KM/H
MINIMUM CENTRAL PRESSURE...972 MB...28.70 INCHES

WATCHES AND WARNINGS
----------------------
CHANGES WITH THIS ADVISORY...

The Tropical Storm Warning has been discontinued east of the Alabama-Florida border.
HURRICANE ISÁAC ADVISORY NUMBER 34
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092012
1000 AM CDT WED AUG 29 2012

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WATCHES AND WARNINGS
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A HURRICANE WARNING IS IN EFFECT FOR...
* EAST OF MORGAN CITY LOUISIANA TO THE MISSISSIPPI-ALABAMA BORDER...
  INCLUDING METROPOLITAN NEW ORLEANS...LAKE PONTCHARTRAIN...AND LAKE
  MAUREPAS
At 1000 AM CDT, 1500 UTC, the center of Hurricane Isaac was located by NOAA Doppler weather radar near latitude 29.6 North, longitude 90.7 West, or very near Houma, Louisiana. Isaac is moving toward the northwest near 6 mph (9 km/h). This general motion is expected to continue through tonight, followed by a turn toward the north-northwest by Thursday night or early Friday. On the forecast track, the center of Isaac will move farther inland over Louisiana today and tomorrow, and over southern Arkansas by early Friday.

Maximum sustained winds have decreased to near 75 mph (120 km/h) with higher gusts. Isaac is a category one hurricane on the Saffir-Simpson Hurricane Wind Scale. Gradual weakening is forecast during the next 48 hours as the hurricane continues moving farther inland and Isaac is expected to weaken to a tropical storm later today.

Hurricane-force winds extend outward up to 45 miles (75 km) from the center, and tropical-storm-force winds extend outward up to 175 miles (280 km).

A gust to 74 mph was recently reported at the Mid Lake station in Lake Pontchartrain and a wind gust to 63 mph was reported at New Orleans International Airport.
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HAZARDS AFFECTING LAND

STORM SURGE...THE COMBINATION OF A STORM SURGE AND THE TIDE WILL CAUSE NORMALLY DRY AREAS NEAR THE COAST TO BE FLOODED BY RISING WATERS. THE WATER COULD REACH THE FOLLOWING DEPTHS ABOVE GROUND IF THE PEAK SURGE OCCURS AT THE TIME OF HIGH TIDE...

* MISSISSIPPI AND SOUTHEASTERN LOUISIANA...6 TO 12 FT
* ALABAMA...3 TO 6 FT
* SOUTH-CENTRAL LOUISIANA...3 TO 6 FT
* FLORIDA PANHANDLE AND APALACHEE BAY...2 TO 4 FT

THE DEEPEST WATER WILL OCCUR ALONG THE IMMEDIATE COAST IN AREAS OF ONSHORE WINDS. SURGE-RELATED FLOODING DEPENDS ON THE RELATIVE TIMING OF THE SURGE AND THE TIDAL CYCLE...AND CAN VARY GREATLY OVER SHORT DISTANCES. FOR INFORMATION SPECIFIC TO YOUR AREA...PLEASE SEE PRODUCTS ISSUED BY YOUR LOCAL WEATHER SERVICE OFFICE. NEAR THE COAST...THE SURGE WILL BE ACCOMPANIED BY LARGE AND DANGEROUS WAVES.

STORM SURGE VALUES OF NEAR 8 FEET HAVE RECENTLY BEEN REPORTED AT SHELL BEACH LOUISIANA AND WAVELAND MISSISSIPPI.

WIND...TROPICAL STORM CONDITIONS WILL CONTINUE ACROSS THE WARNING AREA TODAY...AND HURRICANE CONDITIONS WILL CONTINUE TO AFFECT PORTIONS OF SOUTHEASTERN LOUISIANA AND MISSISSIPPI IN THE HURRICANE WARNING AREA INTO THIS AFTERNOON.
HAZARDS AFFECTING LAND

WIND...TROPICAL STORM CONDITIONS WILL CONTINUE ACROSS THE WARNING AREA TODAY...AND HURRICANE CONDITIONS WILL CONTINUE TO AFFECT PORTIONS OF SOUTHEASTERN LOUISIANA AND MISSISSIPPI IN THE HURRICANE WARNING AREA INTO THIS AFTERNOON.

WINDS AFFECTING THE UPPER FLOORS OF HIGH-RISE BUILDINGS WILL BE SIGNIFICANTLY STRONGER THAN THOSE NEAR GROUND LEVEL. AT ABOUT THE 30TH STORY...WINDS WOULD LIKELY BE ONE SAFFIR-SIMPSON CATEGORY STRONGER THAN AT THE SURFACE.

