

Experimental Probabilistic Hurricane Inundation Surge Height (PHISH) Guidance

DRBC Flood Advisory Committee

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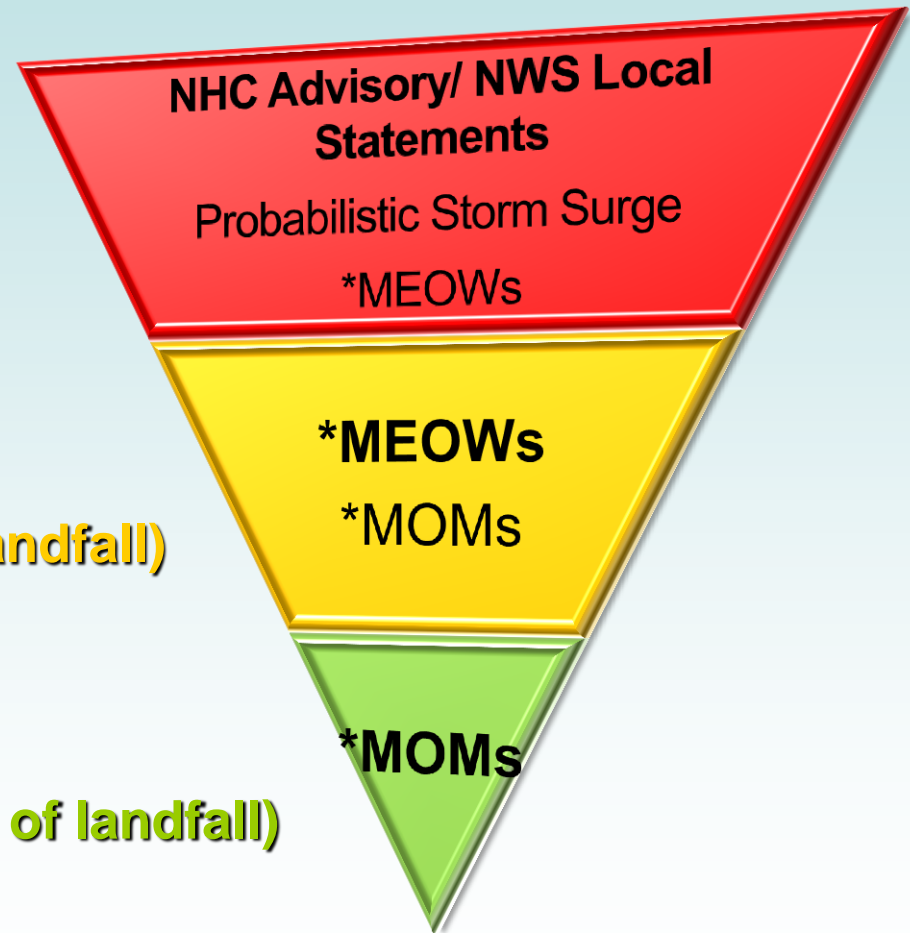
SLOSH



