



Resiliency and Charleston's Economic, Environmental, and Socio-Demographic Fabric

M. Richard DeVoe
Executive Director

South Carolina Sea Grant Consortium
Charleston, SC



What is Resilience?

“The ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events” – NAS 2012



What coastal resiliency challenges face SC?

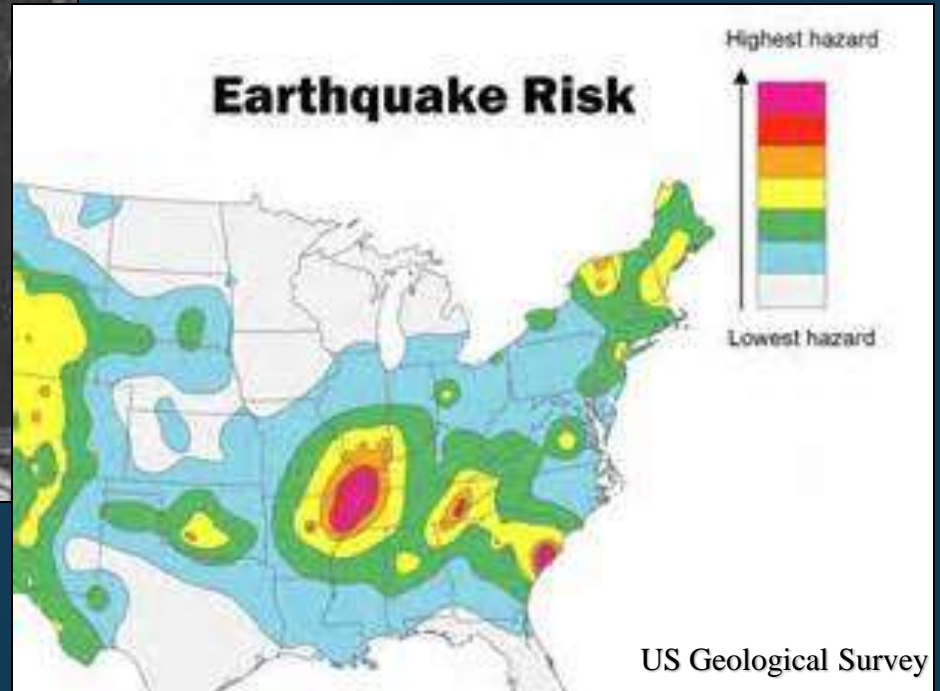
- Earthquakes
- Hurricanes
- Precipitation
- Sea level rise/Flooding
- Other