RAINFALL...ISAAC IS EXPECTED TO PRODUCE TOTAL RAINFALL AMOUNTS OF 7 TO 14 INCHES...WITH POSSIBLE ISOLATED MAXIMUM AMOUNTS OF 20 INCHES...OVER MUCH OF LOUISIANA...SOUTHERN MISSISSIPPI...AND SOUTHWEST ALABAMA THROUGH FRIDAY MORNING. THESE RAINS COULD RESULT IN SIGNIFICANT LOWLAND FLOODING. RAINS ARE EXPECTED TO INCREASE NORTHWARD INTO ARKANSAS ON THURSDAY...WITH AMOUNTS OF 3 TO 6 INCHES EXPECTED OVER SOUTHERN ARKANSAS BY FRIDAY MORNING.

TORNADOES...ISOLATED TORNADOES ARE POSSIBLE ALONG THE CENTRAL GULF COAST REGION AND PARTS OF THE LOWER MISSISSIPPI RIVER VALLEY THROUGH THURSDAY.

SURF...DANGEROUS SURF AND RIP CURRENT CONDITIONS WILL CONTINUE TO AFFECT THE WEST COAST OF FLORIDA AND THE NORTHERN GULF COAST FOR THE
...ISAAC SOAKING SOUTHEASTERN LOUISIANA AND SOUTHERN MISSISSIPPI WITH HEAVY RAIN...DANGEROUS COASTAL STORM SURGE AND INLAND FLOOD THREAT EXPECTED THROUGH TONIGHT...

SUMMARY OF 100 PM CDT...1800 UTC...INFORMATION
-------------------------------------------------------------------
LOCATION...29.7N 90.8W
ABOUT 10 MI...15 KM NW OF HOUMA LOUISIANA
ABOUT 45 MI...75 KM WSW OF NEW ORLEANS LOUISIANA
MAXIMUM SUSTAINED WINDS...75 MPH...120 KM/H
PRESENT MOVEMENT...NW OR 310 DEGREES AT 6 MPH...9 KM/H
MINIMUM CENTRAL PRESSURE...973 MB...28.73 INCHES

WATCHES AND WARNINGS
----------------------
A HURRICANE WARNING IS IN EFFECT FOR...
* EAST OF MORGAN CITY LOUISIANA TO THE MISSISSIPPI-ALABAMA BORDER...
INCLUDING METROPOLITAN NEW ORLEANS...LAKE PONTCHARTRAIN...AND LAKE MAUREPAS
There is a storm.

How big is it?

Where is it going?

I can’t wait!

• Forecast Advisory
HURRICANE ISAAC FORECAST/ADVISORY NUMBER 34
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092012
1500 UTC WED AUG 29 2012

THE TROPICAL STORM WARNING HAS BEEN DISCONTINUED EAST OF THE ALABAMA-FLORIDA BORDER.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT...

A HURRICANE WARNING IS IN EFFECT FOR...
* EAST OF MORGAN CITY LOUISIANA TO THE MISSISSIPPI-ALABAMA BORDER...
INCLUDING METROPOLITAN NEW ORLEANS...LAKE PONTCHARTRAIN...AND LAKE MAUREPAS

HURRICANE CENTER LOCATED NEAR 29.6N 90.7W AT 29/1500Z
POSITION ACCURATE WITHIN 15 NM

PRESENT MOVEMENT TOWARD THE NORTHWEST OR 310 DEGREES AT 5 KT

ESTIMATED MINIMUM CENTRAL PRESSURE 972 MB
MAX SUSTAINED WINDS 65 KT WITH GUSTS TO 80 KT.
64 KT........ 30NE 40SE 0SW 0NW.
50 KT........ 80NE 70SE 40SW 40NW.
34 KT........150NE 150SE 140SW 100NW.
12 FT SEAS..180NE 240SE 90SW 0NW.
WINDS AND SEAS VARY GREATLY IN EACH QUADRANT. RADII IN NAUTICAL
THE TROPICAL STORM WARNING HAS BEEN DISCONTINUED EAST OF THE ALABAMA-FLORIDA BORDER.

SUMMARY OF WATCHES AND WARNINGS IN EFFECT...

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POSITION ACCURATE WITHIN  15 NM

PRESENT MOVEMENT TOWARD THE NORTHWEST OR 310 DEGREES AT   5 KT

ESTIMATED MINIMUM CENTRAL PRESSURE  972 MB
MAX SUSTAINED WINDS   65 KT WITH GUSTS TO  80 KT.