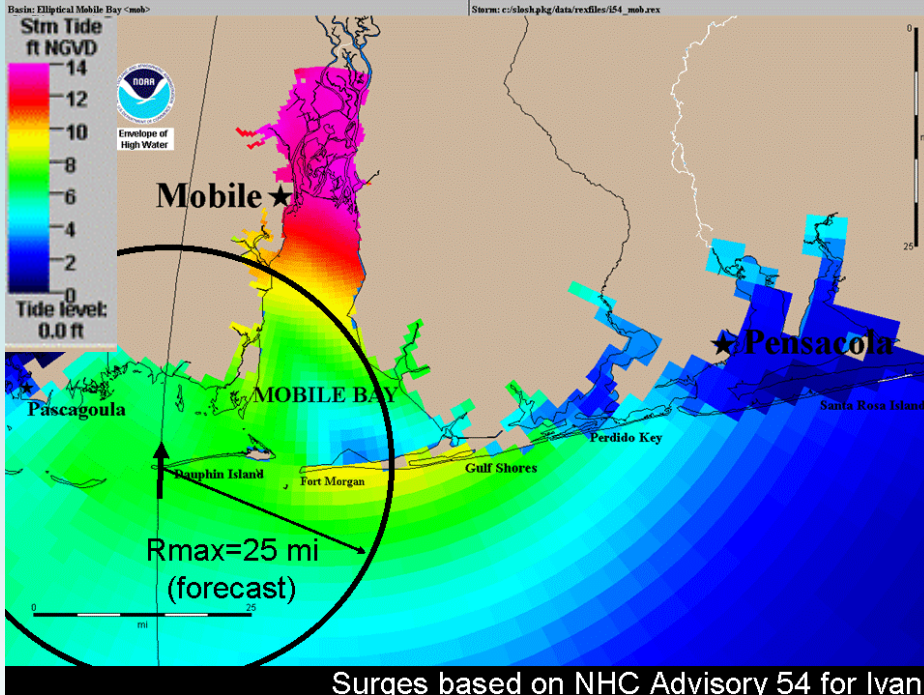
- Sea, Lake and Overland Surges from Hurricanes
 - Finite differencing model developed by the Meteorological Development Laboratory to predict storm surge
 - Overland flooding
 - Parametric wind model for forcing
 - Structured grid with finer resolution near shore, and coarser offshore
 - Models sub-grid features such as levies, barrier islands, and river channels
- Does not include
 - Tides, waves, river flow
 - Tides can be conservatively estimated by initializing the grid at high tide

SLOSH Products

- Historic Runs
- P-Surge
 - Probabilistic Storm Surge
 - **Response (<48 hr of landfall)**
- MEOW
 - Maximum Envelope Of Water
 - **Readiness (48hr – 120 hr of landfall)**
- MOM
 - Maximum Of the MEOWs
 - **Planning / Mitigation (>120 hr of landfall)**



Case Study: Hurricane Ivan

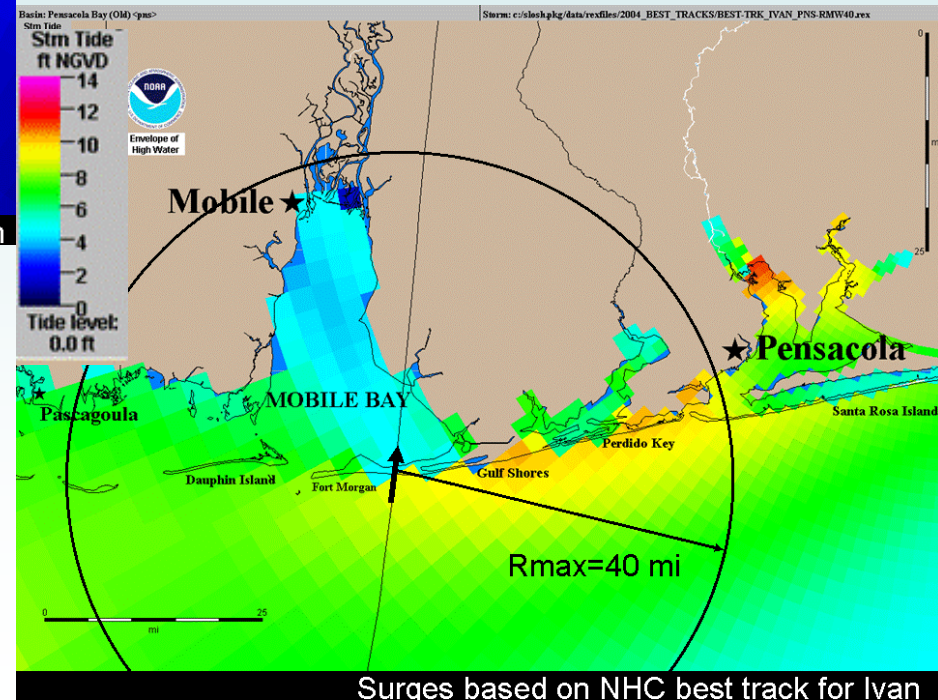


Top Left: Real-time deterministic SLOSH run for Ivan at advisory 54, about 10 hours before landfall

