



Overview of HFIP Socio-Economic Research & Storm Surge Social Science Research

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Purpose of Briefing

Provide overview:

- 1) HFIP Socio-Economic Working Group
- 2) HFIP Socio-Economic Research
- 3) Storm Surge Social Science Research



HFIP Socio-Economic Working Group

HFIP Socio-Economic Working Group

- Co-Lead by NHC Director Rick Knabb & Jennifer Sprague
- Members:
 - *NHC: Edward Rappaport, Jamie Rhome & Robbie Berg*
 - *NWS WFOs: Lance Wood (WFO Texas), Hendricus Lofus (WFO CT)*
 - *FEMA: Matthew Green (FEMA Liaison at NHC)*
 - *State/Local Emergency Managers: Chuck Lanza (FL), Mike Sprayberry (NC), Christopher Moore (TX),*
 - *Social Scientist: Hugh Gladwin*
 - *Media: Need to fill*
 - *Private Sector: Karen Townsend (HURREVAC)*



HFIP Socio-Economic Research

- Jointly funded by HFIP and NOS Coastal Service Center
- Eastern Research Group (ERG) Awarded Contract 09/21/11
- Project Term: September 21, 2011 – March 30, 2013
- Total Cost: \$272,000 (includes funding for a GIS Prototyper)

Purpose:

- Inform NHC and NOAA HFIP efforts to effectively convey tropical cyclone risk and uncertainty, resulting in more resilient behaviors that reduce losses of life and property
- Incorporate information gained through project into the development of NHC products, information and services.



Project Goals

- Collect stakeholder feedback on NHC forecast products
 - Storm surge
 - Wind
- Test prototype products with:
 - Emergency managers (EMs)
 - Broadcast meteorologists
 - National Weather Service (NWS) Warning Coordination Meteorologists (WCMs)
 - General public



Research Plan

EXPLORATORY STAGE

- Develop, test, and refine storm surge prototype graphics
 - One-on-one webinars, interviews with key stakeholders
 - Discussions with groups of EMs and NWS personnel
 - Booths at AMS Weatherfest and National Hurricane Conference
- Develop survey questions for key stakeholders
 - OMB approval
 - Pre-testing

