The NHC Storm Surge Program: Past, Present, and Future

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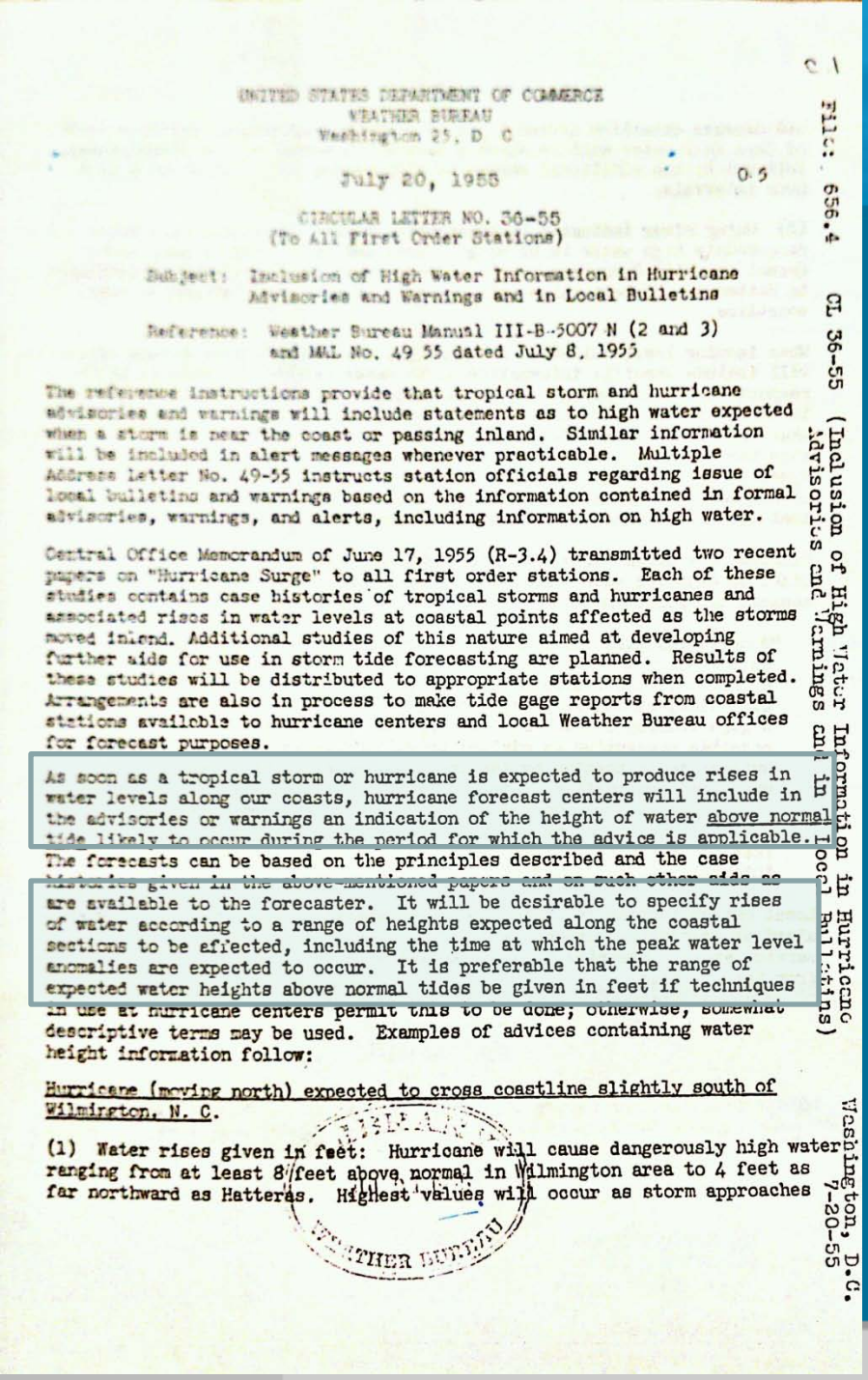
NHC Storm Surge Unit

A Trip Down Memory Lane



UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU
Washington 25, D C

July 20, 1955

CIRCULAR LETTER NO. 36-55
(To All First Order Stations)

Subject: Inclusion of High Water Information in Hurricane Advisories and Warnings and in Local Bulletins

Reference: Weather Bureau Manual III-B-5007 N (2 and 3) and MAL No. 49 55 dated July 8, 1955

The reference instructions provide that tropical storm and hurricane advisories and warnings will include statements as to high water expected when a storm is near the coast or passing inland. Similar information will be included in alert messages whenever practicable. Multiple Address Letter No. 49-55 instructs station officials regarding issue of local bulletins and warnings based on the information contained in formal advisories, warnings, and alerts, including information on high water.

Central Office Memorandum of June 17, 1955 (R-3.4) transmitted two recent papers on "Hurricane Surge" to all first order stations. Each of these studies contains case histories of tropical storms and hurricanes and associated rises in water levels at coastal points affected as the storms moved inland. Additional studies of this nature aimed at developing further aids for use in storm tide forecasting are planned. Results of these studies will be distributed to appropriate stations when completed. Arrangements are also in process to make tide gage reports from coastal stations available to hurricane centers and local Weather Bureau offices for forecast purposes.

