



4C George Mason University  
Center for Climate Change Communication

# RISKY BUSINESS

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

Karen Akerlof, Research Assistant Professor  
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

# FUTURE COAST

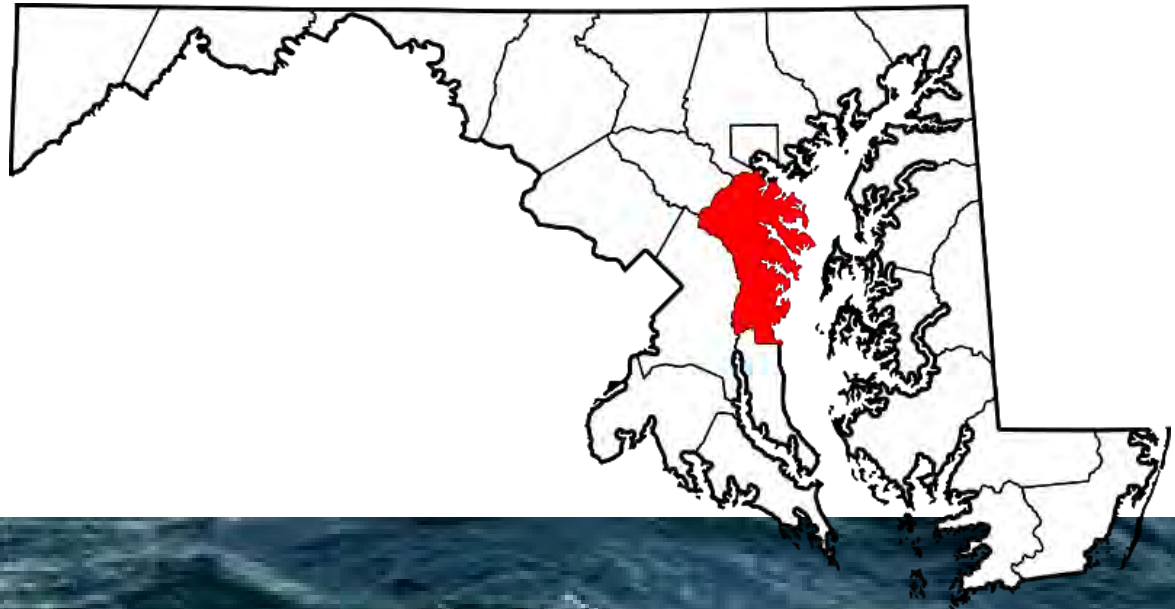
Anne Arundel



- 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

**Project Goals**

- 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



# Project Team



# Funder



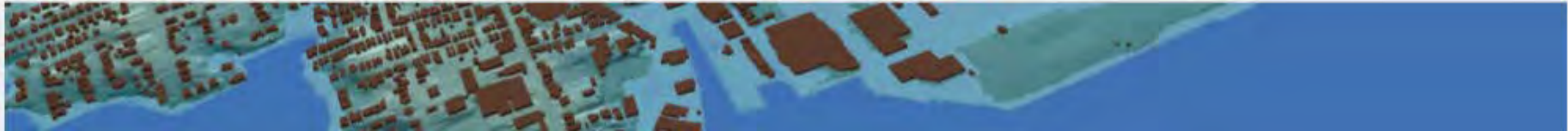
# Team and Funder

- **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

# FUTURE COAST



**Visualize Sea-Level  
Rise Impacts**



**Hear from Experts**



**Read the Reports**



**Take the Surveys,  
Compare your Results  
to Others**



**Host a Discussion**

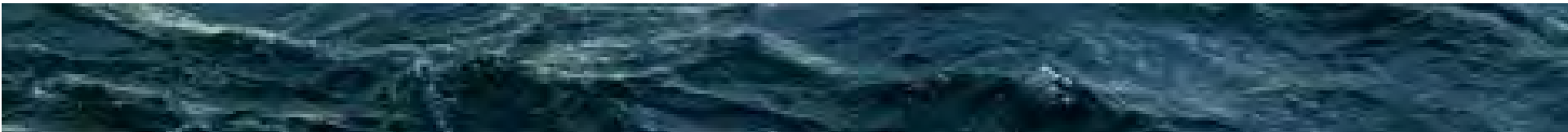


**Citizens' Discussion  
April 28th**

<http://www.futurecoast.info/reports>

## **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
- **Replicability report** -- Findings, Lessons Learned, and Replicability of a Model for Sea-Level Rise Public Engagement
- **Risk Analysis** (Dewberry)





# Future Coast - Other Policies-YouTube.mov

FutureCoast

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**Dan Nataf**  
*Director, Center for the Study of Local Issues  
Anne Arundel Community College*

00:06 / 14:50



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by FutureCoast  
3 views



**Future Coast - Community A**  
by FutureCoast  
9 views

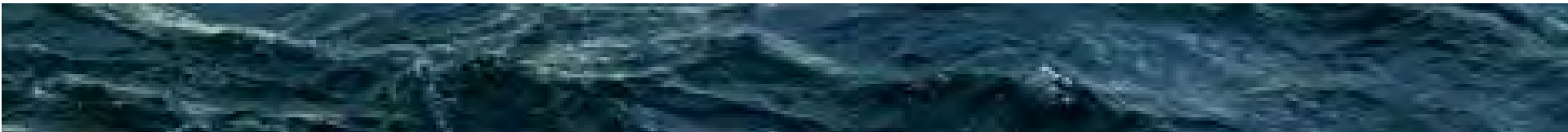


**Future Coast - Policies-**  
by FutureCoast  
8 views

Suggestions



**Watch Blue Ep**  
by wigs  
272,395 views



# FUTURE COAST



**Step 1: Find a Location**

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

Search Address  Clear Address

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:

- 2012
- 2025
- 2050
- 2075
- 2100

**Step 3: View Summary of Estimated Impacts**

Building Neighborhood County

Neighborhood Level Summary



Visualize Sea-Level Rise Impacts



Take the Surveys, Compare your Results to Others



Host a Discussion



Citizens' Discussion April 28th

# Pinpoint a location on a map ....

Search Address    Clear Address

Address for Point of Interest (Approximate):  
80 Compromise Street, Annapolis, MD 21401, USA

**Step 2: Choose a Scenario and Year** ?

Choose Scenario  
(Find out more):

Historic Trend  
Low Acceleration  
Moderate Acceleration

Choose Year:

2012  
2025  
2050  
2075  
2100

Map data ©2013 Google - [Terms of Use](#) Report a map error

Legend:

- Address Search Result
- Permanent Inundation
- 1 % Chance Floodplain
- Low Composite Risk Exposure
- Medium Composite Risk Exposure
- High Composite Risk Exposure
- Impacted Neighborhoods
- Selected Feature(s)

# ... and get risk information for that building

Building

Neighborhood

County

## Building Summary

Composite Risk Analysis Category:

**High**

Year	Exposed to 1% Annual Chance Floodplain? <sup>?</sup>	Expected Damage During 1% Annual Chance Flood <sup>?</sup>	Percent Chance of Coastal Flooding in a 30-Year Period <sup>?</sup>	Permanent Inundation at this Sea Level Rise Scenario? <sup>?</sup>
2012	YES	Severe	96%	NO
2025	YES	Severe	96%	YES
2050	YES	Severe	96%	YES
2075	YES	Severe	96%	YES

# ... and the surrounding neighborhood

Step 3: View Summary of Estimated Impacts ? Reset ALL

Building Neighborhood County

### Neighborhood Level Summary

Estimated Impacts Due to Potential Sea Level Rise and Coastal Flooding in 2100 Assuming Moderate Acceleration

	Potentially Impacted Area <span>?</span>	Percent of Neighborhood Area Impacted <span>?</span>	Number of Impacted Buildings <span>?</span>	Value of Impacted Buildings <span>?</span>
Permanently Inundated	0.0 (sq. miles)	5.9%	28	\$2,900,000
Located within 100 Year Floodplain	0.0 (sq. miles)	10.2%	43	\$47,200,000
Total Impacts	0.0 (sq. miles)	16.1%	71	\$50,100,000

