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Seeing the Future: Here-Now-Us and the Use of Visualization in Community Engagement in Marin County, California

Susanne C. Moser, Ph.D.

Susanne Moser Research & Consulting and Stanford
University

and

Cara Pike

Climate Access

THANK YOU!



FEMA



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Outline

- The Study Context
- Key Research Questions, Owl Visualizations & Research Design
- Findings
- Conclusions





THE STUDY CONTEXT

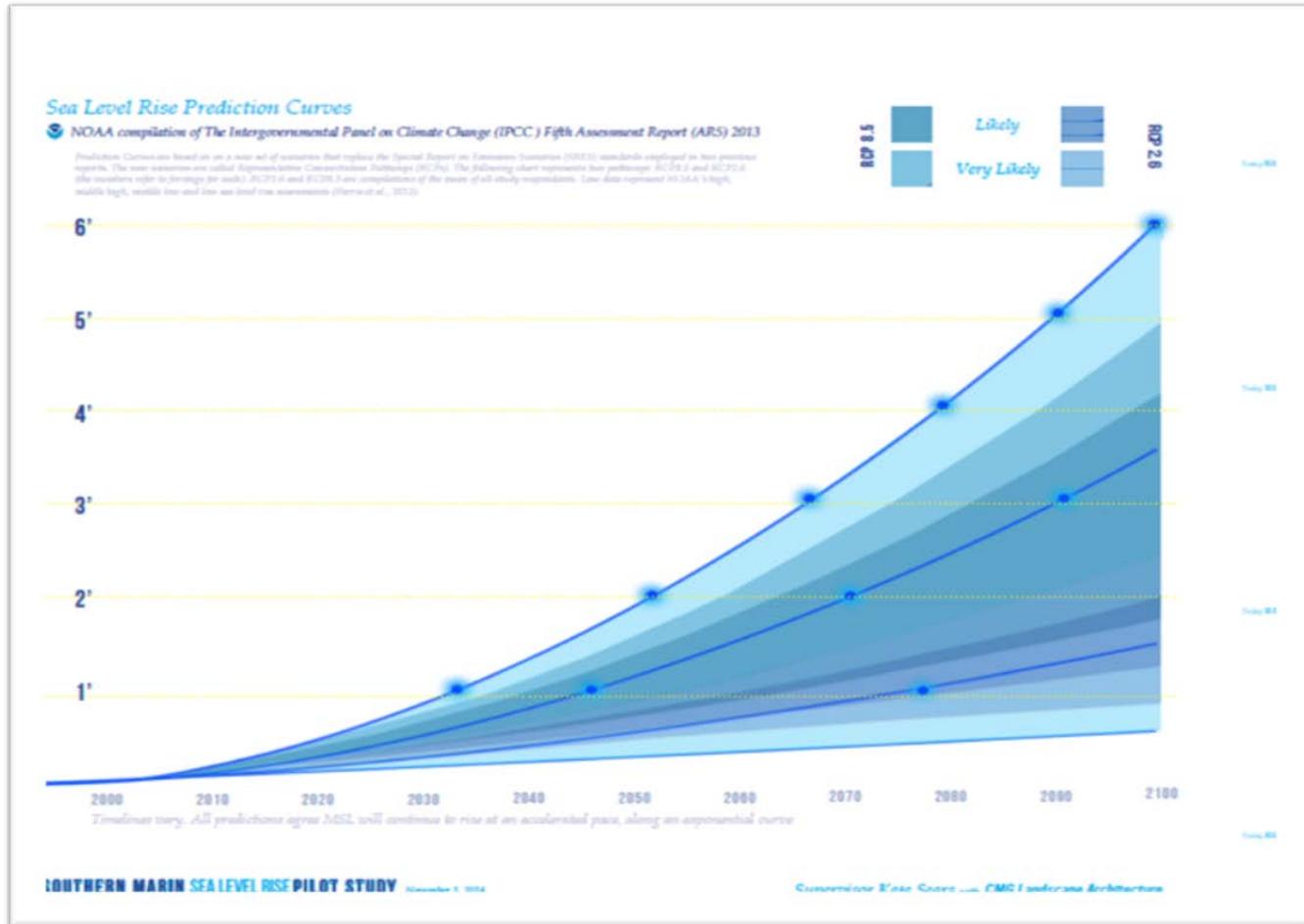


Already
experienced
nuisance flooding



Current Levels of Flooding:
King Tides, 2+ /year, causing disruption

Clear climate change threat



Potential Future Sea-level Rise 16-55" by 2100



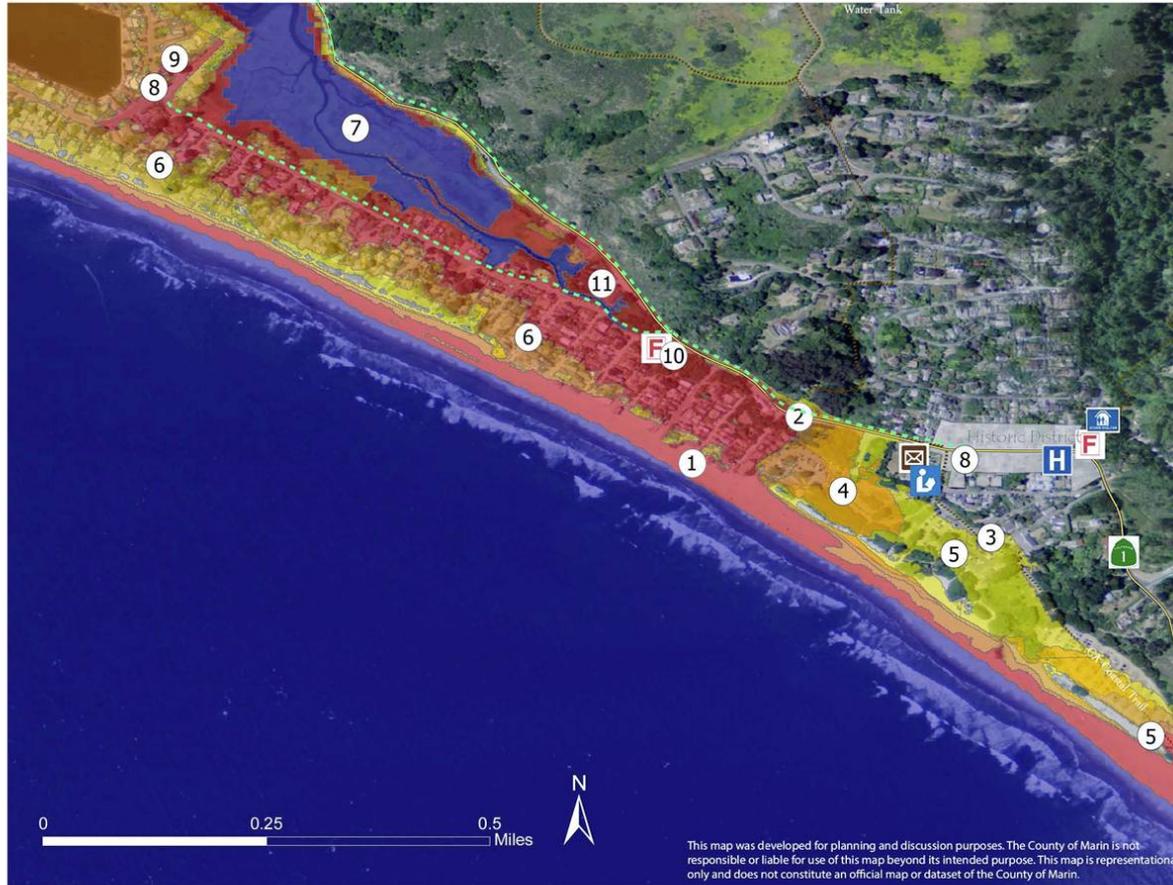
King Tide (1ft) in Mill Valley



3' of Sea-Level Rise in Mill Valley

Marin County government actively planning

Stinson Beach



Exposed Assets

- ① Stinson Beach
- ② State Highway 1
- ③ California Coastal Trail
- ④ Picnic Area
- ⑤ Stinson Beach Parking Lots
- ⑥ Commercial/Residential Development
- ⑦ Bolinas Lagoon
- ⑧ Tsunami Evacuation Route
- ⑨ Emergency Generator
- ⑩ Fire Station
- ⑪ Water District Office

Additional Natural Resources include Steelhead Trout habitat, Harbor Seal Haul Outs, Brown Pelican Roosting Sites, Wetlands

Sea Level Rise (SLR) Scenarios

- Baseline No SLR/ No Storm
- 25 cm (0'10") SLR w/ Annual Storm
- 25 cm (0'10") SLR w/ 20 year Storm
- 50 cm (1'8") SLR w/ 20 year Storm
- 100 cm (3'3") SLR w/ 100 year Storm
- 200 cm (6'6") SLR w/ 100 year Storm