As soon as a tropical storm or hurricane is expected to produce rises in water levels along our coasts, hurricane forecast centers will include in the advisories or warnings an indication of the height of water above normal tide likely to occur during the period for which the advice is applicable. The forecasts can be based on the principles described and the case histories given in the above-mentioned papers and on such other aids as are available to the forecaster. It will be desirable to specify rises of water according to a range of heights expected along the coastal sections to be effected, including the time at which the peak water level anomalies are expected to occur. It is preferable that the range of expected water heights above normal tides be given in feet if techniques in use at hurricane centers permit this to be done; otherwise, somewhat descriptive terms may be used. Examples of advices containing water height information follow:

Hurricane (moving north) expected to cross coastline slightly south of Wilmington, N. C.

(1) Water rises given in feet: Hurricane will cause dangerously high water ranging from at least 8 feet above normal in Wilmington area to 4 feet as far northward as Hatteras. Highest values will occur as storm approaches

File: 656.4 CL 36-55 (Inclusion of High Water Information in Hurricane Advisories and Warnings and in Local Bulletins)

Washington, D.C. 7-20-55

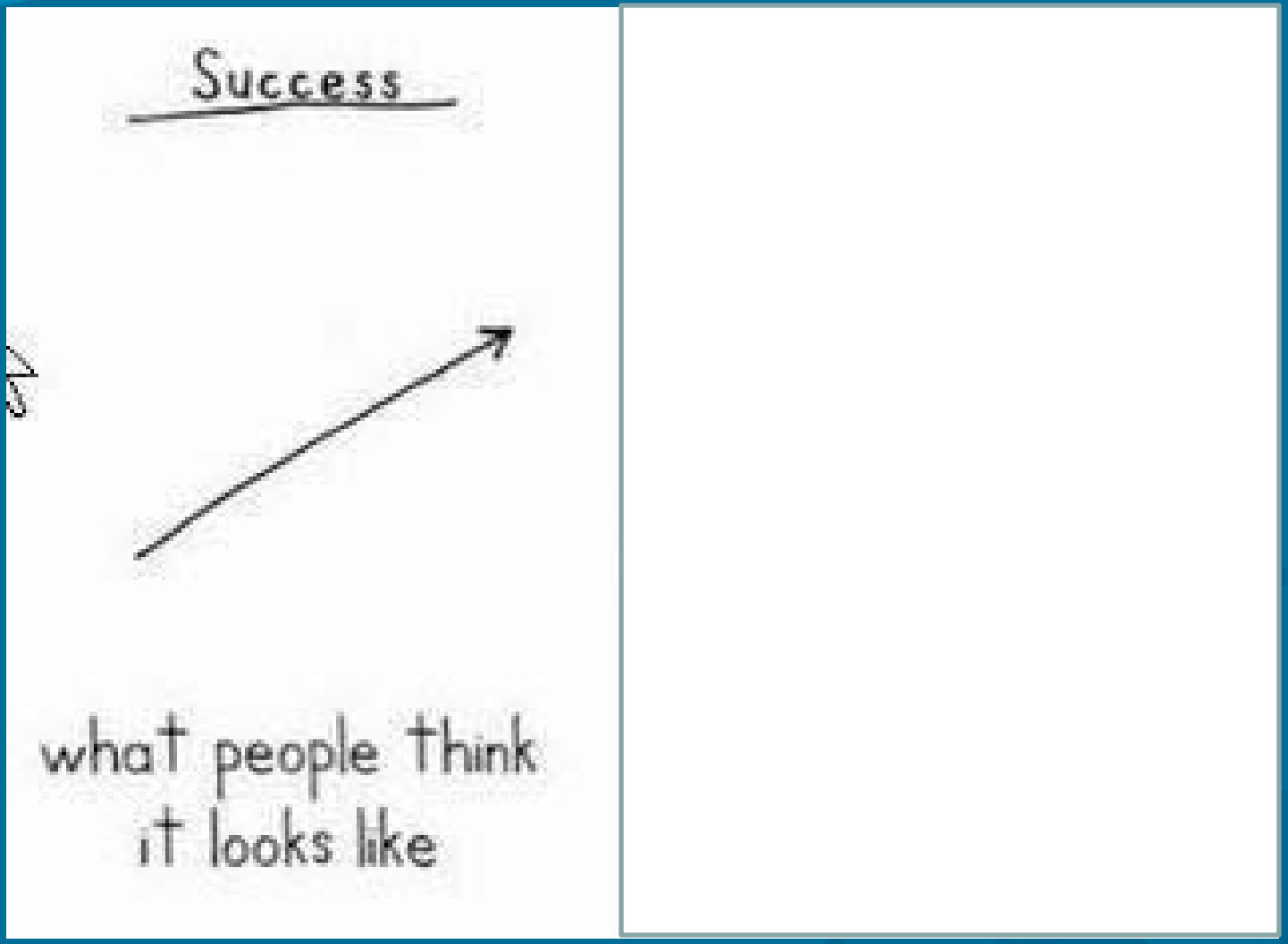
COASTAL STORM SURGE FLOODING OF UP TO 20 FEET...WITH A FEW SPOTS TO NEAR 25 FEET...ABOVE NORMAL TIDES ALONG WITH LARGE AND DANGEROUS BATTERING WAVES...CAN BE EXPECTED NEAR AND TO THE EAST OF WHERE THE CENTER OF IKE MAKES LANDFALL. THE SURGE EXTENDS A GREATER THAN USUAL DISTANCE FROM THE CENTER DUE TO THE LARGE SIZE OF THE CYCLONE. WATER LEVELS HAVE ALREADY RISEN BY MORE THAN 5 FEET ALONG MUCH OF THE NORTHWESTERN GULF COAST.