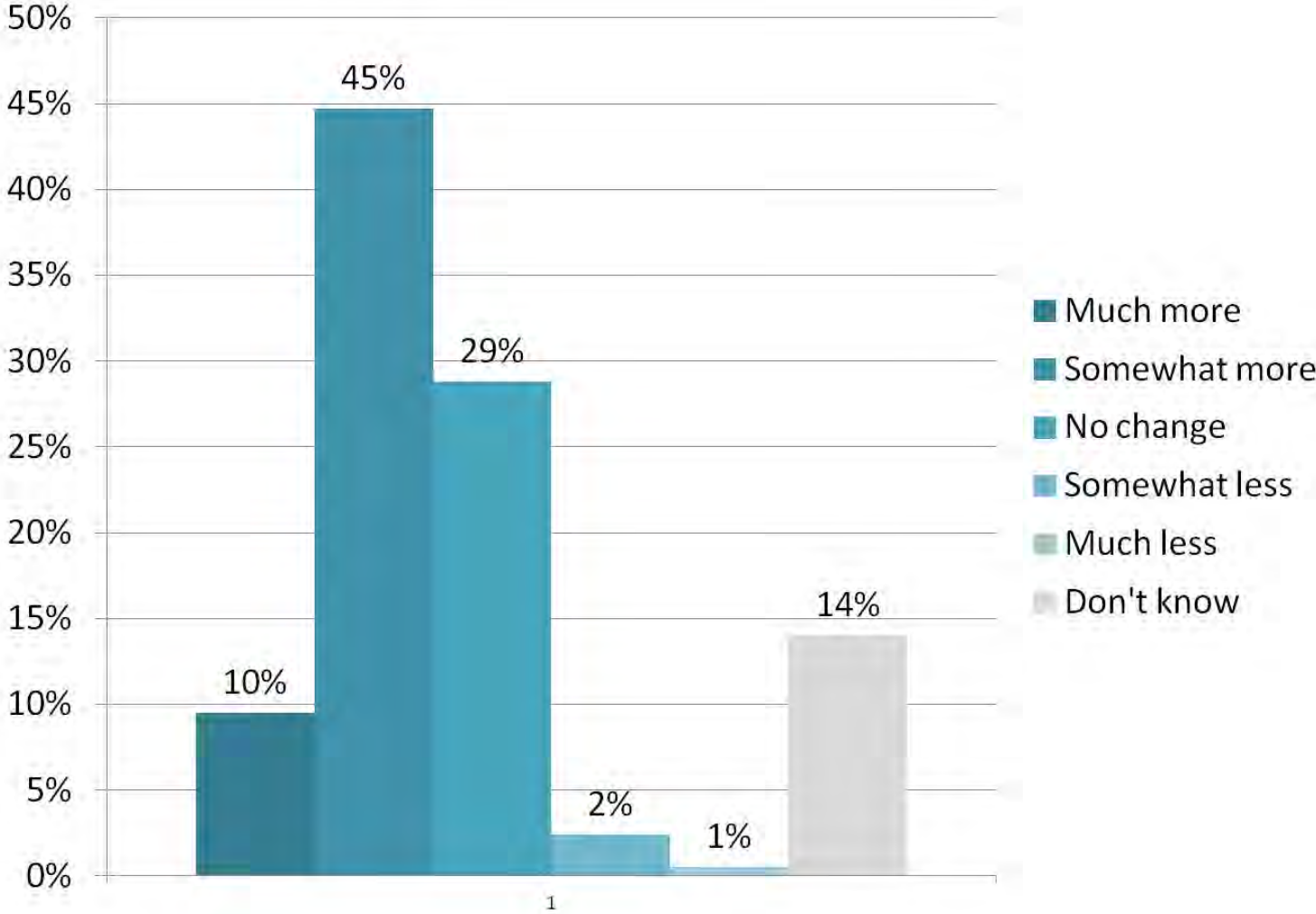
*including economic damage estimates*



# Good News

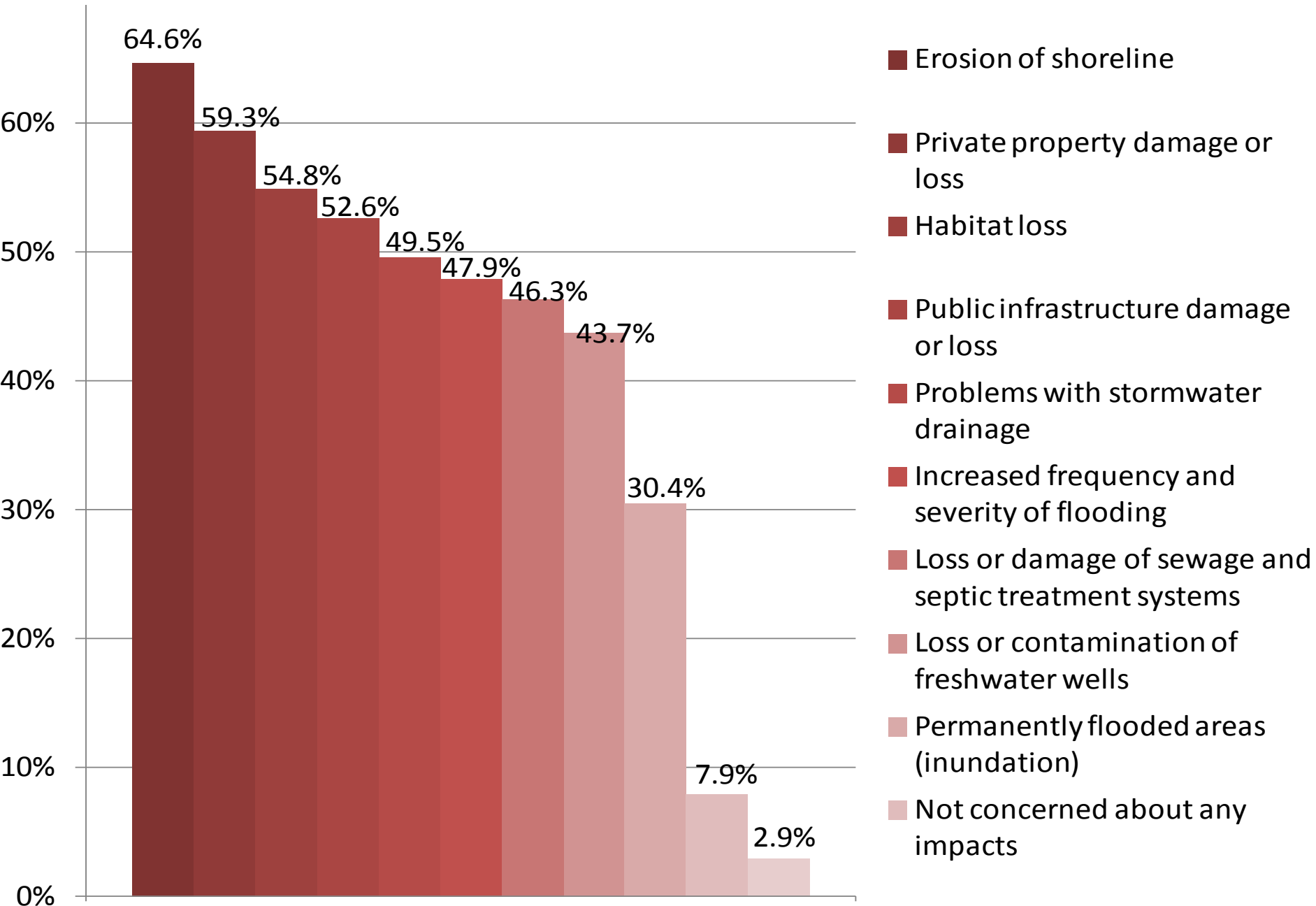


In your opinion, has coastal flooding become more or less of a problem in the county in recent years? *n=376*



