



Measuring Hurricane Storm Tides in South Carolina

Paul Conrads



66th Interdepartmental Hurricane Conference

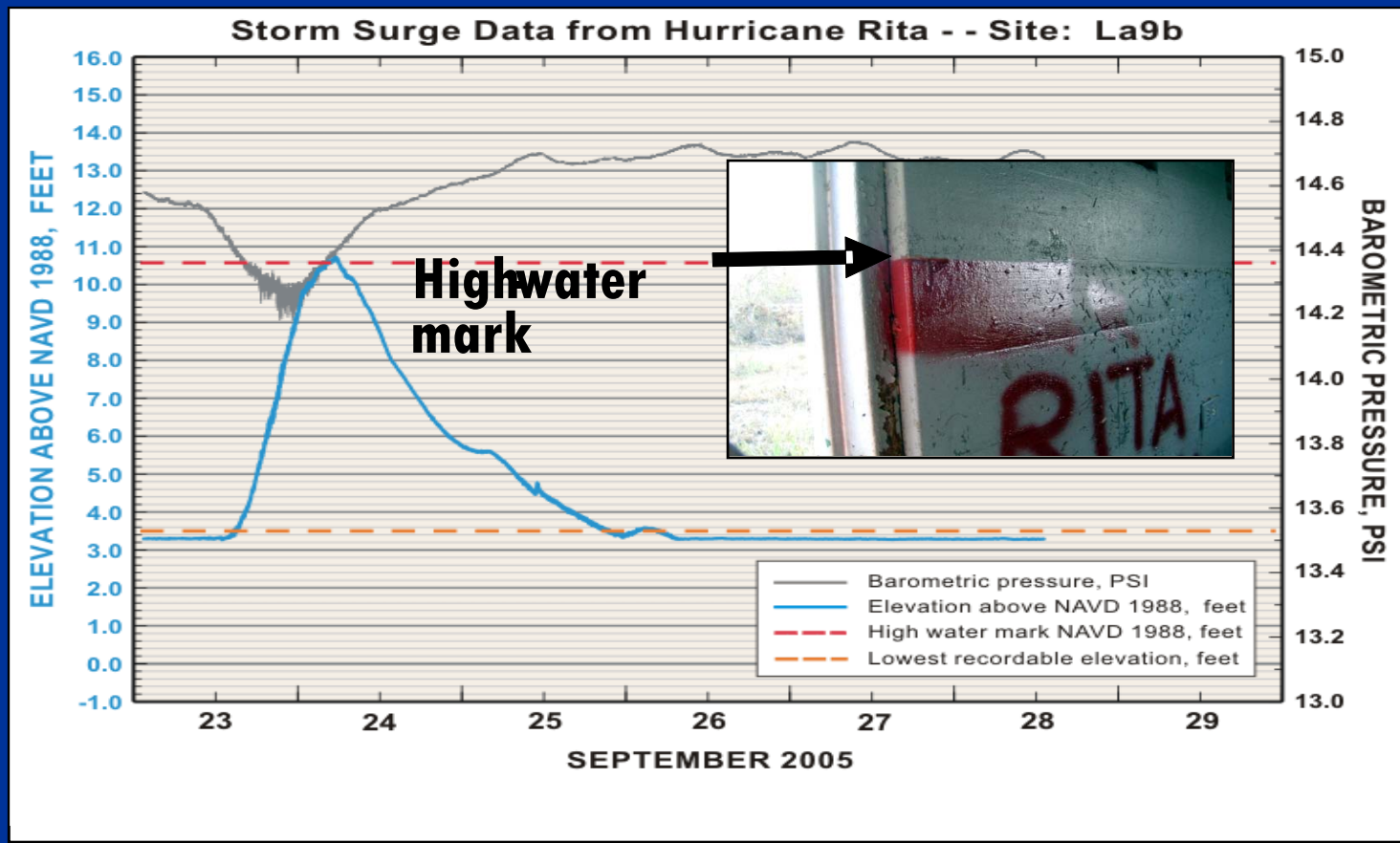
March 6, 2012

Charleston, SC

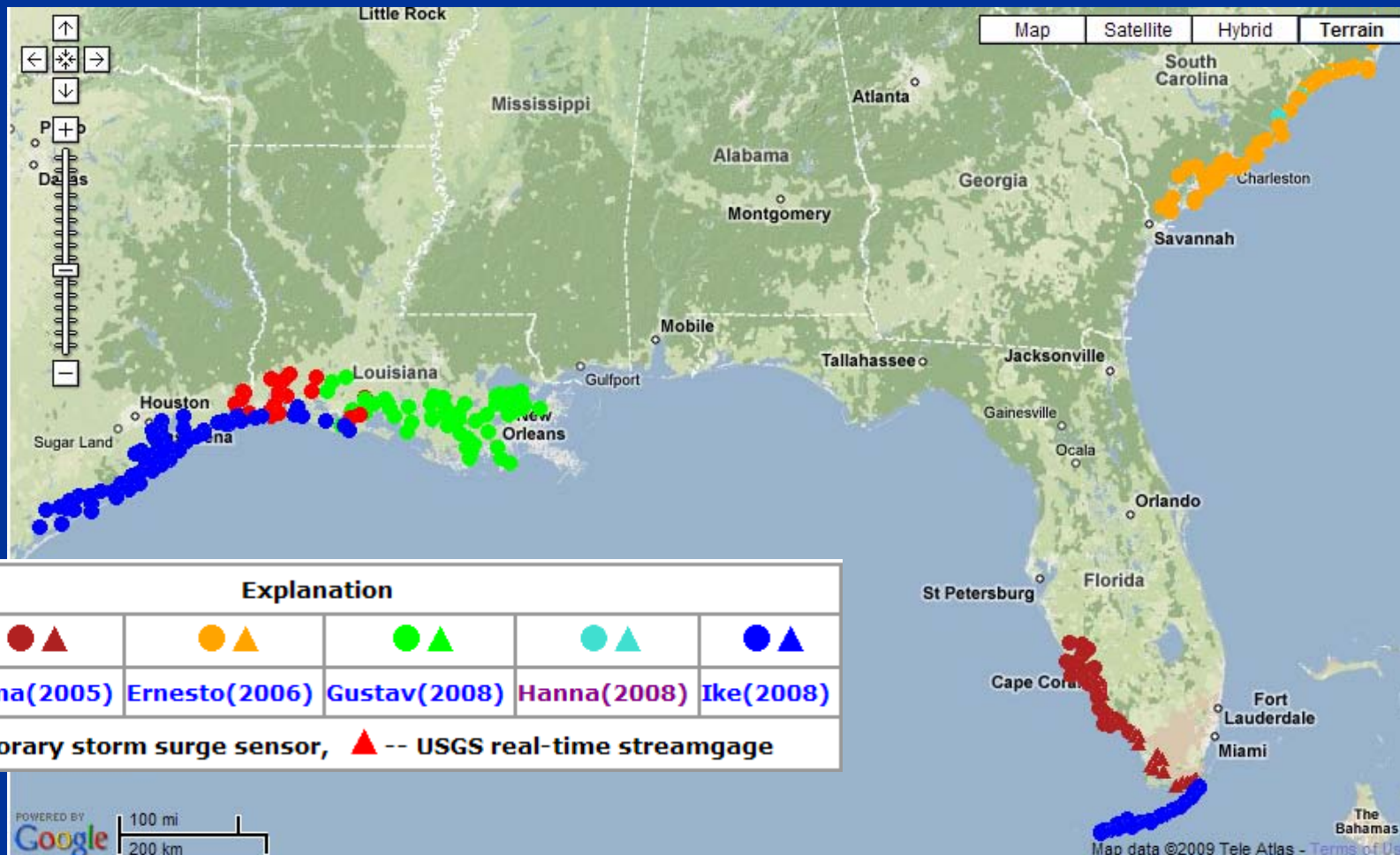
U.S. Department of the Interior
U.S. Geological Survey

Snapshot to Movie

Time-Series Water-Level Hydrographs



Storm Deployments



Deployment Issues

- **Timing**
 - **Storm Tracking vs. Deployment Time**
 - **Ideal – 3 low tide before landfall**
- **Data Dissemination**
 - **Post-event levels**
- **Funding**

Pre-Deployed Infrastructure Network

- Threaded bracket installed and leveled
- Sensor housing attached prior to storm



Benefits: Pre-Storm

- Network design not hurriedly made during pre-storm preparations
- Installation and level worked into regular work schedule
- Website and database setup in advance

Benefits: Post-Storm

- **Post-Storm**
 - Ease of recovery effort
 - Quick data delivery to known datum
- **Overall**
 - Workload for deployment and recovery greatly reduced
 - Supplemental funding for storm typically don't cover labor costs.

Retrieval Issue

Storm tracker on beach mistaken for pipe bomb

By JANELLE FROST
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MYRTLE BEACH — A device meant to measure Tropical Storm Ernesto's impact caused an evacuation at Myrtle Beach's Pier 14 restaurant and drew a crowd of onlookers Friday after it was thought to be a pipe bomb.

Myrtle Beach police were called about 10:30 a.m. by someone walking on the beach who noticed a metal box strapped to a pylon under the pier at 14th Avenue North, Myrtle Beach police Capt. David Knipes said. He said police checked to see whether the device was registered by some agency, but it was not.

Myrtle Beach police called the Horry County Police Department's Explosive Ordnance Disposal team. The team decided to blow the top off the box to reveal its contents, which turned out to be a device from the U.S. Geological Service that measures wave height and frequency and storm surge, police detective and team member Van Sissell said.