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WINDS AND SEAS VARY GREATLY IN EACH QUADRANT   RADII IN NAUTICAL Leads to an inherent over-estimate of radii, especially near land

NHC estimates and forecast cyclone "size" via wind radii in four quadrants

Radii represent the largest distance from the center in particular quadrant
Forecast Advisory


NHC estimates and forecast cyclone “size” via wind radii in four quadrants

<table>
<thead>
<tr>
<th>Forecast Time</th>
<th>34 kt</th>
<th>50 kt</th>
<th>64 kt</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 hr</td>
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<tr>
<td>48 hr</td>
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<td>72 hr</td>
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<tr>
<td>96 hr</td>
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<tr>
<td>120 hr</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
There is a storm.

Chance for some effects?
Will we get hurricane winds?
Staging areas safe?

• Wind Speed Probabilities
# Wind Speed Probabilities


<table>
<thead>
<tr>
<th>Location</th>
<th>Wind Speed (KTS)</th>
</tr>
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<tbody>
<tr>
<td>OCEAN CITY MD</td>
<td>34</td>
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<tr>
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</tr>
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<td>OCEAN CITY MD</td>
<td>64</td>
</tr>
<tr>
<td>RICHMOND VA</td>
<td>34</td>
</tr>
<tr>
<td>NORFOLK NAS</td>
<td>34</td>
</tr>
<tr>
<td>NORFOLK NAS</td>
<td>50</td>
</tr>
<tr>
<td>NORFOLK VA</td>
<td>34</td>
</tr>
<tr>
<td>NORFOLK VA</td>
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</table>

- **Tropical-Storm-Force**
  - 58 mph
- **Hurricane-Force**
## Wind Speed Probabilities

**How Likely. Arrival Times. Inland Threat.**

### Location-specific Probabilities
- **Tropical-Storm-Force**
- **58 mph**
- **Hurricane-Force**

---

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# Wind Speed Probabilities


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Location-specific Probabilities

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force
**Wind Speed Probabilities**


---

**TROPICAL DEPRESSION ONE WIND SPEED PROBABILITIES NUMBER 1**

NWS NATIONAL HURRICANE CENTER MIAMI FL AL012014

0300 UTC TUE JUL 01 2014

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**- - - - WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS - - - -**

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**Location-specific Probabilities**

- Tropical-Storm-Force
- 58 mph
- Hurricane-Force
# Wind Speed Probabilities


### Location-specific Probabilities
- Tropical-Storm-Force
- Hurricane-Force

## Onset Probabilities
- Timing information

---

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# Wind Speed Probabilities

**How Likely. Arrival Times. Inland Threat.**

---

## Location-specific Probabilities

- **Tropical-Storm-Force**
- **Hurricane-Force**

### Onset Probabilities

- **Timing information**

---

## Table: Wind Speed Probabilities

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TROPICAL DEPRESSION ONE WIND SPEED PROBABILITIES NUMBER 1
NWS NATIONAL HURRICANE CENTER MIAMI FL AL012014
0300 UTC TUE JUL 01 2014

- - - - WIND SPEED PROBABILITIES FOR SELECTED LOCATIONS - - - -

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Location-specific Probabilities
- Tropical-Storm-Force
- Hurricane-Force

Onset Probabilities
- Timing information

Cumulative probabilities
- Total risk through the time period
## Wind Speed Probabilities

**How Likely. Arrival Times. Inland Threat.**

### Location-specific Probabilities
- **Tropical-Storm-Force**
- **58 mph**
- **Hurricane-Force**

### Onset Probabilities
- **Timing information**

### Cumulative probabilities
- **Total risk through the time period**

---

**TROPICAL DEPRESSION ONE WIND SPEED PROBABILITIES NUMBER 1**

NWS NATIONAL HURRICANE CENTER MIAMI FL AL012014

0300 UTC TUE JUL 01 2014

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### Wind Speed Probabilities for Selected Locations

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**NATIONAL HURRICANE CENTER**

National Oceanic and Atmospheric Administration

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**Location-specific Probabilities**
- Tropical-Storm-Force
- 58 mph
- Hurricane-Force

**Onset Probabilities**
- Timing information

**Cumulative probabilities**
- Total risk through the time period
There is a storm.

How confident is the NHC?

Contingencies?

Are watches possible?

