Social Vulnerability and Community Disaster Resilience in the Southeast United States

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Social Vulnerability and Community Disaster Resilience in the Southeast United States

Understanding Vulnerabilities and Building Resiliency

2nd Workshop on Coastal Risk and Resilience
Broward County Governmental Center
Ft. Lauderdale Florida

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University of South Carolina
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The HVRI @ USC

Mission (in part)

improvement of emergency preparedness, planning, response, resilience and recovery at local, state, national, and international scales.

Tools/technologies for use in every stage of the EM cycle.
Vulnerability and Resilience Science

- What circumstances place people and localities at risk?
- What enhances or reduces the ability to respond to and recover from environmental threats?
- What are the geographic patterns between and among places?

Goal: Provide scientific basis for disaster and hazard reduction policies through the development of methods and metrics for analyzing societal vulnerability and resilience to environmental hazards and extreme events.
30 years of research in 15 minutes
What could go wrong?
What could go wrong?
What could go right?
Some examples of what makes people/places vulnerable to hazards and disasters:

**Special needs populations**
- difficult to identify (infirm, transient) let alone measure; invariably left out of recovery efforts; often invisible in communities

**Age (elderly and children)**
- affect mobility out of harm’s way; need special care; more susceptible to harm

**Socioeconomic status (rich; poor)**
- ability to absorb losses and recover (insurance, social safety nets), but more material goods to lose

**Race and ethnicity (non-white; non-Anglo)**
- impose language and cultural barriers; affect access to post-disaster recovery funding; tend to occupy high hazard zones

**Gender (women)**
- gender-specific employment, lower wages, care-giving role

**Housing type and tenure (mobile homes, renters)**

# Social Vulnerability in the Florida State of Florida, Tract Level 2006-10 Social Vulnerability Component Summary

<table>
<thead>
<tr>
<th>Component</th>
<th>Cardinality</th>
<th>Name</th>
<th>% Variance Explained</th>
<th>Dominant Variables</th>
<th>Component Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+</td>
<td>Race (Black) and Poverty</td>
<td>17.172</td>
<td>QBLACK</td>
<td>0.806</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>QPOVTY</td>
<td>0.790</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>QNOAUTO</td>
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<td>QFHH</td>
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<td></td>
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<td></td>
<td></td>
<td>QRENTER</td>
<td>0.616</td>
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<td></td>
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<td></td>
<td></td>
<td>QED12LES</td>
<td>0.554</td>
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<td>QSERV</td>
<td>0.548</td>
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<td></td>
<td></td>
<td></td>
<td>QFAM</td>
<td>-0.669</td>
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<tr>
<td>2</td>
<td>+</td>
<td>Age (Old)</td>
<td>14.148</td>
<td>MDHVAL</td>
<td>0.880</td>
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<td>QSSBEN</td>
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<td>QAGEDEP</td>
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<td>MEDAGE</td>
<td>0.768</td>
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<td></td>
<td>QCVLUN</td>
<td>0.656</td>
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<td>QASIAN</td>
<td>-0.598</td>
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<tr>
<td>3</td>
<td>-</td>
<td>Wealth</td>
<td>12.043</td>
<td>QRICH200K</td>
<td>0.837</td>
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<td>PERCAP</td>
<td>0.722</td>
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<td>MDGREN</td>
<td>0.553</td>
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<td></td>
<td>QMOHO</td>
<td>-0.504</td>
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<td>4</td>
<td>+</td>
<td>Ethnicity (Hispanic)</td>
<td>8.456</td>
<td>QHISP</td>
<td>0.861</td>
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<td>QESL</td>
<td>0.681</td>
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<td>QED12LES</td>
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<tr>
<td>5</td>
<td>+</td>
<td>Gender (Female)</td>
<td>7.662</td>
<td>QFEMALE</td>
<td>0.762</td>
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<td>QFEMALE</td>
<td>0.537</td>
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<td>QEXTRACT</td>
<td>-0.516</td>
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<tr>
<td>6</td>
<td>+</td>
<td>Retirement Communities</td>
<td>6.913</td>
<td>PPUNIT</td>
<td>-0.749</td>
</tr>
</tbody>
</table>