Same language and dissemination vehicle (text) as was used over 50 years ago!

The Initial NHC Vision

- "At the top is developing and employing more effective methods of **communicating** storm surge risk to the public and decision makers…To achieve this requires more than gradual or incremental improvements in our products and services"
- "What we need most, however, is a jolt to the system in how storm surge is viewed and addressed"
- "So, we need new ideas, products, and outreach methods to get people to think about storm surge. These messages also need to be delivered in high dosages"

Government Strategic Planning



Context

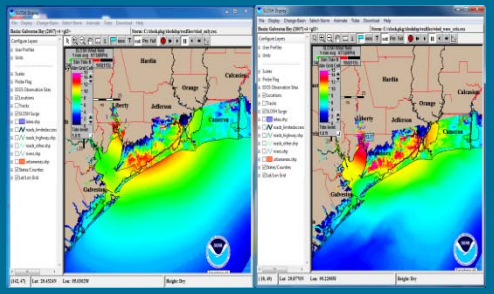

06:55
Hawaii
16:55
UTC
09:55
Pacific
11:55
Central
12:55
Eastern

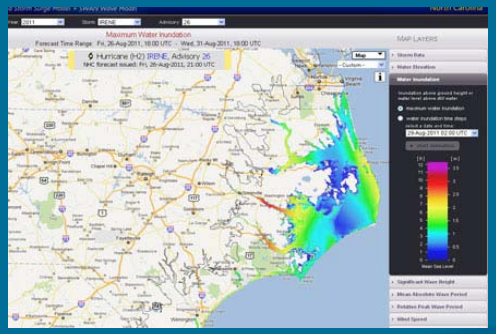
The NOAA/NWS Vision

- **Total Water Level Guidance:** produce water level analyses, forecasts, and observations that include all contributions to surge
  - Surge, tides, waves, fresh water, background anomaly
- **Inundation Products:** provide information about the water depth over the land (inundation) above ground level (AGL)
- **Communicating Actionable Information:** provide information that people can act on
- **Transition from Deterministic** approaches to ensemble/probabilistic approaches

Modeling Total Water Level

- Prototype SLOSH+SWAN
- Prototype SLOSH+tide
- Hydraulic connectivity with partnership with RFCs
- Leveraging NOAA IOOS Super Regional Testbed
- Leveraging Army Corp modeling activities and expertise
- Partnering with USGS to obtain necessary data for model validation





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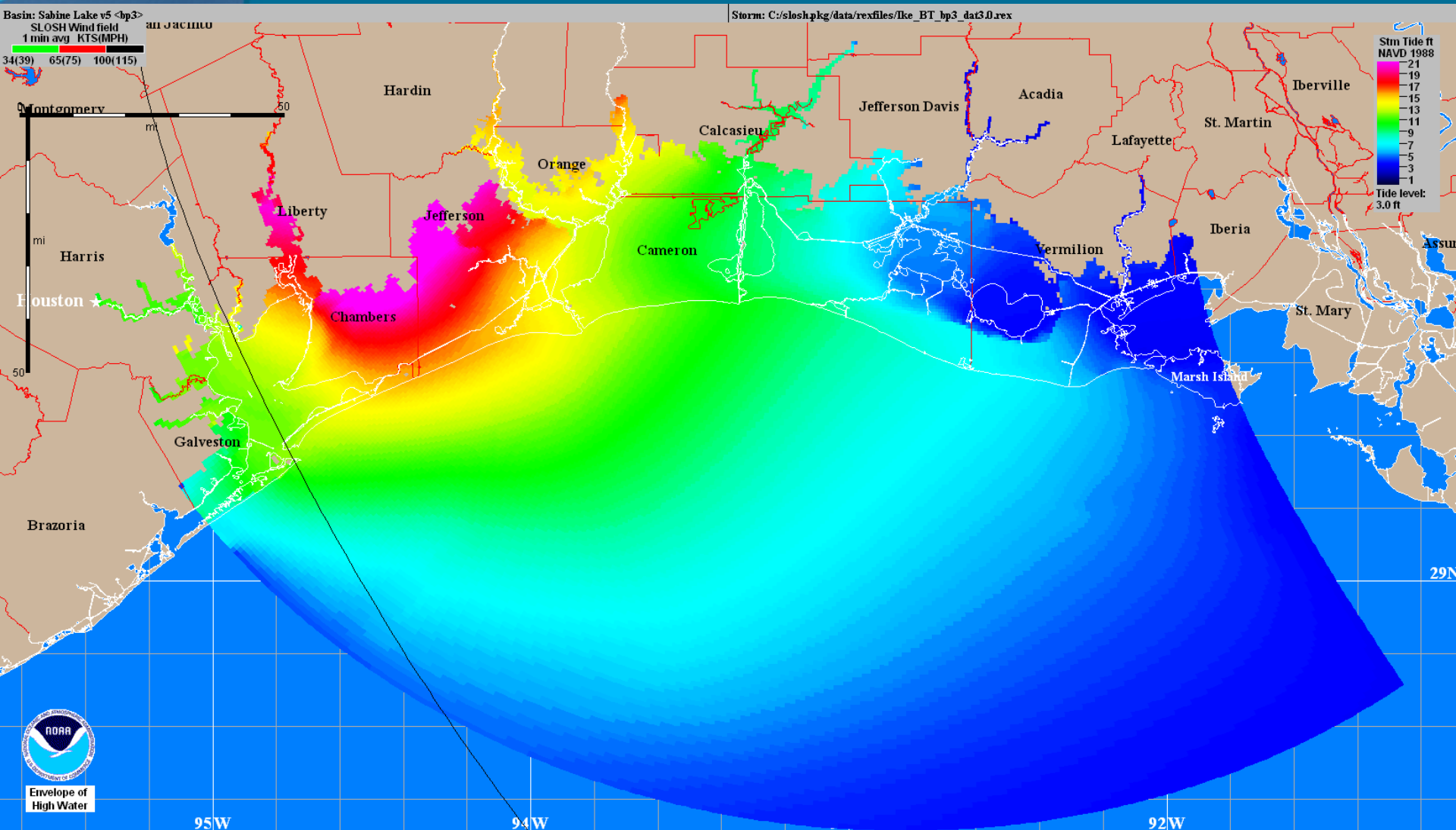
First Generation Inundation Graphic



