Resiliency of the South Carolina Coastal Region

The Lowcountry Hazards Center: Serving the Low Country with Research, Education and Outreach on Natural Hazards

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Challenges and Priorities

- South Carolina Overview
- Hazards, Challenges and Needs

- The coastal counties account for 28% the states population
- South Carolina areas less than 10 feet above the local high tide line - 62,000 homes at risk -
- Cities with the largest total exposed populations, ranked most to least :
- Mount Pleasant, Charleston, Isle of Palms, North Charleston, Port Royal, North Myrtle Beach, Beaufort, Hilton Head Island, Folly Beach, Georgetown
- Counties with the largest total exposed populations, ranked most to least :
- Charleston, Beaufort, Georgetown, Horry, Berkeley, Colleton, Jasper, Dorchester, Hampton, Williamsburg

Population

Coastal counties are those with Estuarine systems



COLLEGE of CHARLESTON The BCD-COG region

Fastest Growing Region in South Carolina









CHARLESTON Major Regional Hazards

- Hurricanes
- Sea Level Rise
- Flooding
- Earthquakes
- Coastal Erosion & Channel Maintenance
- Salt water Intrusion
- Marshland Degradation
- Hypoxic zones in estuaries

COLLEGE of Hurricanes

- We are statistically overdue for a Larger one
- Even smaller Hurricane do great deal of damage to SC coast
- HUGO in 1989 is the last Big Event that all others are compared to
- Current HAZUS estimates for a HUGO event on the same track land falling today Quadruple the 5.9 billion dollar damage.

SCDNR Map of Tracks





The size, strength, and track of a hurricane is related to the storm surge's impacts-greatest threat to life.

Hugo3















CHARLESTON Potential Sandy Impacts

- Had Hurricane Sandy come ashore near Folly Beach, SC; the combined wind and surge impacts to Charleston, Berkeley, and Dorchester Counties would be:
 - Maximum Peak wind speed Gust: 87 mph
 - 15,964 buildings would be at least moderately damaged.
 - 1,063 building will be completely destroyed
 - 580,010 tons of debris (brick, wood, tree) would be generated.
 - Total economic loss 3 billion dollars.
 - 52,936 people will seek temporary shelter.
 - HAZUS does not calculate injury/casualty estimates. Model assumes people will evacuate from approaching storms.
- Important to Note These numbers are from the 2000 Census data and may actually be a *lower estimate* than one would expect today. (113 max wind - Minimal cat 3 storm)

Results and Visualizations

3-D

View

Storm Surge Category 1



Vertical exaggeration of 30x base height set to show contours. (practically nonexistent otherwise). Bldg. base height set at 8x extrusion of base height

COLLECE

Storm Surge Category 3



3-D View

> Vertical exaggeration of 30x base height set to show contours. (practically nonexistent otherwise). Bldg. base height set at 8x extrusion of base height.



3-D View

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of base height.

Sea Level Rise

- We are already seeing the effects of it here
- It will only get worse over time



Charleston Peninsula Flooding

Sea Level Rise



	D-f	Odds of exceeding reference flood level by 2030		Measured historic sea level rise ⁴		Projected sea level rise by 2050 ⁵	
Water level station	100-year flood level (feet) ²	With global warming ²	Without global warming ³	Inches rise	Period of record	Inches rise 2009-2050	90% range
Springmaid Pier - Atlantic Ocean	4.1	36%	6%	8	1957-2006	14	7-25
Charleston - Cooper River Entrance	5.1	22%	12%	11	1921-2006	13	6-23
Fort Pulaski - Savannah River (GA)	3.3	83%	0%	8	1935-2006	13	6-24

Earthquakes every year



USGS Seismic Hazard Map

COLLEGE of Liquefaction/Lateral Spread Damage



Liquefaction features from the 1886 Earthquake and areas of potential liquefaction/landslide from a future earthquake

COLUCE Guildings needed repair 69% on "made CHARLESTON"



Strong motion records (east-west component) from Dec. 2008 earthquake.

C1SC (blue) on Quaternary sediments; C2SC (orange) on artificial fill over pluff mud (Holocene tidal marsh)



Figure 2. Geologic map of Charleston peninsula and Drum Island by Weems et al. (1997) showing locations of liquefaction and ground deformation in 1886.



Socio-Economic Issue for Resiliency

- At Risk Populations
- Hazardous Materials
- Infrastructure Age and Suitability
- Heavy Reliance on Tourism and Ports
- HAZUS analysis

COLLEGE of CHARLESTON Bridges +780 in region

Study Region new : Berkeley-Charleston-Dorchester Region

Hazard Scenario : 70fullbcd



Priorities

- Integrated Management Structure
 Common Operation Platform (COP)
- Coastal Development Strategy
 - Common regulations and enforcement
- Hazard Mitigation Prioritization
 - Funding for Infrastructure projects