

### Methods, Tools, and Data for Coastal System Resilience Assessments

Prepare Anticipate  
Resist Withstand  
Recover Bounce Back  
Adapt Evolve

Disturbance

Engineering  
Environmental  
Community

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### Overview (1 of 2)

- Types of Assessments: Top-Down (T), Bottom-Up (B)
- Examples of Tools (for additional discussion, see handout)
  - T: Baseline Resilience Indicators for Communities (BRIC)
  - T: SoVI® – Social Vulnerability Index
  - T: Regional Capacity Index (RCI)
  - B: Coastal Resilience Index (CRI)
  - B: Maryland's CoastSmart Communities Report Card
  - B: Communities Advancing Resilience Toolkit (CART)
  - More... *only a snapshot of the many tools available, with more being developed daily*

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### Overview (2 of 2)

- Data and Resources
  - Coastal Resilience Tool – The Nature Conservancy
  - Sea Level Rise Viewer – NOAA
  - Coastal Vulnerability Index – USGS
  - State of the Coast; NOAA Digital Coast - NOAA
- Discussion & Review

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### Assessments: Bottom-Up vs. Top-Down

#### Bottom-Up

- Community-Generated
- Utilize local knowledge, expert elicitation, anecdotal information
- Hazard-specific
- Intended for communities to identify vulnerabilities and build capacity
- Subjective - not transferrable

#### Top-Down

- Externally-Generated
- Utilize regional and national data
- Hazard-independent
- Intended to intercompare regions, address policy
- Objective, although data may be arbitrarily weighted in an index

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### Examples: Top-Down (T) and Bottom-Up (B)

#### Top-Down



BRIC – Univ of South Carolina



ASCE's Infrastructure Report Card

#### Bottom-Up



Sea Grant's Coastal Resilience Index



Maryland's CoastSmart Community Report Card



USACE's Resilience Matrix

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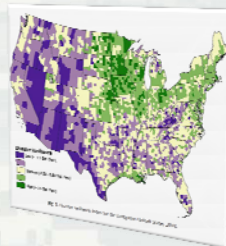
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### T: Baseline Resilience Index for Communities (BRIC)

- Considers 6 categories using publically-available data: infrastructure, ecosystems, institutions; economic, social, and community capacity
- Hazard-independent
- Categories can be viewed independently or weighted and summed for an index; values will vary depending on spatial extent



Hazards & Vulnerability Research Institute, University of South Carolina  
<http://webra.cas.sc.edu/hvri>

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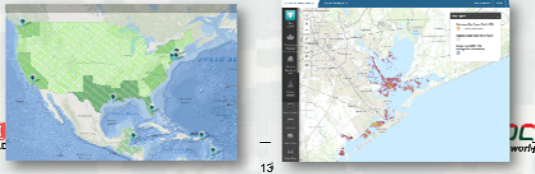
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## Coastal Resilience Tool – The Nature Conservancy <http://coastalresilience.org/>

- Online geoportal with natural resource, storm and related process data; selected locations (see map lower left)
  - ▶ Oyster restoration, habitat, species, bathymetry, salinity, management, social, economic, and built infrastructure information – a "must" to explore for your region!
  - ▶ Only a portion of the Tool's resources are discussed herein
  - ▶ We will use part of the Tool during the breakout
  - ▶ Note: Terminology may differ from definitions herein