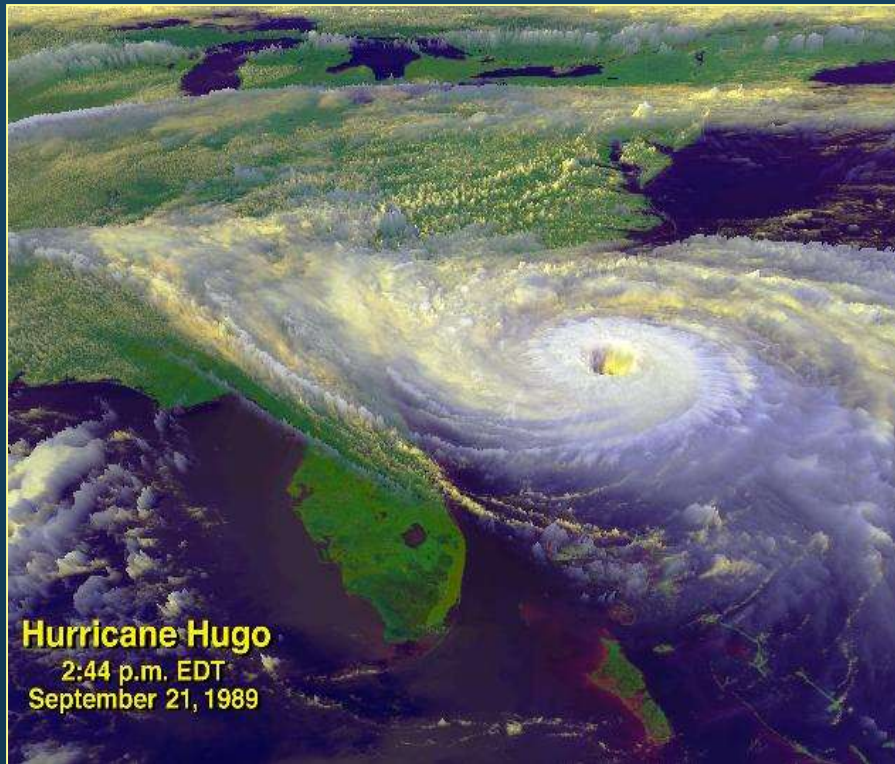
Earthquakes



Charleston Earthquake, August 31, 1886



Hurricane Hugo Approaching Landfall



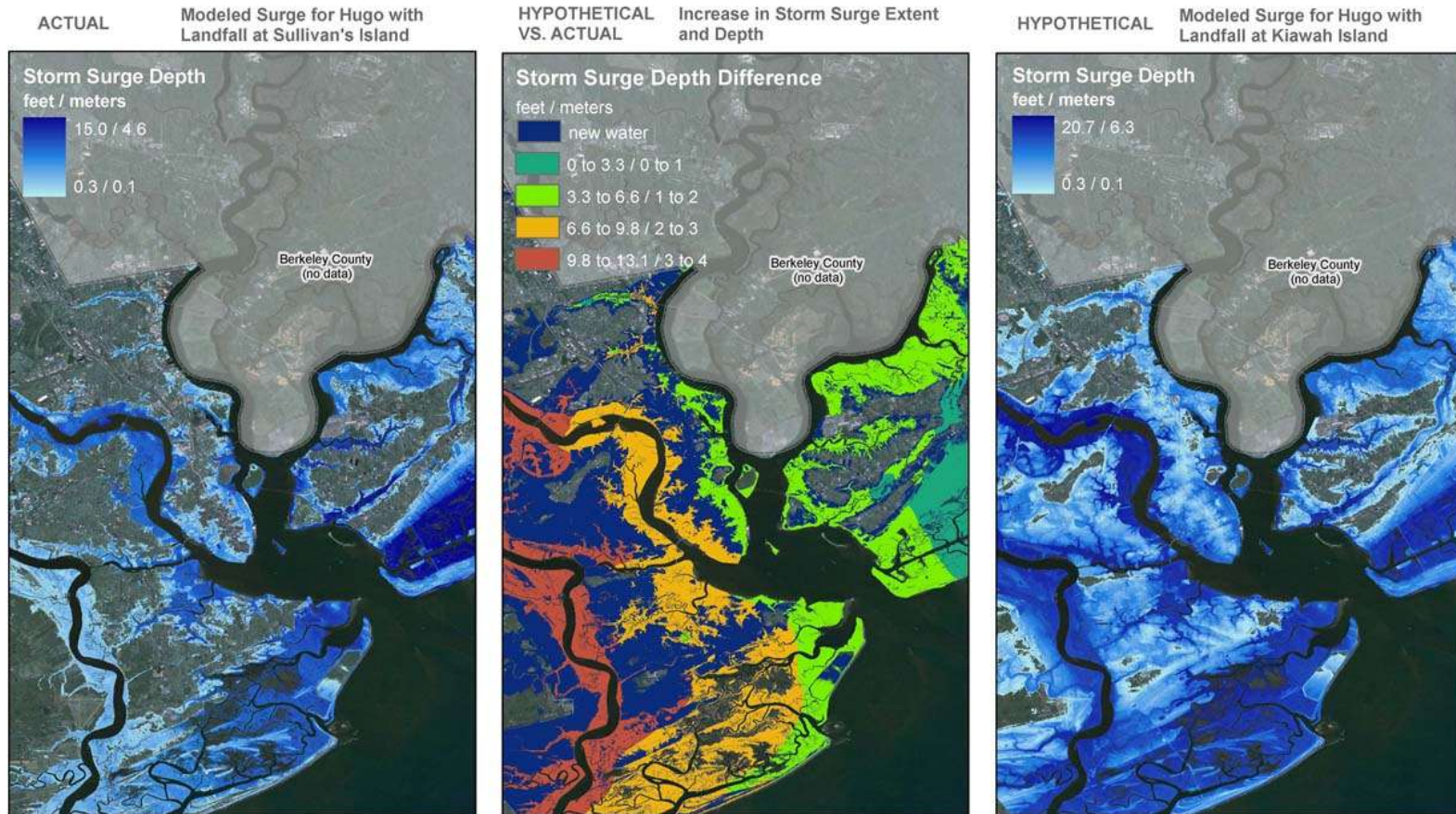
Charleston, SC
September 21, 1989

It Could've Been Worse!:

