Alabama's Coastal Flood Maps: What a Journey!

Presented by:
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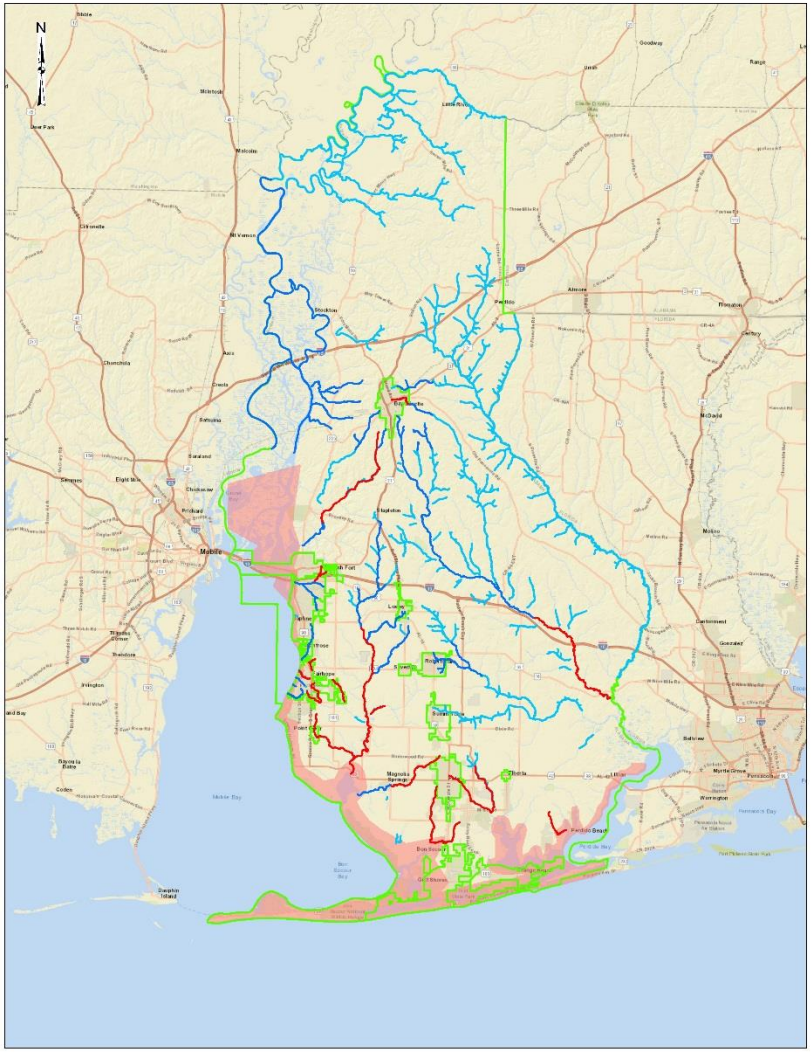
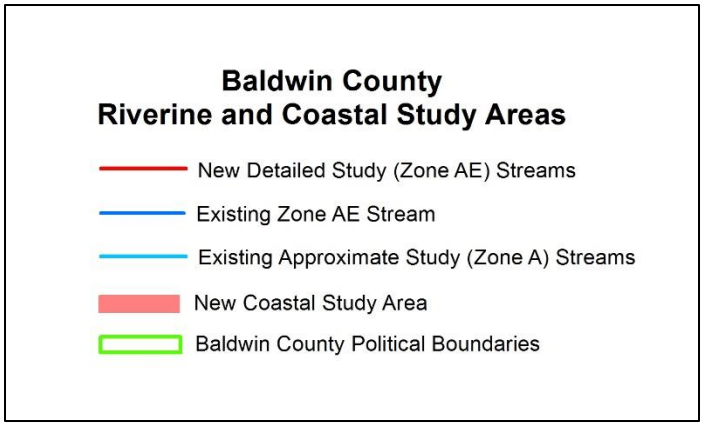
Brief History

- Effective studies were out of date
  - Baldwin County Flood Insurance Study
    - Surge Elevations revised in 1983
    - Wave Elevations revised in 2002
  - Mobile County Flood Insurance Study
    - Surge and Wave Elevations revised in 1983
- Major storms since 1983
  - Elena (1985) - Ivan (2004)
  - Opal (1995) - Dennis (2005)
  - Danny (1997) - Katrina (2005)
  - Georges (1998)
- **Bottom Line = New Coastal Studies Needed**
- First FEMA grants were issued in FY08
  - Followed by grants in FY09, FY10, FY11, FY12, FY13 and FY15

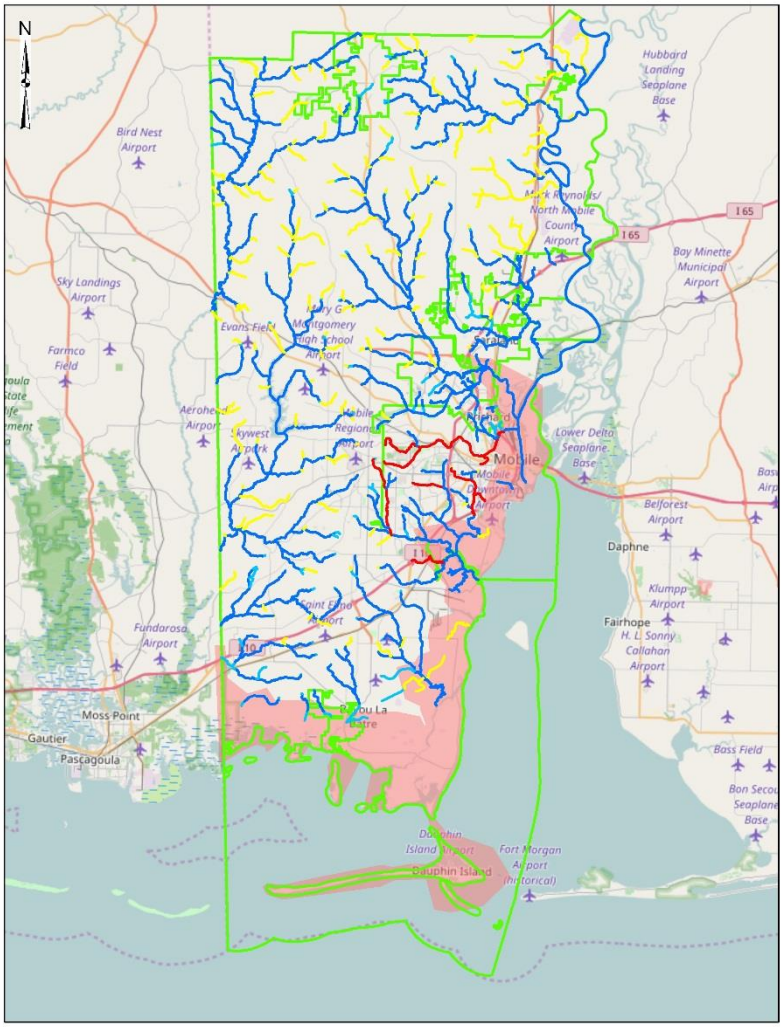
Baldwin County Study Overview



- Detailed Studies – Zone AE
  - Zone AE – 214 miles of studies
  - **Zone VE – 111 miles of studies**
- Approximate Studies – Zone A
  - 494 miles of studies
- 15 Communities



Mobile County Study Overview



- Detailed Studies
  - Zone AE – 34 miles of studies
  - Mobile LOMRs – 88 miles of studies
  - **Zone VE – 100 miles of studies**
- Approximate Studies – Zone A
  - 278 miles of studies
  - Mobile LOMRs – 15 miles of studies

Mobile County
Riverine and Coastal Study Areas

- New Detailed Study (Zone AE) Streams
- Existing Zone AE
- New Approximate Study (Zone A) Streams
- Existing Approximate Study (Zone A) Streams
- New Coastal Study Area
- Mobile County Political Boundaries

Coastal Modeling – Two Phased Approach

- Phase 1 – ADCIRC/Wave set up modeling to determine the 1% and 0.2% annual chance stillwater elevations.
  - ADCIRC is an Advanced 3D Circulation Model used to compute storm surge heights from either historic or synthetic storm events.

- Phase 2 – Overland wave or transect modeling and DFIRM mapping.
  - Wave Height Analysis for Flood Insurance Studies (WHAFIS) – used to predict wave heights associated with hurricane storm surge.
  - Runup methods (Runup 2.0, TAW, & SPM) – used to model the effects of wave runup and overtopping of coastal dunes.

Coastal Modeling – Two Phased Approach

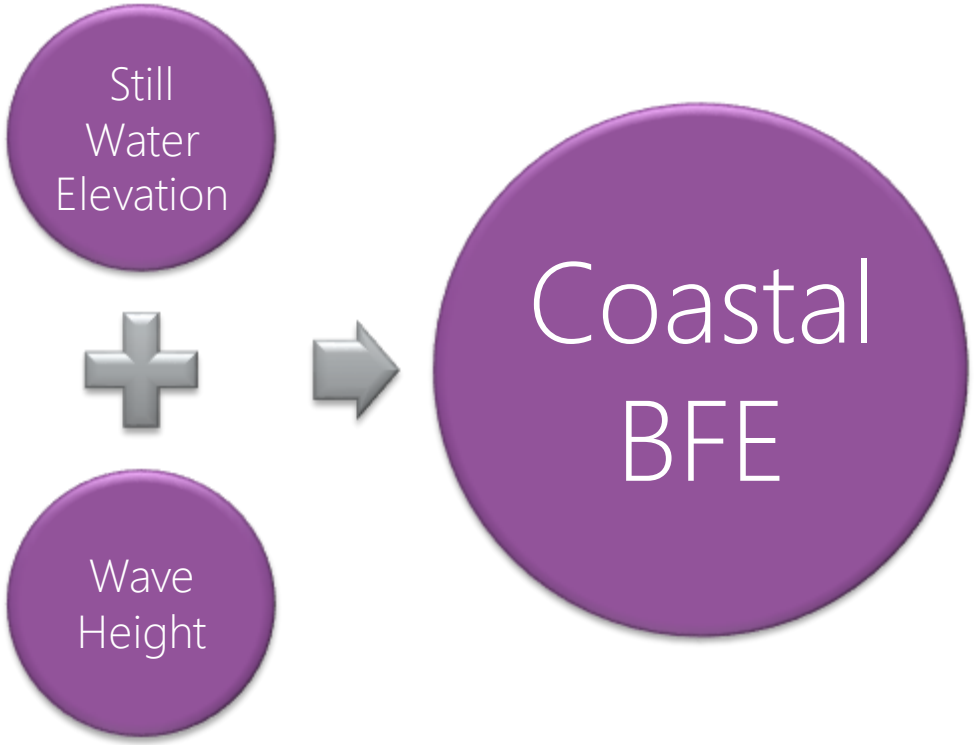
Still Water Elevation + Wave Height = Coastal BFE