• Forecast Discussion
An Air Force Reserve Hurricane Hunter aircraft reported 700-mb flight-level winds of 119 kt in the northwestern eyewall, with a 117 kt surface wind estimate from the Stepped Frequency Microwave Radiometer in the southwestern eyewall. The latest central pressure was 942 mb. Based on these data, the advisory intensity is increased to 110 kt. Satellite imagery indicates that an eye is trying to form in the central dense overcast, and that the cirrus outflow is good in all directions. Joaquin is expected to intensify a little more in the next 12 to 24 hours as it remains over very warm waters and in an environment of decreasing vertical shear. After that time, there could be some fluctuations in intensity due to eyewall replacement cycles. There is some uncertainty in the intensity forecast in the 48-96 hour period. The statistical models suggest that Joaquin should weaken due to increasing shear. However, several of the global models forecast the hurricane to move into an area of strong upper-level divergence and show a falling central pressure. The new forecast will continue to show weakening during this time, but it would not be a surprise if it is stronger than currently forecast. The initial motion is 220/5. Water vapor imagery shows a mid- to upper-level ridge north of the hurricane, with a developing deep-layer trough over the eastern and southeastern United States. The
KEY MESSAGES:

1. Preparations to protect life and property in the central Bahamas should be complete. The slow motion of Joaquin over the next day or so will bring a prolonged period of hurricane force winds, storm surge, and very heavy rainfall to those islands.

2. Confidence in the details of the forecast after 72 hours is still low, since there have been some large changes in the model guidance overnight and a large spread in the model solutions remains, with potential impacts from the Carolinas through New England. It is also possible that Joaquin will remain far from the U.S. east coast. A hurricane watch for the U.S. coast would likely not occur until at least Friday morning.

3. Efforts to provide the forecast models with as much data as possible continue, with twice daily NOAA G-IV jet missions in the storm environment, and extra NWS balloon launches.

4. It's too early to talk about specific wind, rain, or surge impacts from Joaquin in the United States. Regardless of Joaquin's track, strong onshore winds will create minor to moderate coastal flooding along the coasts of the mid-Atlantic and northeastern states through the weekend.

5. Many portions of the eastern U.S. are currently experiencing
4. It's too early to talk about specific wind, rain, or surge impacts from Joaquin in the United States. Regardless of Joaquin's track, strong onshore winds will create minor to moderate coastal flooding along the coasts of the mid-Atlantic and northeastern states through the weekend.

5. Many portions of the eastern U.S. are currently experiencing heavy rains and gusty winds associated with a frontal system. These heavy rains are likely to continue for the next few days, even if the center of Joaquin stays offshore. The resulting inland flood potential could complicate preparations for Joaquin should it head toward the coast, and even more substantial inland flooding is possible if Joaquin later passes near or over these same areas.

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<td>120H 06/1200Z  40.0N  72.5W  55 KT  65 MPH</td>
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HURRICANE ISaac TROPICAL CYCLONE UPDATE
NWS NATIONAL HURRICANE CENTER MIAMI FL AL092012
1100 AM CDT WED AUG 29 2012

...ISAAC CONTINUES TO MOVE SLOWLY OVER SOUTHEASTERN LOUISIANA...
HEAVY SQUALLS LASHING NEW ORLEANS AND THE MISSISSIPPI COAST...

At 1100 am CDT...1600 UTC...The center of hurricane Isaac was
Estimated near latitude 29.6 north...Longitude 90.7 west...Or very
Near Houma Louisiana...And about 45 miles southwest of New Orleans
Louisiana. Isaac is moving toward the northwest near 6 mph...9
Km/h and this general motion is expected to continue through
tonight.

A gust to 67 mph was recently reported at Shell Beach, Louisiana.
Tropical storm conditions continue along the Mississippi and
Alabama coasts.

SUMMARY OF 1100 AM CDT...1600 UTC...INFORMATION
-------------------------------------------------------------------
LOCATION...29.6N 90.7W
ABOUT 1 MI...2 KM W OF HOUMA LOUISIANA
ABOUT 45 MI...75 KM SW OF NEW ORLEANS LOUISIANA
MAXIMUM SUSTAINED WINDS...75 MPH...120 KM/H
PRESENT MOVEMENT...NW OR 310 DEGREES AT 6 MPH...9 KM/H
MINIMUM CENTRAL PRESSURE...972 MB...28.70 INCHES

$$
FORECASTER STEWART/BEVEN/ZELINSKY
There is a storm.

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

- Watches and Warnings
Storm Surge Watch

- There is the **possibility** of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within **48 hours**.

Storm Surge Warning

- There is a **danger** of life-threatening inundation from rising water moving inland from the shoreline somewhere within the specified area, generally within **36 hours**.
Hurricane Watch
• Hurricane conditions are possible within the watch area, generally within 48 hours

Hurricane Warning
• Hurricane conditions are expected within the warning area, generally within 36 hours

Note: The lead time for Hurricane Watches and Warnings is tied to the anticipated arrival time of tropical-storm-force winds
Warnings issued 36 hours prior to anticipated arrival of Tropical-Storm-Force winds.
Where would you issue the hurricane warning?
Must account for track and size (wind radii) uncertainties when issuing watches or warnings.