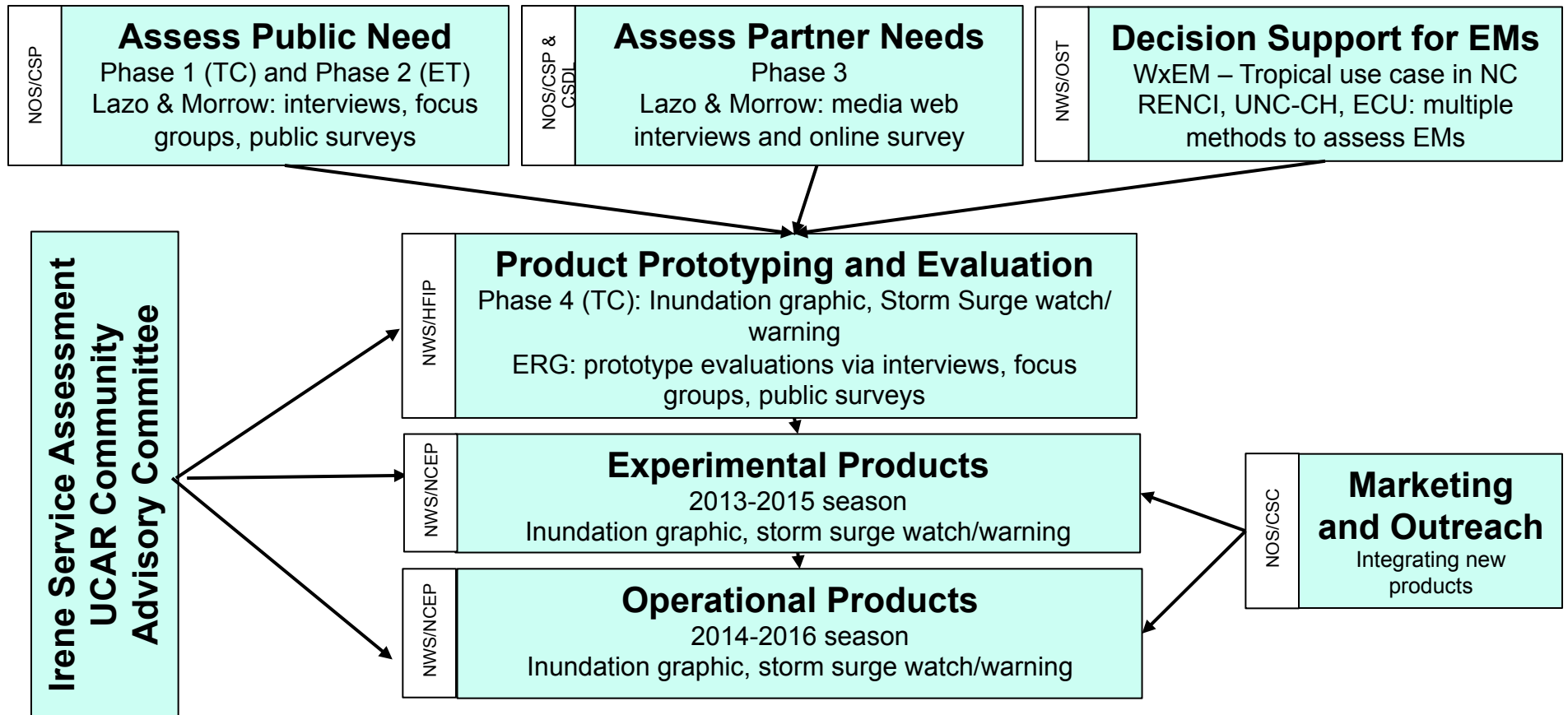
QUANTITATIVE STAGE

- Collect data via 6 surveys (including add-ons to other surveys)





Surge Social Science Strategy





Assessing Current Storm Surge Information from the Public Perspective

- Assessment of people's understanding of hazard
- **Phase 1:** Tropical (Lazo and Morrow, PIs)
 - Uses lit review, EM interviews, focus groups, public survey
 - Results show people do not understand surge or its risk, and want some type of further information
 - Final draft of report on EMs under revision
- **Phase 2:** Extratropical (Lazo and Morrow, PIs)
 - Uses EM interviews, focus groups, online survey
 - Survey completed, awaiting report



Storm Surge Information Partner Needs Assessment (Lazo and Morrow, PIs)

- **Phase 3: Partner needs**
 - Focuses on broadcast meteorologists' perceived needs, constraints, and possibilities for new/ additional storm surge information
 - Uses web-based interviews, internet survey
 - Survey completed and final report in draft



WxEM: Decision Support for EMS in Tropical Events

- EMs desire a locally relevant inundation graphic
- EMs prefer a range of scenarios versus probability plots
- EMs desire surge predictions earlier (i.e., 72 hrs or more before TC landfall)
 - Modeling enhancement needed



Product Prototyping & evaluation (ERG – PI, with NHC GIS prototyper)

- NHC hired GIS expert to develop inundation graphic prototypes
- Social scientists are evaluating prototypes
 - Interviews, focus groups, surveys of EMs and public
 - Prototypes included in broadcast met survey from partner needs project
 - Public survey imminent



Cartographic of Inundation Graphics (K. Sherman-Morris, PI)

- Small project to apply and evaluate cartographic techniques to inundation graphics
 - Advice on appearance and color scheme
 - Survey of coastal residents
 - Eye-tracking analysis of prototype graphics provided by NHC
- Results showed preference for an inundation graphic with a range of colors and a scale of descriptive words (low, med, hi, extreme)