- Phase I (NWFWMD)
  - ADCIRC/Wave Setup
  - Storm Surge Modeling

Still Water Elevation

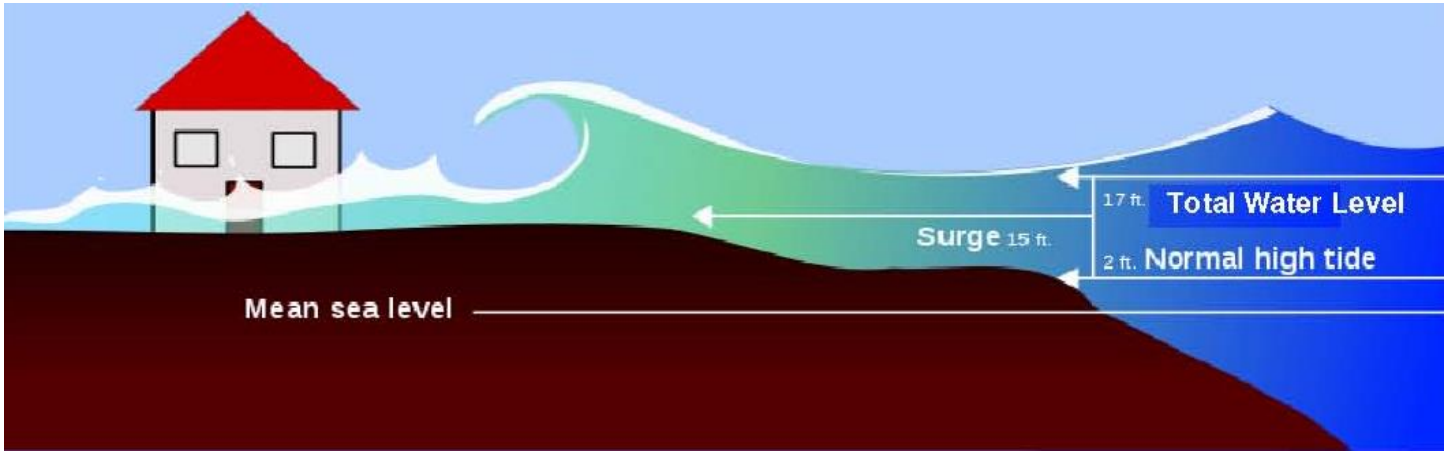
- Phase II (AL OWR)
  - Overland Wave or Transect Modeling

Wave Height

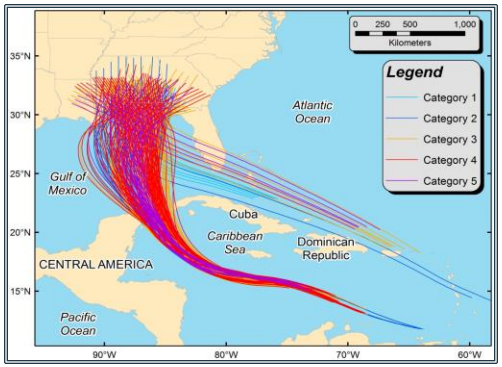


Coastal Modeling 101

- What is coastal storm surge?
  - Still Water Elevation (SWEL) above Normal Tide Levels

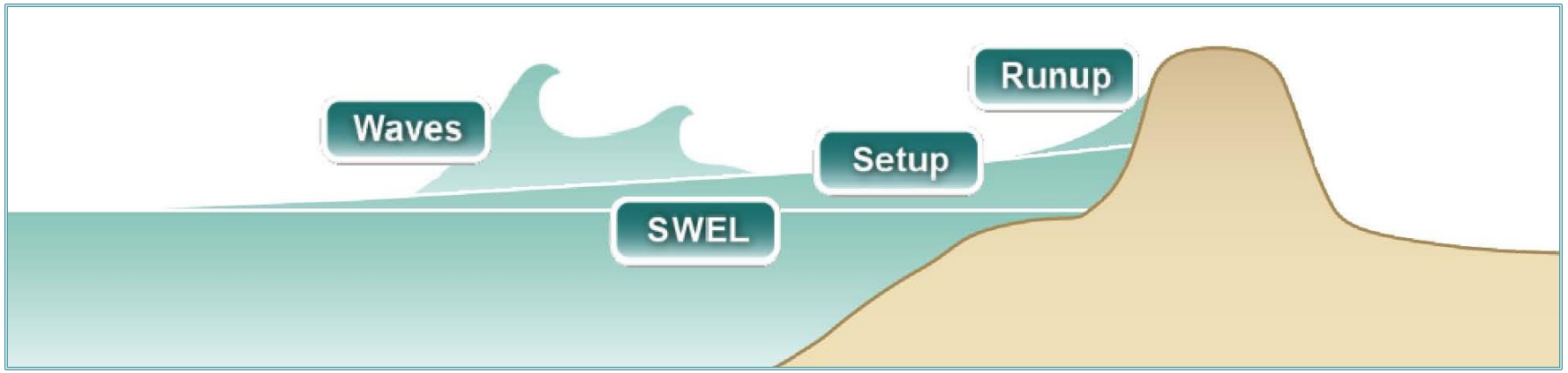


  - Created from several hundred synthetic storm tracks, then validated with historical storm information