Where would you issue the hurricane warning?
There is a storm.
When is the next update?
Can we get a briefing?

• Timeline for advisories
Timeline for Advisories

Scheduled Updates

No Watches/Warnings In Effect

- 5 am – Advisory
- 11 am – Advisory
- 5 pm – Advisory
- 11 pm – Advisory

Time in EDT
Timeline for Advisories

Scheduled Updates

- 5 am – Advisory
- 8 am – Intermediate Advisory
- 11 am – Advisory
- 2 pm – Intermediate Advisory
- 5 pm – Advisory
- 8 pm – Intermediate Advisory
- 11 pm – Advisory
- 2 am – Intermediate Advisory

Time in EDT
Timeline for Advisories

Scheduled Updates

- 5 am – Advisory
- 6 am – Tropical Cyclone Update
- 7 am – Tropical Cyclone Update
- 8 am – Intermediate Advisory
- 9 am – Tropical Cyclone Update
- 10 am – Tropical Cyclone Update
- 11 am – Advisory

Watches/Warnings In Effect and Eye Tracked by Radar

Time in EDT
Special Advisory

- Issued whenever an unexpected significant change has occurred
- When watches or warnings are to be issued between regularly scheduled advisories.

(Watches or warnings may be discontinued on intermediate public advisories.)
There is a storm.
Many words... little time.
Any pictures to help explain?

• NHC Graphical Products
...ISAAC DRENCHING SOUTHEASTERN LOUISIANA...DANGEROUS STORM SURGE AND FLOOD THREAT FROM HEAVY RAINS LIKELY TO CONTINUE THROUGH TONIGHT... ...U.S. Warnings in Effect...

<table>
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<tr>
<th>Time</th>
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<td>NW at 6 mph</td>
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<td>75 mph</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Public Advisory #10</th>
<th>Aviso Publico #10</th>
<th>Forecast Advisory #10</th>
<th>Forecast Discussion #10</th>
<th>Wind Speed Probabilities #10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 AM CDT</td>
<td>1000 AM EDT</td>
<td>1500 UTC</td>
<td>1000 AM CDT</td>
<td>1500 UTC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>NWS Local Statements</th>
<th>US Watch/Warning</th>
<th>Wind History</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 AM CDT</td>
<td>1000 AM EDT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5 Day – Forecast Cone

Probable Track. Watches. Warnings.

Tropical Storm Isaac
Sunday August 26, 2012
5 AM EDT Advisory 21
NWS National Hurricane Center

Current information: ●
Center location 23.1 N 79.0 W
Maximum sustained wind 65 mph
Movement NW at 18 mph

Forecast positions:
• Tropical Cyclone  ○ Post-Tropical
Sustained winds:  D < 39 mph
S 39-73 mph  H 74-110 mph  M > 110 mph

Potential track area: Watches:
Day 1-3  Hurricane  Yellow  Trop Stm
Day 4-5  Hurricane  Blue  Trop Stm

Warnings:

Current wind extent:
NHC Forecast Cone

The cure for the skinny black line?

• Probable track of tropical cyclone center

• Formed by connecting circles centered on each forecast point

• Each circle uses NHC historical track errors. Actual storm position will be within the circle 67% of the time.
• Only displays information about track uncertainty
  No information about specific impacts

• Impacts can occur well outside the area enclosed by the cone
  Center is expected to move outside the cone about 1/3 of the time.

NHC Forecast Cone
No worries, not in the cone?
Wind Speed Probabilities
How Likely. Arrival Times. Inland Threat

Depicts location-specific probabilities
- Tropical-storm-force
- 58 mph
- Hurricane-force
Earliest reasonable (10%) onset
Depicts the time window that one can safely assume will be free from TS-force winds

Most likely (50%) onset
Depicts the time before or after which the onset is equally likely

Accounts for track, intensity, and size uncertainties.
Surface Wind Field
Size. Watches. Warnings.