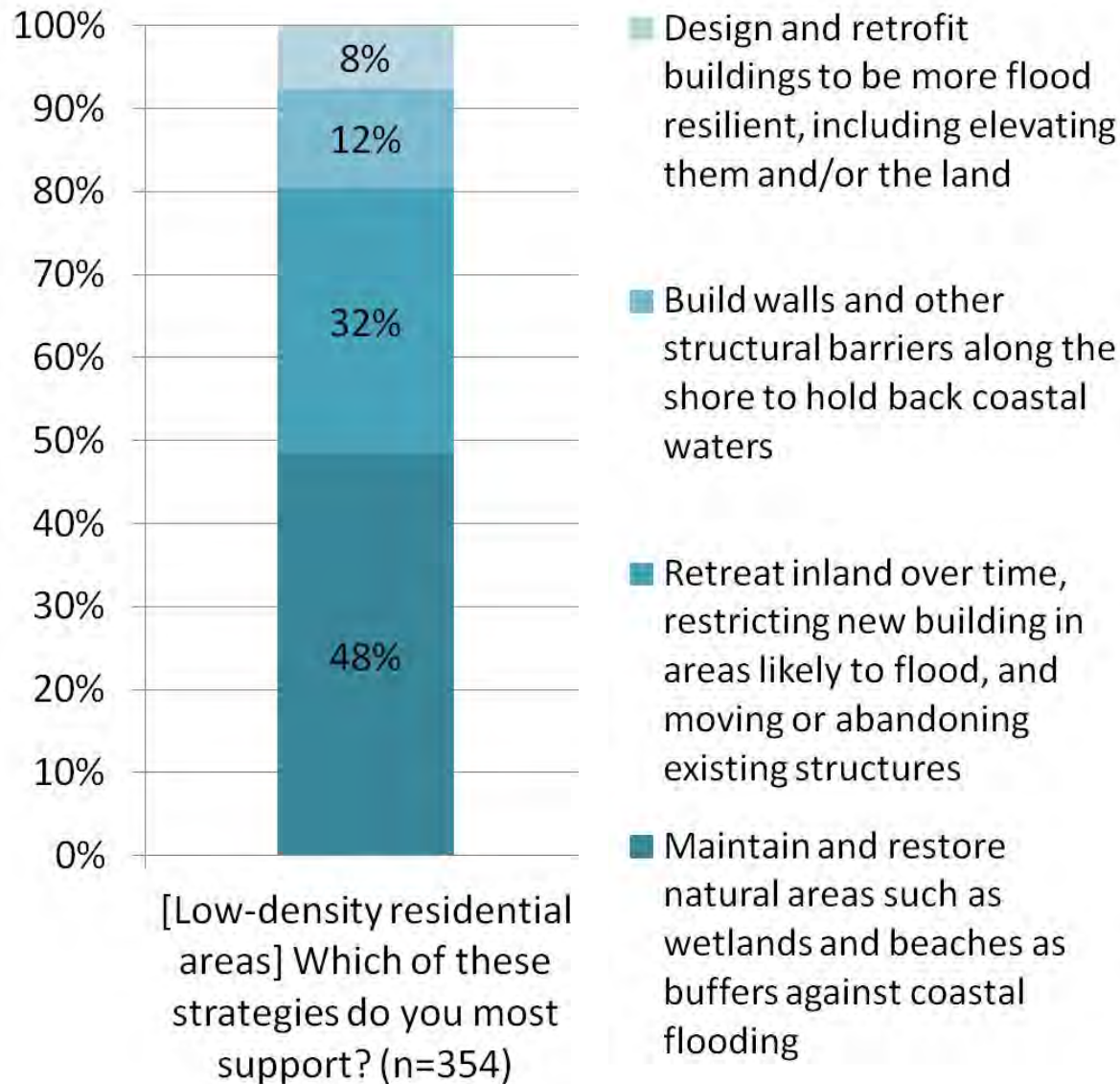
**Problem recognition**

# Which impacts from sea-level rise, if any, are you most concerned about within the county? *n=378* *Multiple responses accepted*