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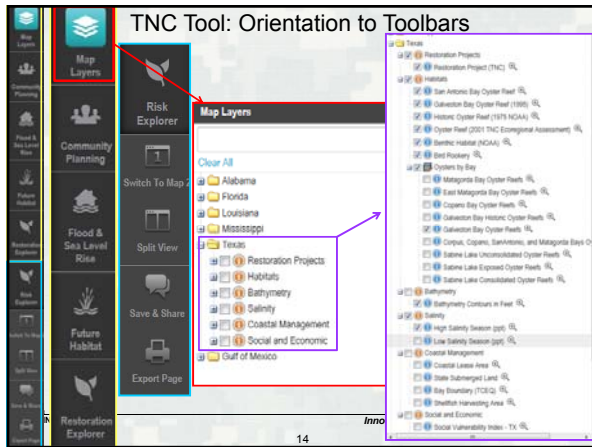
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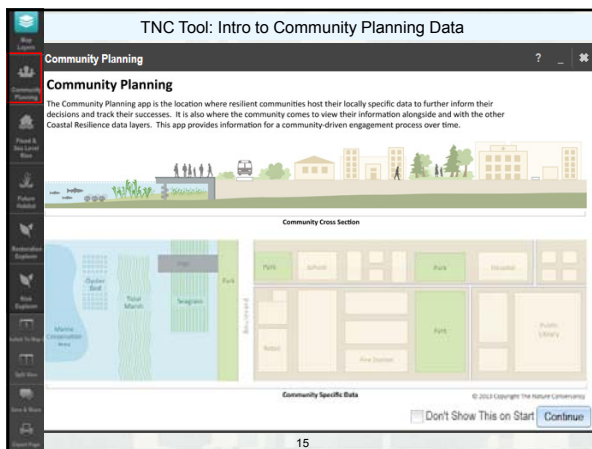
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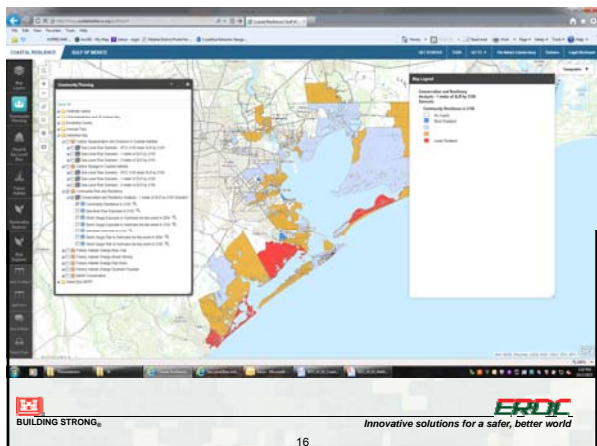
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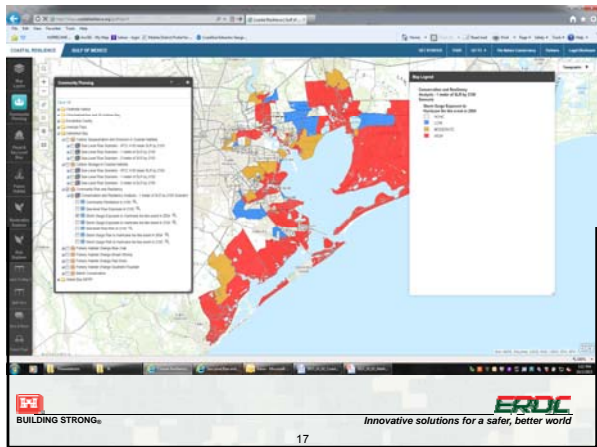
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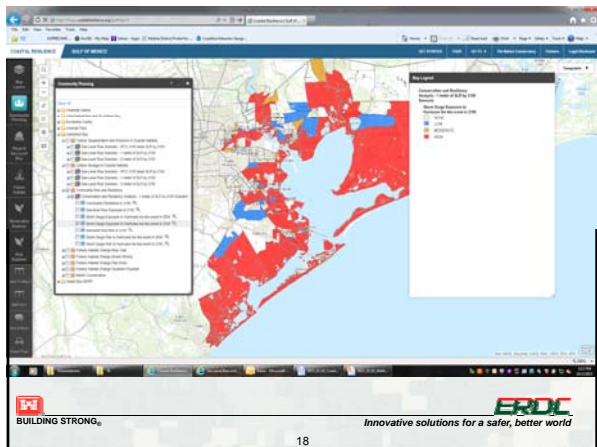
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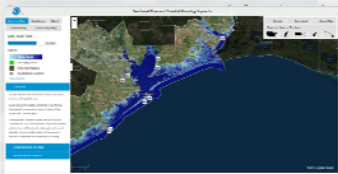




### Sea Level Rise Viewer – NOAA

<http://coast.noaa.gov/slr/>

- Online geoportal with slider bar to visualize change in total water level, from present MHHW to +6-ft, not accounting for erosion, subsidence, and future construction
- Also provided:
  - ▶ Confidence ranges for SLR estimates, marsh locations, vulnerability ratings, and flooding frequency
- Some of these data are in the TNC tool