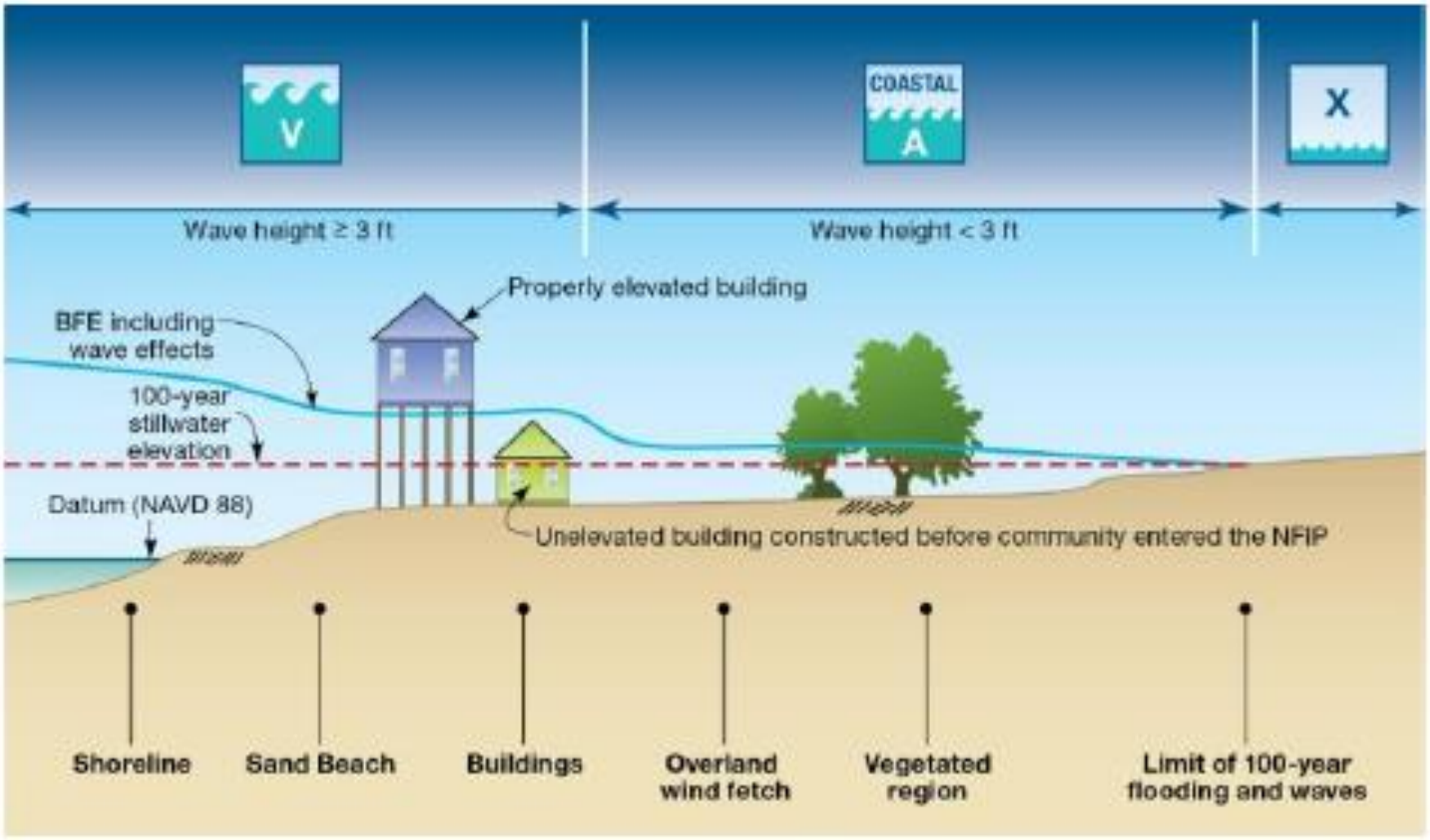


Coastal Hazard Analysis

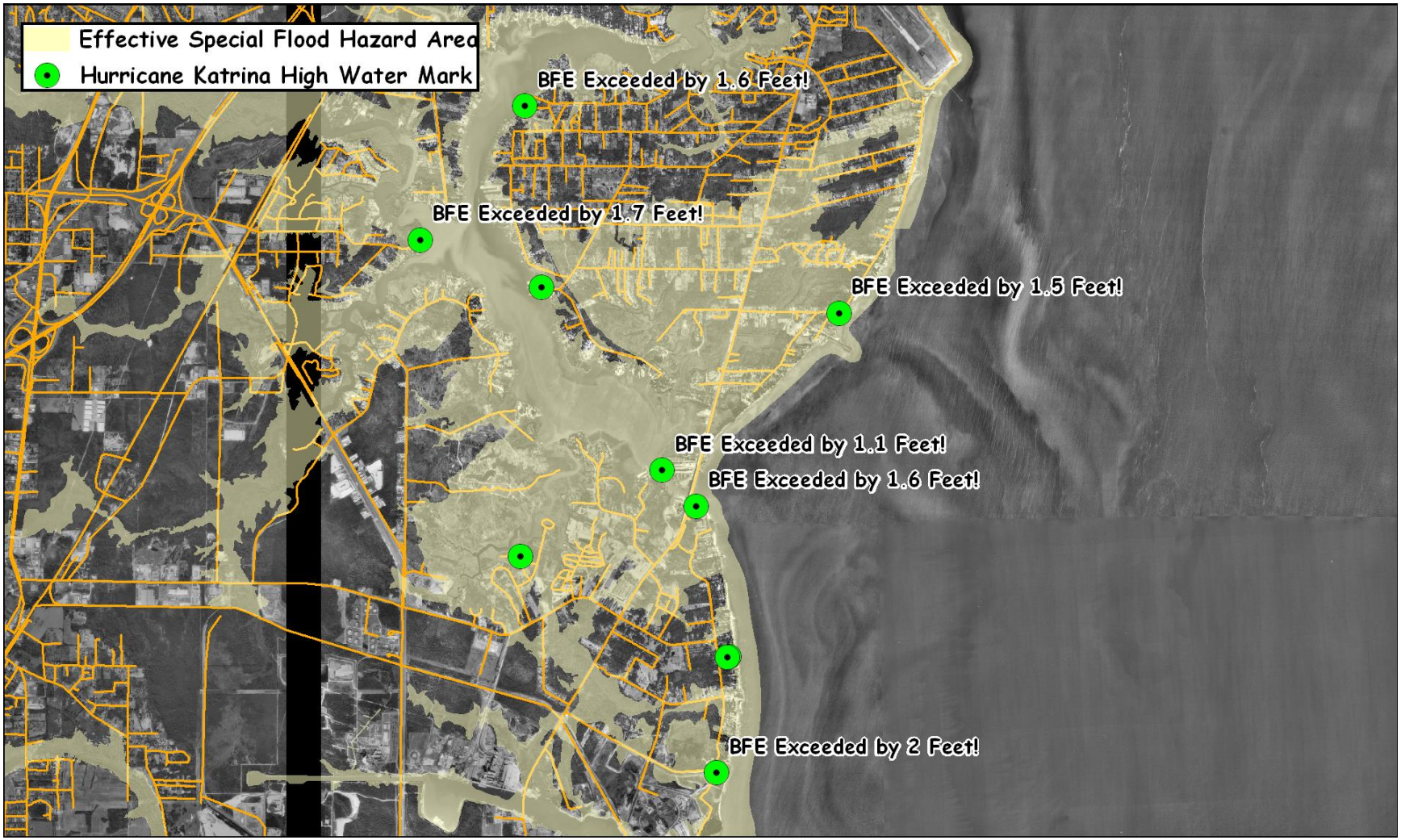
- Coastal BFE on FIRMs include:
  - Storm surge stillwater elevation (SWEL)
  - Wave setup
  - Wave height above SWEL
  - Wave runup above SWEL (if applicable)



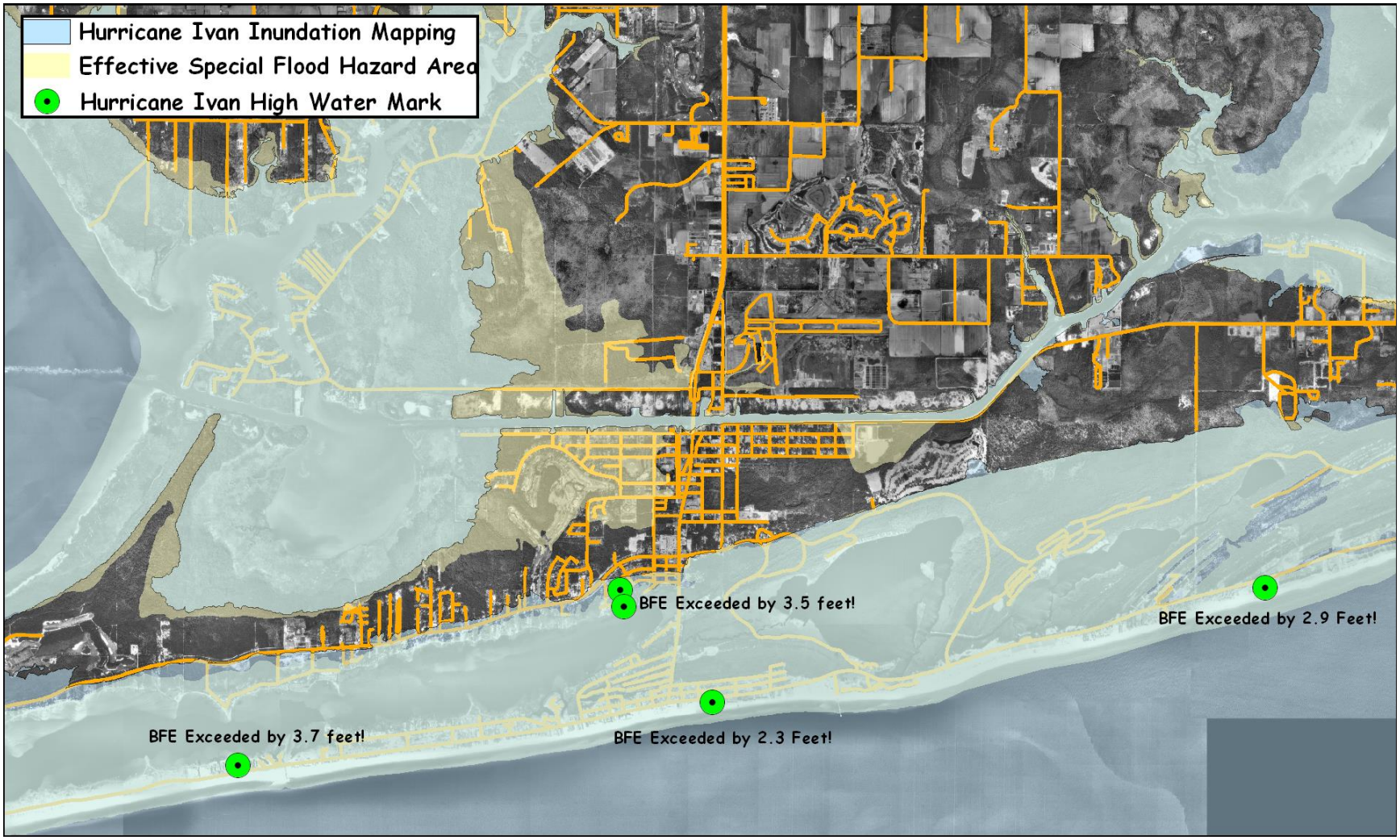
Coastal Flood Mapping



Hurricane Katrina vs. Old Effective FIS



Hurricane Ivan vs. Old Effective FIS



Historical vs. New Baldwin County FIS

Hurricane Ivan High Water Marks – Baldwin County, AL

Transect	USGS Reference	Location	HWM (ft.)	New BFE (ft.)	Effective BFE (ft.)
157.2	USGS 16	Pine Beach	10.66	14 VE	12 VE
161	USGS 14	Gulf Shores	13.74	13 AE	10 AE
173	USGS 10	Orange Beach	12.24	13 VE	12 VE

High Water Mark (HWM) Comparisons (NAVD88, ft.) – Baldwin County, AL

Location	Flood Source	HWM**			New BFE (ft.)	Effective BFE (ft.)
		Ivan	Katrina	Georges		
Fairhope	Mobile Bay	6.07	10.5	7.51	11 AE	11 AE
Weeks Bay	Mobile Bay	6.47	9.2	6.46	10 AE	12 VE
Bon Secour	Mobile Bay	8.82	7.9	7.83	11 AE	11 AE
Gulf Shores	Gulf of Mexico	10.55	8.5	7.66	12 AE	10 AE
Gulf Shores	Gulf of Mexico	10.66	9.2	7.3	14 VE	12 VE
Orange Beach	Gulf of Mexico	12.24	NA	NA	13 VE	12 VE
Ono Island	Gulf of Mexico	6.91	4.8	5.16	10 AE	9 AE