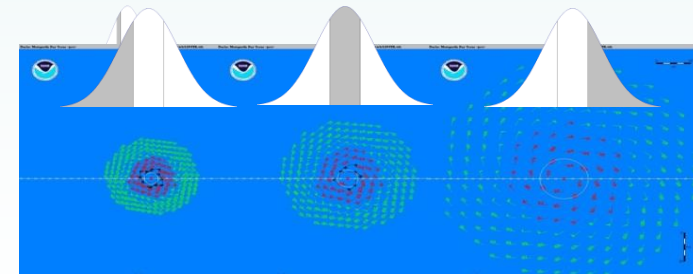
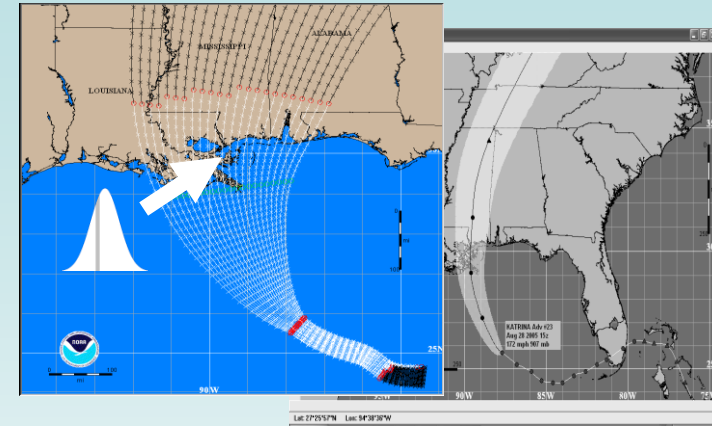
- Note large (~14ft) surge in Mobile, small (~3ft) surge for Pensacola

Bottom Right: Hindcast best track SLOSH results for Ivan

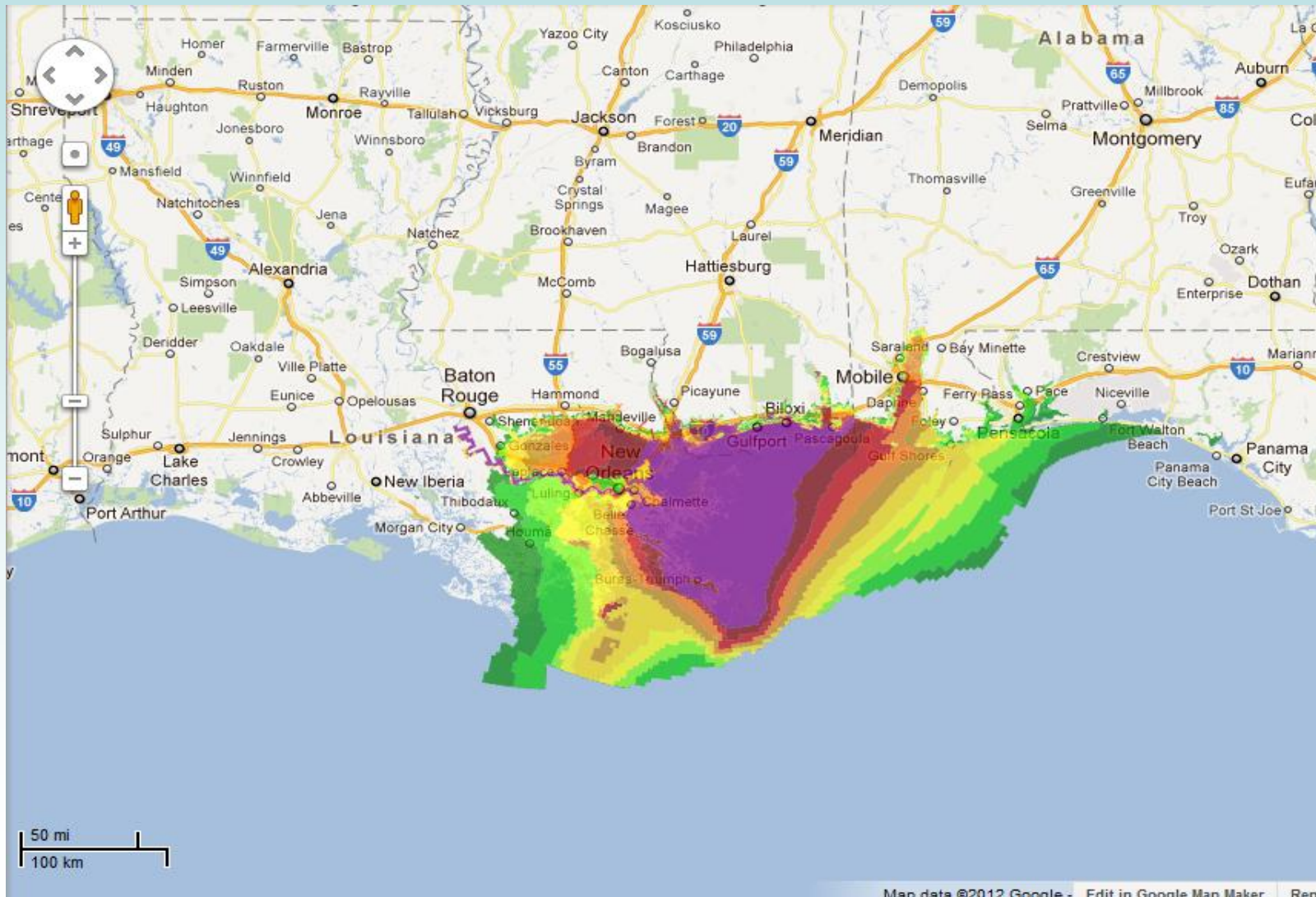
- Track forecast off by approx. 25 mi
- Note significant surge in Pensacola (~7 – 10ft), missed by the deterministic