- Wind field
- Past track
- Current watches & warnings
Cumulative Wind History

Areas Affected

Areas potentially affected by the Tropical Cyclone (through that advisory)

- Tropical Storm (in orange)
- Hurricane (in red)
Storm Surge

Potential Inundation Graphic

Potential Storm Surge Flooding*

- Intertidal Zone/Estuarine Wetland
- Greater than 1 foot above ground
- Greater than 3 feet above ground
- Greater than 6 feet above ground
- Greater than 9 feet above ground
- Leved area
  Consult local officials for flood risk

*Displayed flooding values indicate the water height that has about a 1-in-10 (10%) chance of being exceeded.
Local point maximum rainfall may be higher than shown.
Excessive Rainfall
Weather Prediction Center

Day 1 Excessive Rainfall Outlook
Valid 12Z Sat Oct 08 2016
Thru 12Z Sun Oct 09 2016
Issued: 0812Z Sat Oct 08 2016
Forecaster: BURKE
NOAA/NWS/NCEP/WPC

Risk of rainfall exceeding flash flood guidance to the right of a line
HIGH: > 15%  SLGT: 5%-10%
MDT: 10%-15%  MRGL: 2%-5%
NHC GIS Products

hurricanes.gov/GIS

- Forecast Track/Cone/Watches and Warnings
- Surface Wind Field
- Past Wind Swath
- Forecast Wind Radii
- Breakpoints
- Wind Speed Probability
- Probabilistic Storm Surge
There is a storm.

Local impacts?
Localized forecast information?

• NWS Forecast Offices
...ISAAC DRENCHING SOUTHEASTERN LOUISIANA...DANGEROUS STORM SURGE AND FLOOD THREAT FROM HEAVY RAINS LIKELY TO CONTINUE THROUGH TONIGHT... U.S. WARNINGS IN EFFECT...

10:00 AM CDT Wed Aug 29
Location: 29.6°N 90.7°W
Moving: NW at 6 mph
Min pressure: 972 mb
Max sustained: 75 mph

PUBLIC
Advisory
#10
1000 AM CDT

AVISO
Publico
#10
1000 AM EDT

FORECAST
Advisory
#10
1500 UTC

FORECAST
Discussion
#10
1000 AM CDT

WIND SPEED PROBABILITIES
#10
1500 UTC

NWS Local Statements
US Watch/Warning
1000 AM EDT

Hurricane ISAAC

NATIONAL HURRICANE CENTER
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NWS Forecast Offices
Localized Impacts. Local Products.

Hurricane Wind Speed Probability
50-knot Wind Speed Probability
Trop Storm Wind Speed Probability
Wind History
Storm Surge Inundation
U.S. Rainfall Potential
Warnings/Cone Interactive Map
Warnings/Cone Static Images
Warnings and Surface Wind
Mariner's 1-2-3 Rule
HURRICANE WILMA LOCAL STATEMENT ADVISORY NUMBER 32
NATIONAL WEATHER SERVICE MIAMI FL A242005
530 AM EDT SUN OCT 23 2005

THIS PRODUCT COVERS MAINLAND SOUTH FLORIDA

**EXTENSIVE TO DEVASTATING DAMAGE AND LIFE-THREATENING CONDITIONS EXPECTED AS HURRICANE WILMA MOVES NORTHEAST ACROSS SOUTH FLORIDA**

NEW INFORMATION
-----------------------------
* CHANGES TO WATCHES AND WARNINGS:
  - A HURRICANE WATCH HAS BEEN UPGRADED TO A HURRICANE WARNING FOR MIAMI-DADE...BROWARD...PALM BEACH...COLLIER...GLADES AND MONROE COUNTIES

* CURRENT WATCHES AND WARNINGS:
  - A HURRICANE WARNING IS IN EFFECT FOR MIAMI-DADE...BROWARD...PALM BEACH...COLLIER...HENDRY...GLADES AND MAINLAND MONROE COUNTIES

* STORM INFORMATION:
  - ABOUT 405 MI SW OF NAPLES FL
  - 22.1N 86.6W
  - STORM INTENSITY 100 MPH WITH HIGHER GUSTS
  - MOVING NORTHEAST AT 3 MPH

SITUATION OVERVIEW
-----------------------------
EXTREMELY DANGEROUS HURRICANE WILMA IS EXPECTED TO IMPACT SOUTH FLORIDA BEGINNING THIS EVENING. THE MAIN CONCERN IS FOR LIFE-THREATENING INUNDATION IN SURGE-PRONE AREAS OF COLLIER/MAINLAND MONROE COUNTY.
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NATIONAL WEATHER SERVICE MIAMI FL AL242005
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Hazard's
- Wind
- Storm Surge Flooding
- Inland Flooding
- Tornadoes
- Marine Hazards

Color-coded for risk, threat, and impact
- Standard scheme applied
- Elevated (yellow)
  Extreme (Magenta)
Inform the public of the need to take **immediate shelter** in an interior portion of a well-built structure **due to the onset of extreme tropical cyclone winds**.

**Issuance criteria:**
- Category 3 or greater
- Valid time 2 hours or less
FOR THE NORTH ATLANTIC...CARIBBEAN SEA AND THE GULF OF MEXICO...