** measured HWMs values may include some wave effects

Historical vs. New Mobile County FIS

High Water Marks (HWMs) vs. BFEs Comparisons – Mobile County, AL

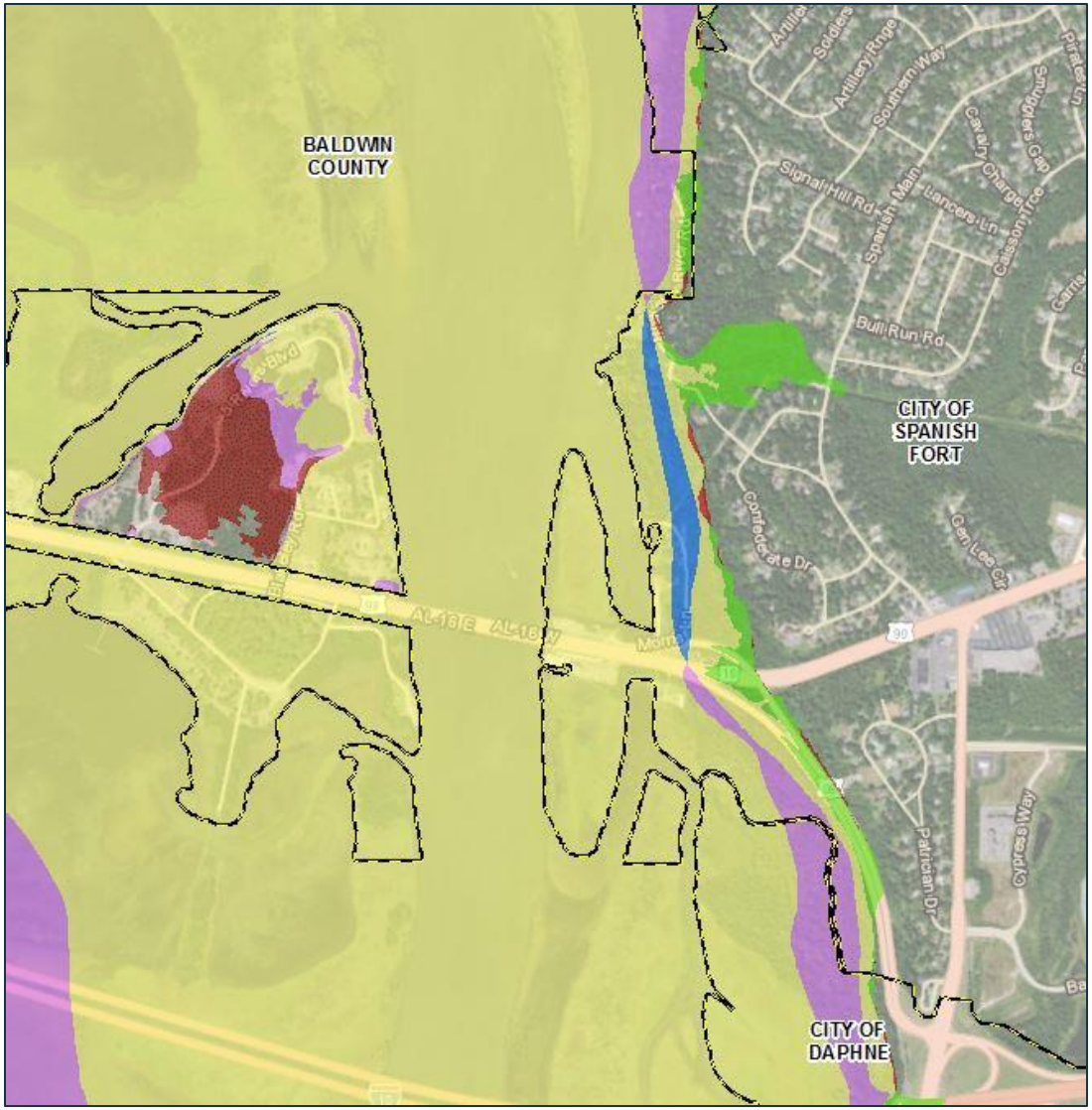
Location	Flood Source	HWM (ft)**			New BFE (ft.)	Effective BFE (ft.)
		Ivan	Katrina	Georges		
Chickasaw	Chickasaw Bogue Creek	4.9	10.8	8.1	11 AE	12 AE
Mobile	Mobile Bay	6.7	11.6	8.7	12 AE	12 AE
Alabama Port	Mobile Bay	4.6	8.1	7.5	15 VE	9 VE
Coden	Portersville Bay	5.8	11.2	8.5	18 VE	15 VE
Dauphin Island	Gulf of Mexico	7.0	8.4	6.6	9 AE	X
Dauphin Island	Gulf of Mexico	6.7	7.3	5.3	10 AE	9 AE
Dauphin Island	Gulf of Mexico	6.3	8.6	5.1	11 VE	9 AE

** measured HWM values may include some wave effects

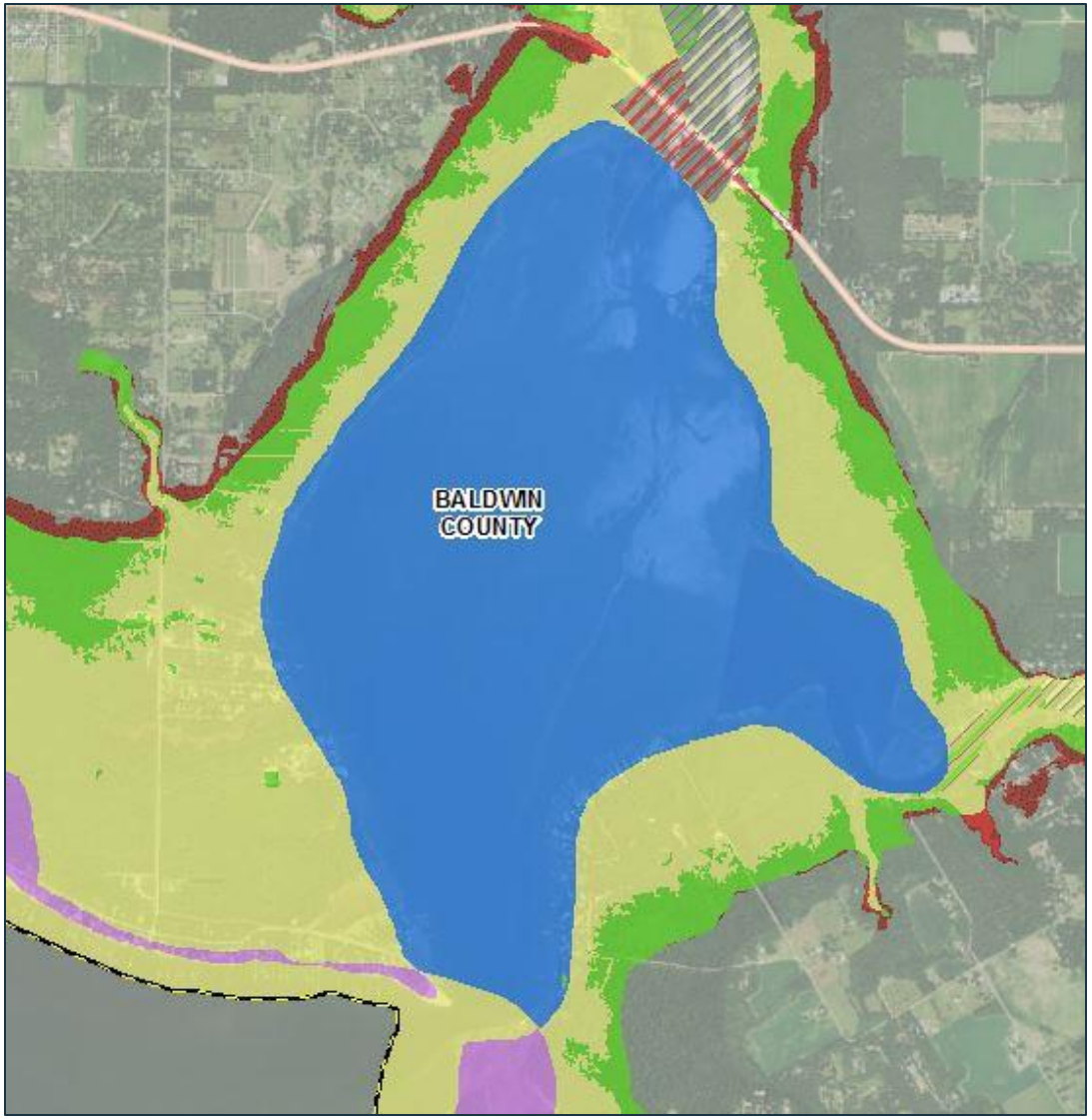
Coastal Special Flood Hazard Area Changes

Old vs. New

Spanish Fort – Mobile Bay

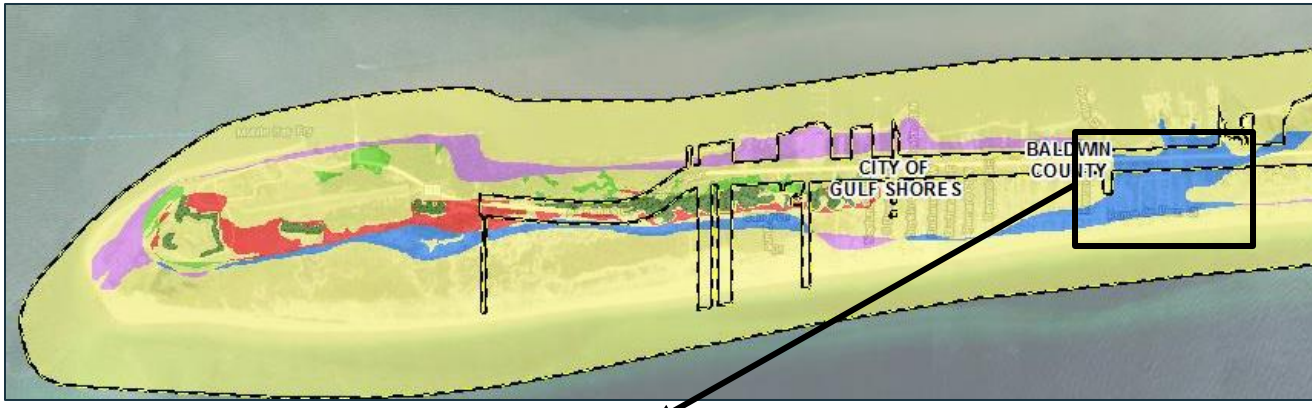


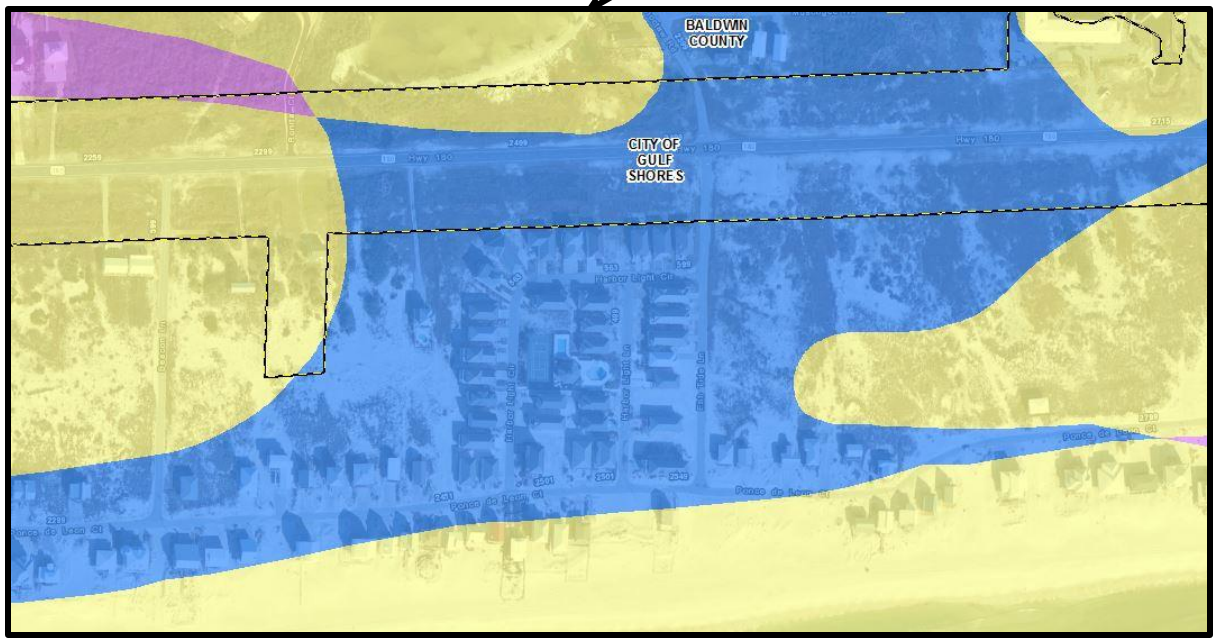
Baldwin County – Weeks Bay



- Political Area Boundary
- Floodway Increase
- Floodway Decrease
- No Floodway Change
- 1% Annual Chance Floodplain Increase
- 1% Annual Chance Floodplain Decrease
- 0.2% Annual Chance Floodplain Increase
- No SFHA Change
- High-Risk SFHA Increase
- High-Risk SFHA Decrease