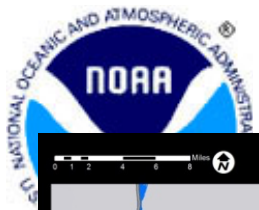


FY12 – Storm Surge Marketing Plan

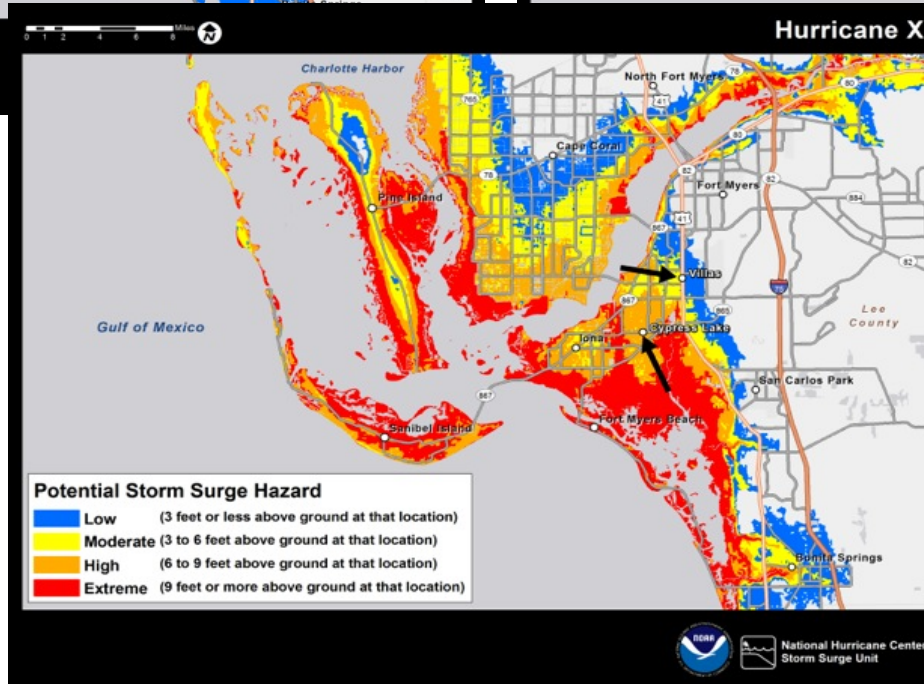
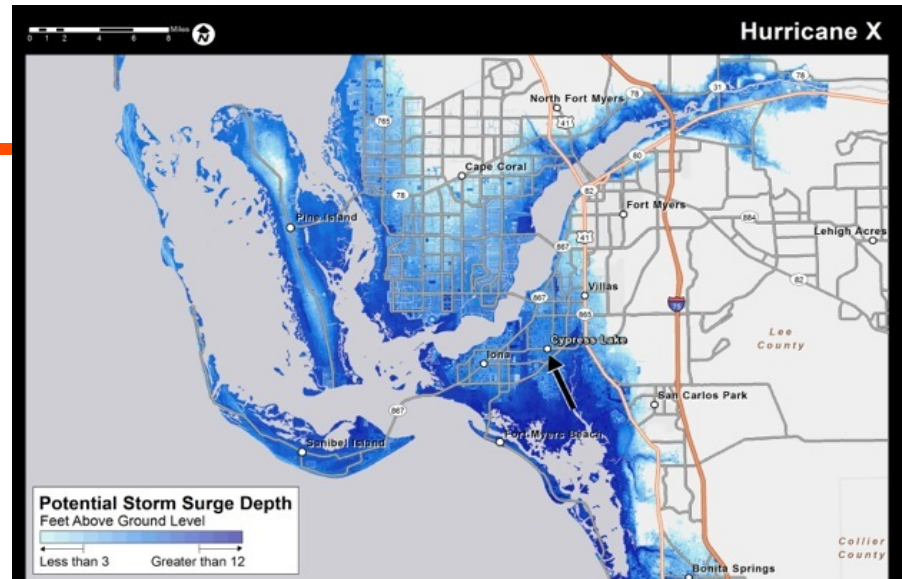
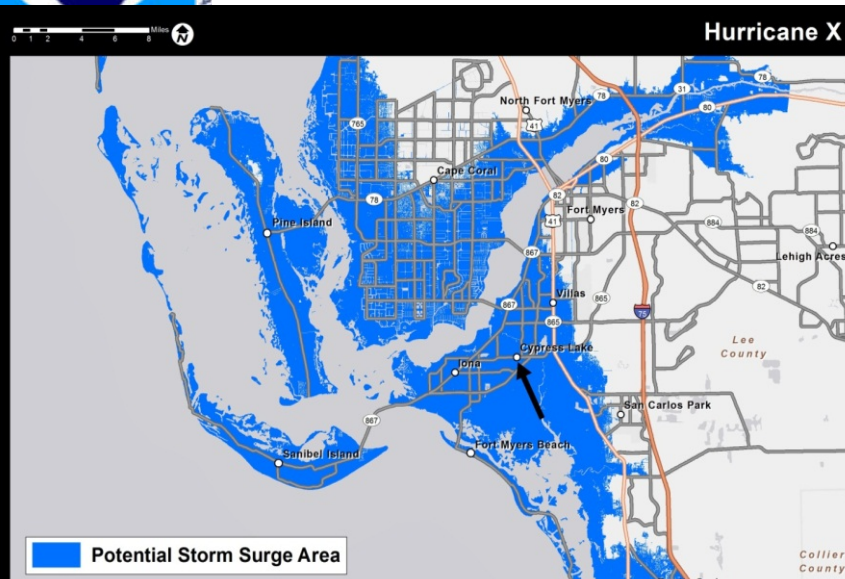
- CSC leading effort via IDIQ contract process
- Develop a marketing plan for NHC and WFO meteorologists to help EMs and broadcast mets accurately explain storm surge risk to their audiences
 - Understand how information flows between NHC/WFOs and EMs and broadcast meteorologists, and their target audiences, and the roles of each in risk communication
 - Develop marketing plan for NWS and its downstream audiences

