RISKY BUSINESS

Engaging the Public in Policy Discourse on Sea-Level Rise and Inundation

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Center for Climate Change Communication, George Mason University

Hampton Roads Sea Level Rise/Flooding Adaptation Forum
Old Dominion University’s Regional Higher Education Center
Virginia Beach, VA | July 10, 2013
1) Develop a deliberative model for public engagement, including a viewer providing the public with household-level sea-level rise impacts data

2) Determine usefulness and replicability of engagement model for other communities, especially in ability to counteract cultural polarization
1) Deliberative community event in Anne Arundel County, Maryland in spring 2012
2) Surveys: pre- and post-event of county and event attendees
3) Creation of sea-level rise viewer with household-level risk information and website with community event materials
• Karen Akerlof, PhD, George Mason University
• Todd La Porte, PhD, George Mason University
• Katherine Rowan, PhD, George Mason University
• Brian K. Batten, PhD, Dewberry
• Mohan Rajasekar, MS, Dewberry
• Howard Ernst, PhD, U.S. Naval Academy
• Dan Nataf, Center for the Study of Local Issues, Anne Arundel Community College
• Dana Dolan, MS, George Mason University
Difficulties for individuals in detecting – and supporting policy action on – sea-level rise risks

1) Slowly “creeping” problem
2) Not always considered immediate concern
3) Risk information frequently not available at household level
4) Attitudes influenced by cultural perspectives
Visualize Sea-Level Rise Impacts

Hear from Experts

Read the Reports

Take the Surveys, Compare your Results to Others

Host a Discussion

Citizens' Discussion April 28th

www.FutureCoast.info
Project reports ...

- **Survey report** -- Public Opinion and Policy Preferences on Coastal Flooding and Sea-Level Rise, Anne Arundel County, MD August 2012
- **Issue book** -- What Should Communities Do -- or Not Do -- about Coastal Flooding and Sea Level Rise?
- **Discussion guides** -- A Roadmap to Small Group Discussions of Sea-Level Rise and Coastal Flooding
- **Replicabilty report** -- Findings, Lessons Learned, and Replicability of a Model for Sea-Level Rise Public Engagement
- **Risk Analysis** (Dewberry)

http://www.futurecoast.info/reports
Dan Nataf
Director, Center for the Study of Local Issues
Anne Arundel Community College
Visualize Sea-Level Rise Impacts

Step 1: Find a Location

Search by Street Address or Use the Map to Find a Location:

Address for Point of Interest (Approximate):
1456 Cedarhurst Rd, Shady Side, MD 20764, USA

Step 2: Choose a Scenario and Year

Choose Scenario (Find out more):
- Historic Trend
- Low Acceleration
- Moderate Acceleration

Choose Year:
- 2070
- 2075
- 2080
- 2090

Step 3: View Summary of Estimated Impacts

Reset ALL

[Map and Satellite options]

Address Search Result
- Low Composite Risk Exposure
- Moderate Composite Risk Exposure
- High Composite Risk Exposure
- Low Chance Flooding
- Medium Composite Risk Exposure
- High Composite Risk Exposure
- Permanent Flooding
- Temporary Flooding

Neighborhood Level Summary

Take the Surveys, Compare your Results to Others

Host a Discussion

Citizens' Discussion April 28th

www.FutureCoast.info
Pinpoint a location on a map ....
... and get risk information for that building

![Building Summary Table]

<table>
<thead>
<tr>
<th>Year</th>
<th>Exposed to 1% Annual Chance Floodplain?</th>
<th>Expected Damage During 1% Annual Chance Flood</th>
<th>Percent Chance of Coastal Flooding in a 30-Year Period</th>
<th>Permanent Inundation at this Sea Level Rise Scenario?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>YES</td>
<td>Severe</td>
<td>96%</td>
<td>NO</td>
</tr>
<tr>
<td>2025</td>
<td>YES</td>
<td>Severe</td>
<td>96%</td>
<td>YES</td>
</tr>
<tr>
<td>2050</td>
<td>YES</td>
<td>Severe</td>
<td>96%</td>
<td>YES</td>
</tr>
<tr>
<td>2075</td>
<td>YES</td>
<td>Severe</td>
<td>96%</td>
<td>YES</td>
</tr>
</tbody>
</table>
... and the surrounding neighborhood