- Cross track error
 - sampled multiple times
- Along Track error
 - sampled three times (fast, med., slow)
- Intensity error
 - sampled three times (strong, medium, weak)
- Size error
 - sampled three times (small, medium, large)



Probability of Surge ≥ 5 feet (NGDV29)

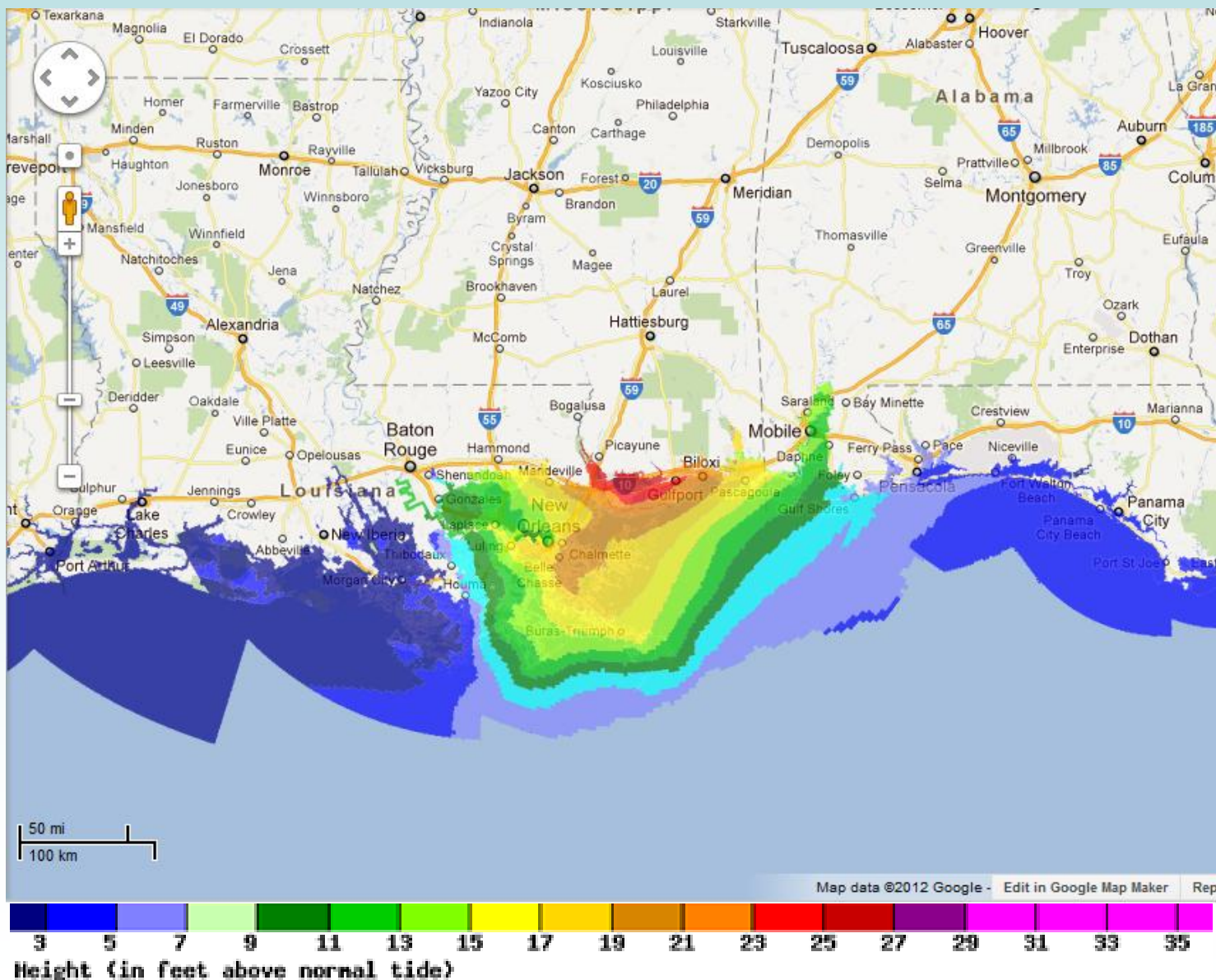


Katrina
adv 25





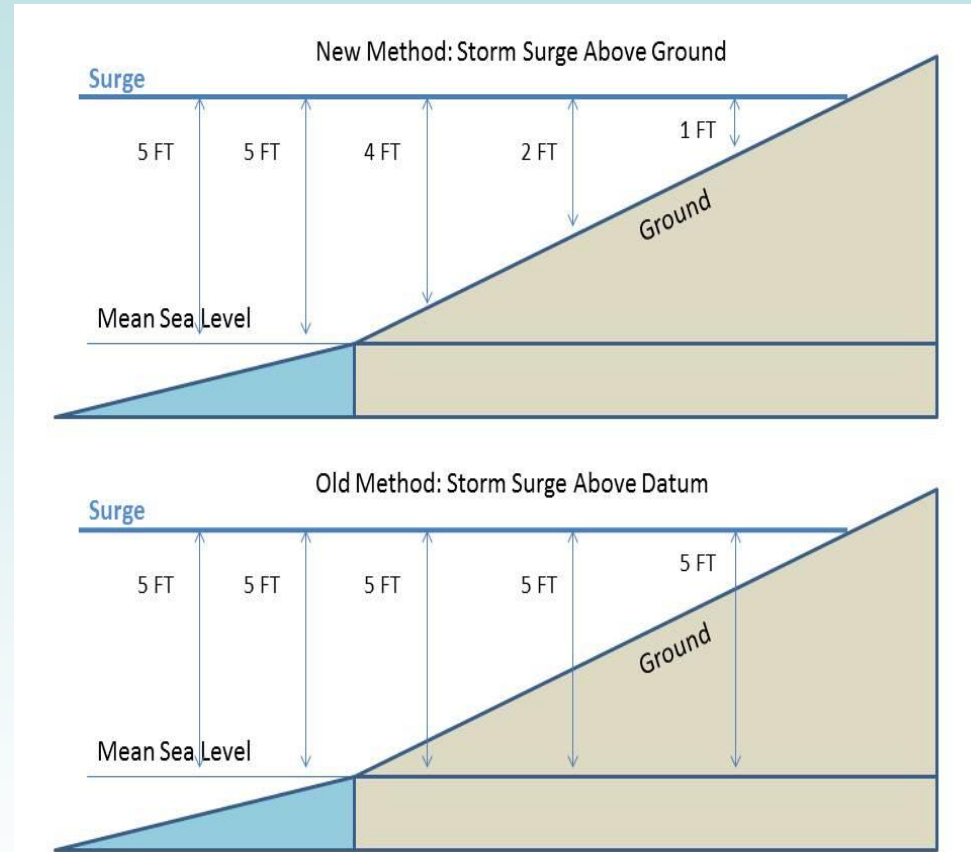
Surge Height Exceeded by 10% of Ensemble Members (NGVD29)



Katrina
adv 25

Rationale for PHISH

- Psurge provides information in terms of above a datum.
- PHISH reduces confusion among users with the various tidal and geodetic vertical datums by providing storm surge guidance in terms of feet above ground level (i.e., inundation).