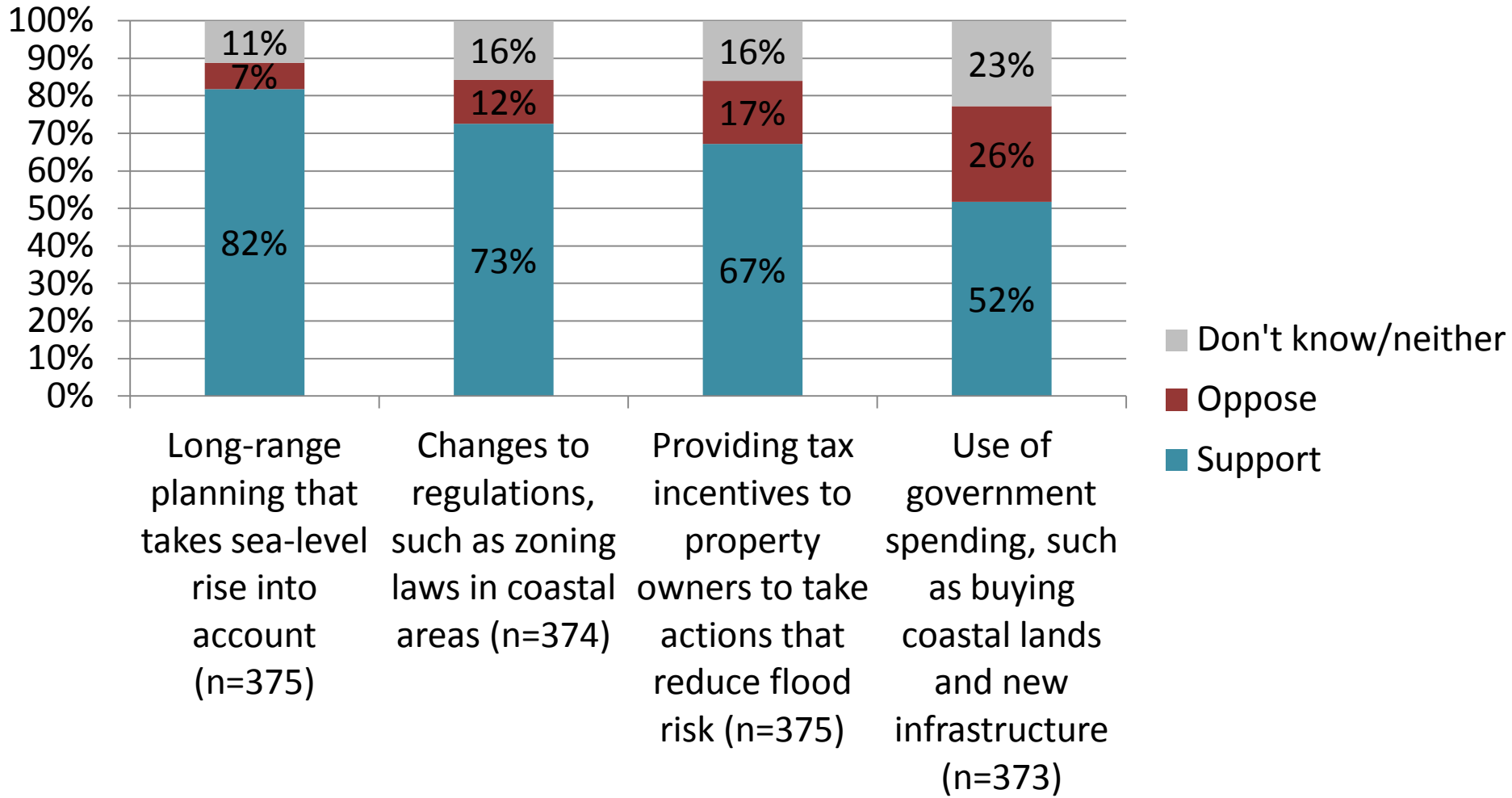


## Policy preferences for built areas



**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?



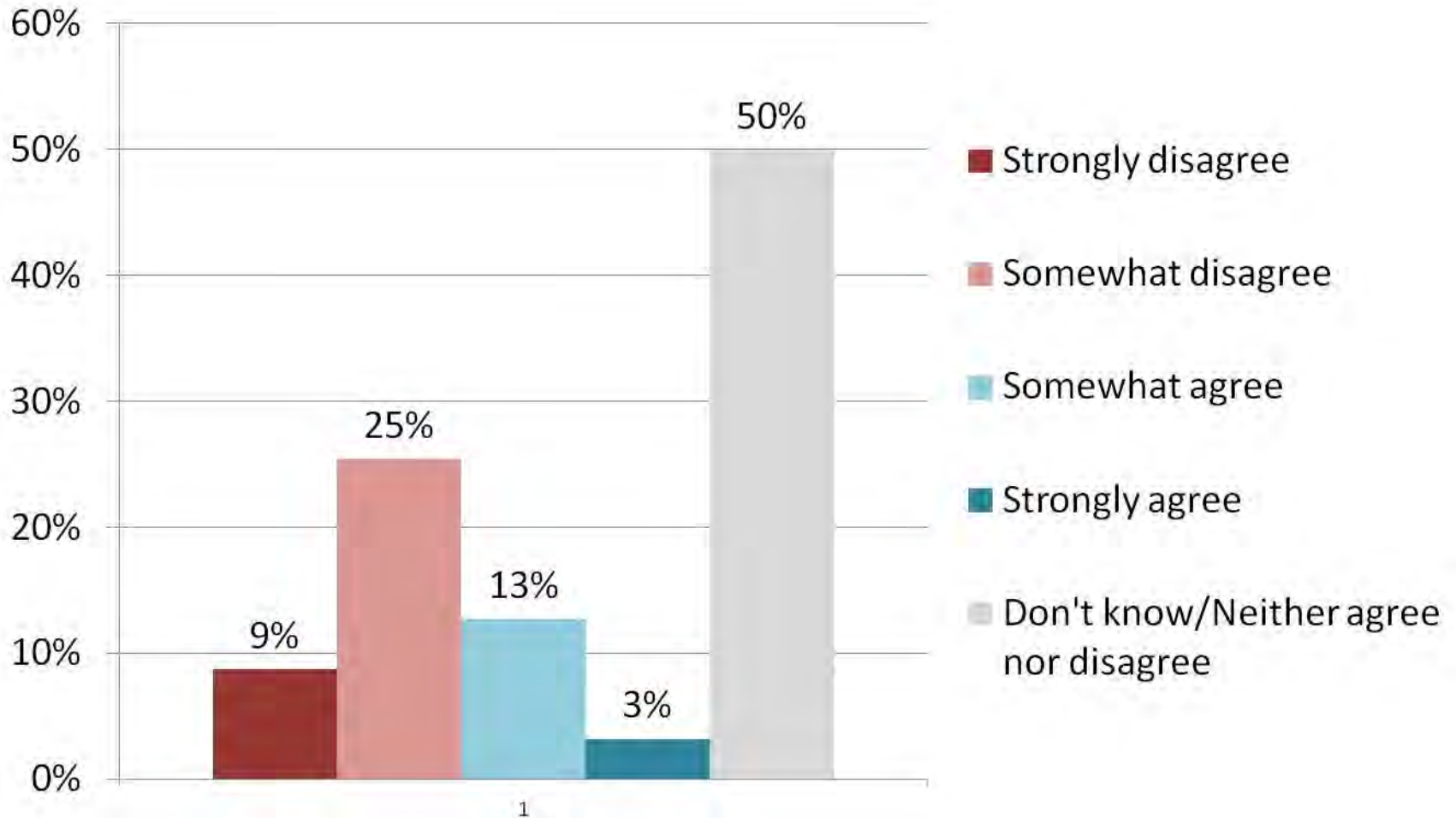
**Majority support for multiple types of policy mechanisms, including government spending**



# Bad News

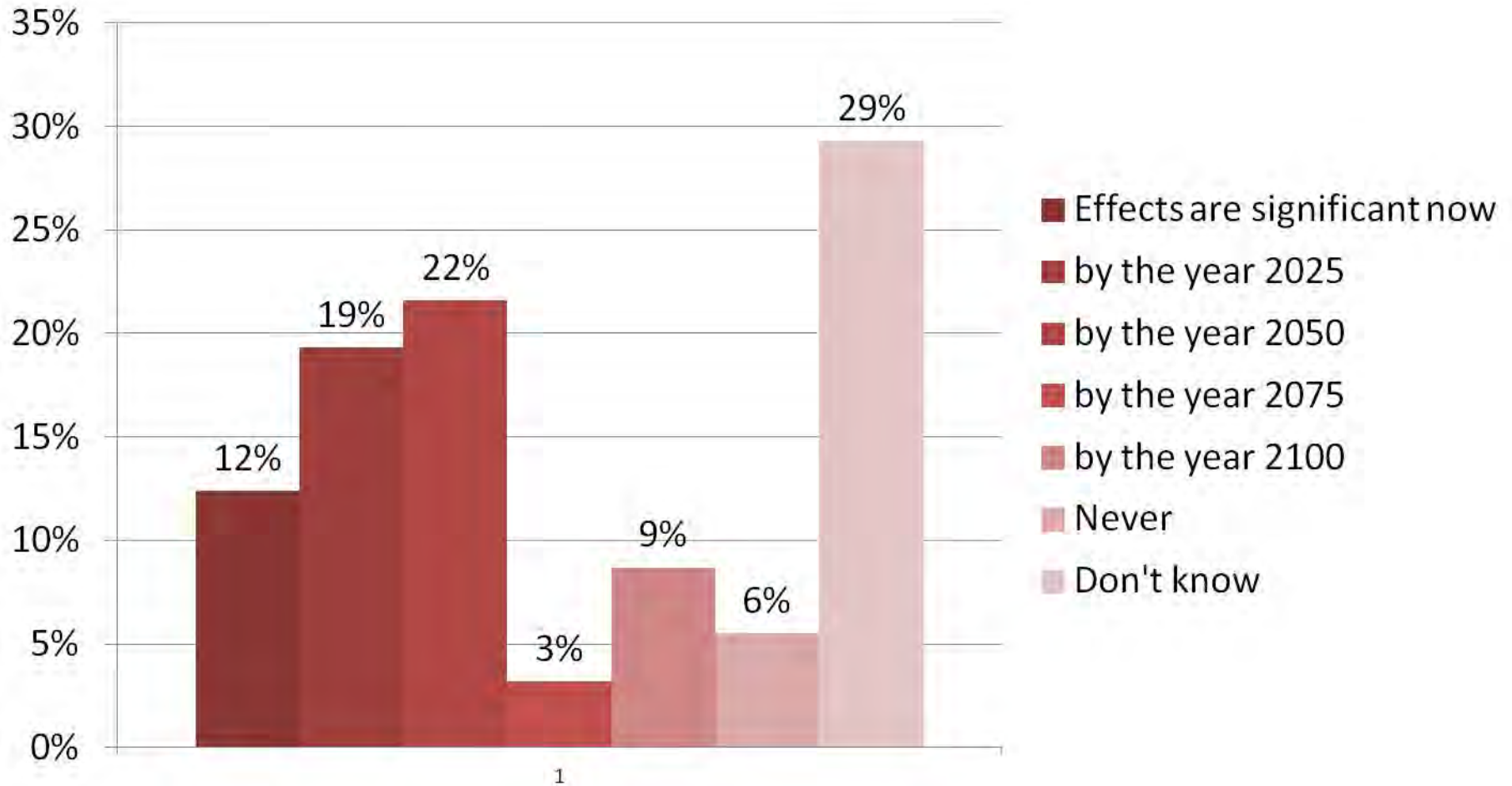


Would you agree or disagree that your local government's policies are adequate for addressing coastal flooding over the long term (e.g., over a decade or more)? *n*=376



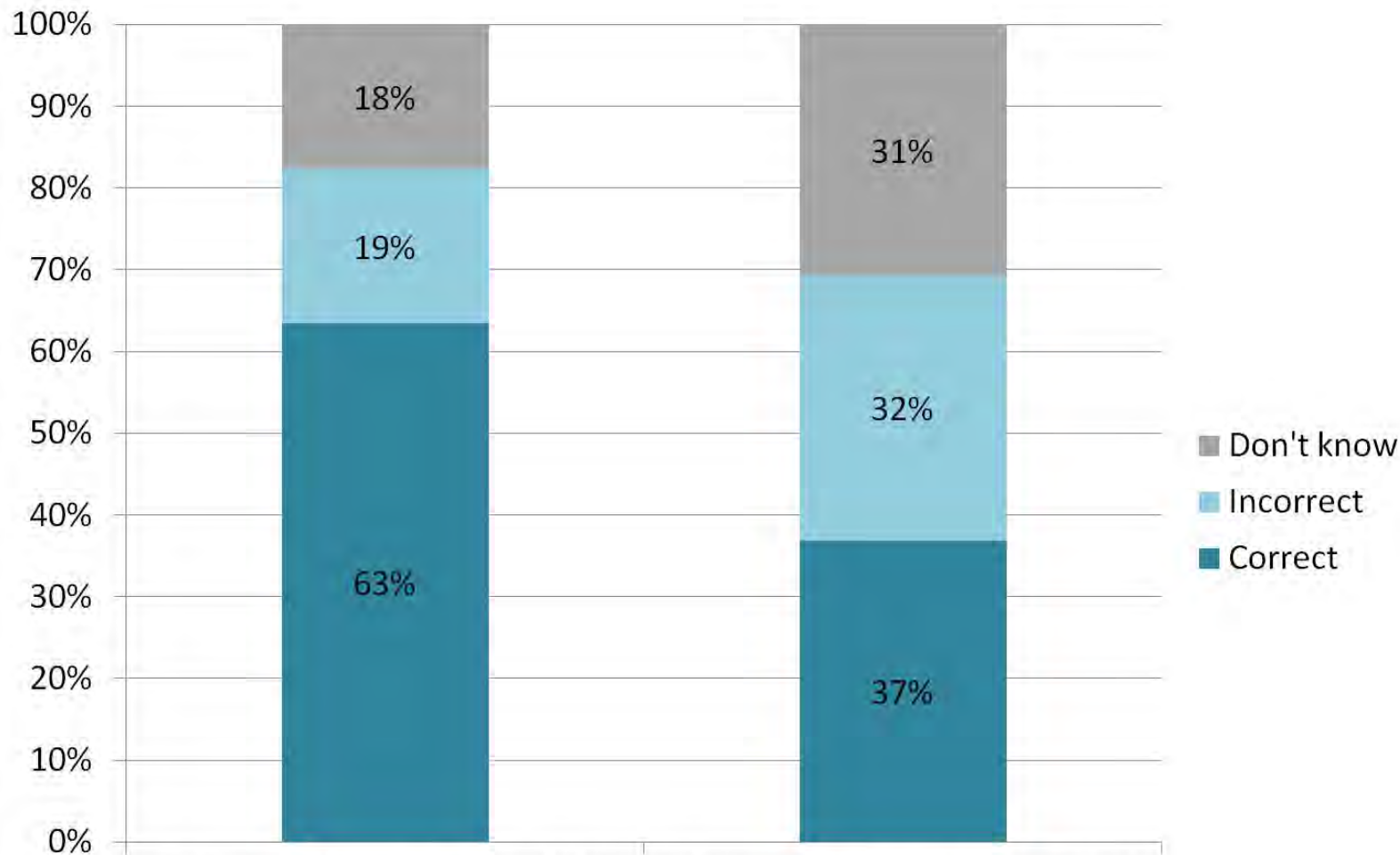
**Uncertainty about whether policies are adequate**

