Analysis of Community Dependence on Recreational Fishing

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Overview

• Context and methods
  • Social indicators of coastal community vulnerability and resilience

• Measurement
  • Social indicators of community vulnerability
  • Indicators of community dependence on recreational and commercial fishing

• Tools available to public
Applications

• MSA Mandated analysis of the potential effects of regulatory change on *place based* communities
  • Social Impact Assessment
  • National Standard 8
  • Environmental Justice

• Hurricane Sandy Rapid Assessment
  • Locate recreational and commercial dependent communities
• 2,917 communities in coastal counties in the Eastern US and Gulf Coast (context)
  • Over 1,000 with commercial and/or recreational activity
• 19 states
  • North Carolina shared
• 75 variables
• 7 different secondary sources
Criteria for indices

- Used the following criteria to qualify indices that emerged:
  - Principal component analysis
    - Single factor solution
    - Factor loadings above .350
    - Variance explained 45%
  - Kaiser-Meyer-Olkin measure of sampling adequacy above .500
  - Bartlett’s test of sphericity significance above .05
  - Theta reliability above .500
  - 14 indices
Social vulnerability

- Is the pre-existing condition that affects a community’s (social system) ability to prepare for and recover from a disruptive event.

- Inherent characteristics of the community that create the potential for harm
Social vulnerability indices

- Poverty
- Personal disruption
- Population composition vulnerability
# Social vulnerability indices

<table>
<thead>
<tr>
<th>Indices</th>
<th>Factor Loadings</th>
<th>% Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Poverty</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% receiving assistance</td>
<td>0.544</td>
<td></td>
</tr>
<tr>
<td>% of families below poverty level</td>
<td>0.915</td>
<td>59.72</td>
</tr>
<tr>
<td>% over 65 in poverty</td>
<td>0.716</td>
<td></td>
</tr>
<tr>
<td>% under 18 in poverty</td>
<td>0.862</td>
<td></td>
</tr>
<tr>
<td><strong>Personal Disruption</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% unemployed</td>
<td>0.628</td>
<td></td>
</tr>
<tr>
<td>Crime index</td>
<td>0.477</td>
<td>45.00</td>
</tr>
<tr>
<td>% with no diploma</td>
<td>0.786</td>
<td></td>
</tr>
<tr>
<td>% in poverty</td>
<td>0.811</td>
<td></td>
</tr>
<tr>
<td>% females separated</td>
<td>0.600</td>
<td></td>
</tr>
<tr>
<td><strong>Population Composition Vulnerability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% white alone</td>
<td>-0.898</td>
<td></td>
</tr>
<tr>
<td>% female single headed households</td>
<td>0.719</td>
<td></td>
</tr>
<tr>
<td>% Population age 0-5</td>
<td>0.675</td>
<td>58.12</td>
</tr>
<tr>
<td>% Speak English less than well</td>
<td>0.739</td>
<td></td>
</tr>
</tbody>
</table>
Social Vulnerability

- Poverty
- Population Composition
- Personal Disruption

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1 Std. Dev.

1/2 Std. Dev.

- Ocean City, MD
- Cape May, NJ
- Point Judith, RI
- Montauk, NY
- Virginia Beach, VA
- Key West, FL
- Orange Beach, AL
- Port Aransas, TX
- Biloxi, MS
- Manteo, NC
Gentrification pressure indices

- Retiree migration
- Urban sprawl
- Natural amenities
### Gentrification pressure indices

<table>
<thead>
<tr>
<th>Indices</th>
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<th>% Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retiree Migration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households with one or more over 65</td>
<td>0.950</td>
<td></td>
</tr>
<tr>
<td>% receiving social security</td>
<td>0.951</td>
<td>78.58</td>
</tr>
<tr>
<td>% receiving retirement income</td>
<td>0.766</td>
<td></td>
</tr>
<tr>
<td>% in labor force</td>
<td>-0.866</td>
<td></td>
</tr>
<tr>
<td><strong>Urban Sprawl</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population density</td>
<td>0.387</td>
<td>49.32</td>
</tr>
<tr>
<td>Nearest city (in miles) with a population of 50,000</td>
<td>-0.589</td>
<td></td>
</tr>
<tr>
<td>Cost of living index</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td>Median home value</td>
<td>0.819</td>
<td></td>
</tr>
<tr>
<td><strong>Natural Amenities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rental vacancy rate</td>
<td>0.770</td>
<td>47.15</td>
</tr>
<tr>
<td>% homes vacant</td>
<td>0.824</td>
<td></td>
</tr>
<tr>
<td>Boat launches by population</td>
<td>0.605</td>
<td></td>
</tr>
<tr>
<td>% water cover</td>
<td>0.493</td>
<td></td>
</tr>
</tbody>
</table>
Gentrification Pressure Vulnerability