"Because of the type of equipment it was when we surveyed it, it appeared to be a pipe bomb," Sissell said. "We did disrupt the device ... everything went very well."



MIC SMITH/THE ASSOCIATED PRESS

Five devices to measure the impact of Ernesto, which hit Myrtle Beach on Thursday, were placed along the Grand Strand by the U.S. Geological Survey. One of the devices was mistaken for a pipe bomb on Friday.

packages we treat it as suspicious," Muncey said. "Since Sept. 11, 2001, we have to be a little more secure with these things. It's always better to be safe than sorry." Myrtle Beach police learned

use of the temporary devices, called pressure transducers, to collect tidal changes during Tropical Storm Ernesto.

About 40 of the devices, in-

cluding five along the Grand Strand, were put in place Tuesday along the S.C. coast to record Ernesto's impact, Conrad said. Officials were collecting the devices,

which are housed in a pipe in a metal box and could resemble a suspicious device, on Friday. They cost about \$1,000 each.

"Anytime water causes a haz-

ard, we want to gather data to provide to emergency managers to make decisions," Conrad said. "The ones on the beach actually record data every two seconds and that information is really valuable for emergency-preparedness people. We knew what happened was a potential because they look like that. After putting 40 of these things out, I'm grateful only one of these things caused a stir."

At the last minute instead of placing the device at the Second Avenue Pier, officials decided to put it at Pier 14 and failed to notify the owners, Conrad said. Officials called Pier 14 owners to apologize for the disruption.

About 10 to 12 workers at the Pier 14 restaurant were out of the building for an hour and a half as police surveyed the device, restaurant owner Bryan Devereux said. He said the police came and told them that someone had strapped a metal box to the pylon under the pier and that they should leave the building. The restaurant was not opened yet for business.

"They wanted to play it safe," Devereux said. "We just waited at the beach access."

Frost and Root are reporters for The (Myrtle Beach) Sun News, a McClatchy newspaper.