Properties Exposed

- 2
- 120
- 250
- 398
- 490

C-SMART - Collaborative:
Sea-level Adaptation Response Team

Marin County government actively planning



**Bay Waterfront Adaptation Vulnerability Evaluation
(BayWAVE)**

**Somewhat concerned
but not very engaged
public**



**An engaged political
leader**



KEY RESEARCH QUESTIONS, OWL VISUALIZATIONS & RESEARCH DESIGN

The Key Research Questions

- Can we raise people's concern about sea-level rise by visualizing the threat in situ?
- Can we move the concerned population to become engaged in adaptation effort?
 - Direct action
 - Web engagement
 - Community dialogue
- What are the larger lessons for the role of visualization in climate engagement?

The Owl Experiment

- Current flood risk
 - Increased flood risk due to SLR
 - 2 potential adaptation options
-
- June-September 2015
 - Installation on busy bike-/walking path
 - Media event at launch
 - Repeated email outreach, media

A Glimpse of the Future



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Surroundings



Current dry conditions

First scenario seen in Owl



Current King Tide conditions

First
adaptation option



Virtual Seawall Option

Second
adaptation option



Virtual Ecoberm Option

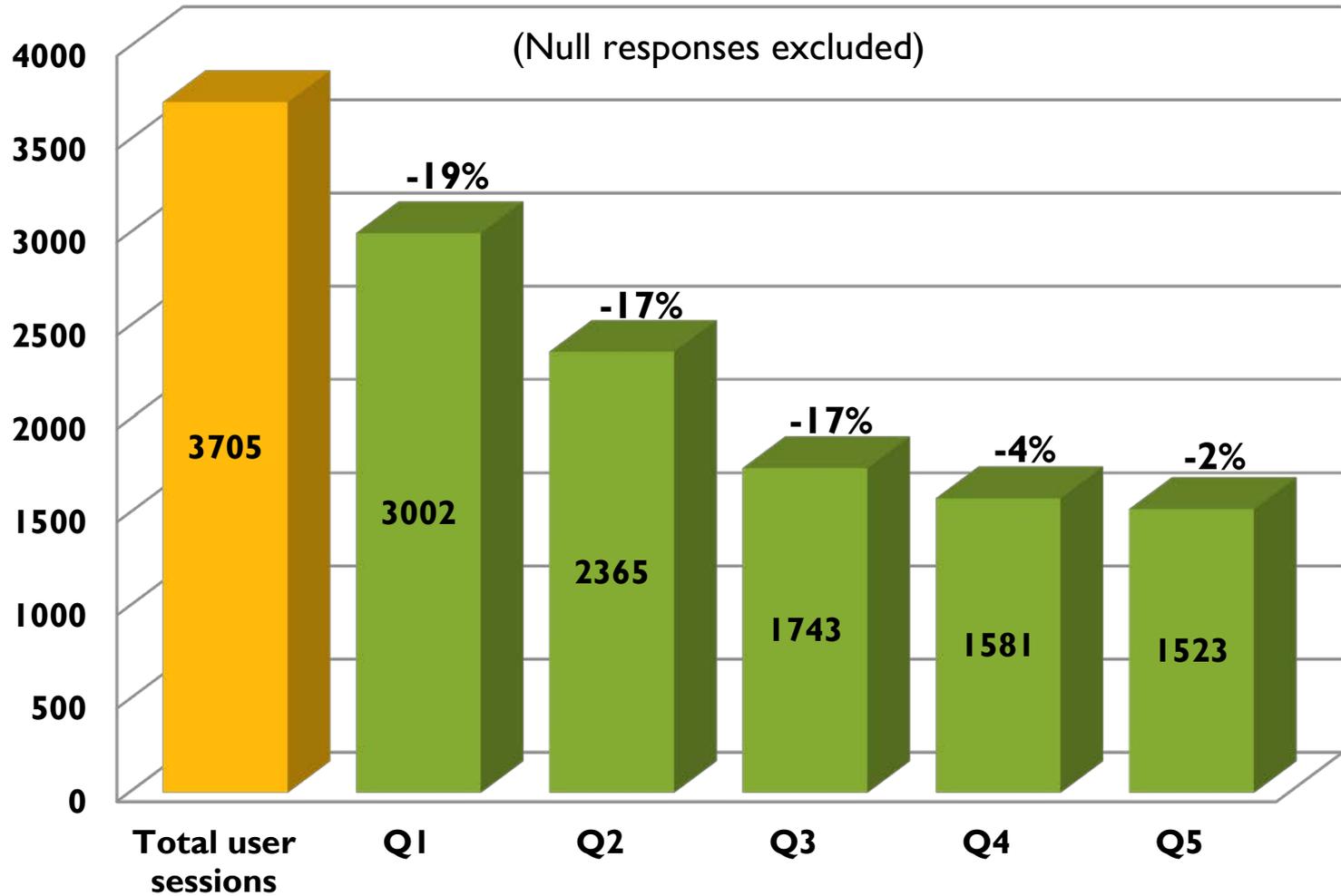
Research Design: Multi-method

- Owl- based survey:
 - 5 simple questions
 - Before and after concern
 - Interest in type of adaptation options
 - Interest in community engagement
 - Age group
- Audio recordings at Owl
- Owl user observation
- Sister web page
 - Survey
 - Online actions
- Facilitated community dialogue
 - Participant observation
 - Exit survey



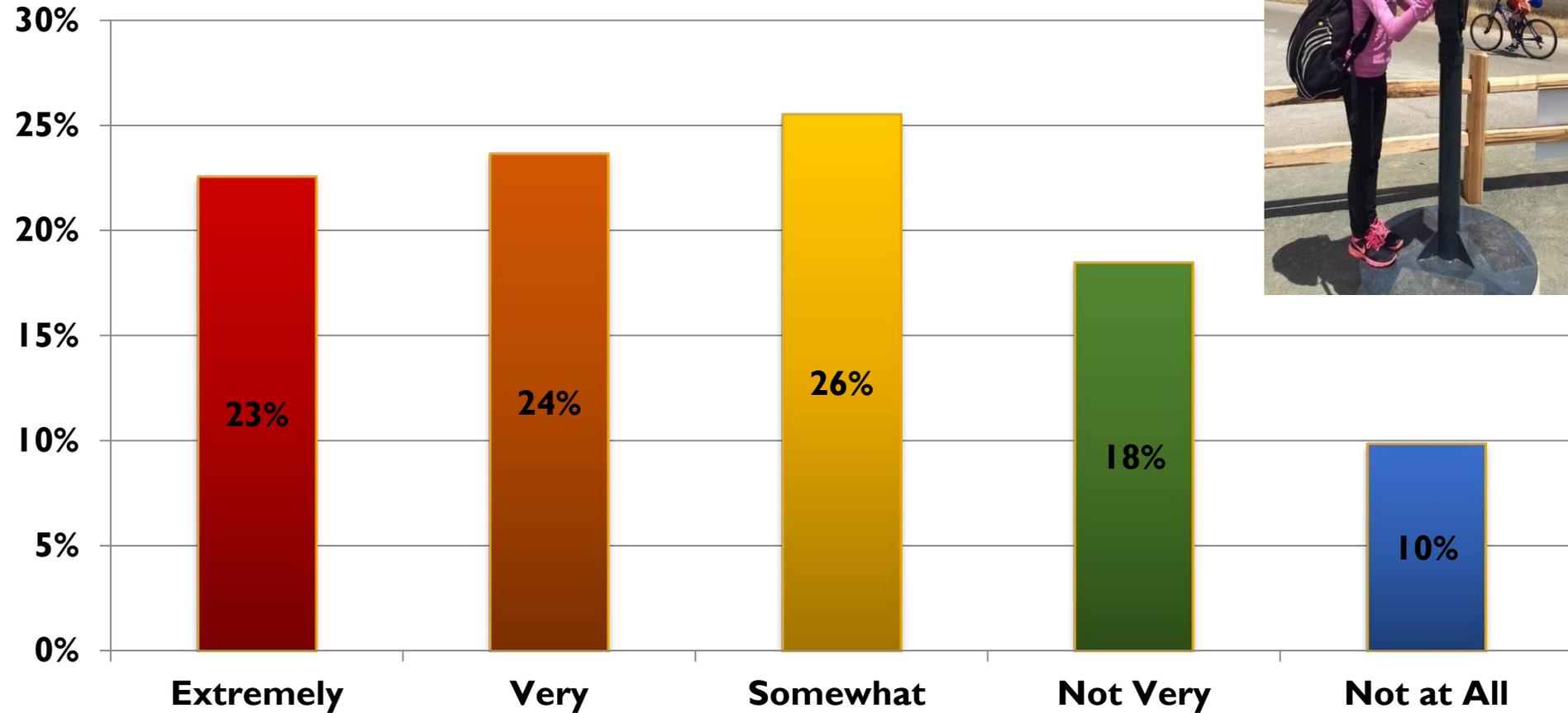
FINDINGS

Total User Sessions vs. Survey Responses (June 9 – September 21, 2015)