EIGHT TROPICAL STORMS FORMED IN THE ATLANTIC BASIN DURING THE MONTH OF SEPTEMBER. THREE OF THESE STORMS...IGOR...JULIA...AND KARL...BECAME MAJOR HURRICANES...AND LISA REACHED HURRICANE STATUS. THESE NUMBERS ARE WELL ABOVE THE LONG-TERM (1944-2009) AVERAGES OF 4 TROPICAL STORMS...2 HURRICANES...AND ABOUT 1 MAJOR HURRICANE FOR THE MONTH OF SEPTEMBER. IN TERMS OF ACCUMULATED CYCLONE ENERGY...ACE...WHICH MEASURES THE COMBINED STRENGTH AND DURATION OF TROPICAL STORMS AND HURRICANES...TROPICAL CYCLONE ACTIVITY IN SEPTEMBER WAS ABOUT 78 PERCENT ABOVE AVERAGE.

SO FAR THIS SEASON...OVERALL TROPICAL CYCLONE ACTIVITY TO DATE IS ABOUT 53 PERCENT ABOVE THE LONG-TERM MEDIAN.

<table>
<thead>
<tr>
<th>NAME</th>
<th>DATES</th>
<th>MAX WIND (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H ALEX</td>
<td>25 JUN-2 JUL</td>
<td>105</td>
</tr>
<tr>
<td>TD TWO</td>
<td>7-8 JUL</td>
<td>35</td>
</tr>
<tr>
<td>TS BONNIE</td>
<td>22-24 JUL</td>
<td>40</td>
</tr>
<tr>
<td>TS COLIN</td>
<td>2-8 AUG</td>
<td>60</td>
</tr>
<tr>
<td>TD FIVE</td>
<td>10-11 AUG</td>
<td>35</td>
</tr>
<tr>
<td>MH DANIELLE</td>
<td>21-31 AUG</td>
<td>135</td>
</tr>
<tr>
<td>MH EARL</td>
<td>25 AUG-5 SEP</td>
<td>145</td>
</tr>
<tr>
<td>TS FIONA</td>
<td>30 AUG-4 SEP</td>
<td>60</td>
</tr>
<tr>
<td>TS GASTON</td>
<td>1-2 SEP</td>
<td>40</td>
</tr>
<tr>
<td>TS HERMINE</td>
<td>6-8 SEP</td>
<td>65</td>
</tr>
</tbody>
</table>

Tropical Summary
• Summarizes activity for the previous month
• Preliminary statistics for the season
National Hurricane Center
Preliminary Track Maps

Updated Monthly
• 1st of the month

Preliminary Data
• Tropical Cyclones to date
• Operational data until final ‘best-track’ issued
National Hurricane Center

Tropical Cyclone Reports

Tropical Cyclone Reports provide a complete summary report for every Atlantic and East Pacific storm

- Available on NHC website weeks to a few months after each storm
- Provide final track, intensity, and size information
- Damage and casualties figures
- Forecast critique

Tropical Storm Andrea (AL012013)

5 - 7 June 2013

John L. Beven II
National Hurricane Center
22 August 2013

Andrea was a tropical storm that made landfall on the northwest coast of the Florida Peninsula. It became a gale-force extratropical low over the southeastern United States.
# National Weather Service

## When is key information available?

<table>
<thead>
<tr>
<th>Normal Operations</th>
<th>1b Elevated Threat</th>
<th>1c Credible Threat</th>
<th>2a-3a RAHP Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Round</td>
<td>Hurricane Season 120hr - 72hr</td>
<td>72hr - 48hr</td>
<td>48hr - 36hr</td>
</tr>
</tbody>
</table>

### Hurricane Evacuation Study (HES) products
(Surge MOMs, Surge Maps, Evacuation Zones, Clearance times, other planning data)

### Coastal Flood Loss Atlas

#### Tropical Weather Outlook
- Public Advisory
- Forecast Discussion
- Wind Speed Probabilities
- Track Forecast and Cone

#### Event Times (Onset of TS Winds)

- **Wind timing via Hurrevac**
- **Surge MEOWs**
- **QPF Rainfall forecasts**

#### Final Events
- **River Forecasts**
- **TS/Hurricane Watches**
- **Hurricane Local Statements**
- **Surge Probabilities**

#### Extreme Events
- **Flood Outlooks**
- **TS/Hurricane Warnings**
- **Surge Inundation**
- **Tornado Watches & Warnings**

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*HAZUS output*
National Weather Service
Tropical Cyclone Products