Fort Morgan


CITY OF
GULF SHORES
BALDWIN
COUNTY


BALDWIN
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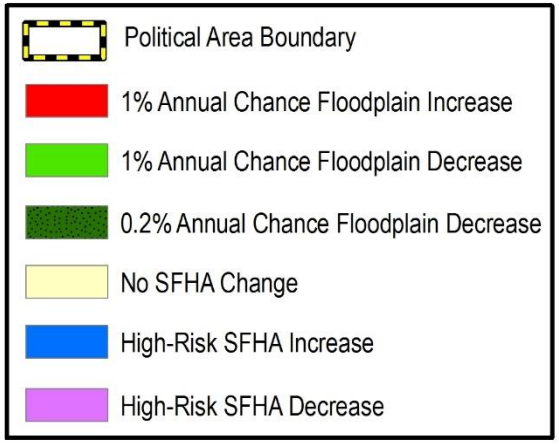
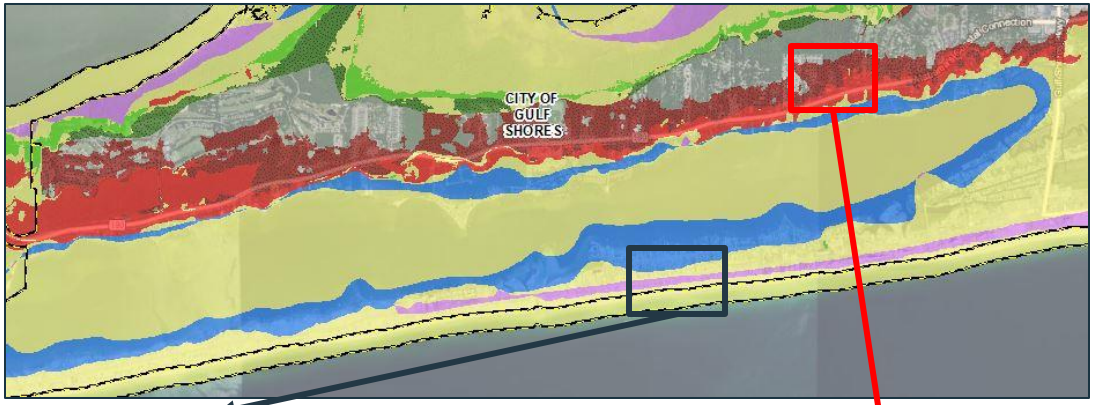
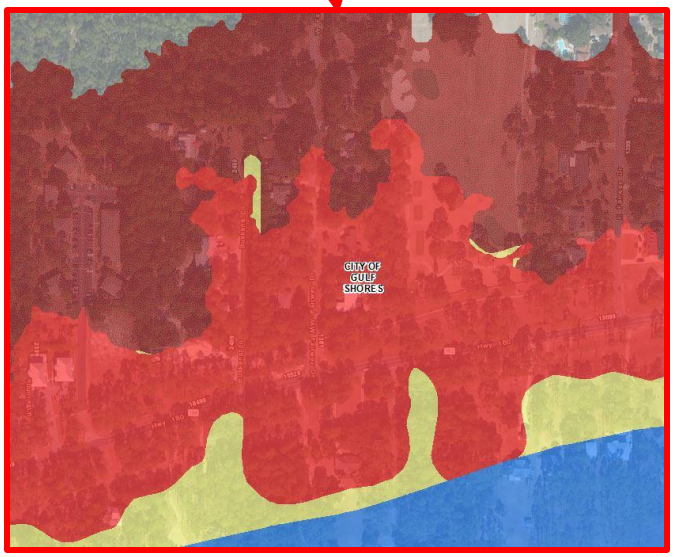

Political Area Boundary
1% Annual Chance Floodplain Increase
1% Annual Chance Floodplain Decrease
0.2% Annual Chance Floodplain Decrease
No SFHA Change
High-Risk SFHA Increase
High-Risk SFHA Decrease

Gulf Shores


CITY OF
GULF
SHORES


CITY OF
GULF
SHORES
W Beach Blvd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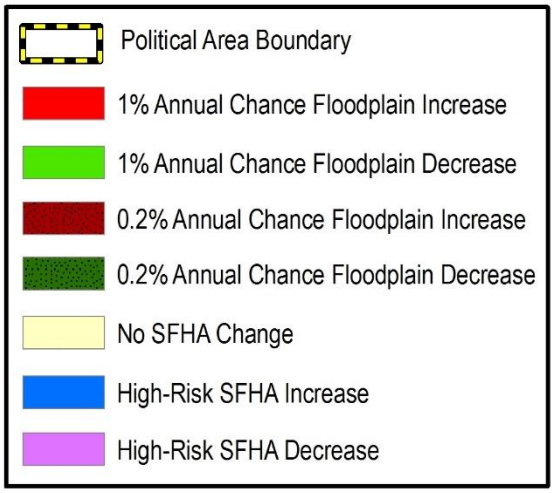
Political Area Boundary
1% Annual Chance Floodplain Increase
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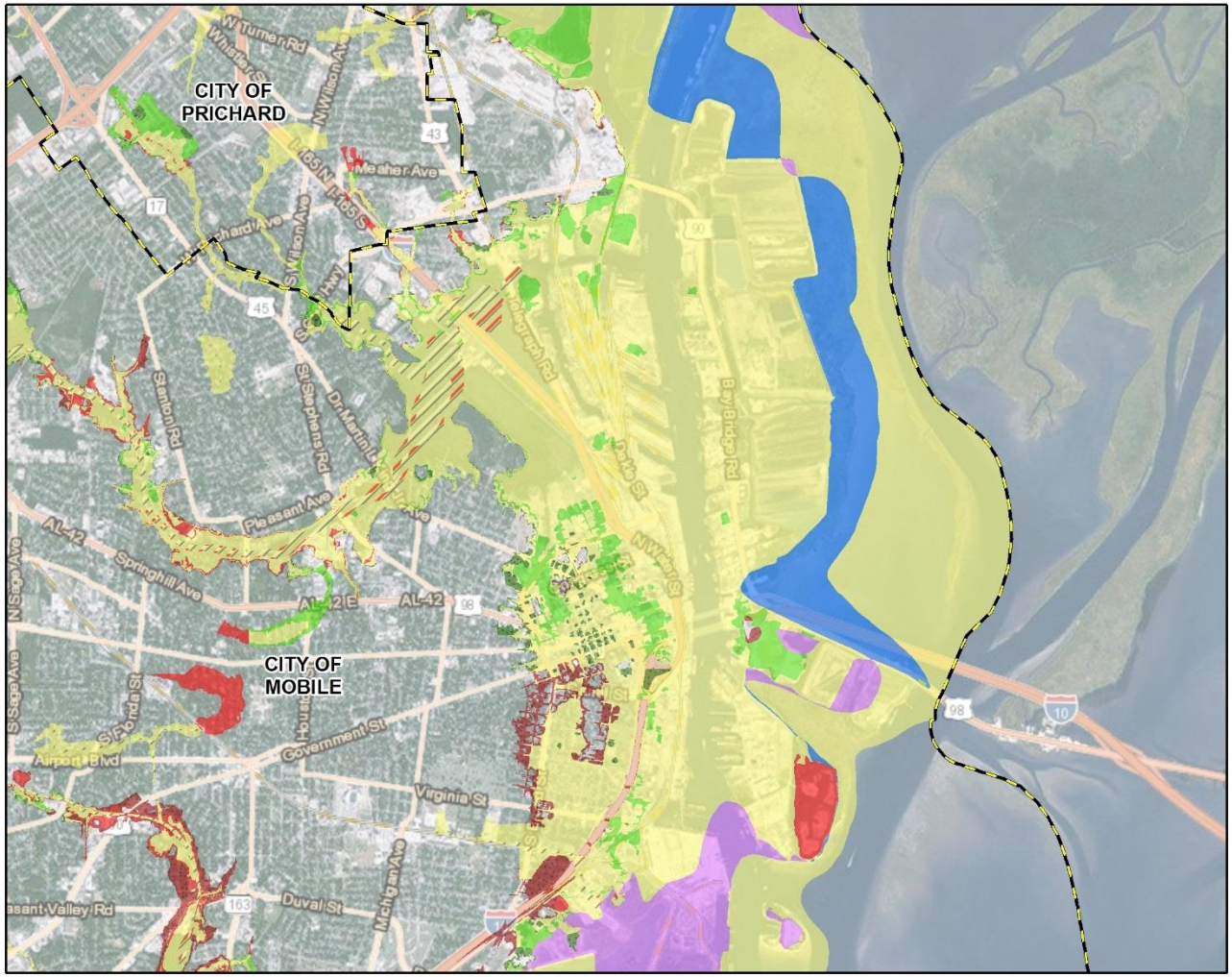
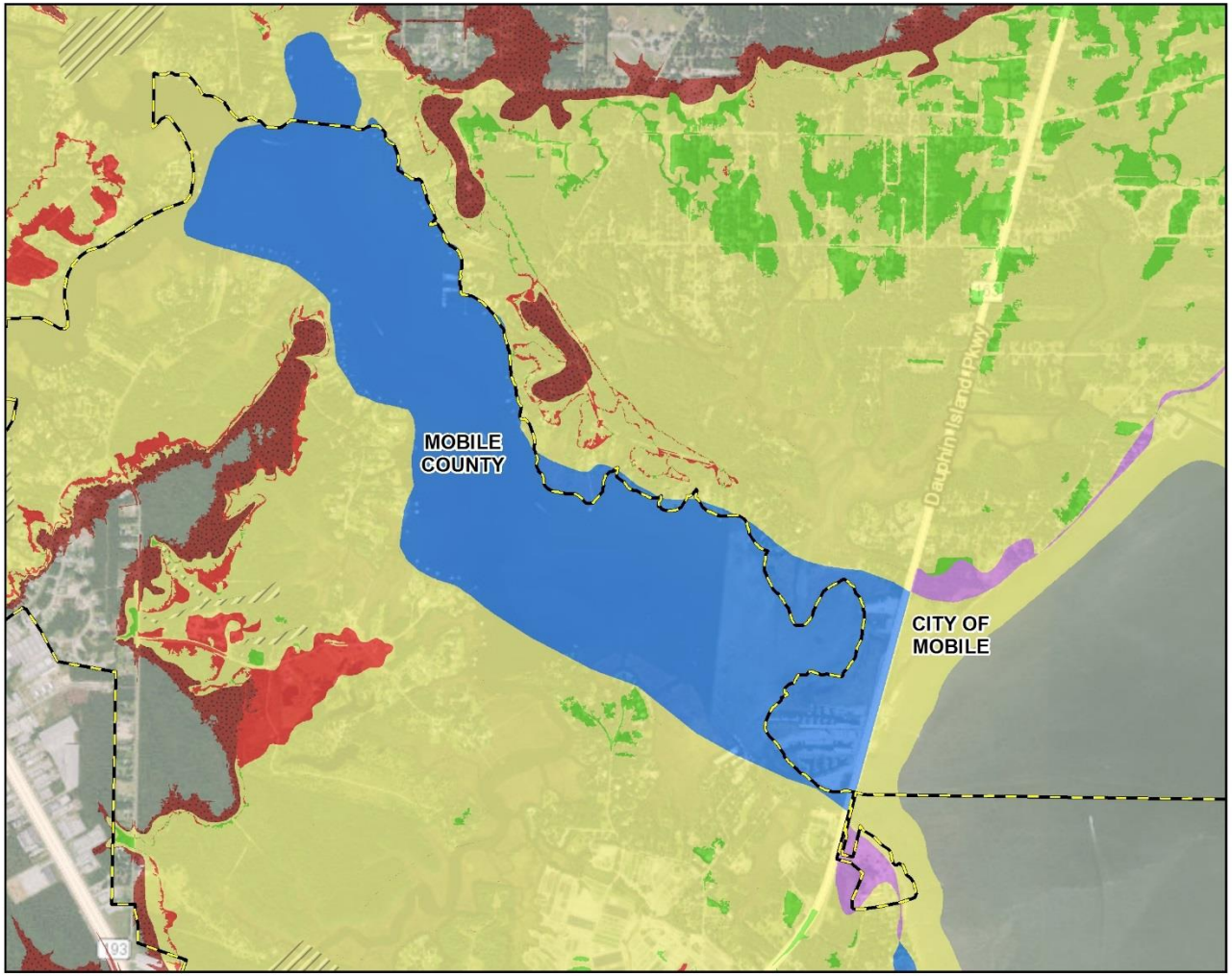
No SFHA Change
High-Risk SFHA Increase
High-Risk SFHA Decrease