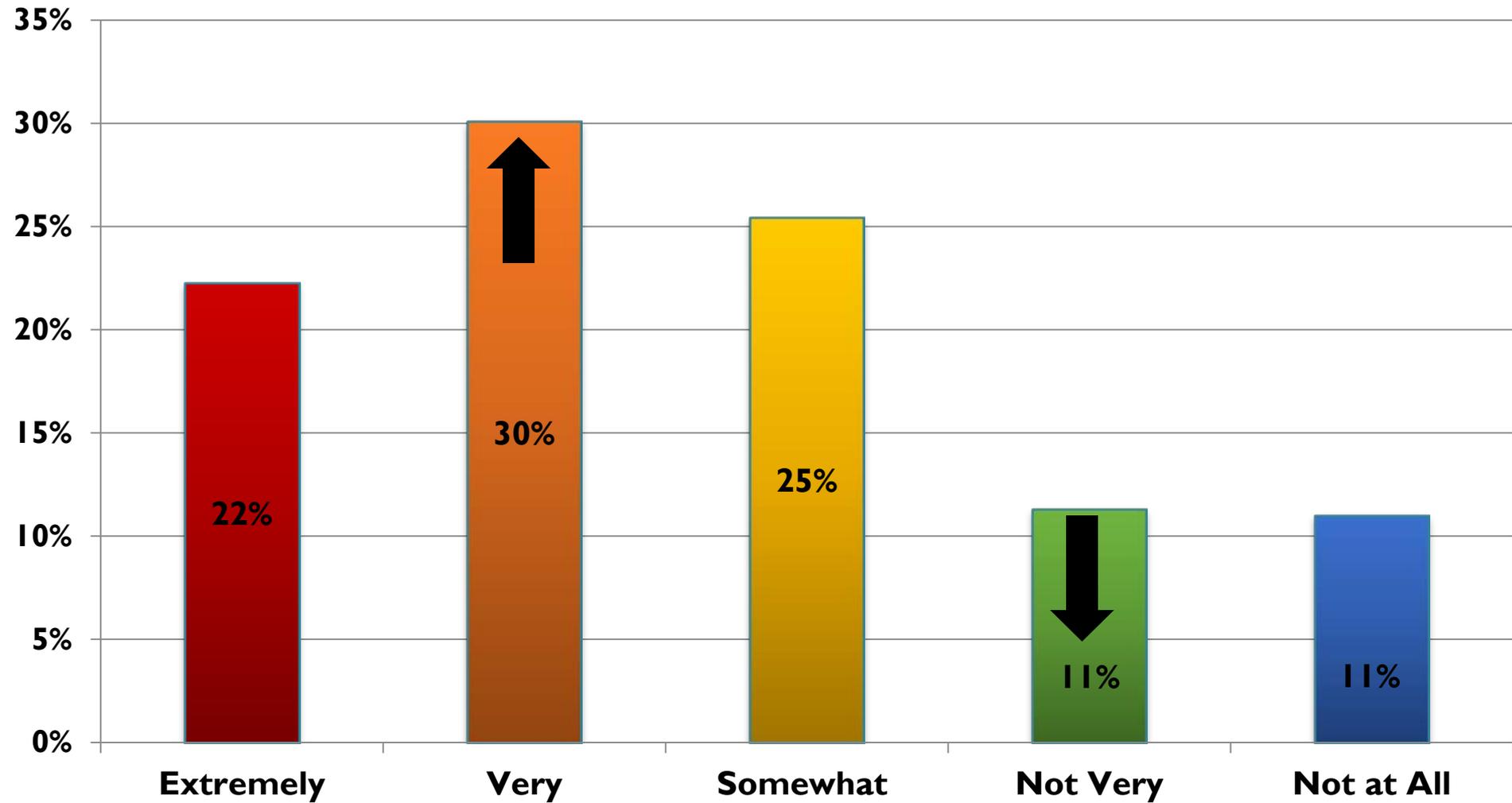
WHAT WE LEARNED

Level of Concern about Current Flood Risk (No null answers)