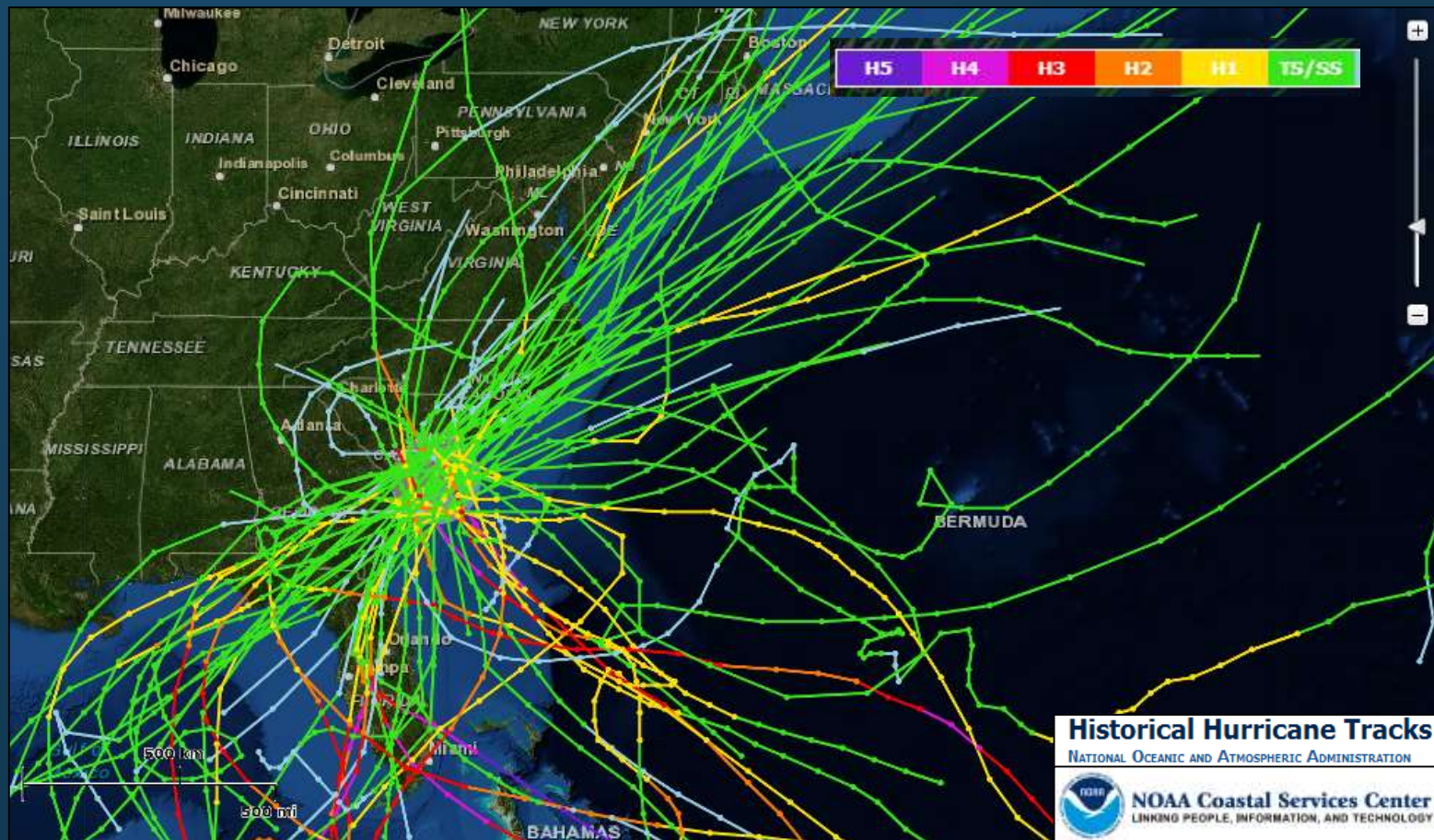
NOAA Coastal Services Center

A Visualization of Storm Surge if Hurricane Hugo Had Made Landfall Just 20 Miles to the South

Hurricane Hugo Characteristics at Landfall: Category 4; Winds=120 knots (138 mph); Pressure=935 MB; Northwest Movement=23 knots (26 mph); Tide=0.6 m (2.1 ft)



Hurricanes/Tropical Storms 1900-2012



Precipitation Trends

- Rainfall continues to be more variable
 - More frequent floods
 - More frequent droughts



- Impacts/Effects
 - Water quality & quantity
 - Salinity/DO changes
 - Public health implications

SLR & Coastal Flooding from Astronomical Tides

<http://www.csc.noaa.gov/digitalcoast/action/hazards/chsflood.htm>



Sea Level Rise and Artificial Fill in Charleston, SC



Historic Map (1849)



Potential Impact of Sea Level Rise



0 0.325 0.65 1.3 Miles

Legend



Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community