<table>
<thead>
<tr>
<th>Potential Impact</th>
<th>Potentially Impacted Area</th>
<th>Percent of Neighborhood Area Impacted</th>
<th>Number of Impacted Buildings</th>
<th>Value of Impacted Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanently Inundated</td>
<td>0.0 (sq. miles)</td>
<td>5.9%</td>
<td>28</td>
<td>$2,900,000</td>
</tr>
<tr>
<td>Located within 100 Year Floodplain</td>
<td>0.0 (sq. miles)</td>
<td>10.2%</td>
<td>43</td>
<td>$47,200,000</td>
</tr>
<tr>
<td>Total Impacts</td>
<td>0.0 (sq. miles)</td>
<td>16.1%</td>
<td>71</td>
<td>$50,100,000</td>
</tr>
</tbody>
</table>

including economic damage estimates
Good News
In your opinion, has coastal flooding become more or less of a problem in the county in recent years? $n=376$
Which impacts from sea-level rise, if any, are you most concerned about within the county? n=378  Multiple responses accepted

- Erosion of shoreline: 64.6%
- Private property damage or loss: 59.3%
- Habitat loss: 54.8%
- Public infrastructure damage or loss: 52.6%
- Problems with stormwater drainage: 49.5%
- Increased frequency and severity of flooding: 47.9%
- Loss or damage of sewage and septic treatment systems: 46.3%
- Loss or contamination of freshwater wells: 43.7%
- Permanently flooded areas (inundation): 30.4%
- Not concerned about any impacts: 7.9%
- Not concerned about any impacts: 2.9%
Policy preferences for built areas

[Chart showing policy preferences]

- 8%: Design and retrofit buildings to be more flood resilient, including elevating them and/or the land.
- 12%: Build walls and other structural barriers along the shore to hold back coastal waters.
- 32%: Retreat inland over time, restricting new building in areas likely to flood, and moving or abandoning existing structures.
- 48%: Maintain and restore natural areas such as wetlands and beaches as buffers against coastal flooding.

[Low-density residential areas] Which of these strategies do you most support? (n=354)

Support for natural buffers over structural barriers
Local governments have different types of policy tools they can use. How much do you support or oppose their use of these types to limit the impacts of coastal flooding due to sea-level rise?

Majority support for multiple types of policy mechanisms, including government spending
Would you agree or disagree that your local government’s policies are adequate for addressing coastal flooding over the long term (e.g., over a decade or more)？n=376

Uncertainty about whether policies are adequate
When do you believe the effects of sea-level rise will significantly impact the county, if ever? $n=377$

Uncertainty about timing of impacts
Majority think SLR caused by climate change, but almost half of those think it is also “natural”
The opposing tribes

Hierarchical individualists

• Individuals should be free from societal constraints to pursue their own interests

• Some people in society should have more power than others due to status

Egalitarian solidarists

• People in society should work together collectively for the common good

• There should be little difference in the amount of power of any person

Cultural Cognition Project
Dan Kahan, Yale Law School
www.culturalcognition.net/
What influences public perceptions of SLR risk and policy support?

“Tribal” beliefs?
or proximity to risk?
Significant factors in relation to SLR risk perception...

- What do my cultural values tell me?
- How close am I to coastal and flood-prone areas?
- My political party affiliation or political ideology

How would you describe the risk of more severe flooding from sea-level rise over the next 40 years to...

--- the county
--- your neighborhood
--- your home or property
Largest decision-making factors in assessing sea-level rise risks to my ...

- What do my political and cultural values tell me?
- How close is my neighborhood to coastal and flood-prone areas?
- How close is my own home to coastal and flood-prone areas?
Significant factors in relation to policy support ...

- Long-range planning that takes sea-level rise into account
- Changes to regulations, such as zoning laws in coastal areas
- Use of government spending, such as buying coastal lands and new infrastructure
- Providing tax incentives to property owners to take actions that reduce flood risk

What do my cultural values tell me?

How close am I to coastal and flood-prone areas?

My political party affiliation or political ideology
Significant factors in relation to policy support ...

- What do my cultural values tell me?
- Gender

- How close am I to coastal and flood-prone areas?

- My political party affiliation or political ideology

- Long-range planning that takes sea-level rise into account
- Changes to regulations, such as zoning laws in coastal areas
- Use of government spending, such as buying coastal lands and new infrastructure
- Providing tax incentives to property owners to take actions that reduce flood risk
Food for Thought
Change in means on knowledge scale. Derived from 5 measures, each with range 1 to 5, correct responses coded high. Hierarchical individualists (n=8); egalitarian solidarists (n=13).
Change in means on sea-level rise beliefs. “Sea-level rise is an issue some coastal communities have been discussing recently. Sea-level rise refers to increases in the average height of water relative to the land over the course of the year. What do you think? Do you agree or disagree that sea-level rise is occurring?” Hierarchical individualists (n=8); egalitarian solidarists (n=14).