City of Mobile – Mobile Bay

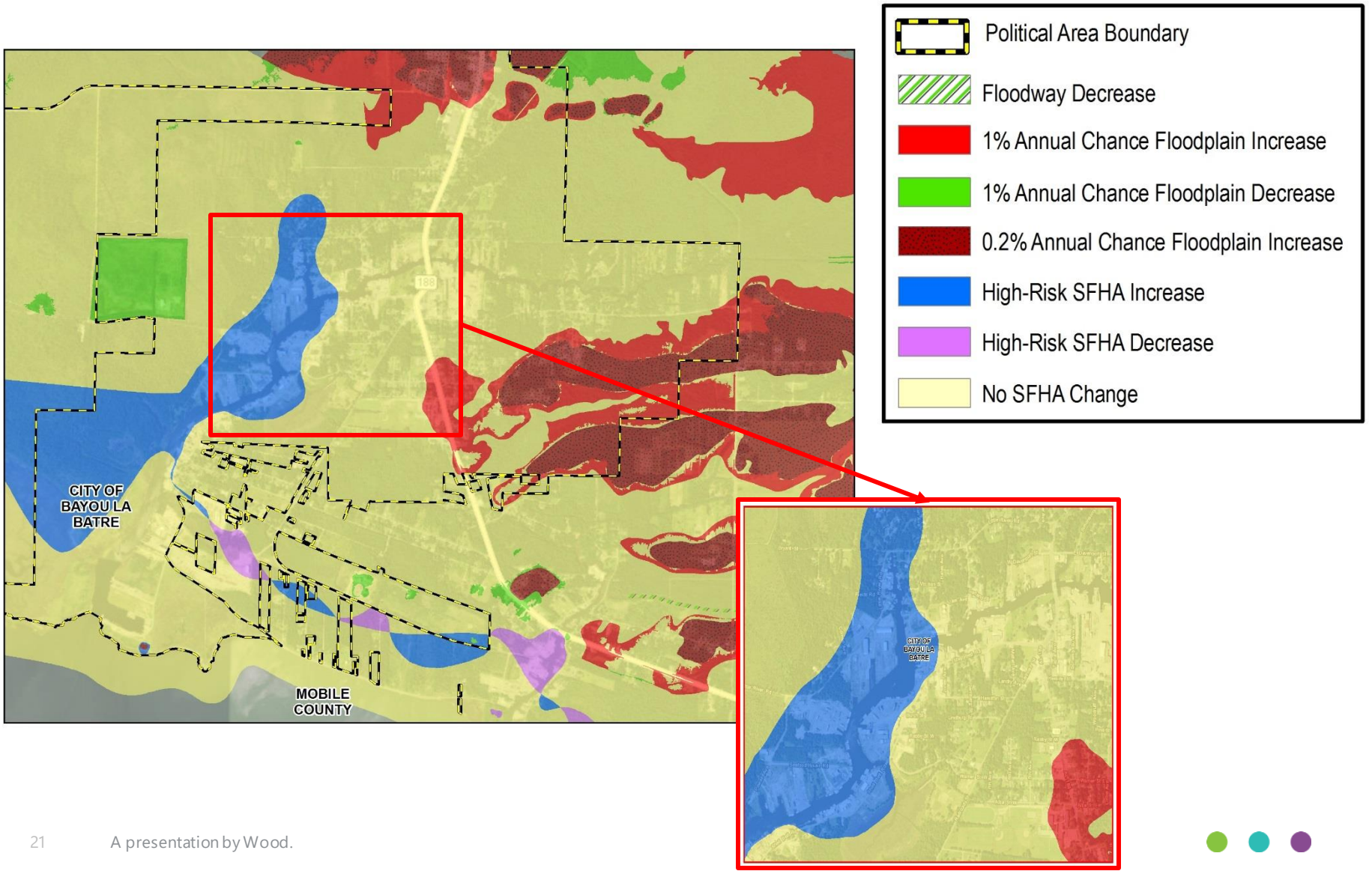


Dog River Confluence

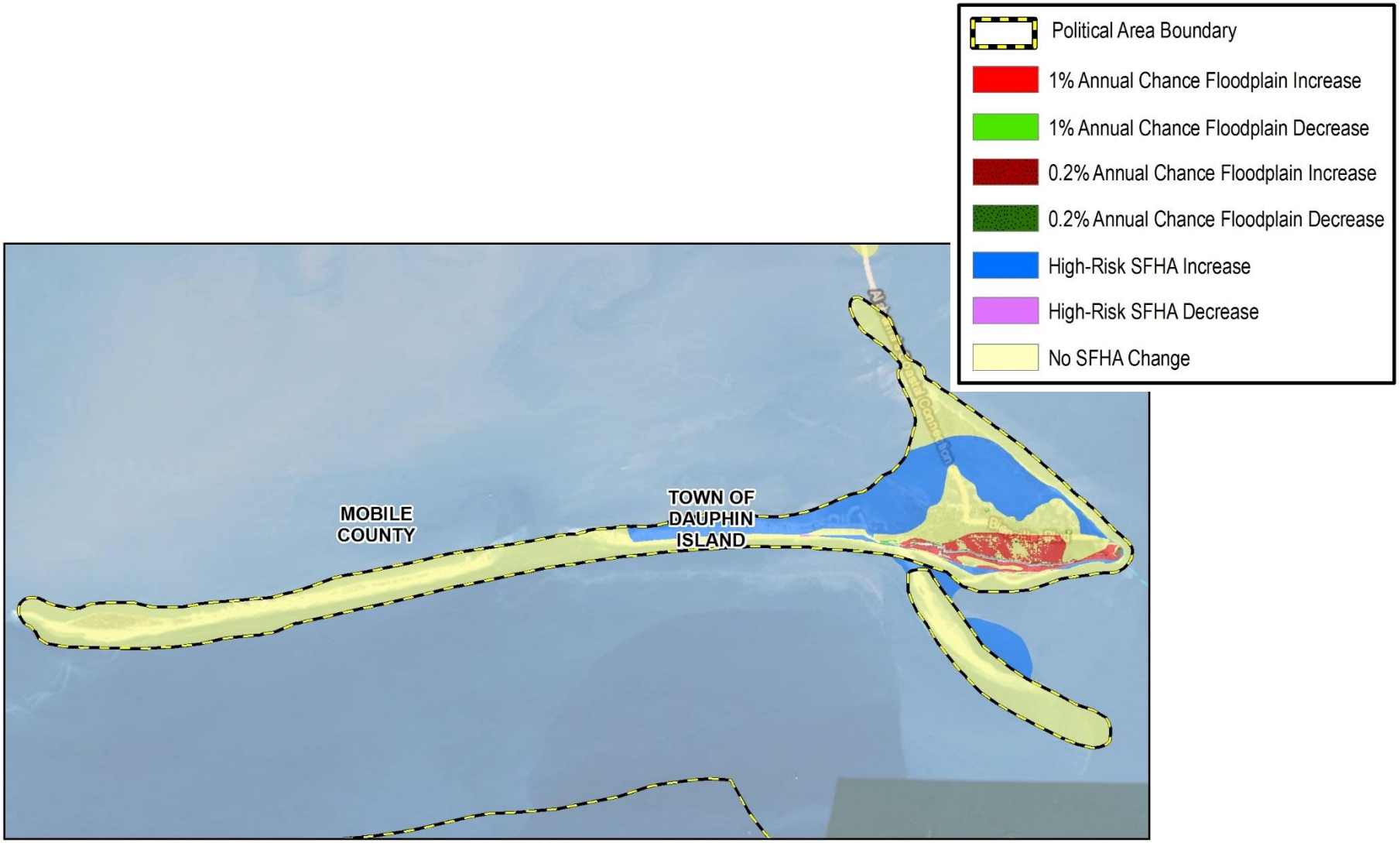


- Political Area Boundary
- No Floodway Change
- 1% Annual Chance Floodplain Increase
- 1% Annual Chance Floodplain Decrease
- 0.2% Annual Chance Floodplain Increase
- 0.2% Annual Chance Floodplain Decrease
- High-Risk SFHA Increase
- High-Risk SFHA Decrease
- No SFHA Change