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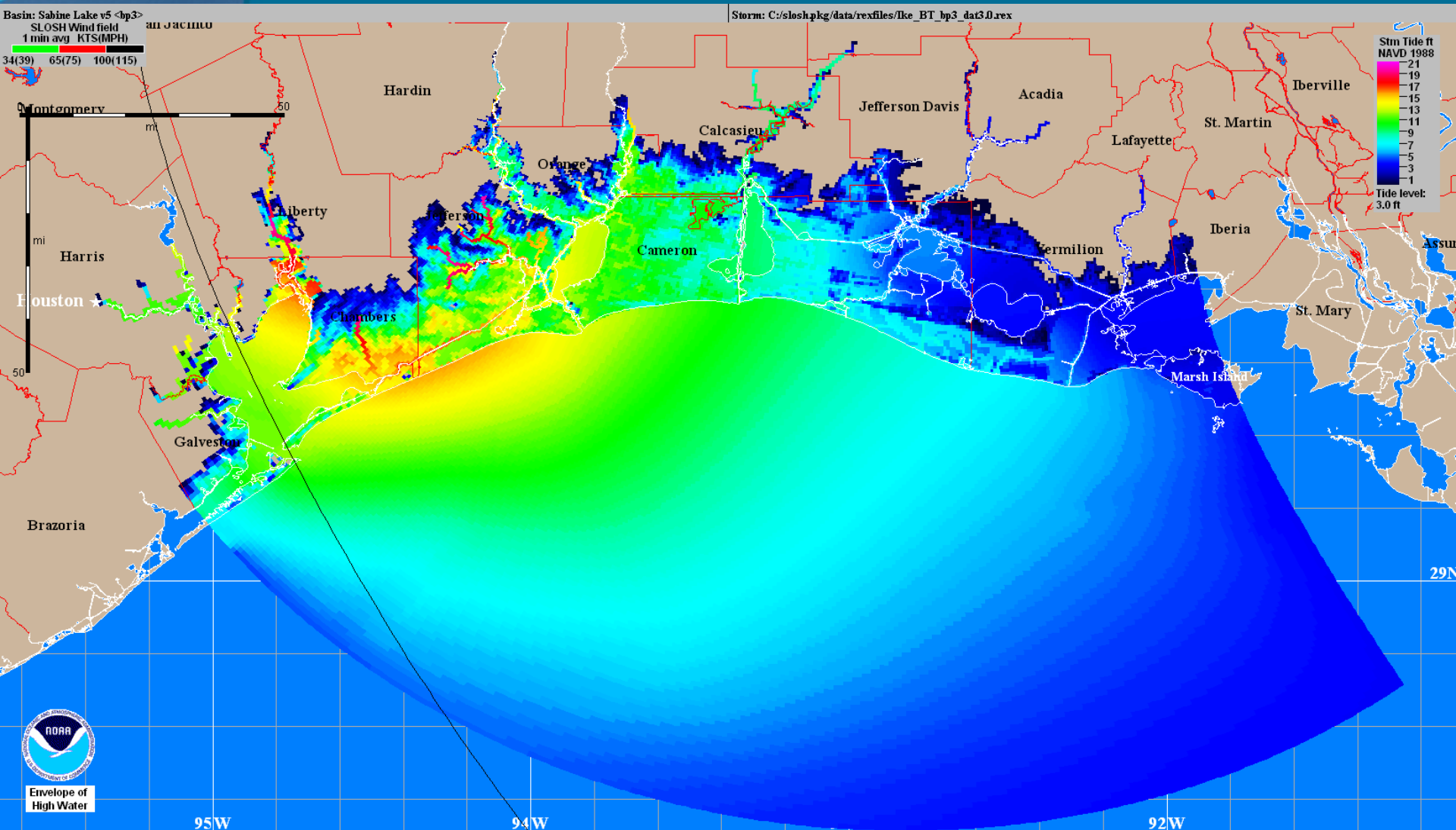
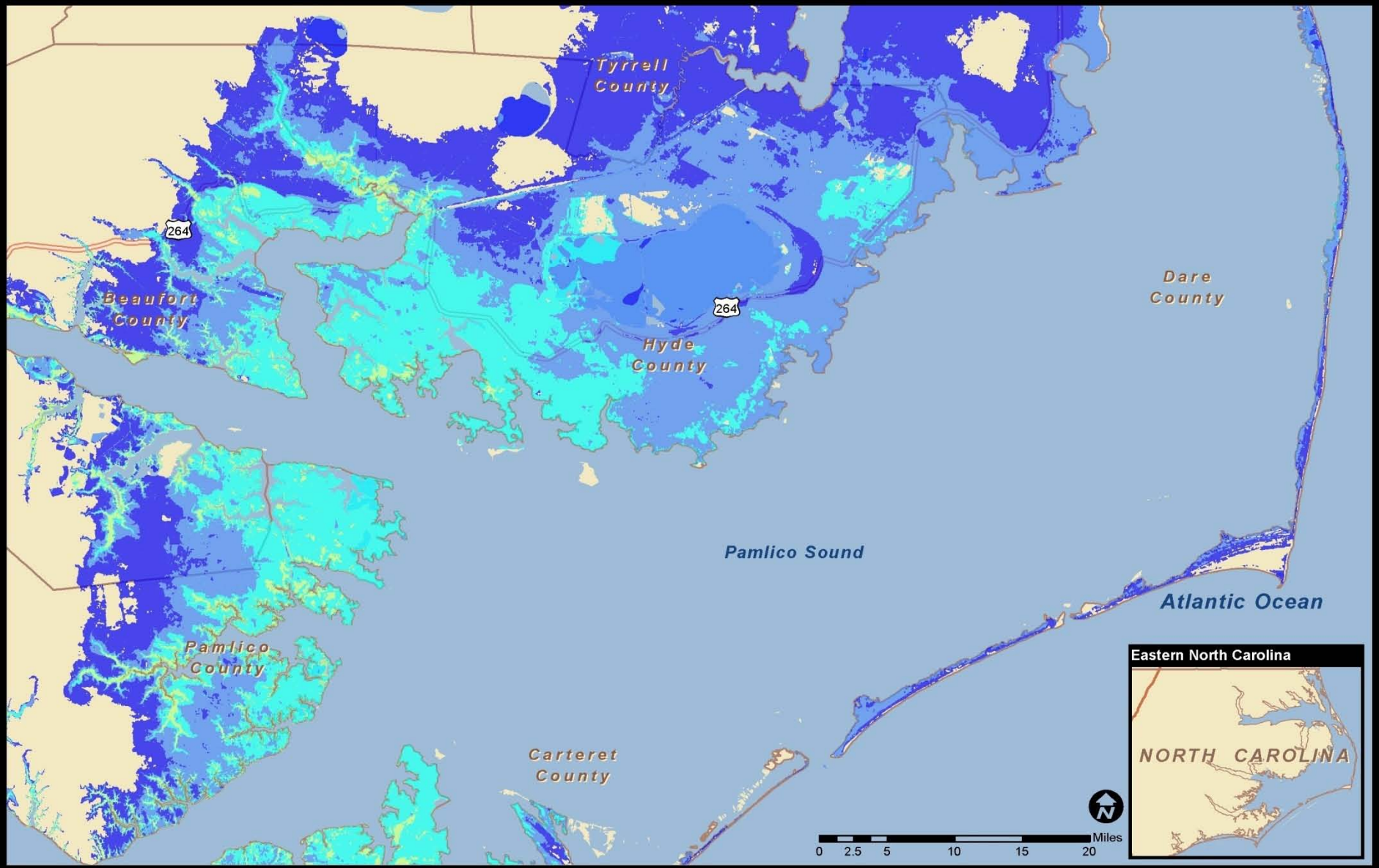