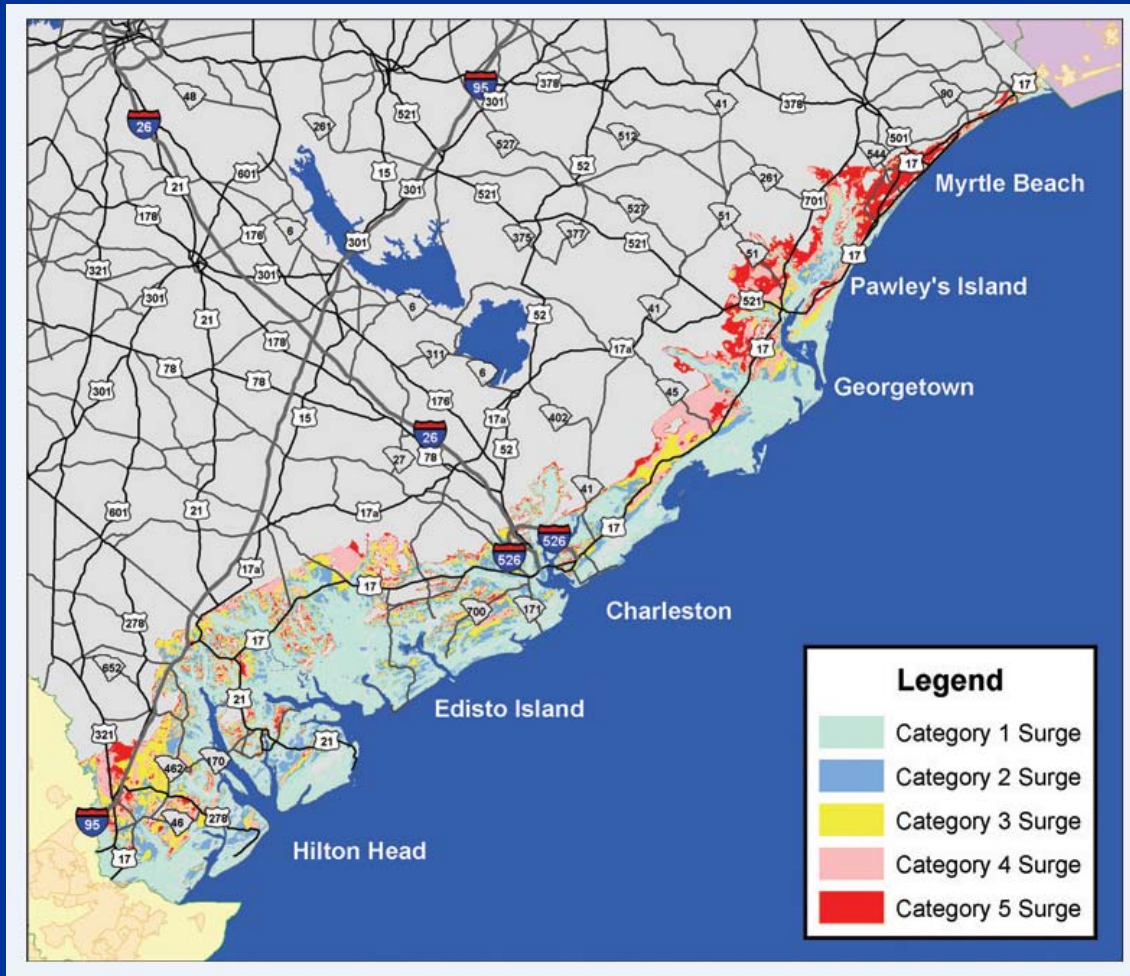
Stimulus Proposal

- Establish a network of 100 sites along the coast
- Contract installation and levels
- Only 5% of cost for USGS oversight