Bayou La Batre

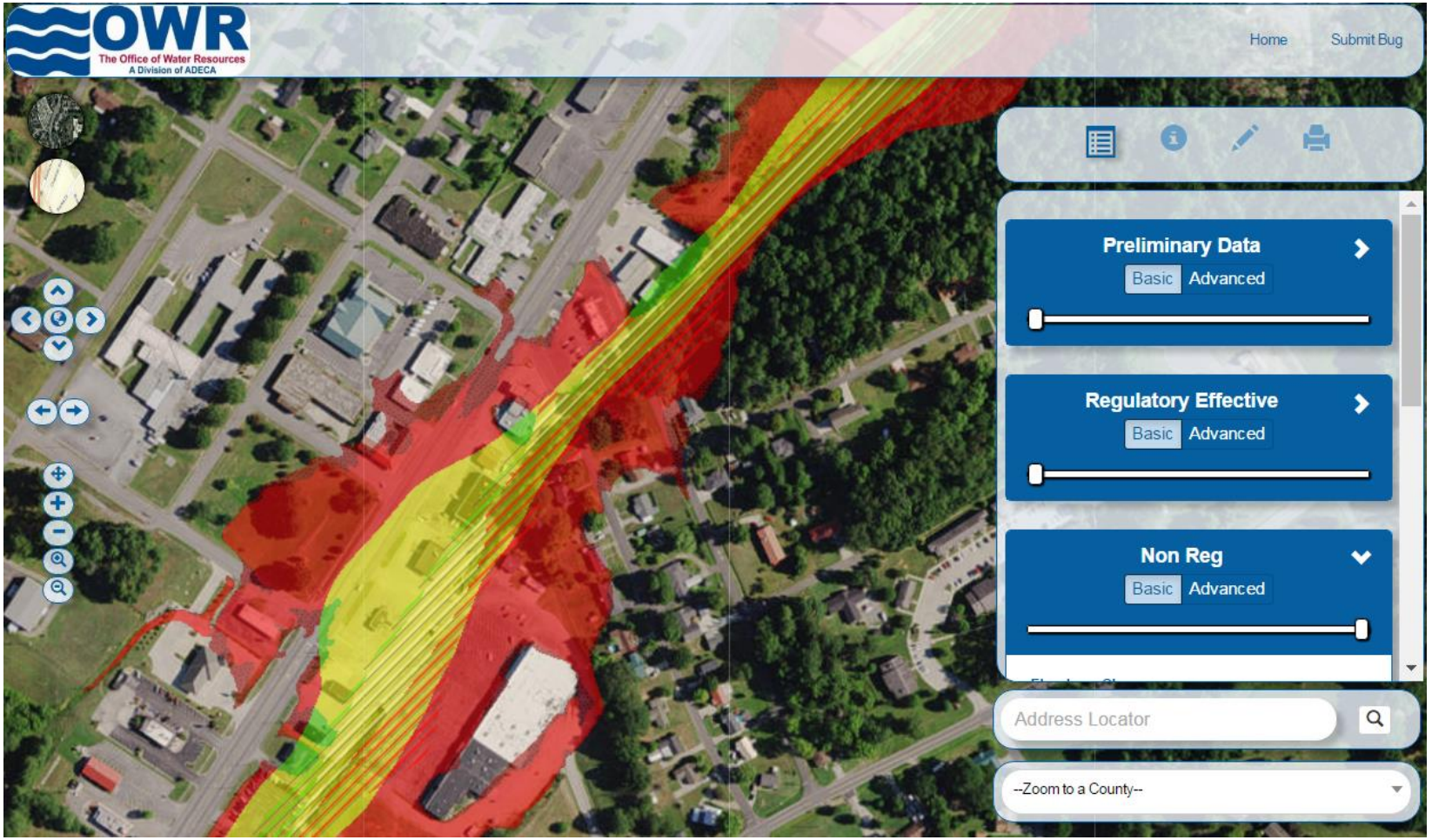


Dauphin Island



AL OWR Website

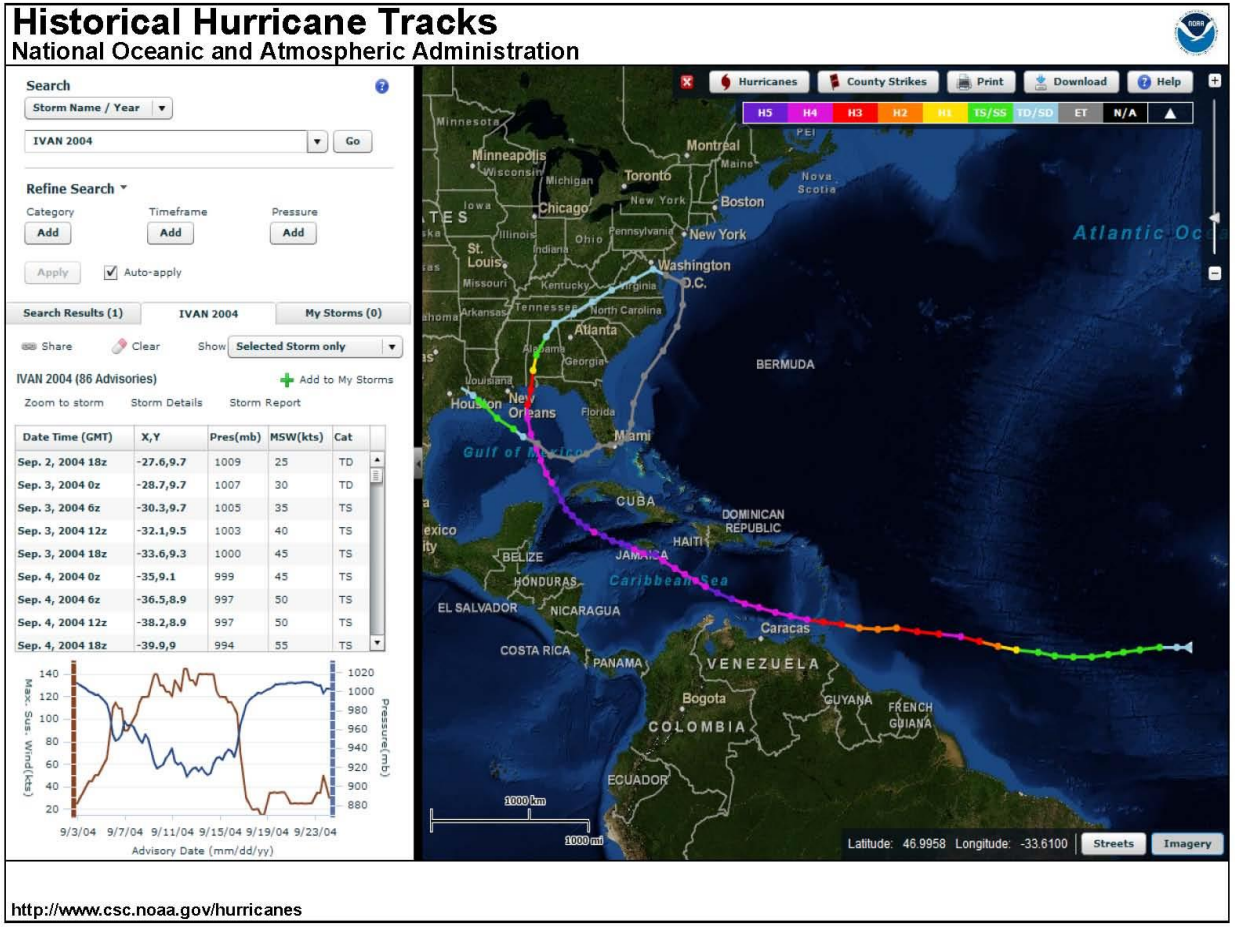
http://www.alabamaflood.com/




wood.

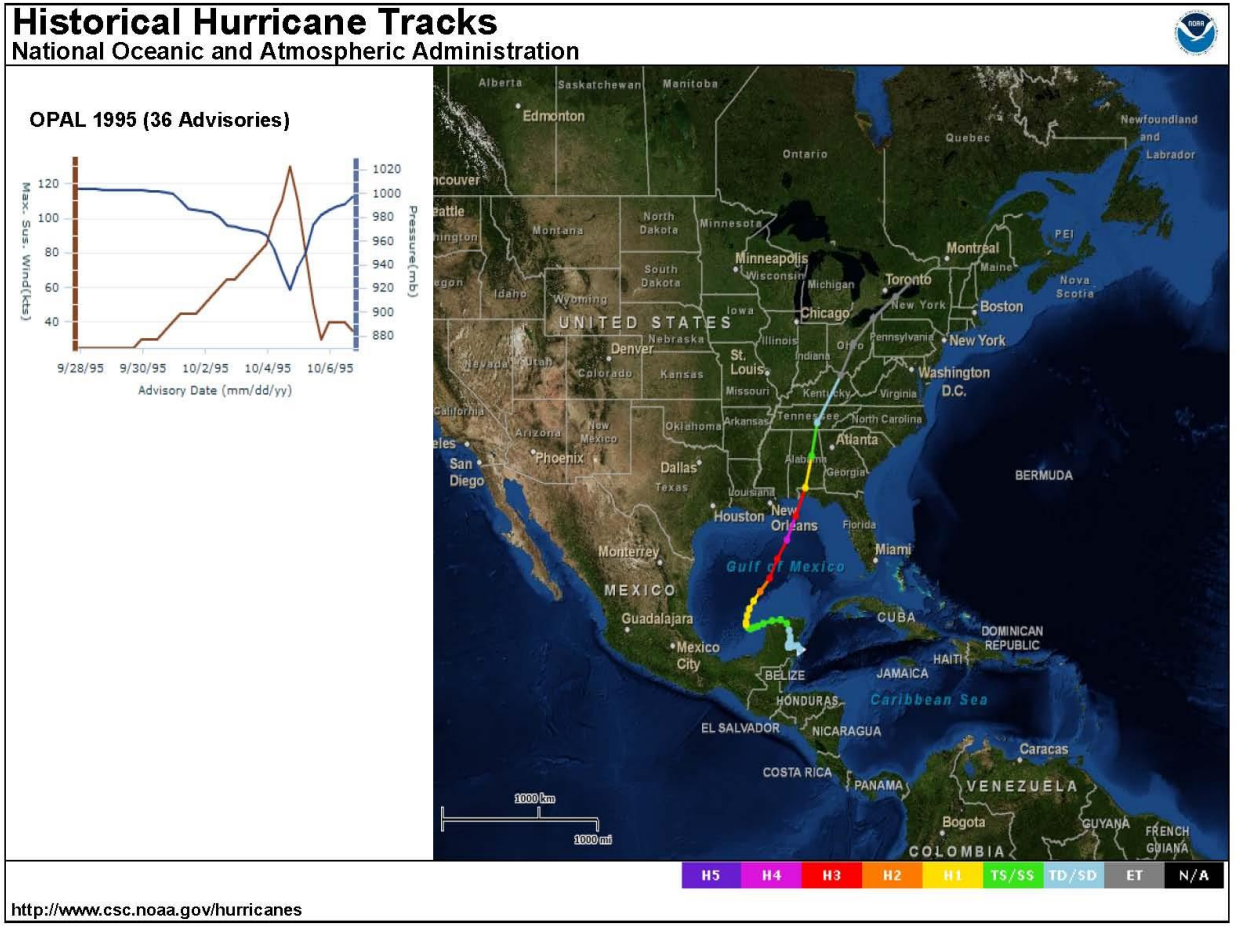
Validation Storm 1: Hurricane Ivan - 2004