NY Daily News



The State



ABC News 4



Jim Cantore



South Carolina Sea Grant Consortium

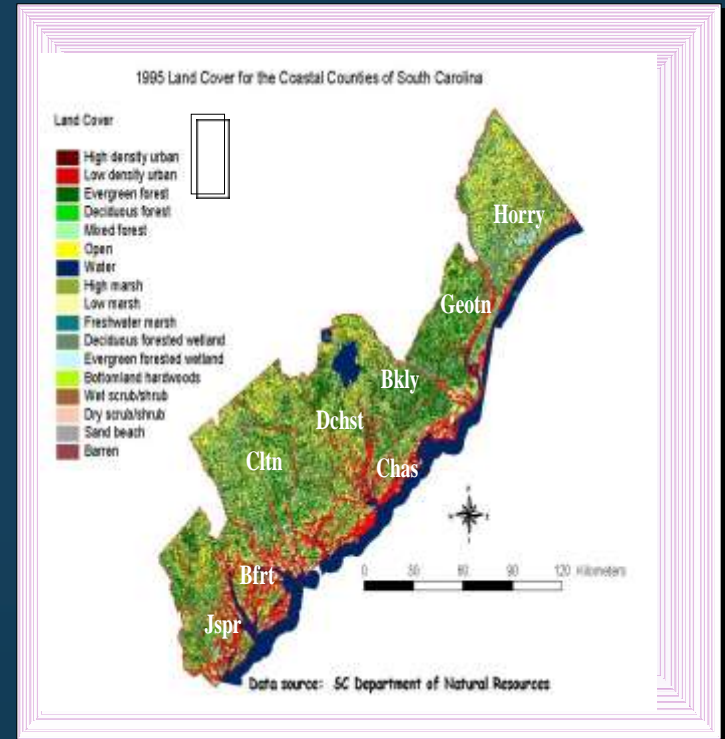


So, What's at Stake?



South Carolina Coast - Setting

- 8 coastal counties; 1.3M residents
- 28% of S.C. population resides in the 8 coastal counties
- By 2025, coastal population will increase by 700,000 to 2M
- 20% of the total salt marsh area on the entire east coast
- Includes 65% of state's 4,500,000 acres of wetlands
- Property value in SC's coastal counties = ~\$229.6B
- S.C. ranked 4th nationally in # of flood insurance policies



Charleston Region - Setting

- Berkeley-Charleston-Dorchester county region spans 3,163 square miles
 - Land area: 2,618 sq. mi.
 - Water area: 558 sq. mi.
- City of Charleston Area: 131 sq. mi.
 - Land Area: 112 sq. mi.
 - Peninsula Area: 8 sq. mi.
- Region includes 17 Sea Islands
- Region has over 200 sites on the National Historic Register