Hurricane Irene

Potential Inundation (10% exceedence)
Advisory #24
Thursday August 26, 2011
5 AM EDT

Feet Above Ground Level

0 3 6 9 12 15 18+



National Hurricane Center
Storm Surge Unit

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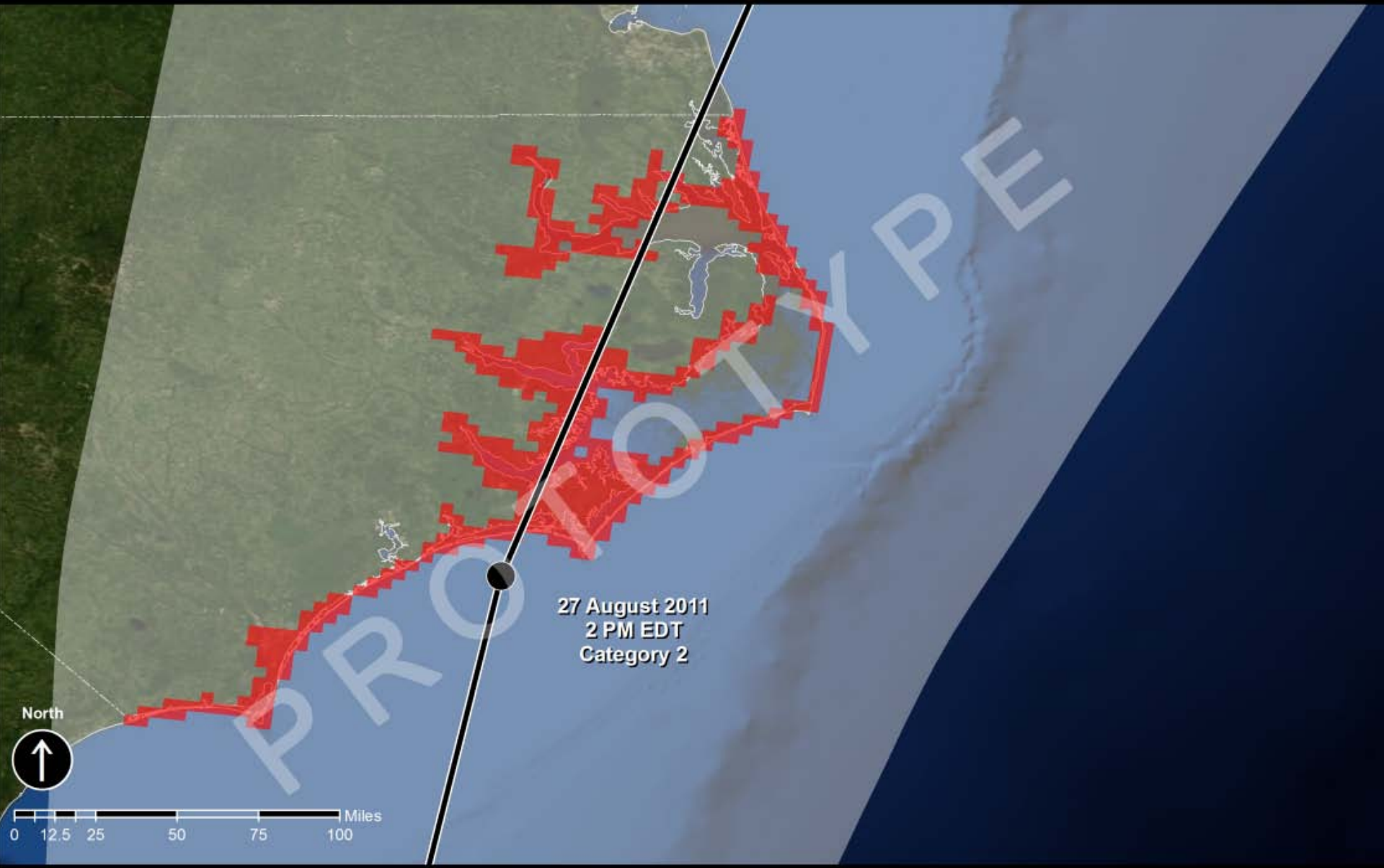
Hurricane Irene, Advisory #22