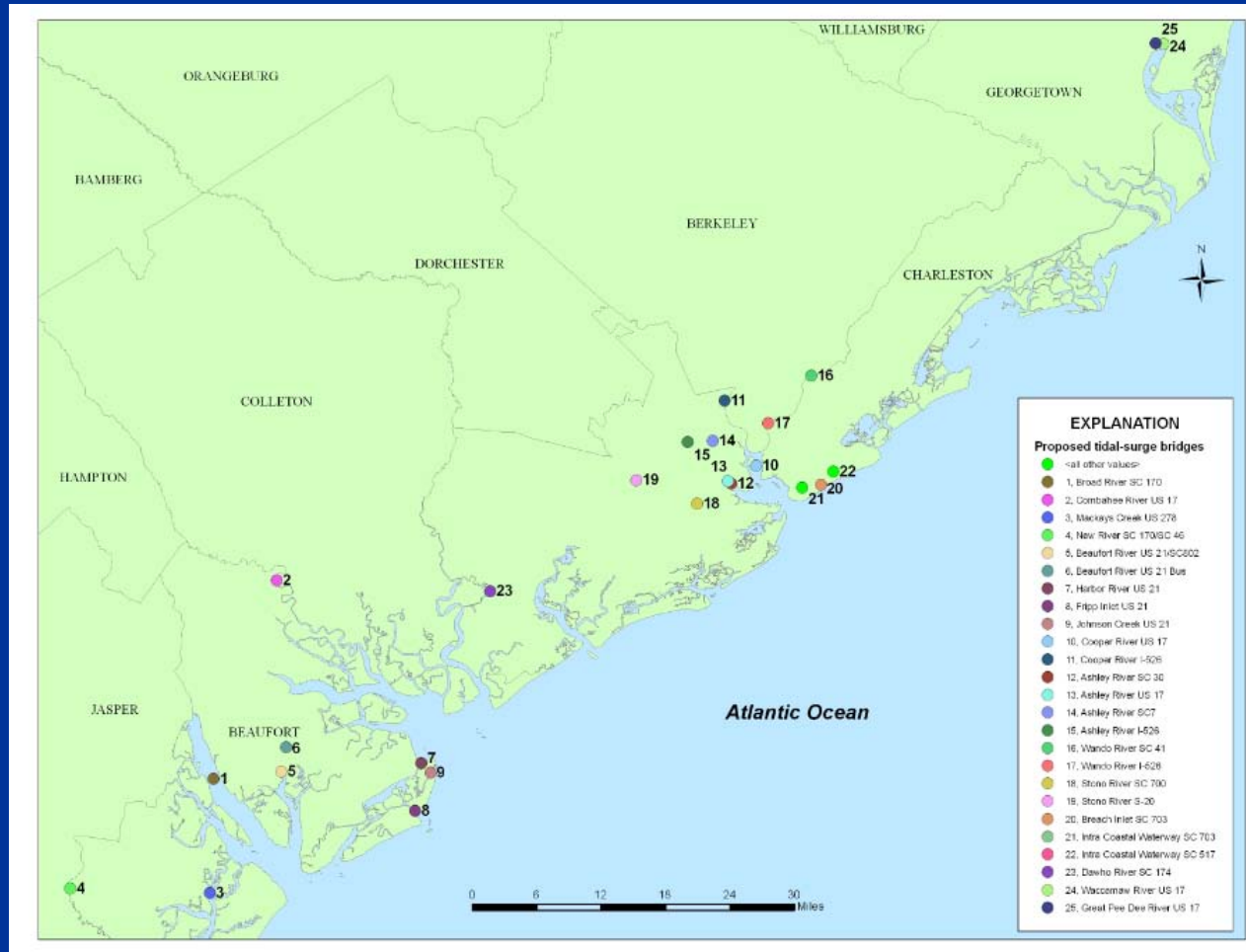
Plan B

- **Incrementally build network**
 - **Install 8-10 brackets a year**
 - **In five year – network of 40-50 sites**
- **USACE - \$27K in 2009**

Site Selection: Storm Surge Map



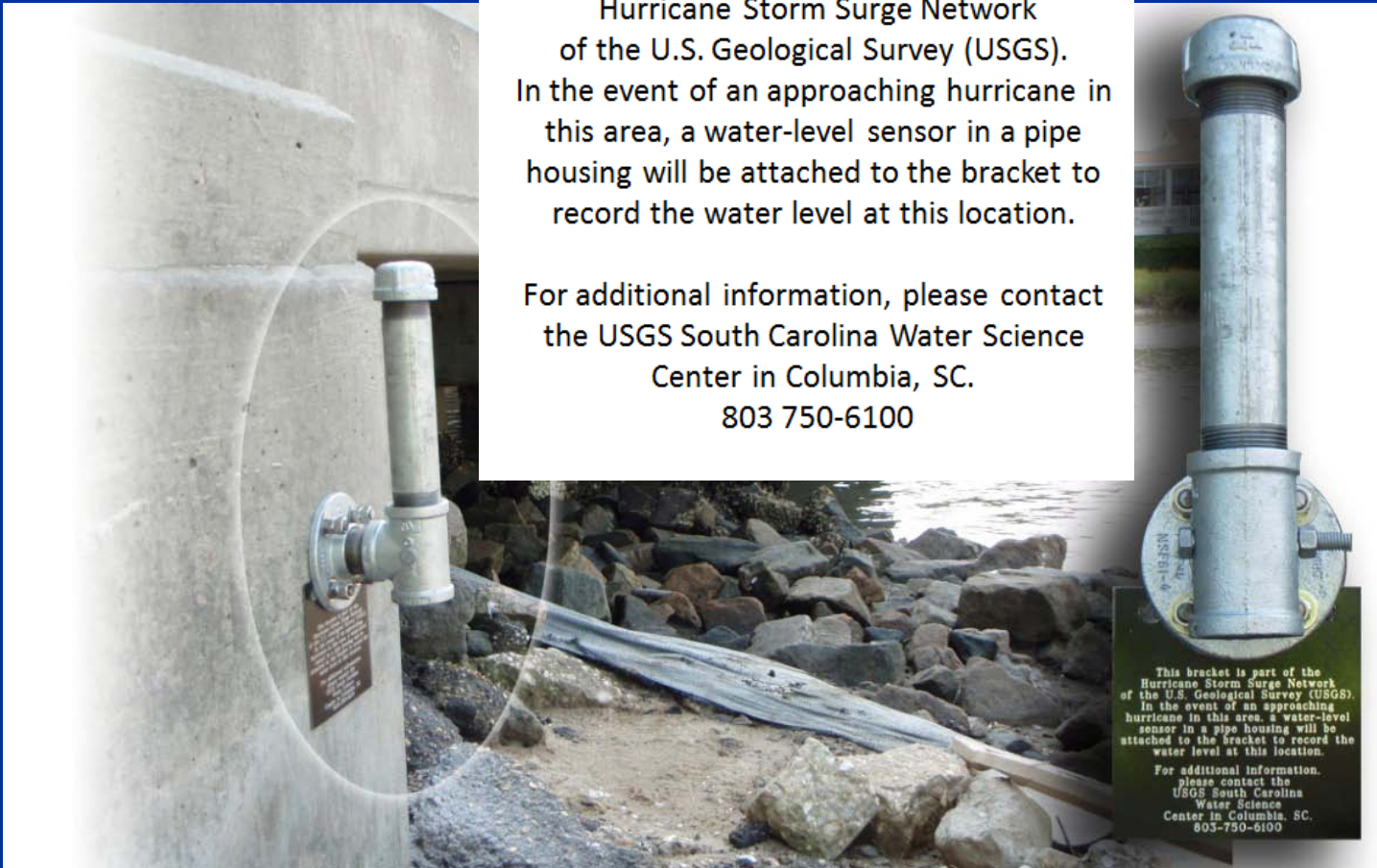
Site Location: SCDOT Tidal-Surge Bridges



Installation

This bracket is part of the Hurricane Storm Surge Network of the U.S. Geological Survey (USGS). In the event of an approaching hurricane in this area, a water-level sensor in a pipe housing will be attached to the bracket to record the water level at this location.