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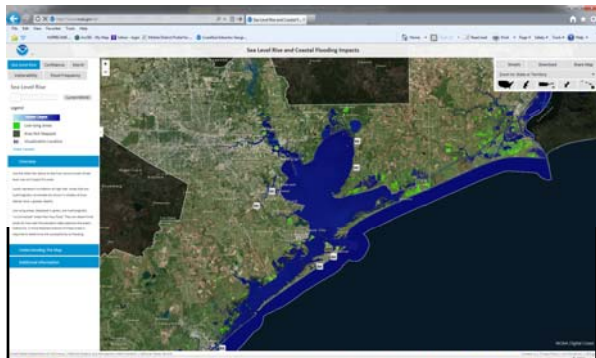
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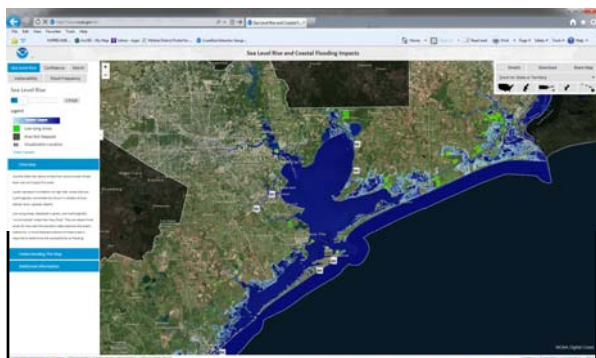
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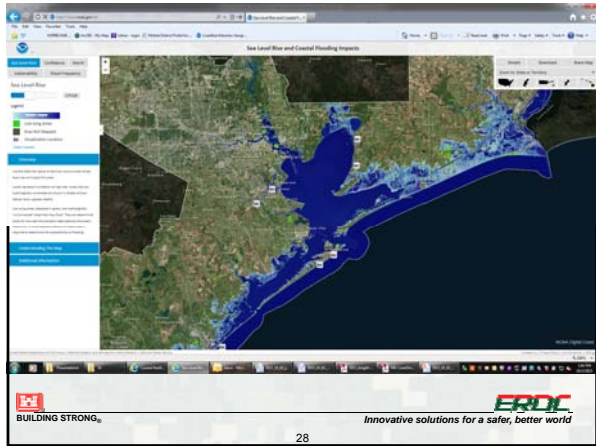
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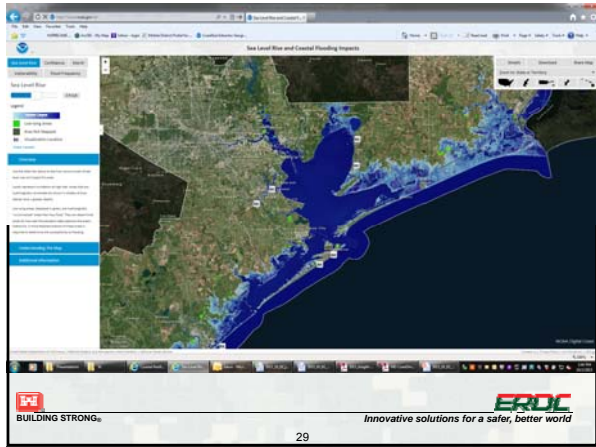
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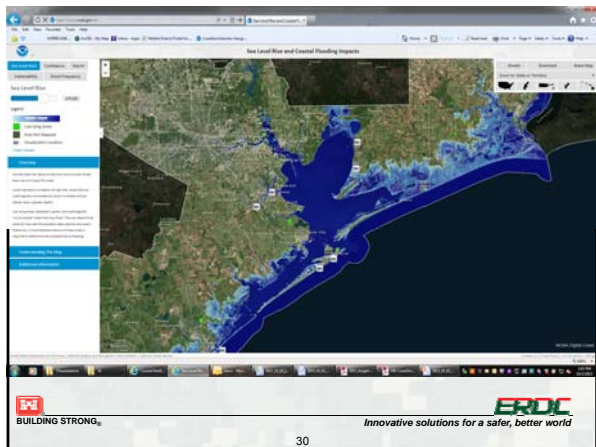
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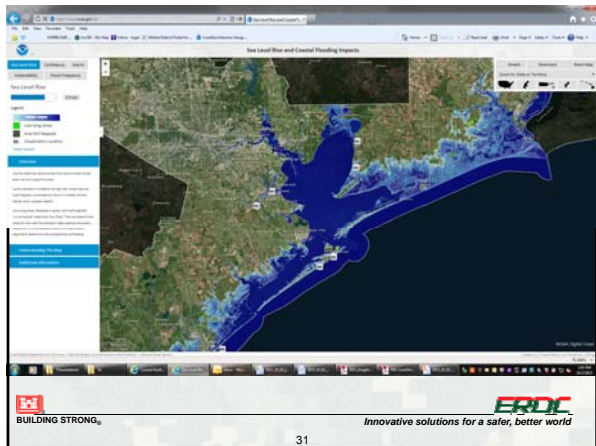