Storm Surge Warning PROTOTYPE

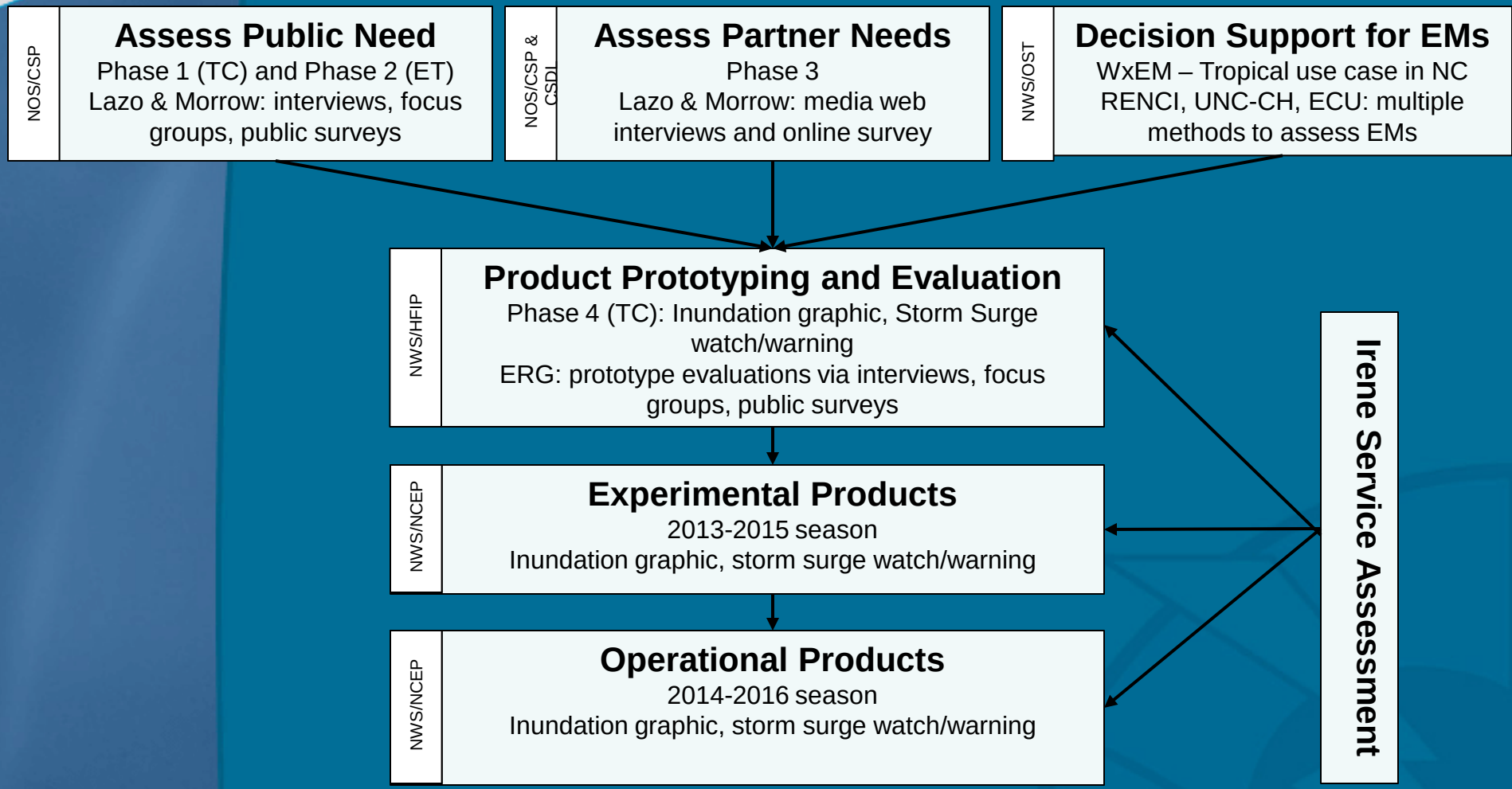


National Hurricane Center
Storm Surge Unit

Hurricane Irene Adv #22 Forecast Track

NWS/NHC Storm Surge Warning

Storm Surge Social Science Strategy