For additional information, please contact the USGS South Carolina Water Science Center in Columbia, SC.
803 750-6100



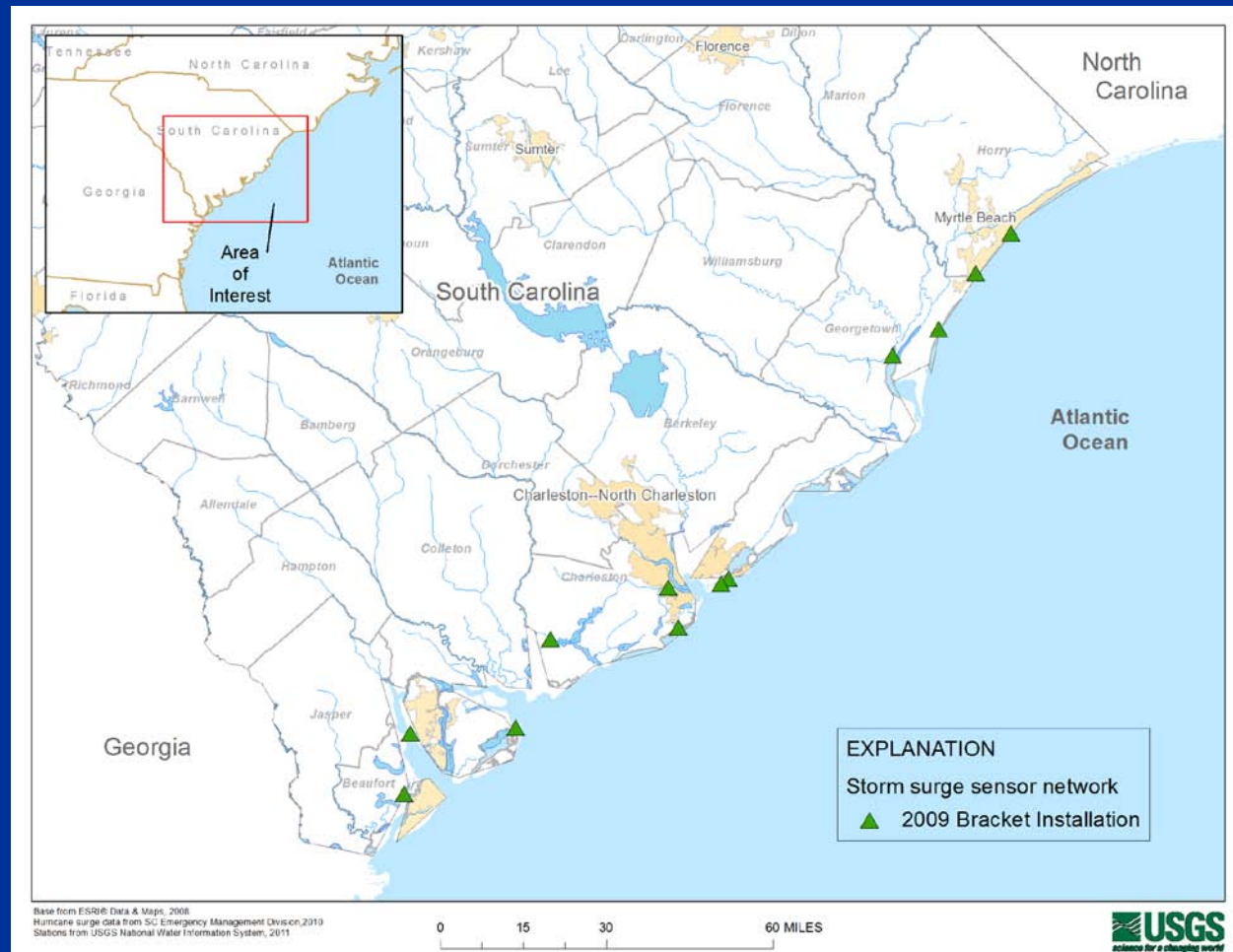
Installation May River



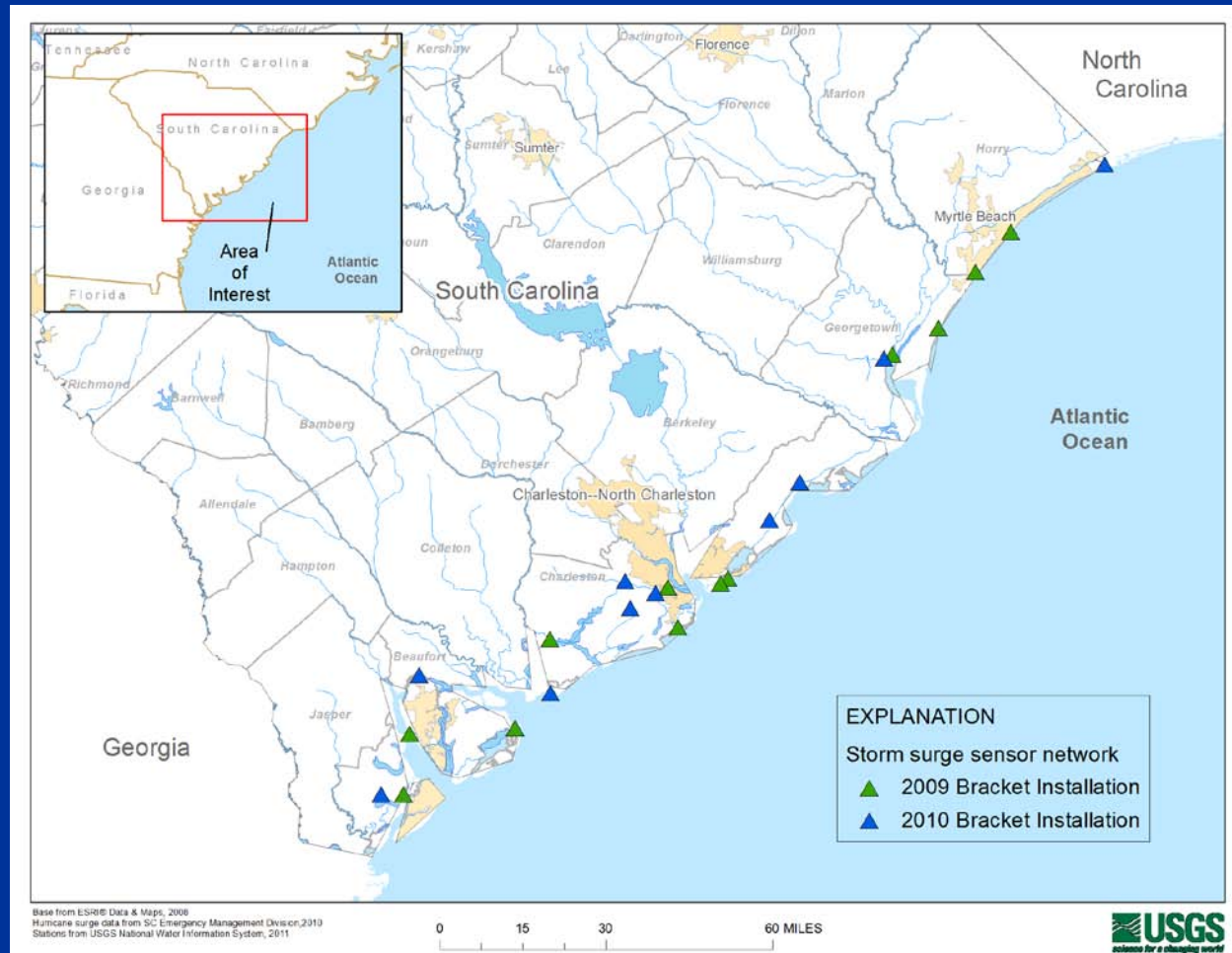
Installation Waties Island