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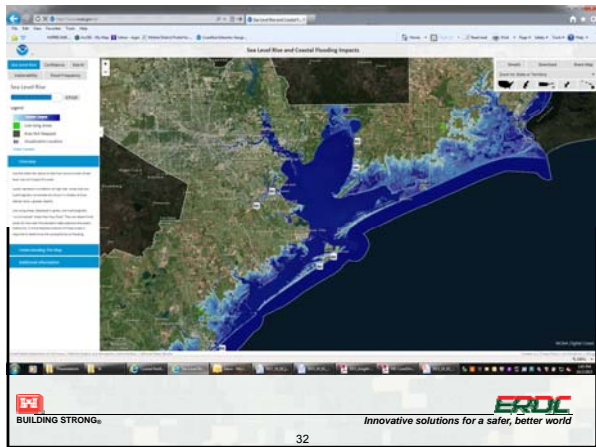
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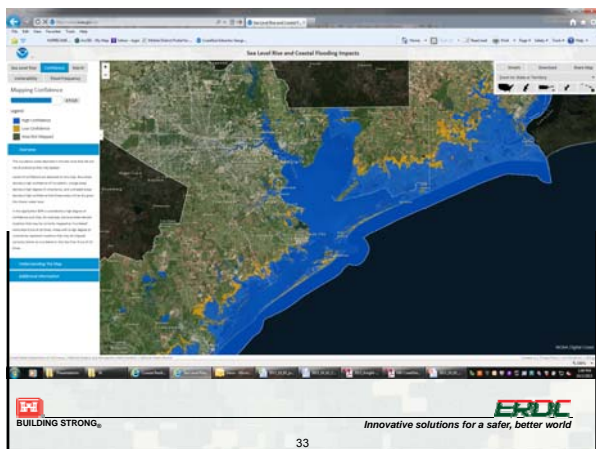
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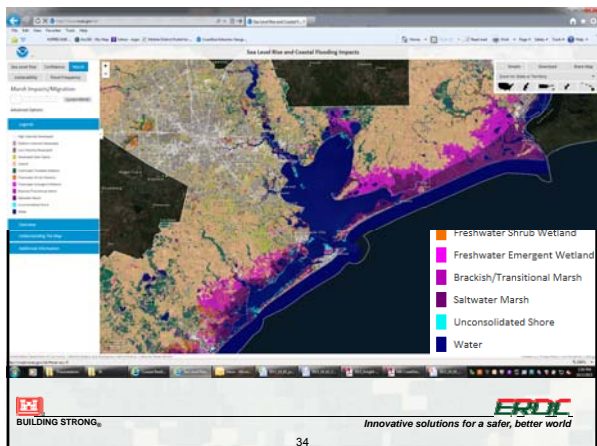
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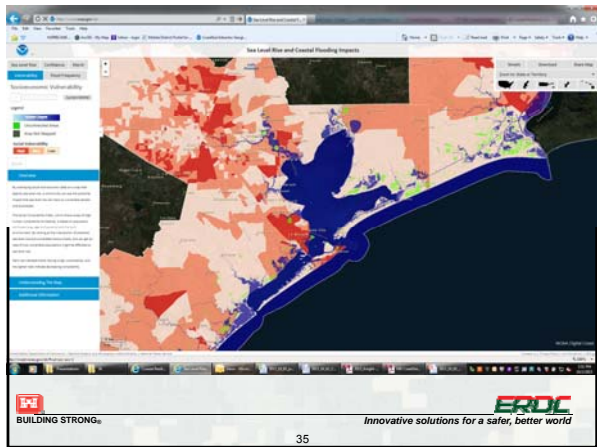
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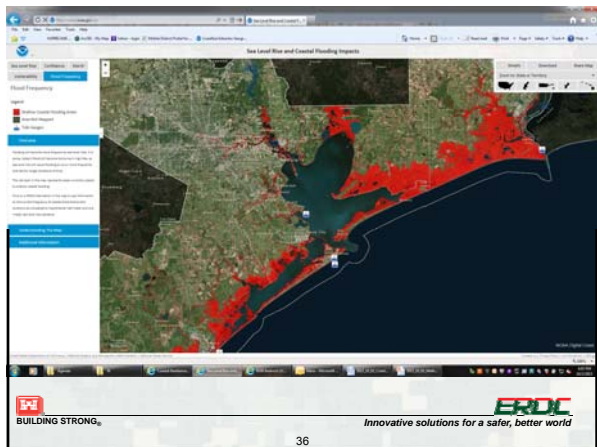
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### Coastal Vulnerability Index (CVI) – USGS