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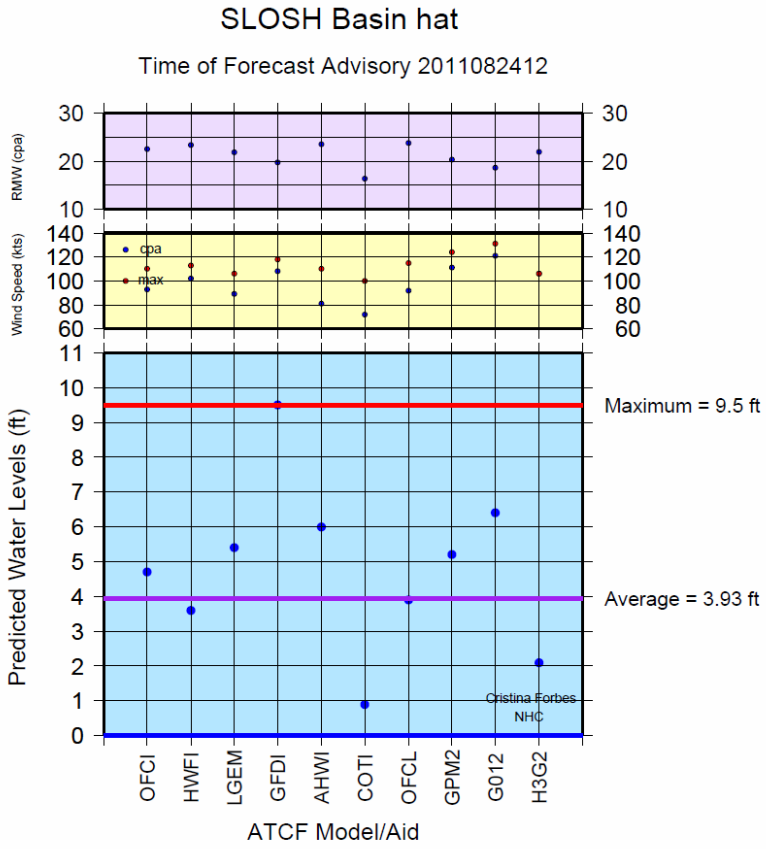
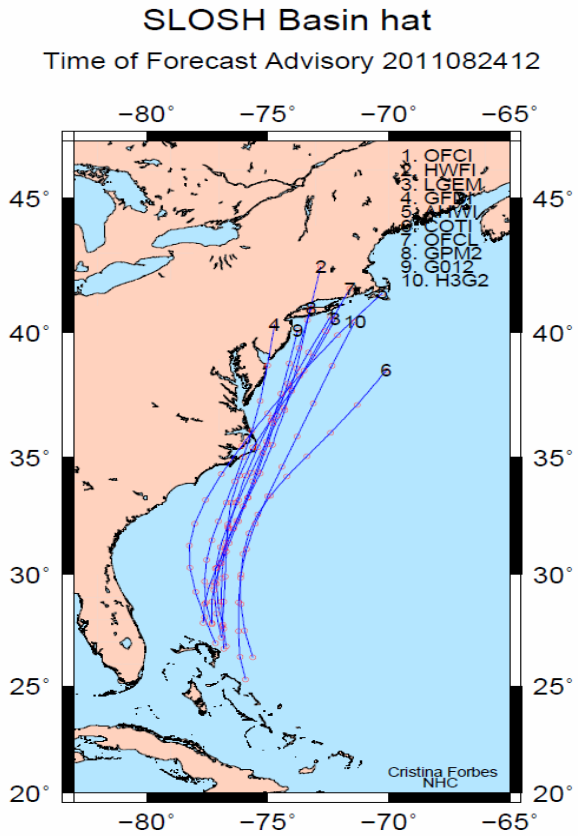
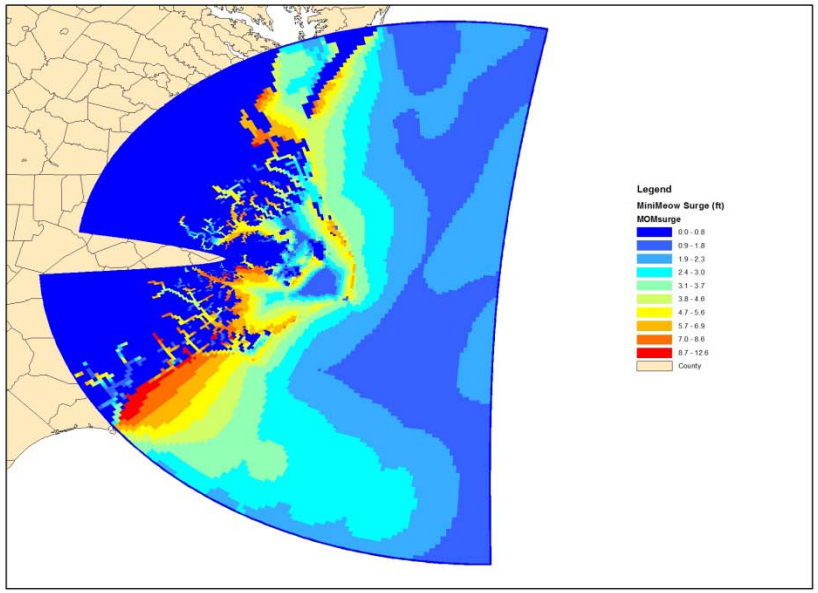
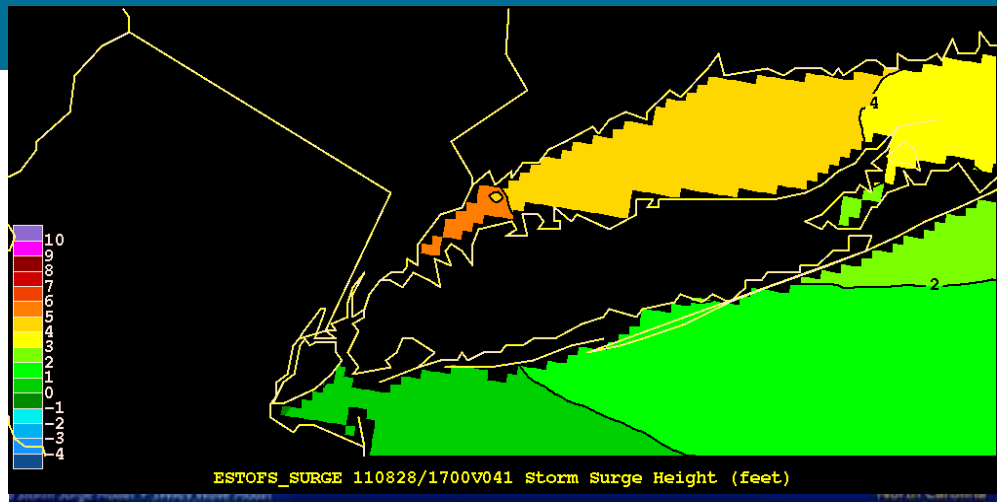
2011 Successes: Automation and Ensembles