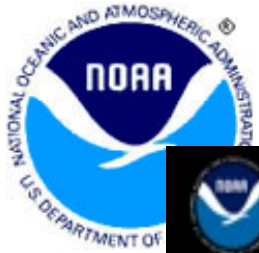


PROTOTYPE MAPS CHOSEN FOR TESTING

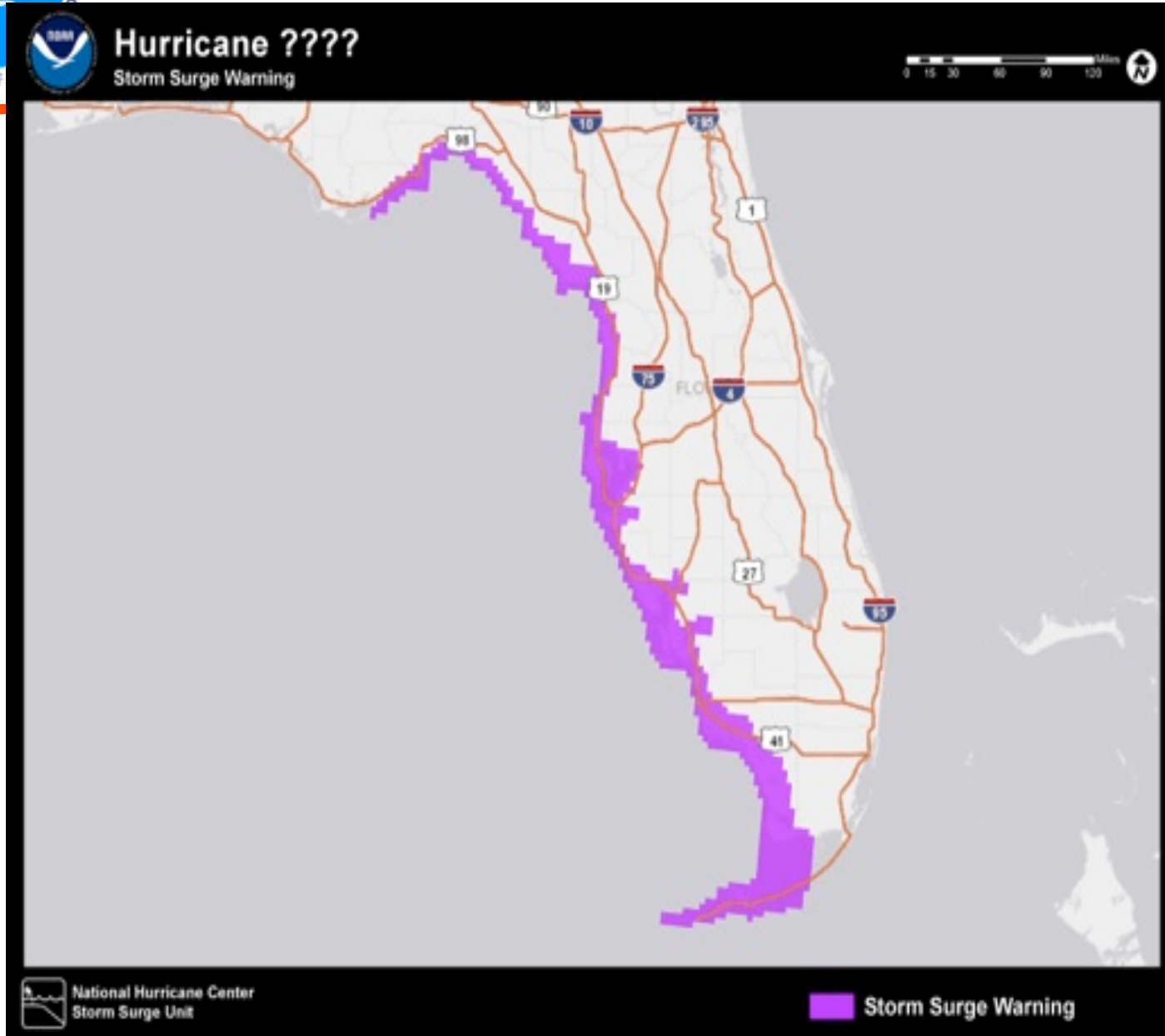


Potential Inundation





Storm Surge Warning

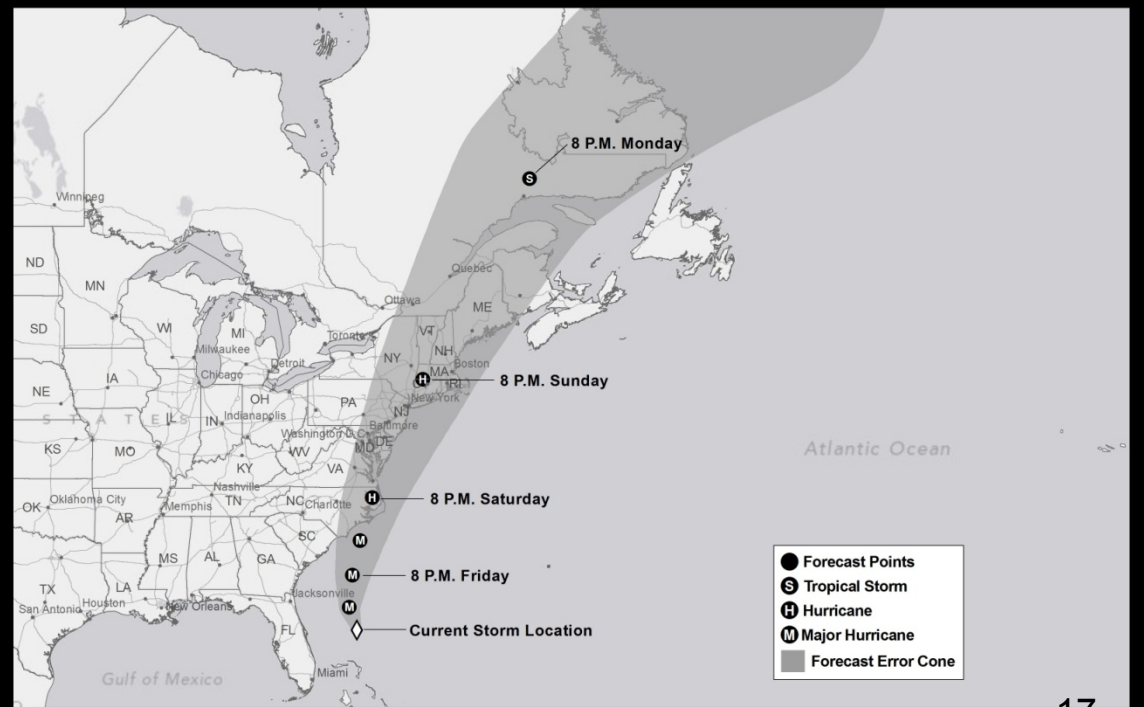


Hurricane X



Track Cone With Dashed Lines

Hurricane X



- Forecast Points
- S Tropical Storm
- H Hurricane
- M Major Hurricane
- Forecast Error Cone

Track Cone With No Lines



Assessment of Support for Storm Surge Warning



Summary of Positive Support for Storm Surge Warning

- 76% EMs TC survey
- 87% EMs ET-TC survey
- 72% Public telephone survey
- 94% Public on-line survey
- 95% Broadcast media
- 77% NWS WCMs (in favor of name)

Most support the label “Storm Surge Warning”



Reasons for Storm Surge Warning

- Serious lack of public understanding of surge (all)
- Too much focus by public on categories (EMs, Bmets)
- Would increase public attention to surge (EMs)
- Would result in greater emphasis in EM decisions
- Would lead to better communication of surge threat in weathercasts (Bmets)

COUNTER ARGUMENTS:

- Public familiar with current coastal flood warnings
- Already too many warnings
- Concern about NWS's ability to provide reliable, timely information at necessary spatial and temporal scale