*Statistically significant change
Change in means on impact concern scale. Derived from a total of 9 possible measures each coded (1,0). Hierarchical individualists (n=8); egalitarian solidarists (n=14).
Some of participants’ preferences for response strategies did change ....

Participants became more opposed to building walls and other structural barriers to hold back waters in publicly owned natural areas (+14.1 pct pts), and more opposed to retreating inland from high-density commercial and residential areas (+17.4 pct pts).
1. **Good news:** Most people think that coastal flooding is a problem, are concerned about SLR, and support policies to address it.

2. **Bad news:** People are uncertain about the timing of the risk, what is already being done to address it, and whether it is just natural; viewpoints toward local policies likely to be more driven by “tribes” than risk proximity.

3. **Food for thought:** Preliminary evidence suggests when bring people together in deliberative events, emphasizing community decision-making, there are coherent changes in policy preferences, and declines in the effects of “tribalism.”
Conclusions for Policy
Generically, there is public support for SLR policy.

Uncertainty in public opinion combined with potential for polarization threatens that support.

1. Providing the public with tailored information (risk levels, policies) may reduce uncertainties.
2. Creating opportunities to build community identity and shared decision-making in pursuit of larger group goals may reduce impacts of polarization.
3. Ignoring public opinion risky (example, North Carolina).
Findings, Lessons Learned, and Replicability of a Model for Sea-Level Rise Public Engagement
January 2013

http://www.futurecoast.info/reports

or email kakerlof@gmu.edu
## Prediction of Sea-Level Rise Risk Perceptions at Different Geographic Scales

**DV=SLR Risks**

### Standardized coefficients

<table>
<thead>
<tr>
<th>Variable</th>
<th>County</th>
<th>Neighborhood</th>
<th>Own Home or Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.075</td>
<td>.052</td>
<td>.082</td>
</tr>
<tr>
<td>Age</td>
<td>.033</td>
<td>-.090*</td>
<td>-.080</td>
</tr>
<tr>
<td>Education</td>
<td>-.020</td>
<td>.002</td>
<td>-.023</td>
</tr>
<tr>
<td>Income</td>
<td>.031</td>
<td>-.091</td>
<td>-.069</td>
</tr>
<tr>
<td>White (v. Black)</td>
<td>.020</td>
<td>-.004</td>
<td>-.083</td>
</tr>
<tr>
<td>Non-white (v. Black)</td>
<td>-.032</td>
<td>-.044</td>
<td>-.086</td>
</tr>
<tr>
<td>Risk Proximity</td>
<td>-.035</td>
<td>-.382***</td>
<td>-.319***</td>
</tr>
<tr>
<td>Democrat (v. Othr/ Indepen)</td>
<td>-.062</td>
<td>.033</td>
<td>.012</td>
</tr>
<tr>
<td>Republican (v. Othr/ Indepen)</td>
<td>-.007</td>
<td>.004</td>
<td>-.024</td>
</tr>
<tr>
<td>Political Ideology</td>
<td>-.049</td>
<td>.061</td>
<td>.071</td>
</tr>
<tr>
<td>Hierarchy Scale</td>
<td>-.272***</td>
<td>-.180**</td>
<td>-.155**</td>
</tr>
<tr>
<td>Individualism Scale</td>
<td>-.228***</td>
<td>-.227***</td>
<td>-.186***</td>
</tr>
<tr>
<td>Hierarchy x Individualism</td>
<td>-.045</td>
<td>-.025</td>
<td>-.046</td>
</tr>
</tbody>
</table>

**Model explains X% of individuals’ risk perceptions ....**

- 29%
- 29%
- 23%

Grey shaded areas = statistically significant variable, p<.05

n=345, 351, 348
Change in means on problem identification. “In your opinion, has coastal flooding become more or less of a problem in the county in recent years?”
Hierarchical individualists (n=8); egalitarian solidarists (n=12).
Change in means on local government policy adequacy.
“Would you agree or disagree that your local government’s policies are adequate for addressing coastal flooding over the long term (e.g., over a decade or more)?” Hierarchical individualists (n=8); egalitarian solidarists (n=14), p=0.315.