When do you believe the effects of sea-level rise will significantly impact the county, if ever? *n=377*



**Uncertainty about timing of impacts**

## Knowledge about Sea-Level Rise



d. Climate change is one of the causes of observed changes in sea-level rise. [TRUE] (n=372)

e. Current sea-level rise is entirely the result of natural cyclical processes. [FALSE] (n=374)

**Majority think SLR caused by climate change, but almost half of those think it is also “natural”**



# The opposing tribes

GRID

*Hierarchist*

Hierarchical Communitarianism

*Communitarian*

**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*

*Egalitarian*

**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*

GROUP

*Individualist*

Egalitarian Individualism



# What influences public perceptions of SLR risk and policy support?



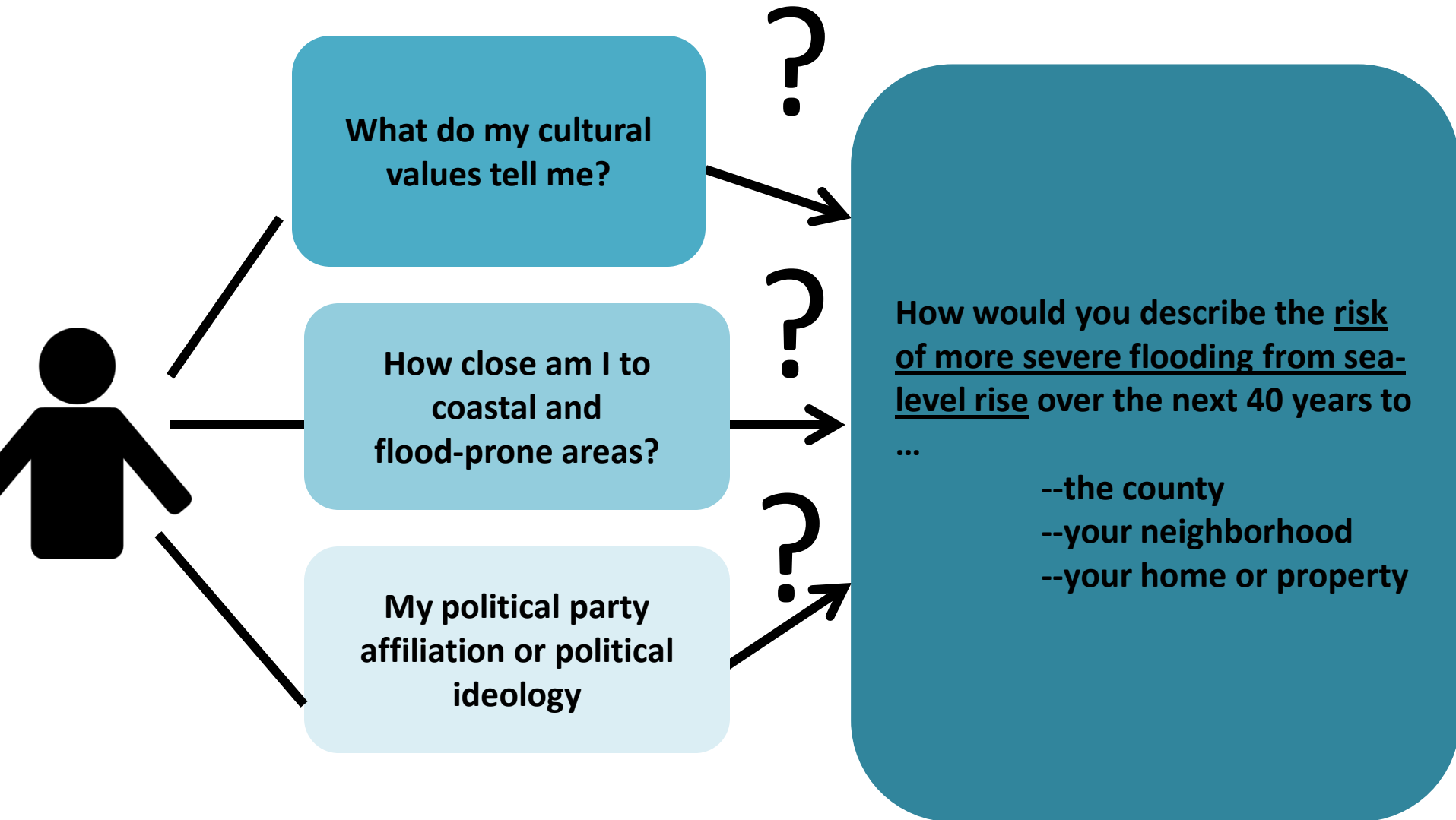
**“Tribal” beliefs?**



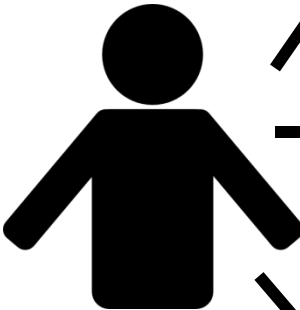


**or proximity to risk?**

# Significant factors in relation to SLR risk perception ...



# 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 house to coastal and flood-prone areas?

**county**



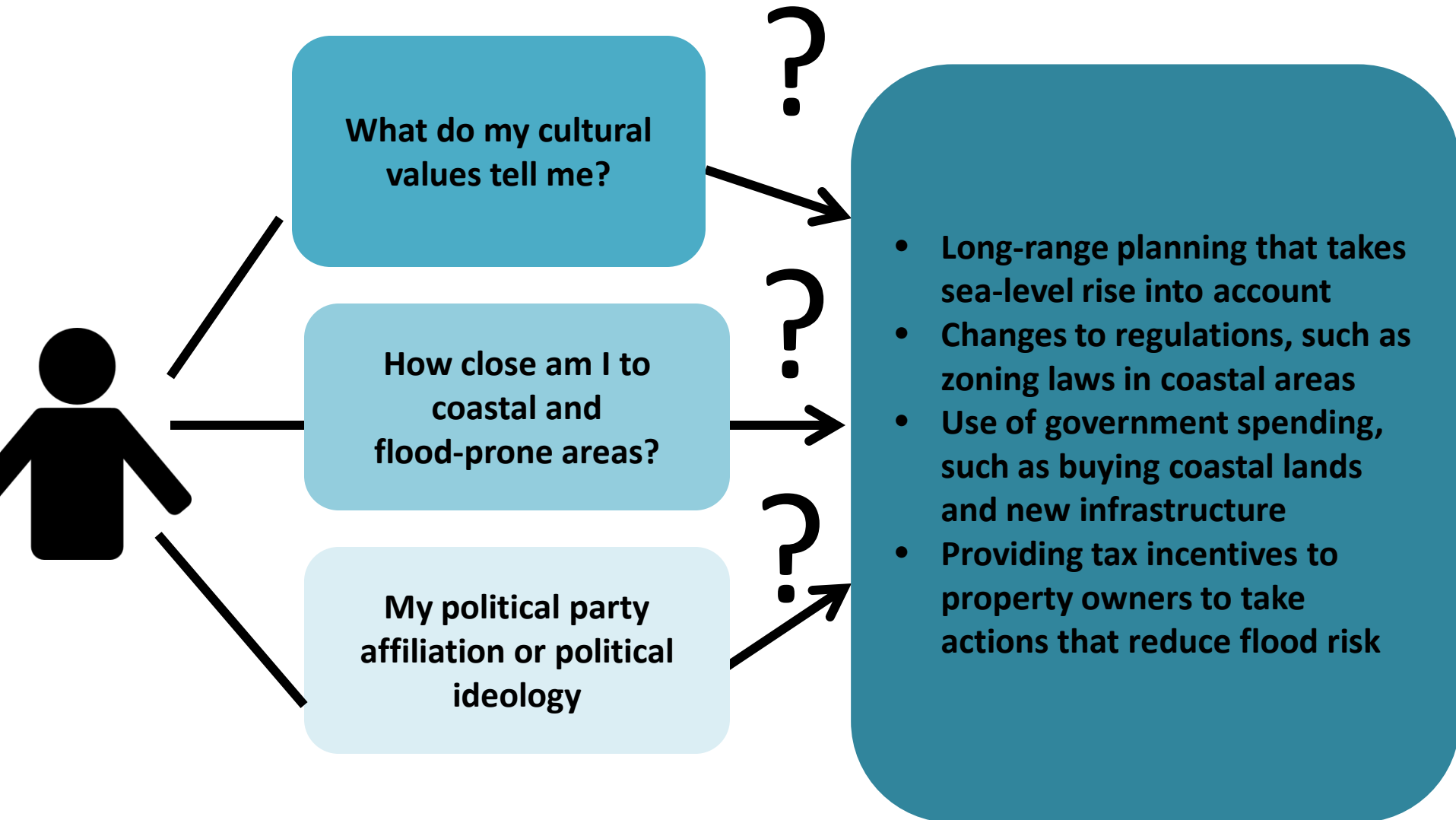
**neighborhood**



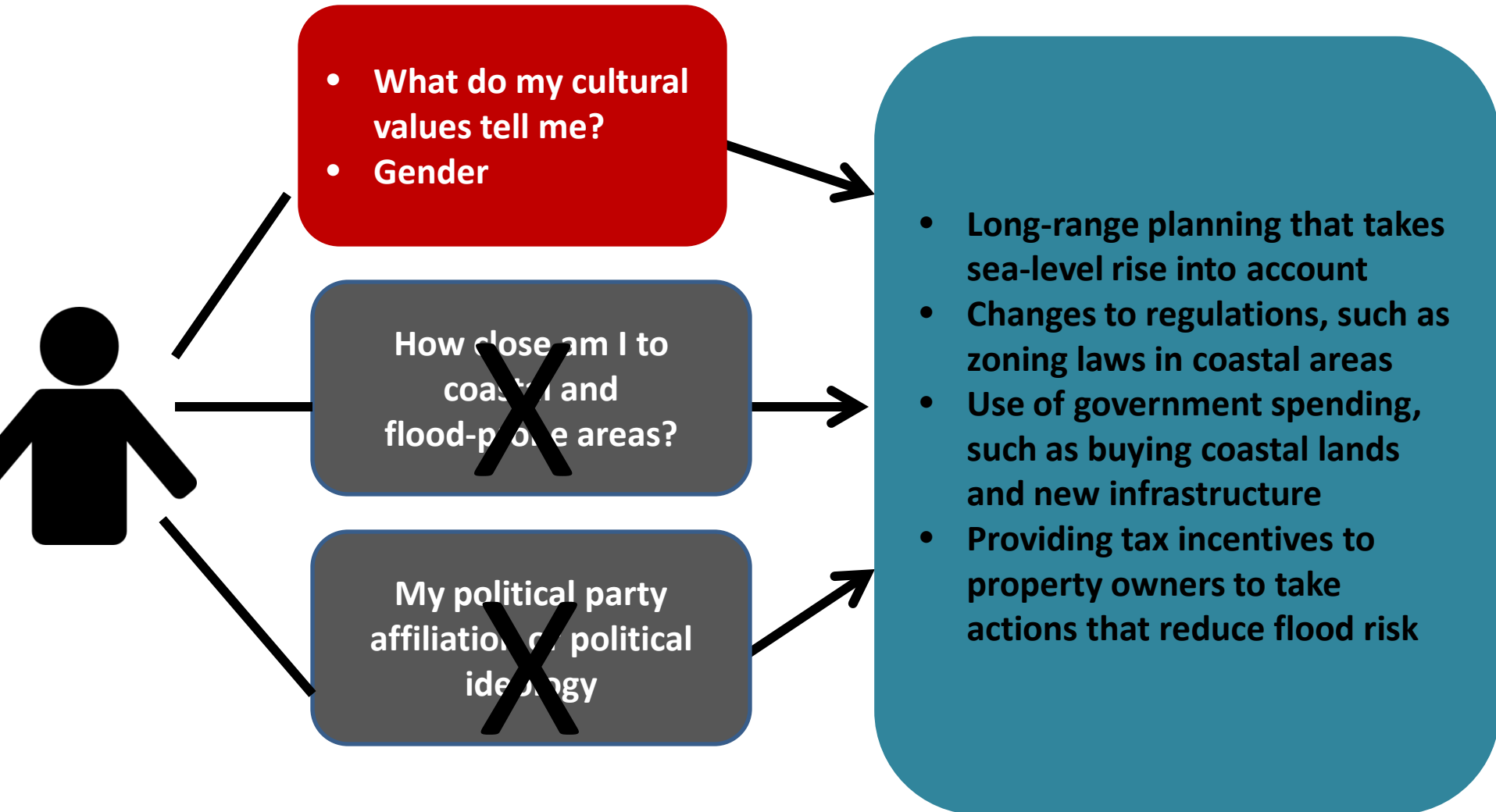
**own home**



# ***Significant factors in relation to policy support ...***



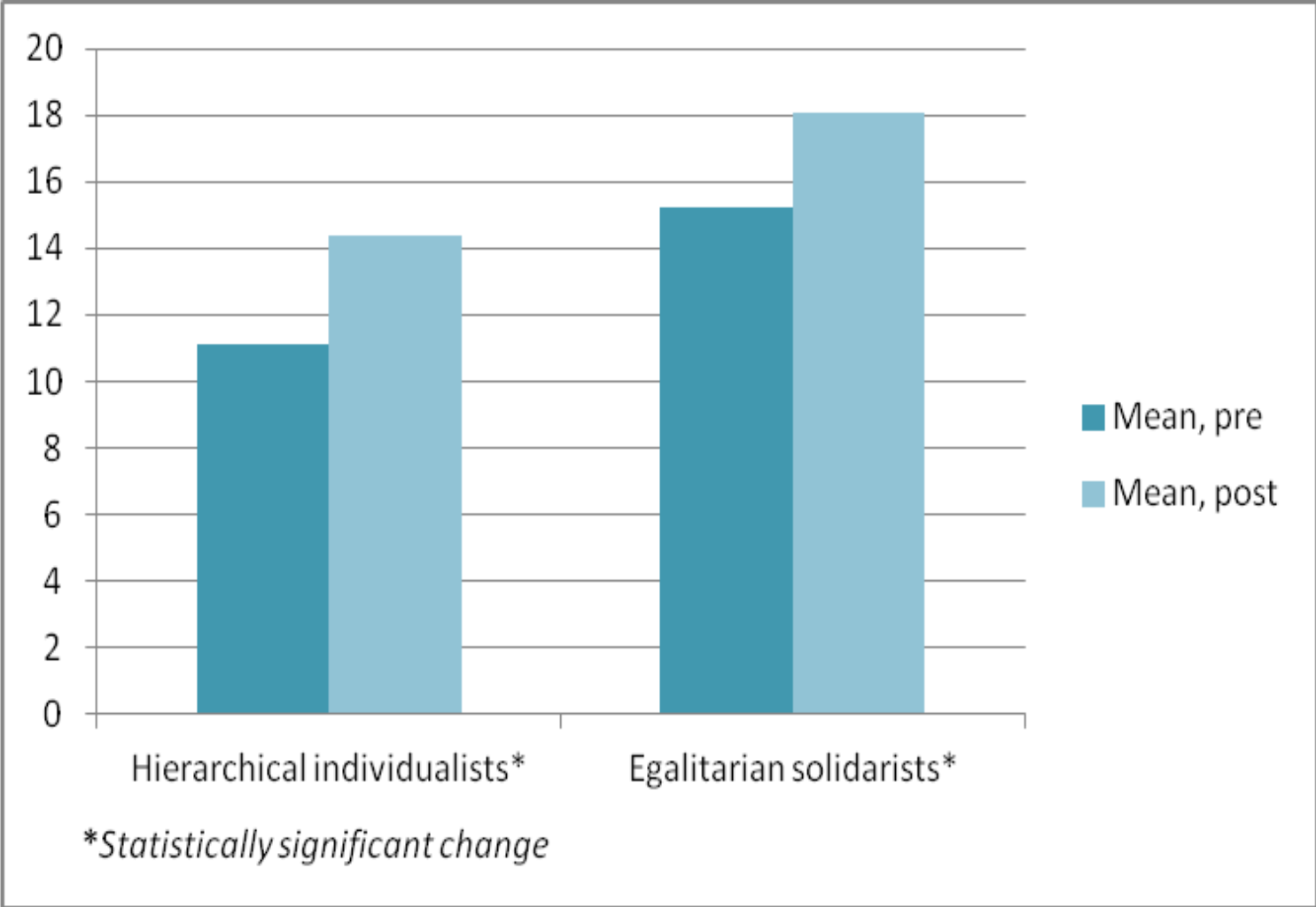
# Significant factors in relation to policy support ...