> 5 Days
Few products
Large uncertainty

3-5 Days
More products
Forecast hazards

2-3 Days

1-2 Days
Detailed products

Warnings

Outlook

5 Day Forecast
Public Advisory
Wind Speed %
Forecast Discussion

TS/Hurricane Watches

TS/Hurricane Warnings
TS/Hurricane Local Statements
Operational Storm Surge Products
Learn More

Recommended Sessions

THURSDAY

8:30-10:00 – National Hurricane Program (NHP) Technology Modernization
  • Updates on the next generation HURREVAC (HVX) and RtePM model

10:30-12:00 – New Products to Aid in Hurricane Forecast and Hazard Communication
  • What's New and What's Next in Tropical Cyclone Forecasting and Observations
  • New Products to Communicate Tropical Cyclone Hazard Arrival Times

1:30-3:00 – Potential Tropical Cyclone Forecasts and Warnings
  • Tropical Cyclone Genesis Forecasting and Potential Tropical Cyclone Advisories

3:30-5:00 – NWS Storm Surge Products
  • How NHC Real-Time Storm Surge Products are Created
  • First Impressions of the New NWS Storm Surge Watch/Warning
  • Use of Real-Time Storm Surge Products in Decision Making
What’s the 411?
National Weather Service
Tropical Cyclone Products

Questions & Answers
What’s the 411?
Which product shows the probable track or path of the center of the tropical cyclone?

A. Cumulative Wind History
B. Wind Speed Probability Graphic
C. Cone Graphic
D. Graphical Tropical Weather Outlook
What’s the 411?

Which product gives the chance of tropical cyclone formation?

A. Tropical Weather Outlook
B. Tropical Cyclone Discussion
C. Public Advisory
D. Wind Speed Probability Graphic
What’s the 411?
Which product provides wind timing information beyond 72 hours?

A. Forecast Advisory  
B. Cone Graphic  
C. Public Advisory  
D. Wind Speed Probabilities
What’s the 411?
Which product shows the current size of the tropical cyclone wind field?

A. NWS Hurricane Threats and Impacts Graphic (HTI)
B. Wind Speed Probability Graphic
C. Tropical Cyclone Cumulative Wind History
D. Cone Graphic
What’s the 411?

Which product provides the reasoning behind the forecast?

A. Public Advisory
B. Forecast Discussion
C. Hurricane Local Statement
D. Forecast Advisory
What’s the 411?
Which product shows areas of possible tropical cyclone formation?

A. Cone Graphic
B. Tropical Weather Outlook
C. Graphical Tropical Weather Outlook
D. Wind Speed Probability Graphic
What’s the 411?
Which product contains forecast position, intensity, and wind radii information?

<table>
<thead>
<tr>
<th>A. Public Advisory</th>
<th>B. Tropical Cyclone Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Tropical Weather Outlook</td>
<td>D. Forecast Advisory</td>
</tr>
</tbody>
</table>
What’s the 411?

When are Special Advisories issued?

A. Upon request
B. When a tropical cyclone is within Radar range
C. When a significant, unexpected change in the storm occurs
D. Before an Emergency Management briefing
What’s the 411?

Which products provide continuous flow of information when a tropical cyclone is near land?

A. Public Advisory & Tropical Outlook
B. Public Advisory & Forecast Discussion
C. Public Advisory & Cone Graphic
D. Public Advisory, Intermediate Advisory, & TC Update
What’s the 411?
When are intermediate public advisories issued?

A. All of the time
B. When the 5-day forecast reaches land
C. When ships are crossing the path of the storm
D. When coastal watches and warnings are in effect
What’s the 411?
Which warning is issued when a major (cat 3 or stronger) hurricane is about to make landfall?

A. Extreme Wind Warning
B. Hurricane Warning
C. Tornado Warning
D. Severe Thunderstorm Warning
What’s the 411?

How many days does the forecast information in the Public Advisory cover?

A. 1 day  
B. 2 days  
C. 5 days  
D. 7 days
What’s the 411?
The lead time for a Hurricane Watch or Warning is tied to the arrival of ________.

A. Hurricane force winds
B. Life threatening inundation
C. Tropical storm force winds
D. Strong tropical storm force winds
What’s the 411?
Which product is often issued when a hurricane makes landfall?

A. Special Advisory
B. Intermediate Public Advisory
C. Tropical Cyclone Update
D. Special Tropical Weather Outlook
What’s the 411?
Which product shows the areas that may have been affected by sustained tropical storm winds?

A. Tropical Cyclone Cumulative Wind History
B. Tropical Cyclone Surface Wind Field Graphic
C. Tropical Cyclone Report
D. Monthly Tropical Cyclone Summary