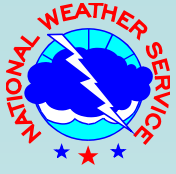
Experimental PHISH Products



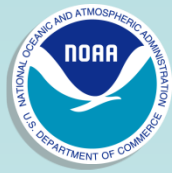
	Probability (0-20 feet)	Exceedance (10-50%)
Cumulative	Probability of <u>inundation</u> exceeding 0 through 20 feet above ground level, at 1 foot intervals, will occur from the advisory release time until some specified time after the advisory release time (e.g. 0-6 hours, 0-12, 0-18, etc.)	10% through 50% chance, at 10% intervals, of the displayed <u>inundation</u> being exceeded from the advisory release time until some specified time after the advisory release time (e.g. 0-6 hours, 0-12, 0-18, etc.)
Incremental	Probabilities of <u>inundation</u> exceeding 0 through 20 feet above ground level, at 1 foot intervals, will occur during the specified time period in reference to the advisory release time (e.g. 0 - 6 hours, 6-12, 12-18, etc.)	10% through 50% chance, at 10% intervals, of the displayed <u>inundation</u> being exceeded during the specified time period in reference to the advisory release time (e.g. 0 - 6 hours, 6-12, 12-18, etc.)



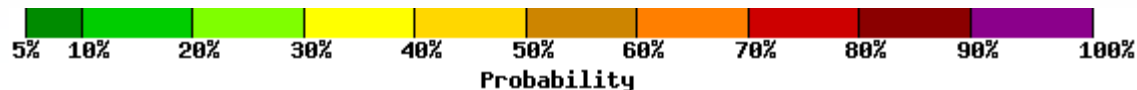
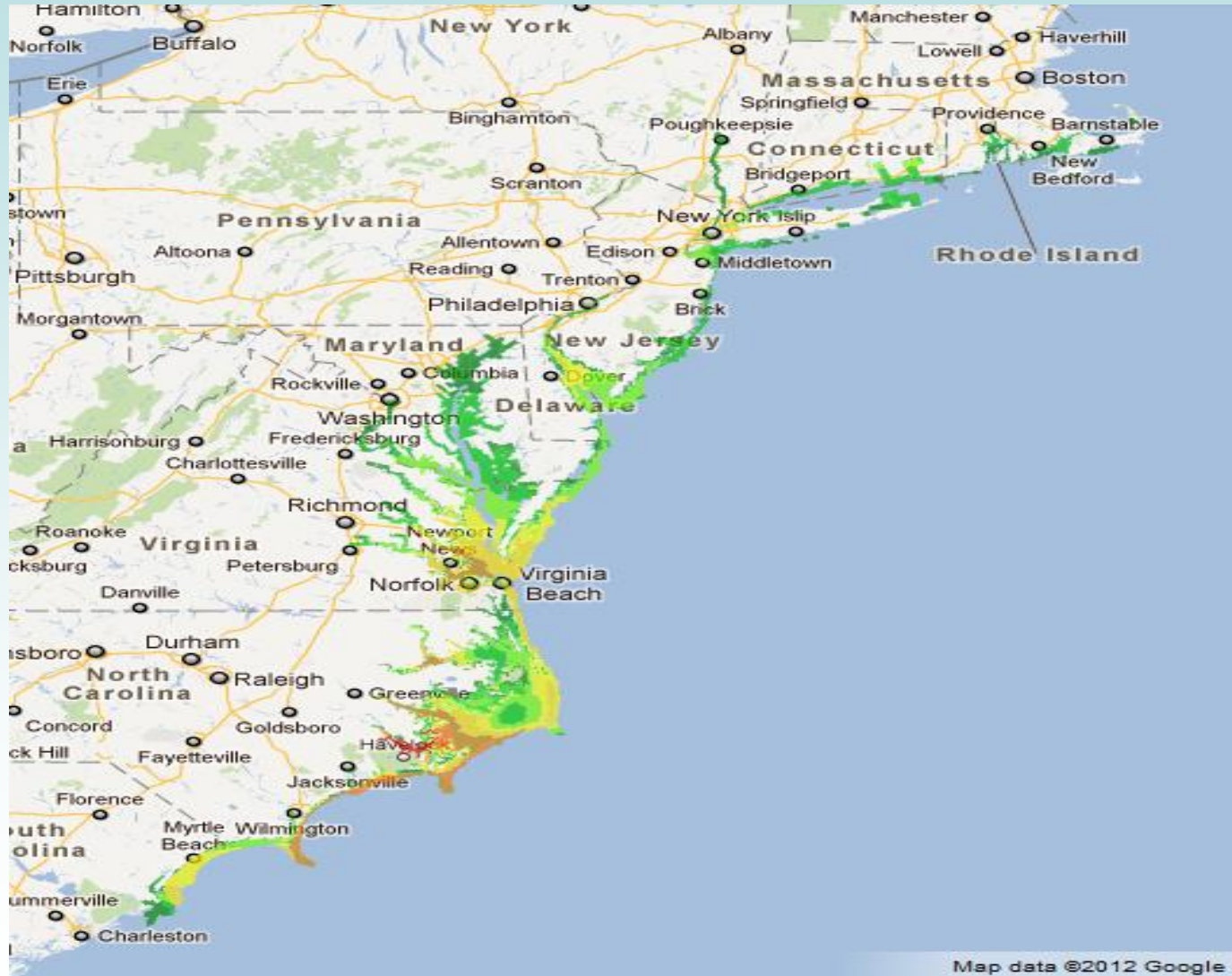
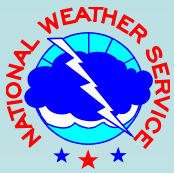
PHISH Availability