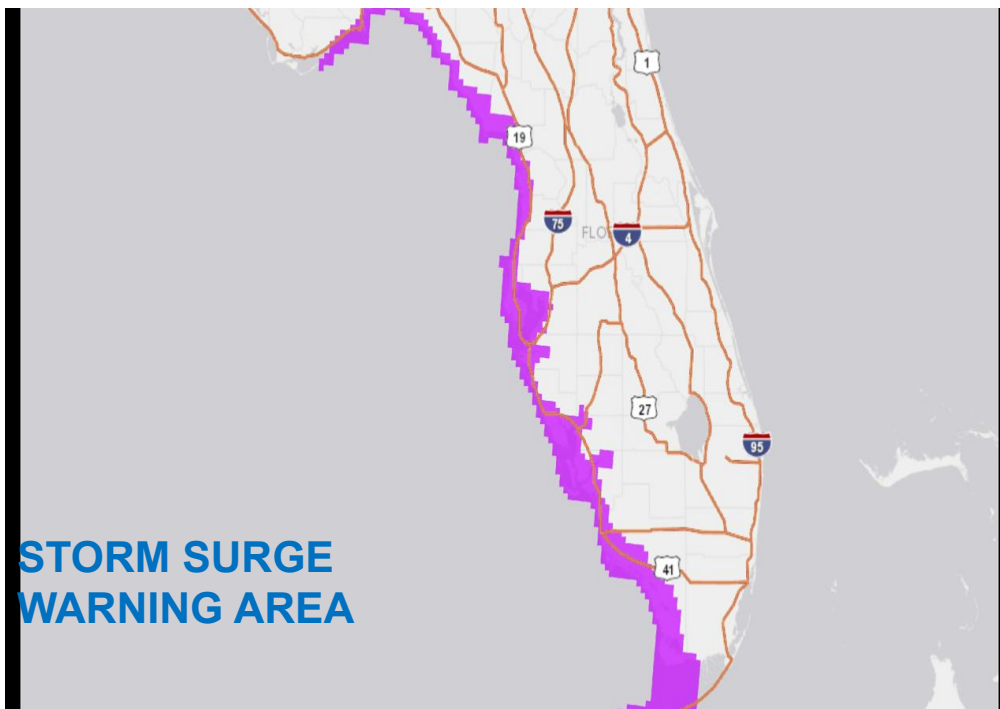


Assessment of Storm Surge Warning Area Maps



If a warning for storm surge is issued, a map will show the AREA INCLUDED IN THE WARNING, something that is currently done for Hurricane and Tropical Storm Warnings. More detailed maps will be provided for localities. The color purple is used in the following example in order to avoid colors used for other NWs watches and Warnings.

*How effective do you think a map like this would be in communicating to the public the area under storm surge or coastal flood warning?
(Extremely effective, Very Effective, Effective, Somewhat Effective, Not Effective at All)*



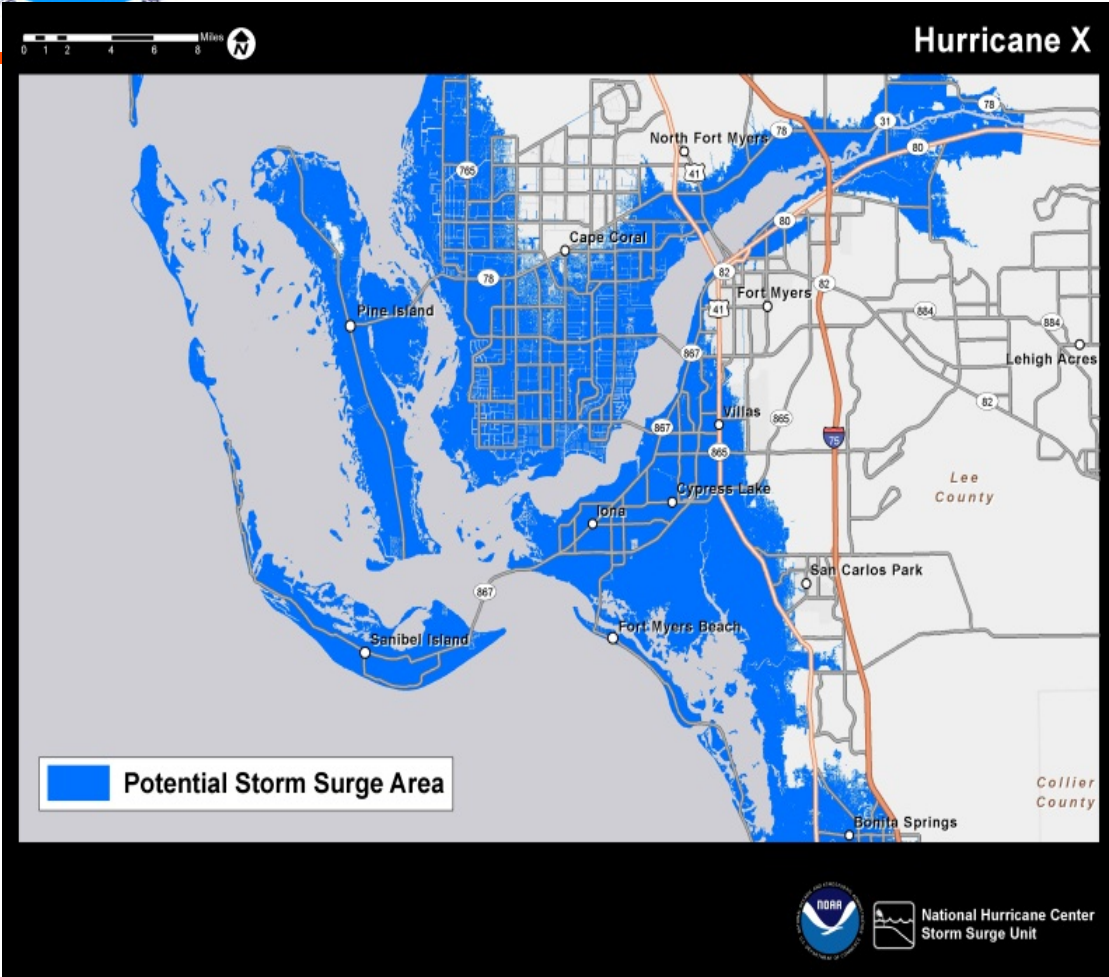
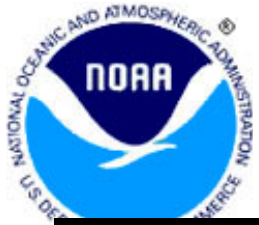
Effectiveness:*