*Cumulative Variance Explained: 66.394*
Social Vulnerability in Florida

Santa Rosa
Medium-low SoVI
Fac. 2 Age (Elderly)
Fac. 4 Race (Black), No Auto

Hillsborough
Medium-low SoVI
Fac. 5 Service Industry
Fac. 2 Age (Elderly)

Franklin
High SoVI
Fac. 4 Race (Black), No Auto
Fac. 6 (Ethnicity) Native American

DeSoto
High SoVI
Fac. 3 Hispanic, Extractive Industry

Glades
High SoVI
Fac. 3 Hispanic, Extractive Industry
Fac. 6 Ethnicity (Native American)

St. Johns
Low SoVI
Fac. 1 Lack of Wealth
Fac. 4 Race (Black) No Auto

Putnam
Medium-high SoVI
Fac. 1 Lack of Wealth
Fac. 4 Race (Black) No Auto

Seminole
Low SoVI
Fac. 5 Service Industry
Fac. 2 Age (Elderly)
Fac. 1 Wealth

Broward
Medium-low SoVI
Fac. 5 Service Industry
Fac. 1 Wealth

Miami-Dade
Medium SoVI
Fac. 3 Hispanic, Extractive Industry
Fac. 6 Ethnicity (Native American)
Fac. 1 Wealth
How can SoVI inform you?

- How does your state/citizenry measure up?
- Do you have more counties characterized by ‘high’ vulnerability than ‘low’ vulnerability?
- What percentage of your total population resides in a vulnerable county?
- Are your socially vulnerable places coincident with hazardous places?

<table>
<thead>
<tr>
<th>SoVI® Category</th>
<th>Characteristic</th>
<th>Alabama</th>
<th>Arkansas</th>
<th>Florida</th>
<th>Georgia</th>
<th>Kentucky</th>
<th>Lousiana</th>
<th>Mississippi</th>
<th>North Carolina</th>
<th>Tennessee</th>
<th>Virginia</th>
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</thead>
<tbody>
<tr>
<td>High</td>
<td>Number of Counties Population (2010)</td>
<td>10,591</td>
<td>22,224</td>
<td>251,501</td>
<td>60,555</td>
<td>4,755</td>
<td>30,206</td>
<td>93,931</td>
<td>13,981</td>
<td>7,832</td>
<td>12,969</td>
</tr>
<tr>
<td>Medium-high</td>
<td>Number of Counties Population (2010)</td>
<td>7</td>
<td>21</td>
<td>19</td>
<td>33</td>
<td>22</td>
<td>20</td>
<td>17</td>
<td>17</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Medium</td>
<td>Number of Counties Population (2010)</td>
<td>35</td>
<td>44</td>
<td>33</td>
<td>70</td>
<td>67</td>
<td>29</td>
<td>47</td>
<td>47</td>
<td>61</td>
<td>49</td>
</tr>
<tr>
<td>Medium-low</td>
<td>Number of Counties Population (2010)</td>
<td>23</td>
<td>8</td>
<td>9</td>
<td>33</td>
<td>26</td>
<td>8</td>
<td>9</td>
<td>30</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Low</td>
<td>Number of Counties Population (2010)</td>
<td>195,085</td>
<td>0</td>
<td>190,865</td>
<td>2,895,455</td>
<td>274,867</td>
<td>521,761</td>
<td>398,072</td>
<td>1,424,077</td>
<td>598,884</td>
<td>4,437,446</td>
</tr>
</tbody>
</table>
Social Vulnerability for Florida

Just because a county is characterized by one level of vulnerability does not mean that all parts of the said county exhibit the same characteristics.