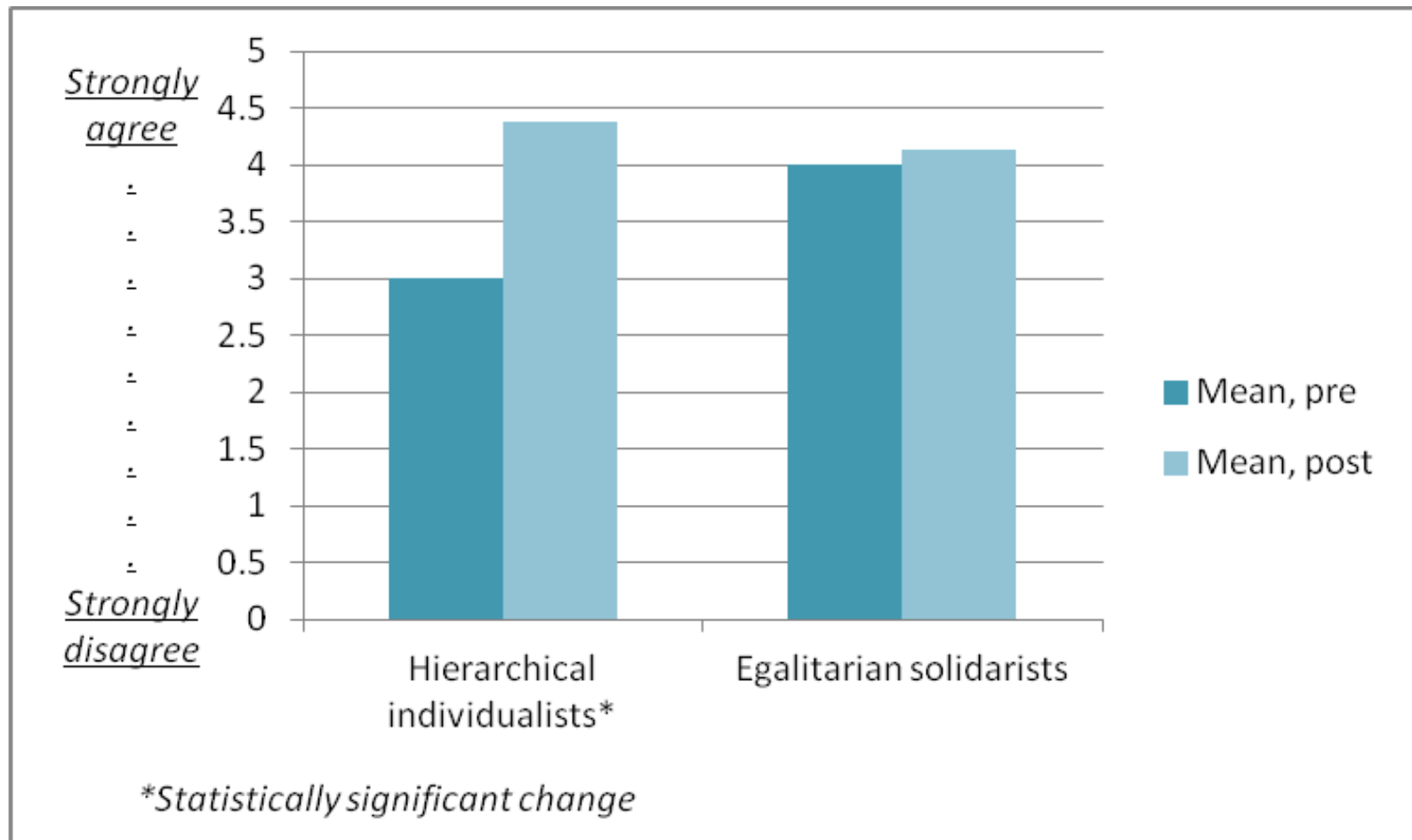
An aerial photograph of a vast, dark blue ocean with white-capped waves. The water is textured with small, rhythmic ripples and larger, more pronounced waves. The overall tone is a deep, rich blue, with the white foam of the waves providing a stark contrast. The perspective is from directly above, looking down at the sea.

# 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).

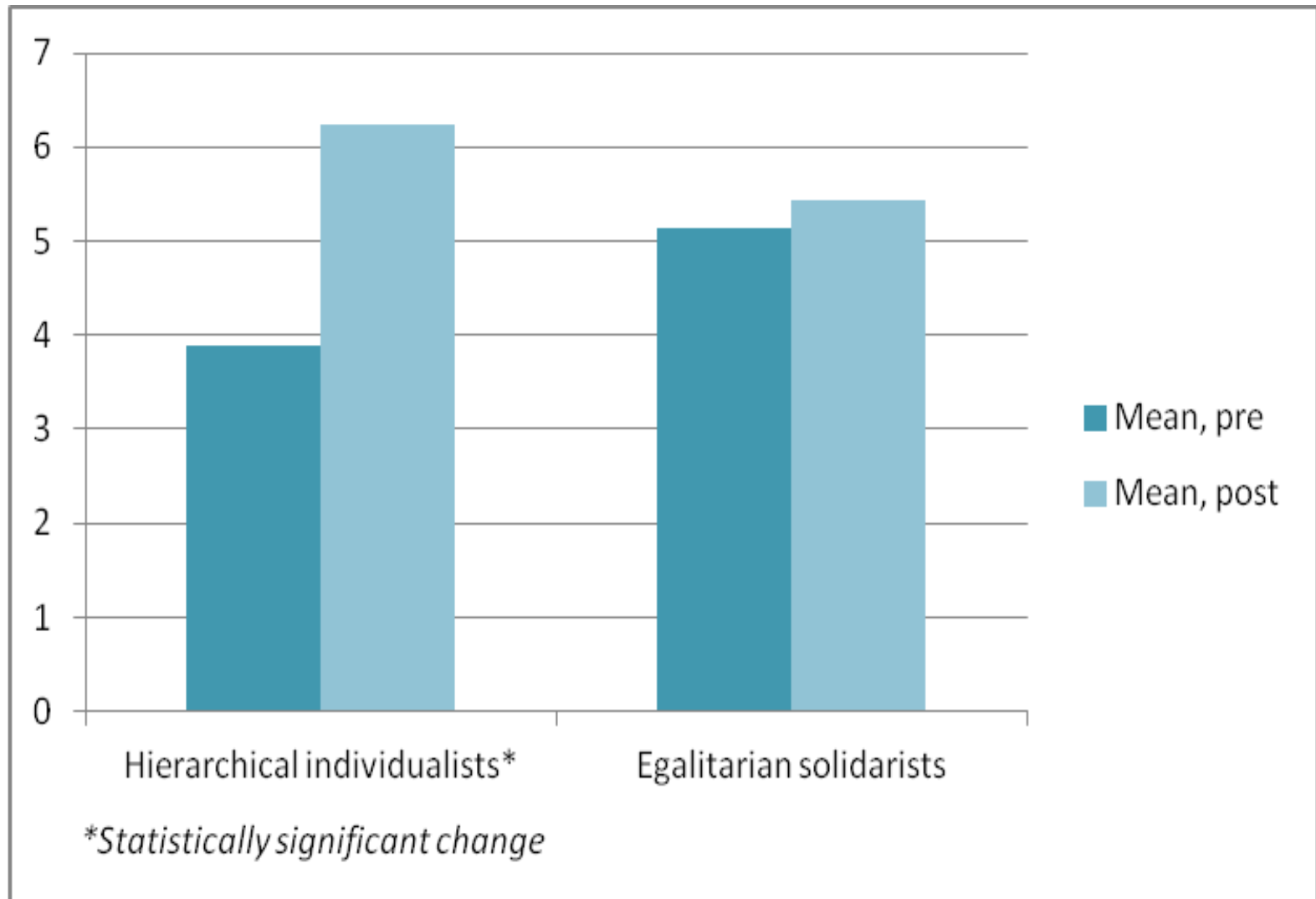


**Change in means on sea-level rise beliefs.** “Sea-level rise is an issue some coastal communities have been discussing recently. Sea-level rise refers to increases in the average height of water relative to the land over the course of the year. What do you think? Do you agree or disagree that sea-level rise is occurring?” Hierarchical individualists (n=8); egalitarian solidarists (n=14).