<http://woodshole.er.usgs.gov/project-pages/cvi/images/largenat.jpg>

- Risk that physical changes will occur as sea level rises
- Criteria: tidal range, wave height, coastal slope, shoreline change, geomorphology, and historical rate of relative sea level rise
- Calculated as the root-mean-square of the ranked variables



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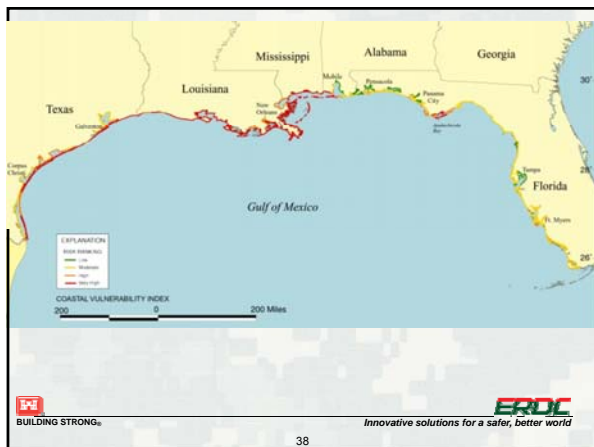
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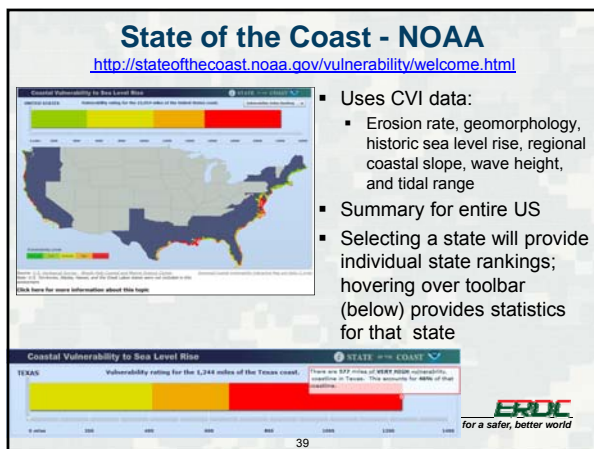
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### Closing Remarks; Discussion

- Many assessment tools and a lot of data are available
  - ▶ More are being developed regularly
  - ▶ Worthwhile to explore new tools and data when starting new study
- Many of the Top-Down tools are not hazard-specific, but results are comparable between regions
  - ▶ Be aware that aggregation of data sets may mask vulnerabilities
  - ▶ Typically utilize data that are not easily changed (e.g., median income, % older/vulnerable population, number of roadways, etc.)
- Most of the Bottom-Up tools are qualitative and not transferrable
  - ▶ Beneficial for coming to common understanding, identifying vulnerabilities and developing actionable decisions
- Advancements are needed in tool development
- Data documenting recovery and the potential for adaptation are lacking

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