- 92% by EMs
- 96% by Public
- 96% by Media
- 63% by WCMs

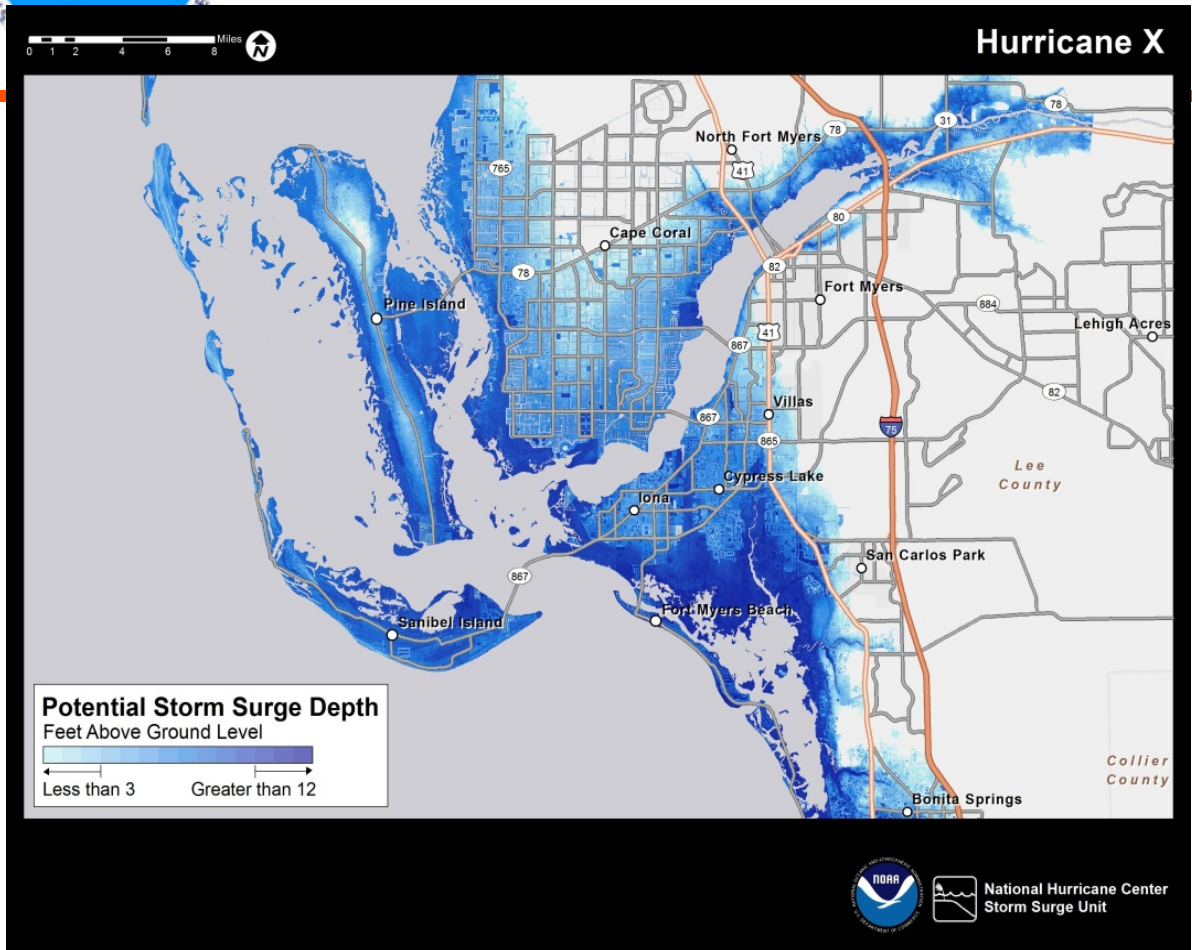
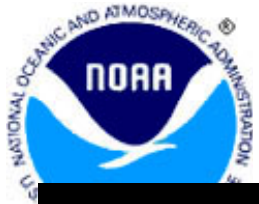
*Total of first three choices