- Available whenever a hurricane watch and/or warning is in effect for any portion of the Gulf or Atlantic coasts of the continental United States.
- Updates to the product are generally produced one hour after the issuance of routine NHC tropical cyclone advisories (03, 09, 15, and 21 Coordinated Universal Time - UTC).
- Products online at: <http://www.nws.noaa.gov/mdl/phish>
 - KMZ format displayed on a interactive Google map background. Also available as a static PNG file.
 - Download formats: KMZ, Shape file, GRIB2

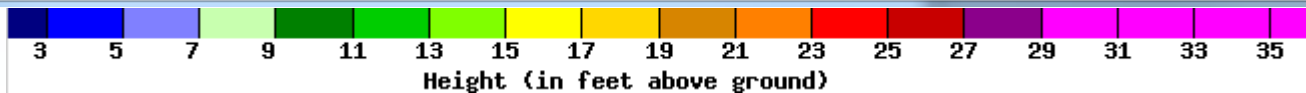
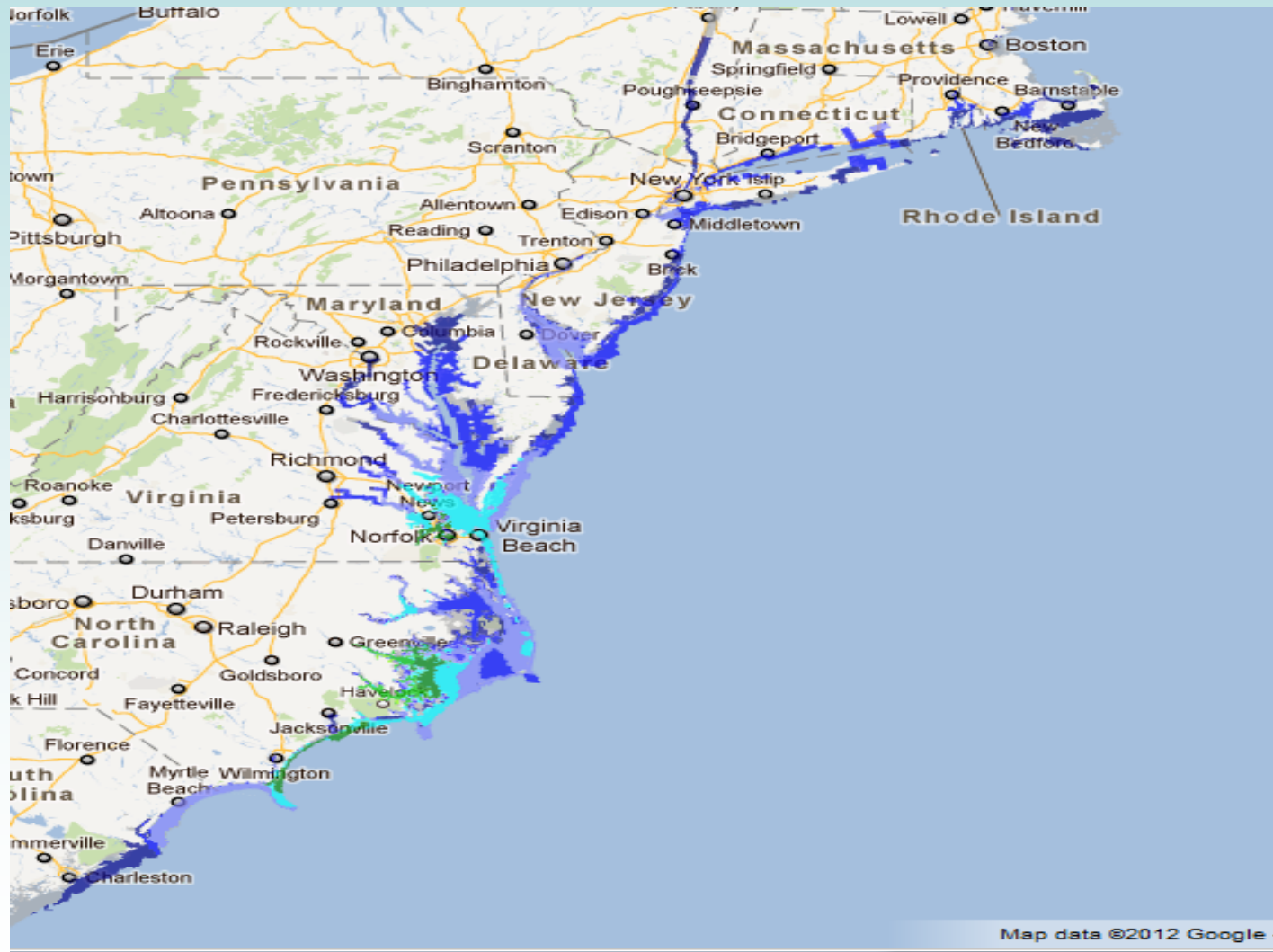
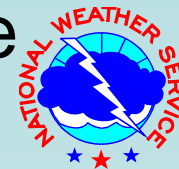


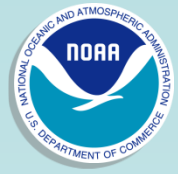
Storm Surge \geq 3 Feet Above Ground Level Hurricane Irene Advisory 24



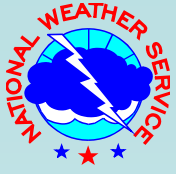


Surge Height Exceeded by 10% of Ensemble Members - Hurricane Irene Advisory 24





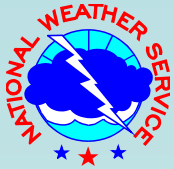
Future Work



- SLOSH + Tides >> PHISH + Tides
- Use more recent basins
 - Shift all basins to NAVD88
- Inundation maps with 30m DEMs
 - Possible routes:
 - User subtracts DEM from p-surge exceedance product
 - Won't work for probability products
 - Provide PHISH products at high resolution
 - Large amount of data transmission (May need paradigm shift)



Feedback



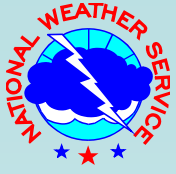
- Feedback on PHISH can be provide through an NWS Survey at:

<http://www.weather.gov/survey/nws-survey.php?code=phss>

OR

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Questions?