Charleston Region - Economy

- From 2004-2012, the Charleston's Gross Regional Product (GRP) increased by 35.4%
 - \$28B Regional Gross Domestic Product
- Charleston region is # 1 in US for growth in manufacturing jobs
- Regional military installations have an economic impact of \$8.8B
- Regional public Higher Education institutions employ 16,300 workers and teach 33,000 students
 - Annual economic impact of \$4.4B
- Value of agricultural products from Charleston County is \$24M



Charleston Region - Economy



- The City of Charleston was named the #1 tourist destination in the US by Conde Nast Traveler
- 4.8 million visitors to Charleston in 2012
- Visitors to the region have increased by 70% over the past 20 years
- Tourism adds \$3B to regional economy/year
- Charleston cruise industry has a regional economic impact of \$37M/year



Charleston Region – THE Port

- Port of Charleston has a statewide economic impact of \$45B/year
- Supports 300,000 jobs overall
 - 50,700 jobs in the Charleston Region
- Most efficient deepwater port in the nation
- The region's exports are valued at \$3.9B/year
- Ranked top 10 in value of int'l shipments (>\$50B)



and Boeing is in Charleston...



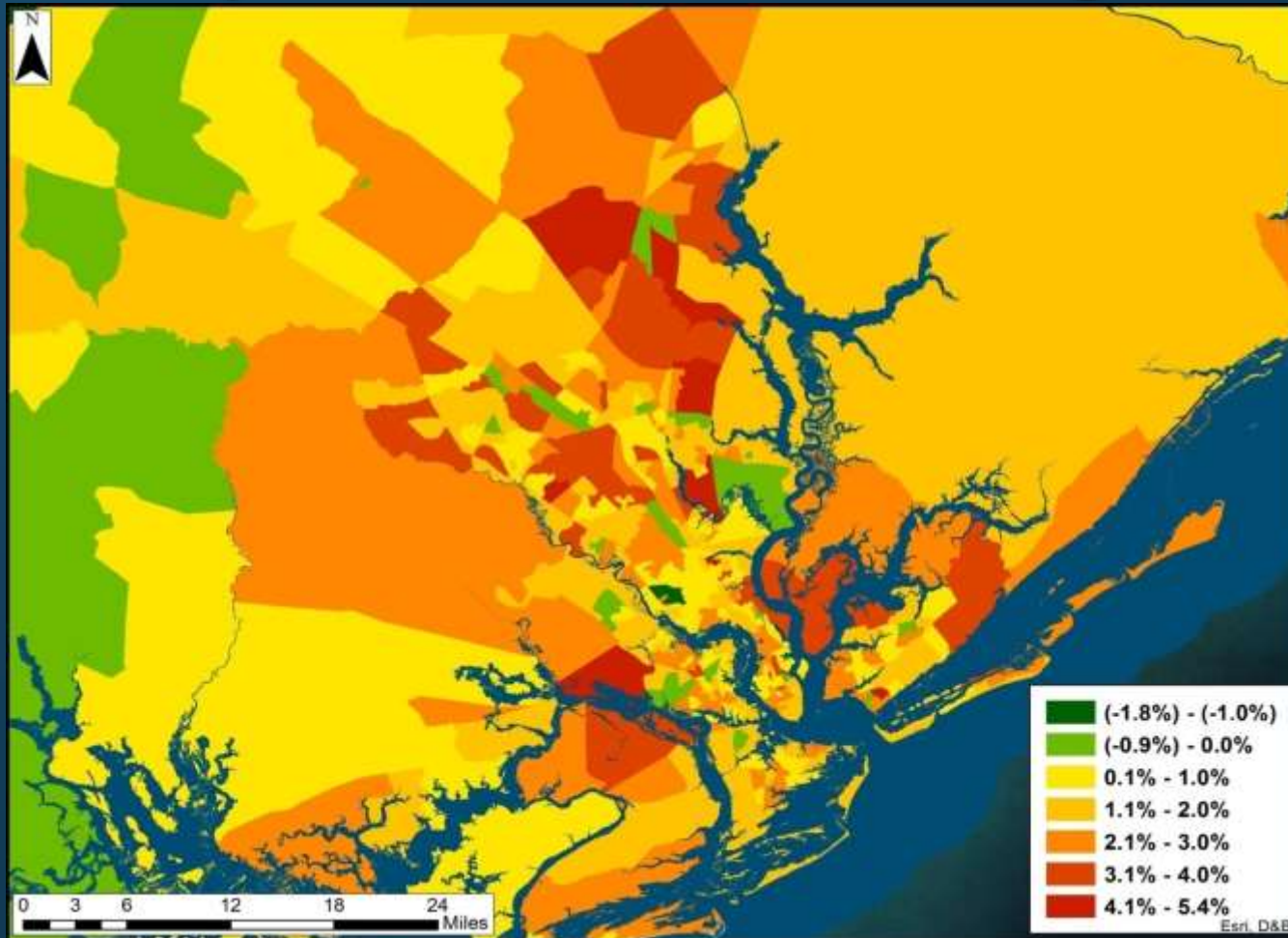
Charleston Region - Population

Metropolitan Statistical Area (MSA)/ County	2000 Census Population	2010 Census Population	% Change in Population
Charleston-North Charleston MSA	549,033	664,607	21.1
Berkeley	142,651	177,843	24.7
Charleston	309,969	350,209	13.0