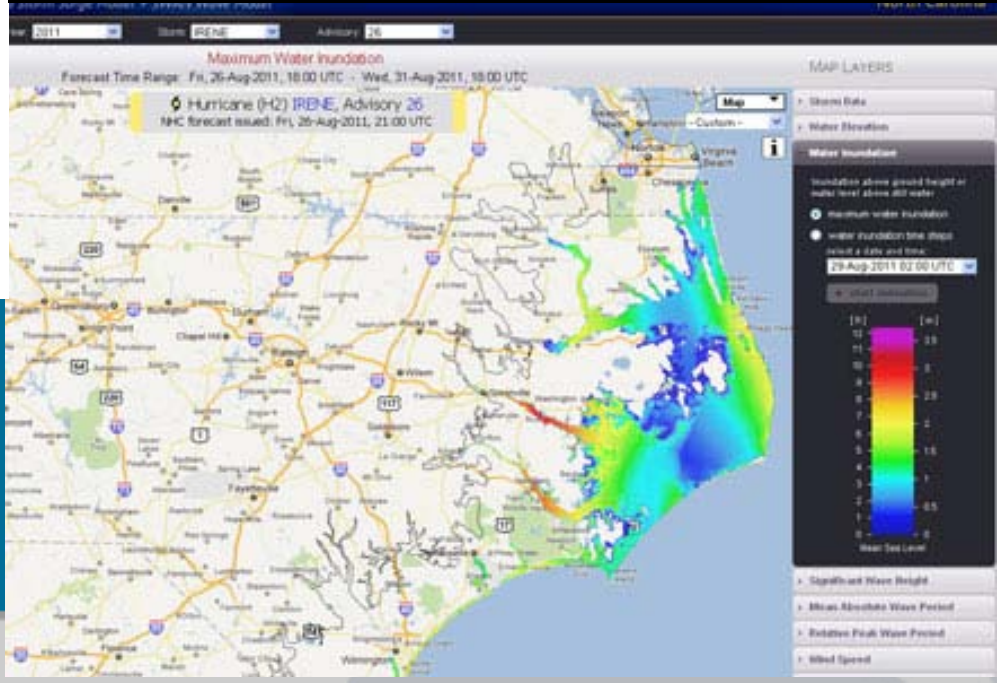




2011 Successes: Muti-model Ensemble







Questions or Comments

https://nhcsurge.ideascale.com/