- 14 foot storm surge recorded between Gulf Shores and Orange Beach.
- 100-yr flood elevations exceeded throughout Alabama.
- Landfall: Gulf Shores, AL



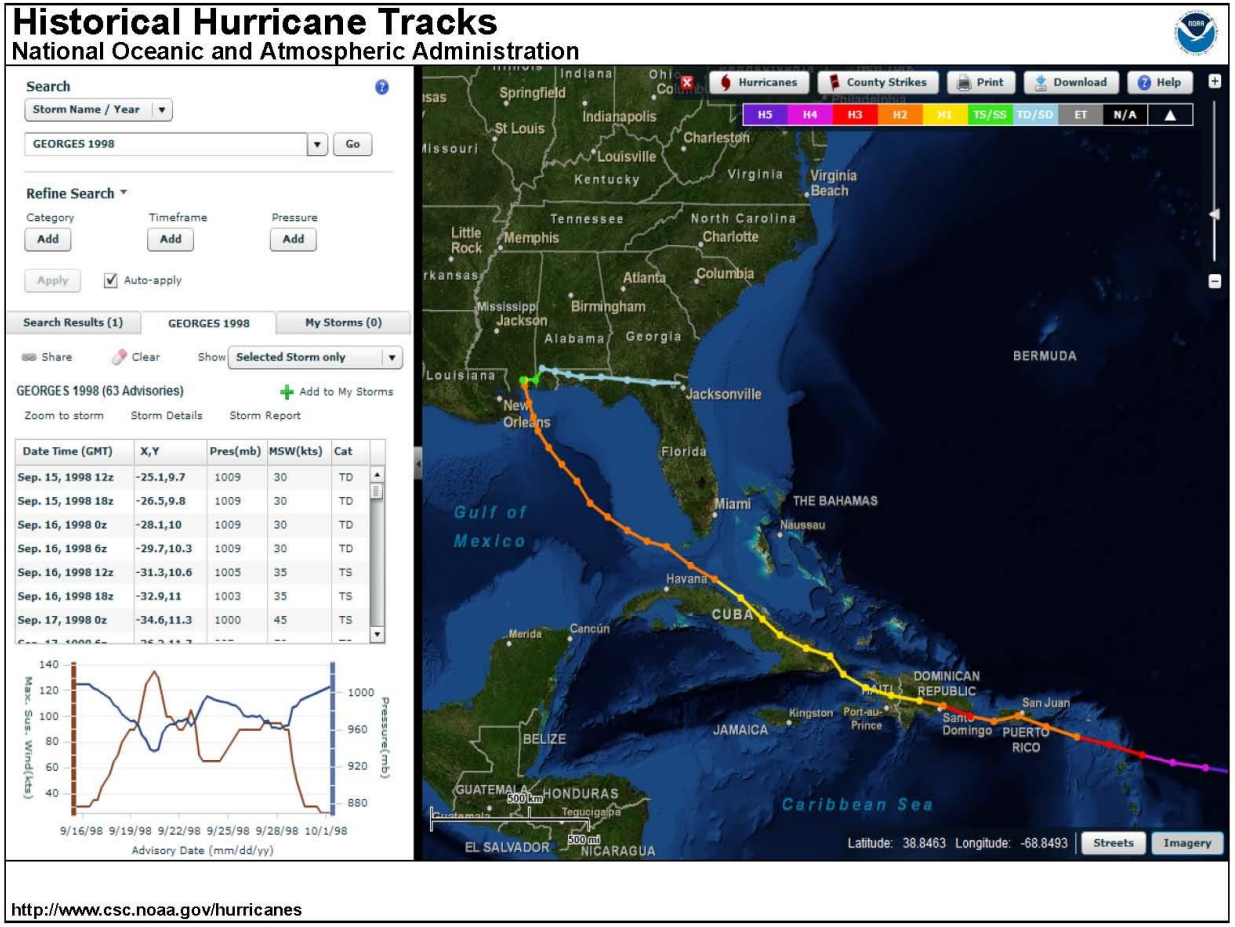
Validation Storm 2: Hurricane Opal - 1995

- Category 4 – October 4, 1995
- Landfall near Pensacola, FL
- 19.4" of rain in Brewton, AL.
- 145 mph winds at Hurlburt Field



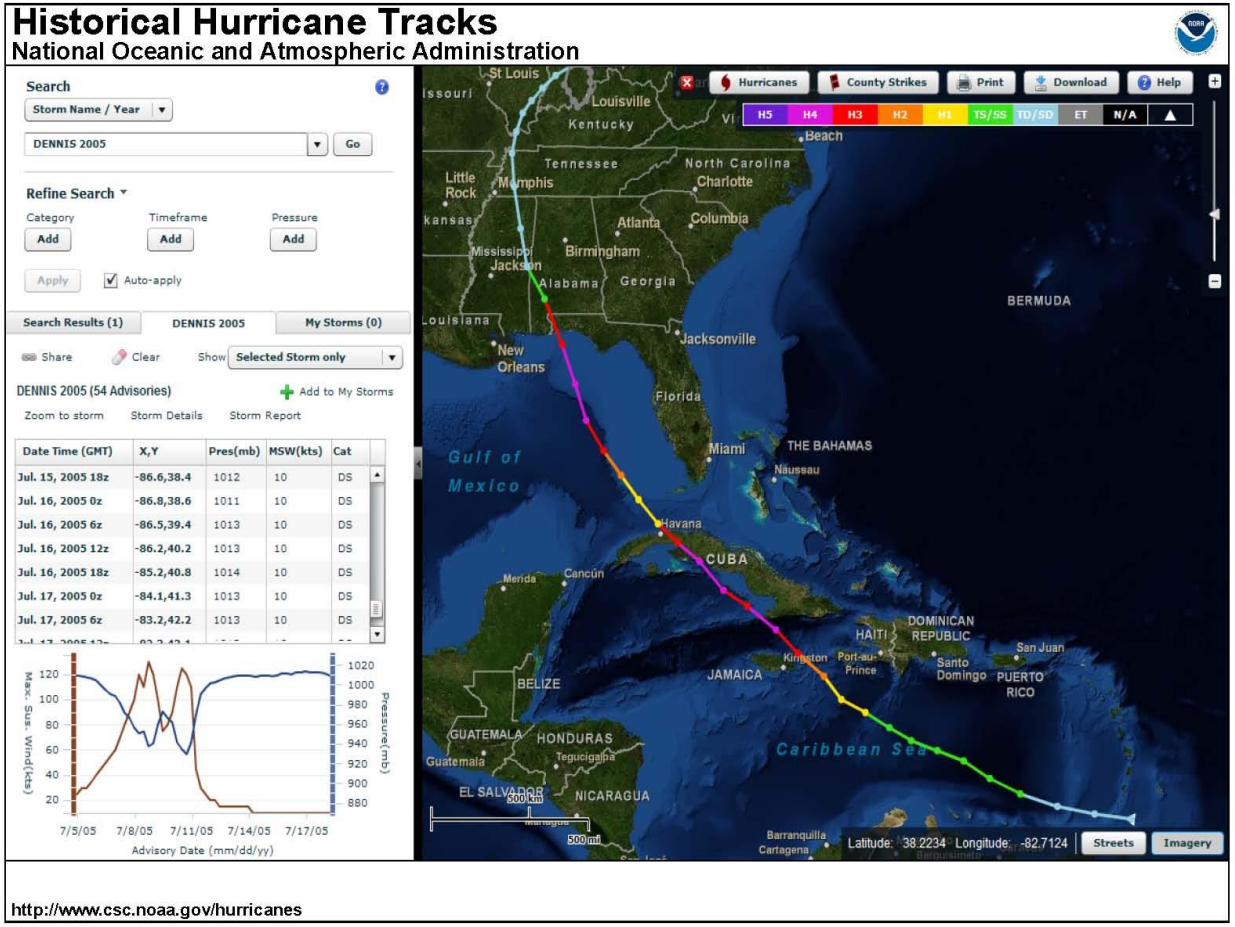
Validation Storm 3: Hurricane Georges - 1998

- Category 2 – September 28, 1998
- Landfall at Biloxi, MS
- Made 7 total landfalls
- Storm Surge of 11.9 feet at Fort Morgan
- 25 foot waves
- 30" of rain in Bay Minette



Validation Storm 4: Hurricane Dennis - 2005

- Category 3 – July 10, 2005
- Landfall at Santa Rosa Island, FL
- Storm surges up to 9 feet on Florida Coast
- One of most powerful "early season" tornadoes



Validation Storm 5: Hurricane Katrina - 2005

- 100-yr flood elevations exceeded throughout Alabama.
- Dauphin Island overwashed.
- Landfall in Louisiana