- Retiree Migration
- Urban Sprawl
- Natural Amenities

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1/2 Std. Dev.

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Fishing dependence indices

• Recreational
  • Recreational fishing engagement
  • Recreational fishing reliance

• Commercial
  • Commercial fishing engagement
  • Commercial fishing reliance
# Recreational fishing indices

<table>
<thead>
<tr>
<th>Indices</th>
<th>Factor Loadings</th>
<th>% Variance Explained</th>
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</thead>
<tbody>
<tr>
<td><strong>Recreational Fishing Reliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational fishing mode charter by population</td>
<td>0.352</td>
<td></td>
</tr>
<tr>
<td>Recreational fishing mode private by population</td>
<td>0.917</td>
<td>58.97</td>
</tr>
<tr>
<td>Recreational fishing mode shore by population</td>
<td>0.897</td>
<td></td>
</tr>
<tr>
<td><strong>Recreational Fishing Engagement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreational charter fishing pressure</td>
<td>0.352</td>
<td></td>
</tr>
<tr>
<td>Recreational private fishing pressure</td>
<td>0.815</td>
<td>63.02</td>
</tr>
<tr>
<td>Recreational shore fishing pressure</td>
<td>0.761</td>
<td></td>
</tr>
</tbody>
</table>
Recreational Fishing Dependence

- Recreational Fishing Engagement
- Recreational Fishing Reliance

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1/2 Std. Dev.

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## Commercial fishing indices

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<th>% Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial Fishing Reliance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of landings by population</td>
<td>0.833</td>
<td></td>
</tr>
<tr>
<td>Number of commercial fishing permits by population</td>
<td>0.686</td>
<td>50.30</td>
</tr>
<tr>
<td>Dealers with landings by population</td>
<td>0.592</td>
<td></td>
</tr>
<tr>
<td>% in forestry, farming and fishing occupation</td>
<td>0.705</td>
<td></td>
</tr>
<tr>
<td><strong>Commercial Fishing Engagement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of landings</td>
<td>0.906</td>
<td></td>
</tr>
<tr>
<td>Number of commercial fishing permits</td>
<td>0.862</td>
<td>57.57</td>
</tr>
<tr>
<td>Number of dealers with landings</td>
<td>0.580</td>
<td></td>
</tr>
<tr>
<td>Pounds of landings</td>
<td>0.635</td>
<td></td>
</tr>
</tbody>
</table>
Commercial dependence

- Commercial Fishing Engagement
- Commercial Fishing Reliance

1 Std. Dev.

1/2 Std. Dev.

Locations: Ocean City, MD, Cape May, NJ, Point Judith, RI, Montauk, NY, Virginia Beach, VA, Key West, FL, Orange Beach, AL, Port Aransas, TX, Biloxi, MS, Manteo, NC
Combined fishing dependence

- Commercial Fishing Engagement
- Commercial Fishing Reliance
- Recreational Fishing Engagement
- Recreational Fishing Reliance

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Fishing Infrastructure Index

Marinas - Number of Employees -

New Jersey
Recreational Fishing Infrastructure

Bait and Tackle Stores
-Number of Employees-

New Jersey
Web based interactive mapping tool for use in SIA

http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index
Recreational fishing dependence in context
Continuing work:

• Refine recreational fishing index
  • Replace MRIP site pressure data with regular intercept data on angler trips (stratify to get trips/community)

• Indices under development
  • Fishing Infrastructure
  • Species specific
  • Vulnerable species
  • Climate change

• Time series analysis

• National standardized indicators
Web accessible resources
(http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index)

Tech Memo

Mapping tool
Data available on request

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