Zooming in or downscaling enables a more comprehensive understanding of the driving forces of vulnerability.
What we know about SoVI

- SoVI is
  - Utilized at many levels of intervention from local to national
  - Scalable
  - Replicable
  - Not without issues and challenges
What SoVI is not

• It is not an absolute value
  – A SoVI score of 10 is not twice as vulnerable as a SoVI score of 5

• **Resilience**
  – SoVI is not the other side of the coin
  – Resilience metrics for the US are available
  – A great story can be told when coupling SoVI, Resilience, and hazard zones
Medical Vulnerability in Florida

The medical vulnerability index (MedVI) illustrates pre-event baseline health surveillance conditions among places.

The health disparities of place (or medical vulnerability) complements current approaches in the social determinants of health by measuring and comparing the spatial interaction of social traits, health needs, and healthcare access.

Four general categories of medical vulnerability data were identified including physical medical needs, psychological medical needs, social medical needs, and healthcare access.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
<th>Increases (+), or Decreases (-) Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical health needs</td>
<td>Individuals dependent on the public healthcare system for medication, medical treatments, equipment, or supervision from skilled medical professionals to maintain quality of health and life. Examples include chronic illness, communicable diseases, physical disability or immobility.</td>
<td>Extensive physical health needs of the individuals within a community (+)</td>
</tr>
<tr>
<td>Psychological health needs</td>
<td>Individuals with psychological or psychosomatic disorders, or having mental limitations that often require medical consideration including medication, therapy, supervision, and in some acute cases institutionalization. Conditions are not limited to depression and mental illness, but also drug/alcohol addiction, and mental retardation.</td>
<td>Extensive psychological health needs of the individuals within a community (+)</td>
</tr>
<tr>
<td>Social health needs</td>
<td>Physical, mental or behavioral health issues materialized in direct response to social distress. Examples include homelessness or domestic abuse.</td>
<td>Poor social health within a community (+)</td>
</tr>
<tr>
<td>Healthcare access</td>
<td>Individuals or communities with limited access to healthcare resources, either through direct local scarcity of healthcare providers, or through financial proxies such as insurance status.</td>
<td>Increased access (-), decreased access (+)</td>
</tr>
<tr>
<td>Component</td>
<td>Cardinality</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>+</td>
<td>Low Perception of Health, Diminished Healthcare Access, Preexisting Conditions</td>
</tr>
<tr>
<td>2</td>
<td>+</td>
<td>Disability and Oxygen Dependence</td>
</tr>
<tr>
<td>3</td>
<td>+</td>
<td>Chronic Disease</td>
</tr>
<tr>
<td>4</td>
<td>+</td>
<td>Mental and Emotional Illness</td>
</tr>
<tr>
<td>5</td>
<td>+</td>
<td>Specialized Care</td>
</tr>
<tr>
<td>6</td>
<td>+</td>
<td>Medical Care Dependence</td>
</tr>
<tr>
<td>7</td>
<td>+</td>
<td>Nursing Home Residents</td>
</tr>
<tr>
<td>8</td>
<td>+</td>
<td>Low Birth Weight Babies</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
<td>Emergency care access</td>
</tr>
</tbody>
</table>

Total Variance Explained 74.37

MedVI Score

- > 1.5 SD (Most Vulnerable)
- 0.50 - 1.5 SD
- -0.50 - 0.50 SD
- -1.5 - -0.50 SD
- < -1.5 SD (Least Vulnerable)
Community Disaster Resilience

Composite of six broad categories influencing community disaster resilience

- Social
- Economic
- Community Capital
- Institutional
- Infrastructure
- Environmental

Not the resilience of each of category but how these characteristics influence overall community resilience.
SoVI + MedVI + Hazards = Resilience Opp.
Florida is not North Carolina
Contact Information

SoVI – www.sovius.org
SHELDUS – www.sheldus.org
BRIC –
http://webra.cas.sc.edu/hvri/research/drrc_resilience.aspx

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