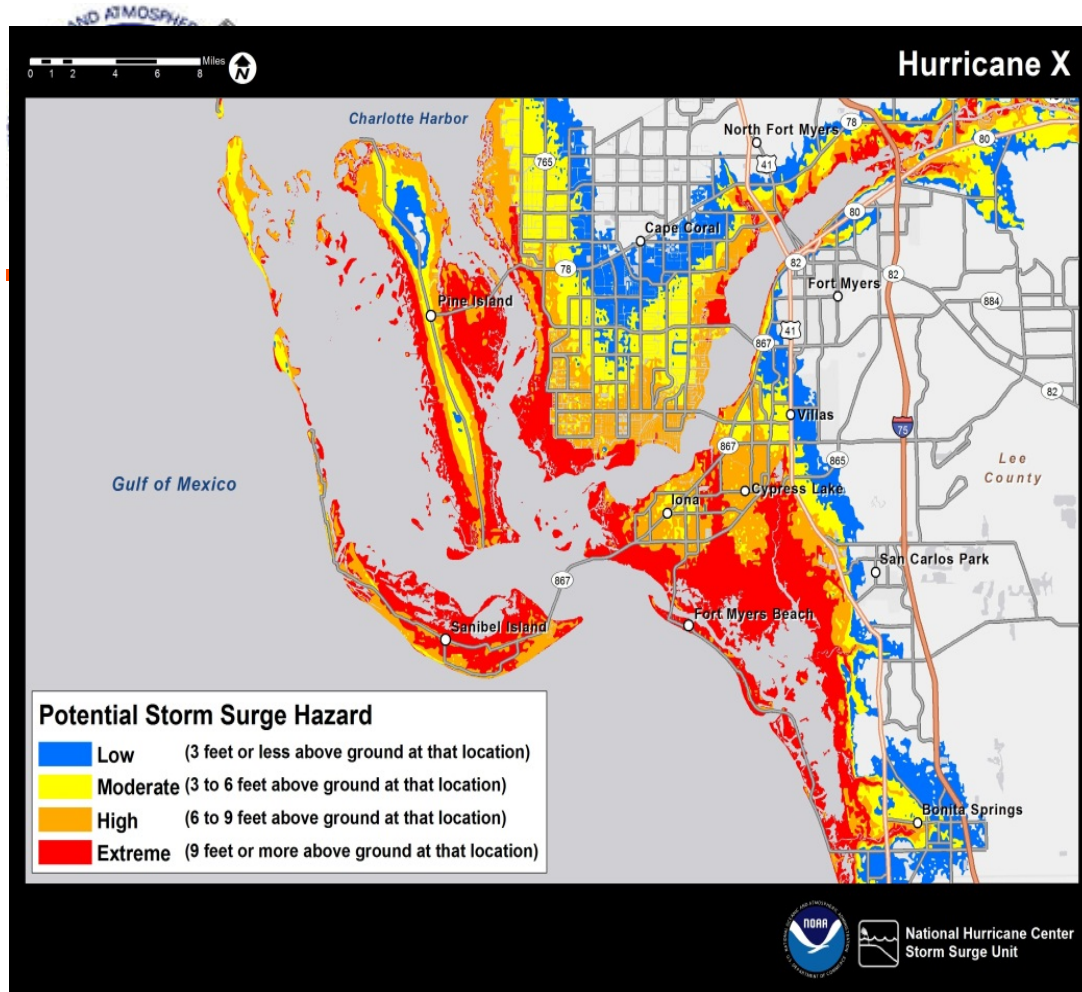
Assessment of Storm Surge Inundation Maps



Storm Surge Inundation Map



Storm Surge Inundation Map



Storm Surge Inundation Map

Criteria:

Easy to understand*

- 86% by EMs
- 96% by Media
- 77% by Public
- 90% by WCMs

Provides useful information*

- 84% by EMs
- 94% by Media
- 98% by Public
- 83% by WCMs

*Total Excellent, Very Good, Good

The majority in all surveys preferred this map

Problems with using “low” to describe storm surge hazard

May affect evacuation decisions at both extremes



Interpretation by Public

The rates for evacuation intent from Cypress Lake (located in a High area) based on each of the three maps were:

- 68% with the solid blue map
- 84% with the shades of blue map
- 95% with the multicolored map

Using the multicolored map, they were then asked if they would evacuate from the Villas (located near border between Moderate and Low) and 54% said they would evacuate.

Providing potential depth information makes a difference, with those located at higher levels being more likely to evacuate than those at lower levels, even though the surge can be life-threatening.



Additional Findings

- Maps should be:
 - High resolution
 - Interactive
 - Allow zooming (to some degree)
 - Mouse-overs with explanations
 - Usable on smart phones, etc.



Additional Findings (continued)

- NWS websites need to be more user friendly
- WFO websites are under-utilized by public
- Too many NWS products and too much text
- Timing of storm surge information is too late for EMs
- Timing of forecast products too close to media broadcast times



Summary

- Strong support for Storm Surge Warning from all stakeholder groups
- Positive assessment of Storm Surge Warning Area Map
- Positive assessment of Storm Surge Inundation Map using multiple colors to show categories of depth