Dorchester	96,413	136,555	41.6

The Town of Mt. Pleasant is the 10th fastest growing municipality of its size (population 50,000-99,999) in the US



Predicted Population Growth Charleston Region, 2014-19



Land Use Decision-making

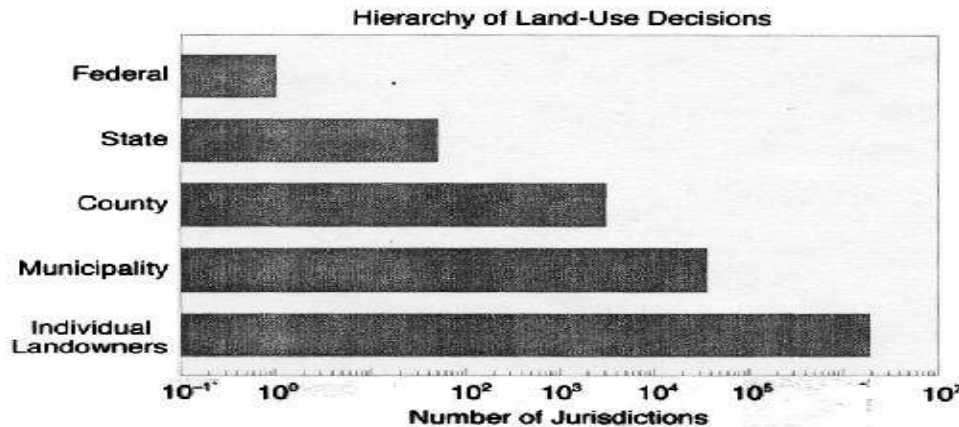


FIG. 5. Hierarchy of domains of influence of decision makers who regulated land use in the United States during 1992. Most authority for land-use choices is vested in the lower levels of the hierarchy: individual landowners and local governments. In this figure, the number of landowners is the number of individual farms in the United States. Data are from the U.S. Bureau of the Census and the U.S. Census of Agriculture (U.S. Department of Commerce, 1975, 1977, 1991, 1996). Note logarithmic scale.

Source: Dale et al. 2001

~80% of all land use decisions are made at the municipal level



Considerations...for Community Resiliency

- Refine the science and information to address decision-making where it occurs, both temporally and spatially
- Think a bit further into the future when making decisions
- Make decisions that are a bit more cautious than we have before
- Take advantage of the multitude of resources that are at our disposal
- Charleston has benefitted from the work of many institutions and organizations on resiliency issues; we need to build on this





Rick DeVoe
Executive Director
SC Sea Grant Consortium
rick.devoe@scseagrant.org
843-953-2078

...with special thanks to Liz Fly and Andrea Sassard