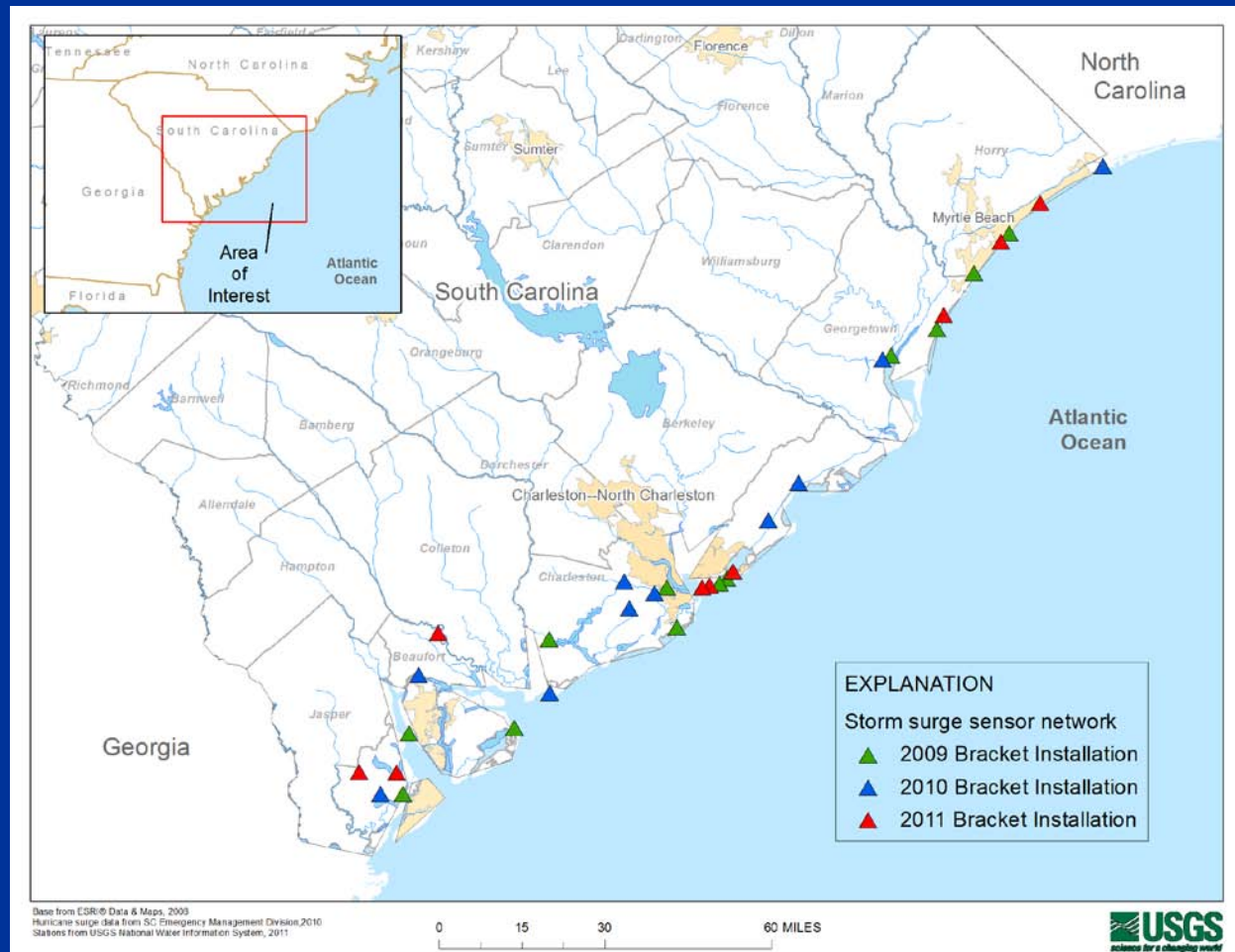
2009 – 12 Sites



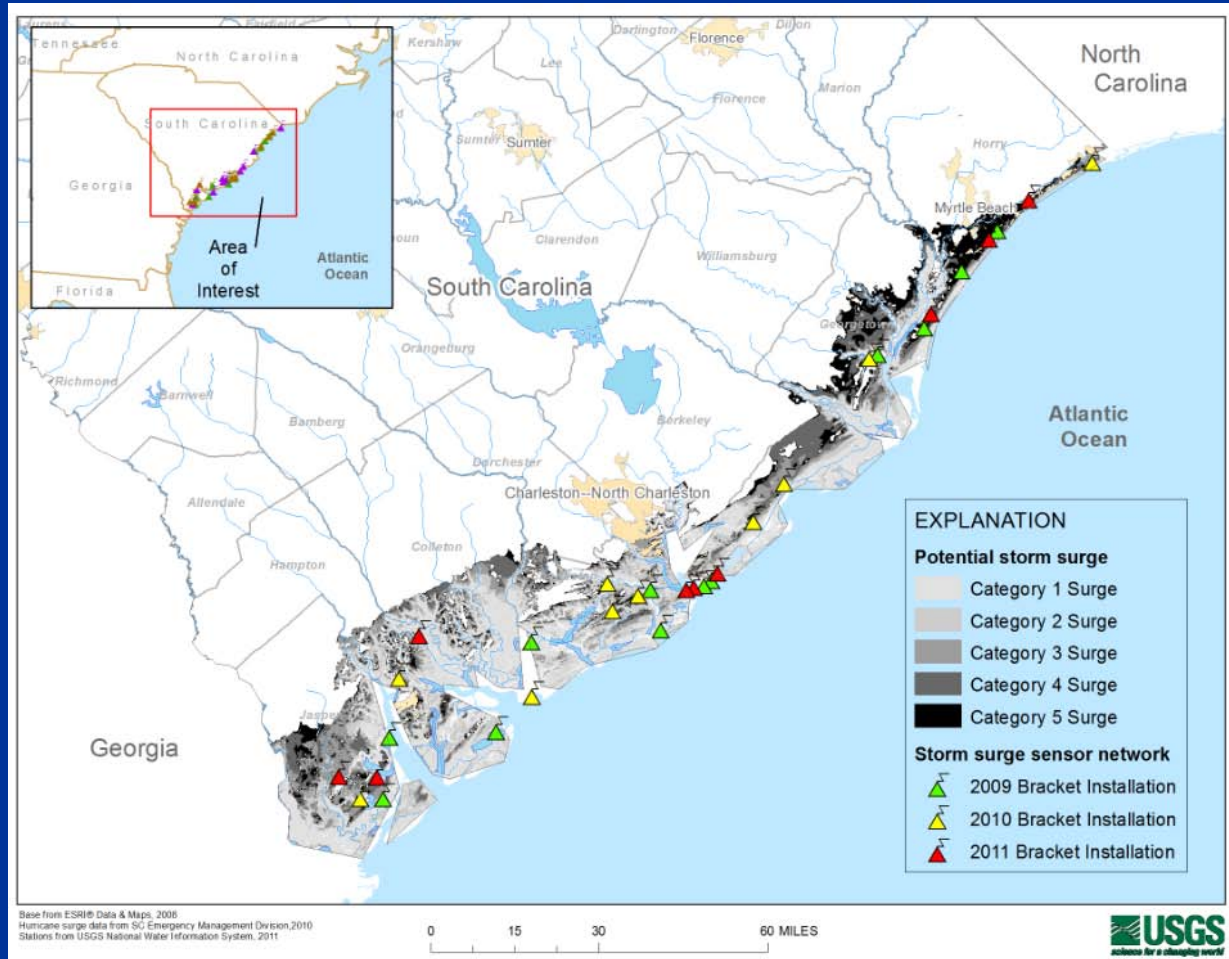
2010 – 10 Sites



2011 – 9 Sites



Network and SLOSH Output

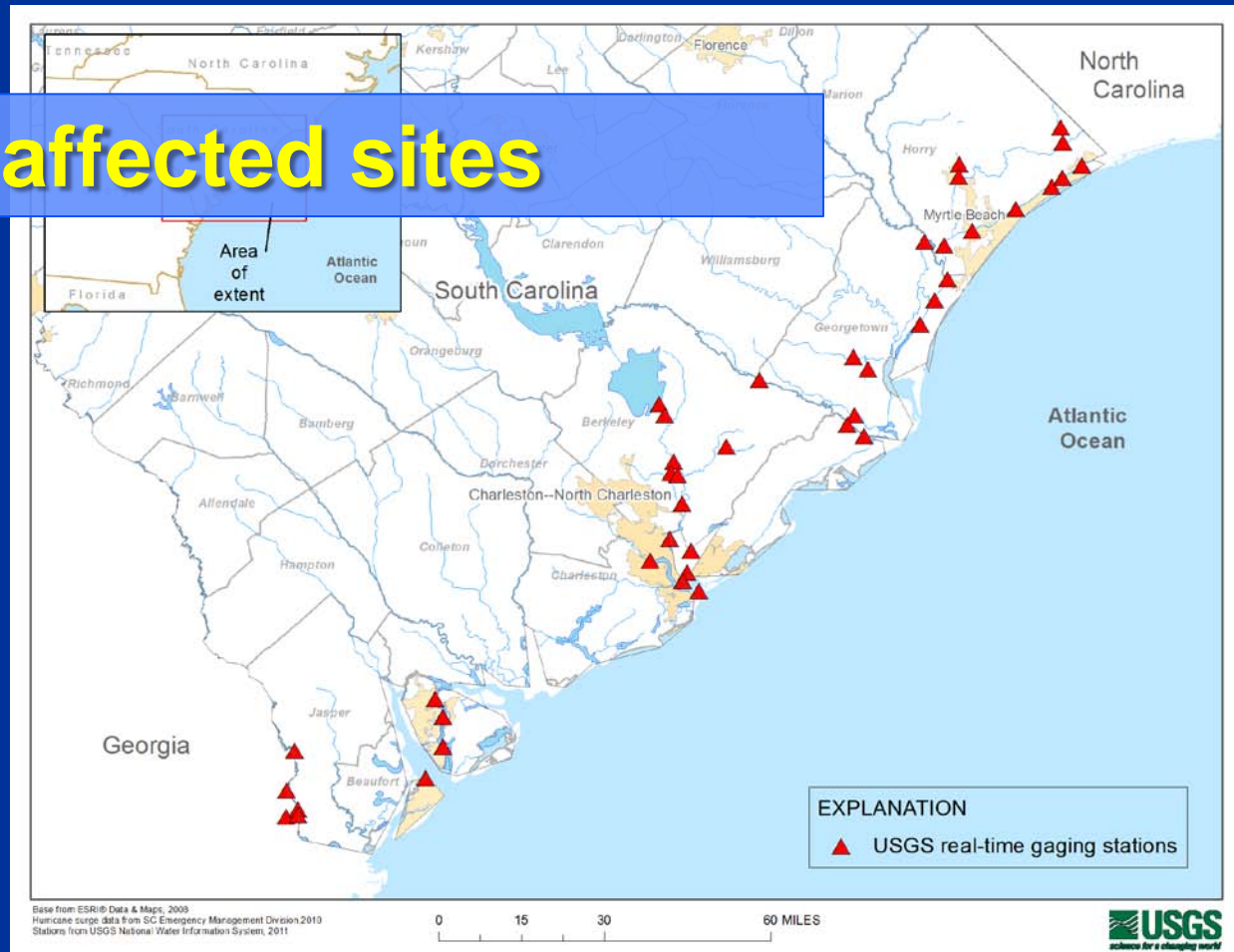


Other Observations

- **Real-time Network**