**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).



# Summary



- 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”


An aerial photograph of a vast ocean with numerous small, white-capped waves. The water is a deep, dark blue, and the white foam of the waves is scattered across the surface, creating a textured appearance. The lighting is bright, highlighting the crests of the waves.

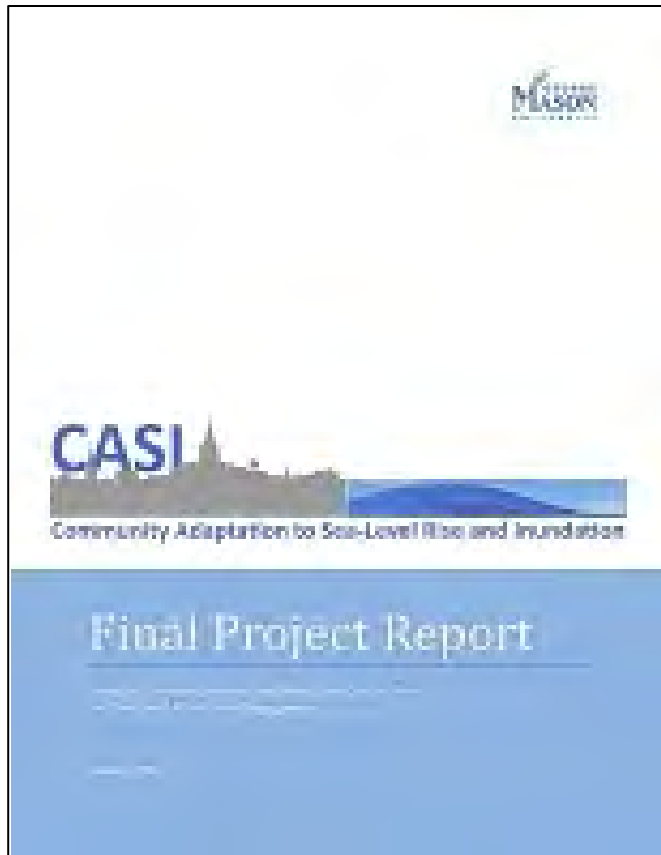
# Conclusions for Policy

**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](mailto:kakerlof@gmu.edu)



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Karen Akerlof, [kakerlof@gmu.edu](mailto:kakerlof@gmu.edu)



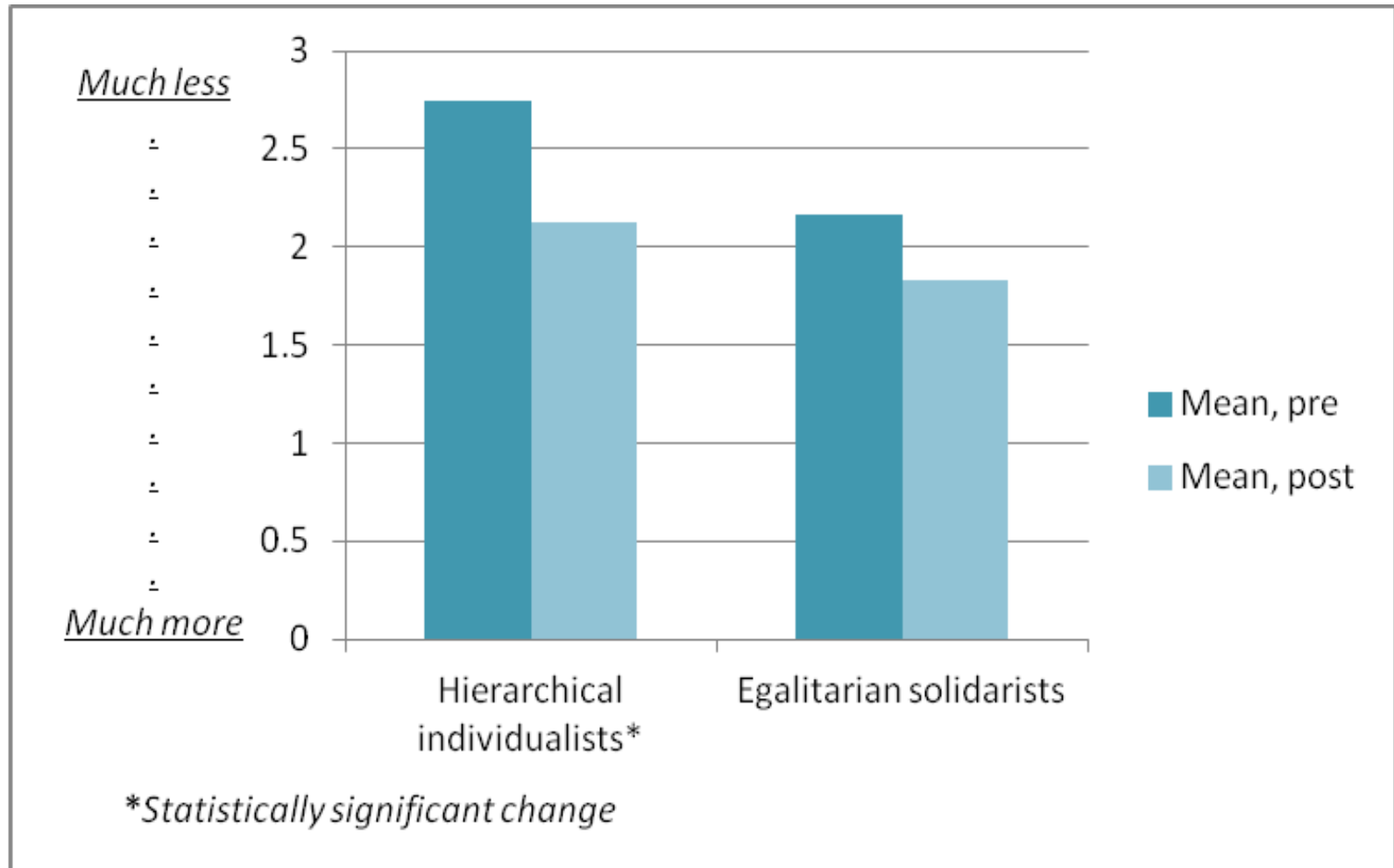
# Prediction of Sea-Level Rise Risk Perceptions at Different Geographic Scales

<i>DV=SLR Risks</i>			
<i>Standardized coefficients</i>	<b>County</b>	<b>Neighborhood</b>	<b>Own Home or Property</b>
<i>Gender</i>	.075	.052	.082
<i>Age</i>	.033	-.090*	-.080
<i>Education</i>	-.020	.002	-.023
<i>Income</i>	.031	-.091	-.069
<i>White</i> <i>(v. Black)</i>	.020	-.004	-.083
<i>Non-white</i> <i>(v. Black)</i>	-.032	-.044	-.086
<i>Risk Proximity</i>	-.035	-.382***	-.319***
<i>Democrat</i> <i>(v. Othr/ Indepen)</i>	-.062	.033	.012
<i>Republican</i> <i>(v. Othr/ Indepen)</i>	-.007	.004	-.024
<i>Political Ideology</i>	-.049	.061	.071
<i>Hierarchy Scale</i>	-.272***	-.180**	-.155**
<i>Individualism Scale</i>	-.228***	-.227***	-.186***
<i>Hierarchy x Individualism</i>	-.045	-.025	-.046
<b>Model explains X% of individuals' risk perceptions ....</b>	<b>29%</b>	<b>29%</b>	<b>23%</b>

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),  $p=0.315$ .