- **Augment Fixed Networks**
 - **Rapid Deployment Gages**
 - **Temporary Deployed Sensors**

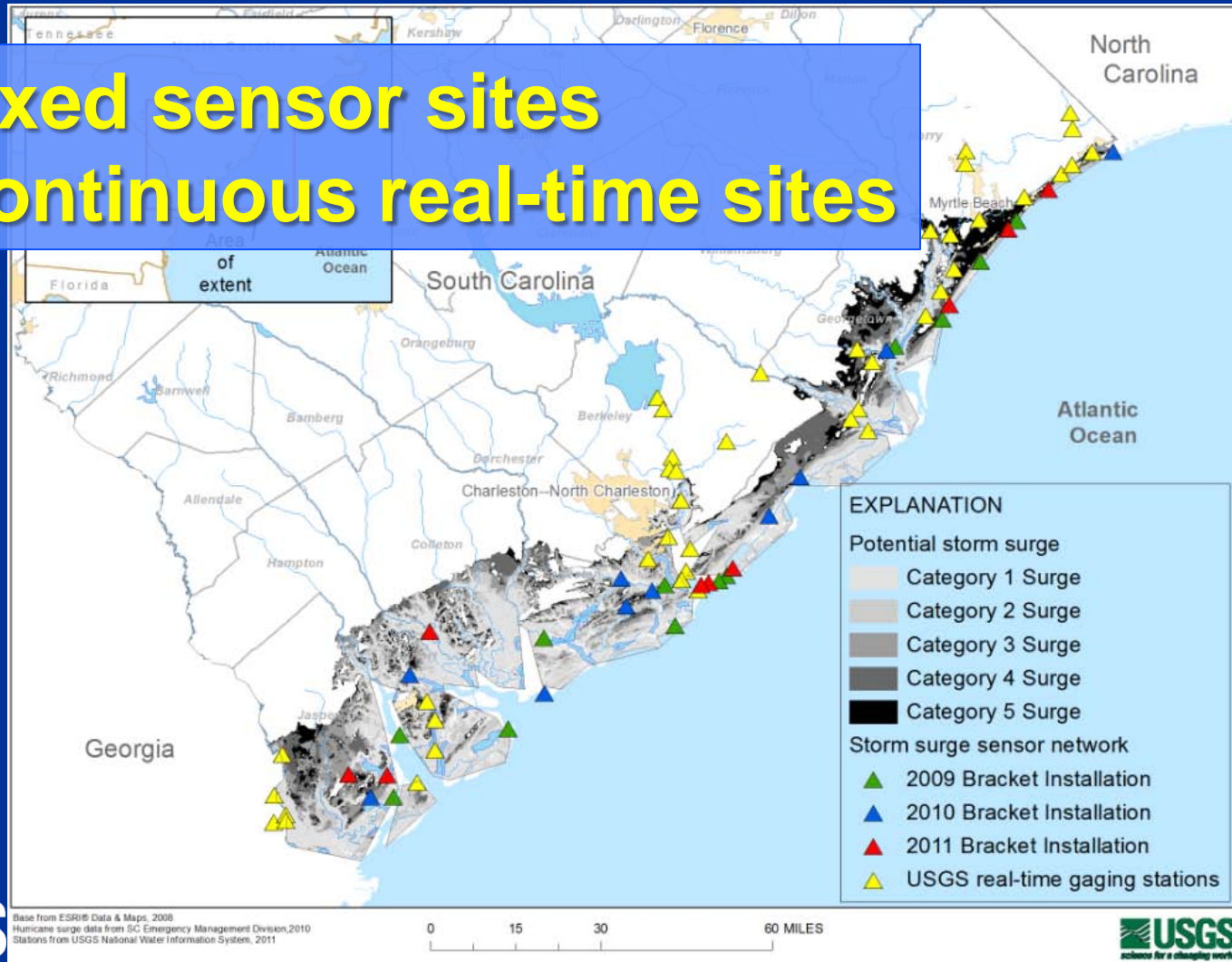
Real-time Coastal Network

40 tidally affected sites



Fixed Networks

31 Fixed sensor sites
40 Continuous real-time sites



Rapid Deployment Gage



Summary

- Positive response to the storm tide network
- Easily work in installations over the summer
- Gives good options for pre-storm planning
- 10-14 more sites in FY12

Questions?



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