WHAT WE LEARNED

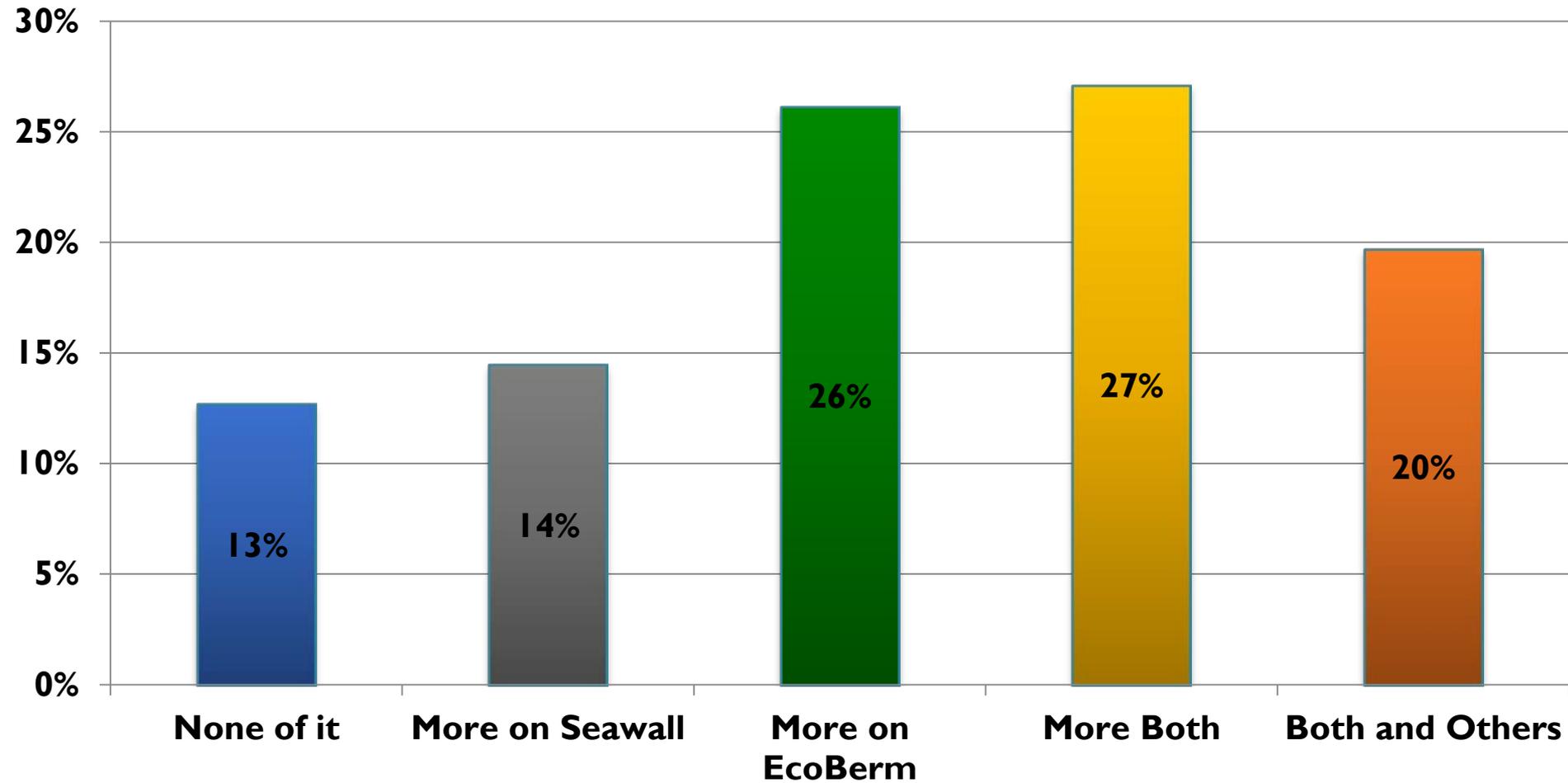
Level of Concern about Future Inundation Risk (No null answers)



Better Insights from Statistical Tests

- Examine pairs of responses where users answers both Q1 and Q2
- 2 tests: Paired T and Wilcoxon Matched Pairs
- Observed changes in concern:
 - “Not at all” and “Not very” – highly significant change toward higher concern (avg. 2 levels)
 - Coming in with higher pre-concern level:
 - More likely to stay at same level
 - Some move to higher concern
 - Very few lower their concern

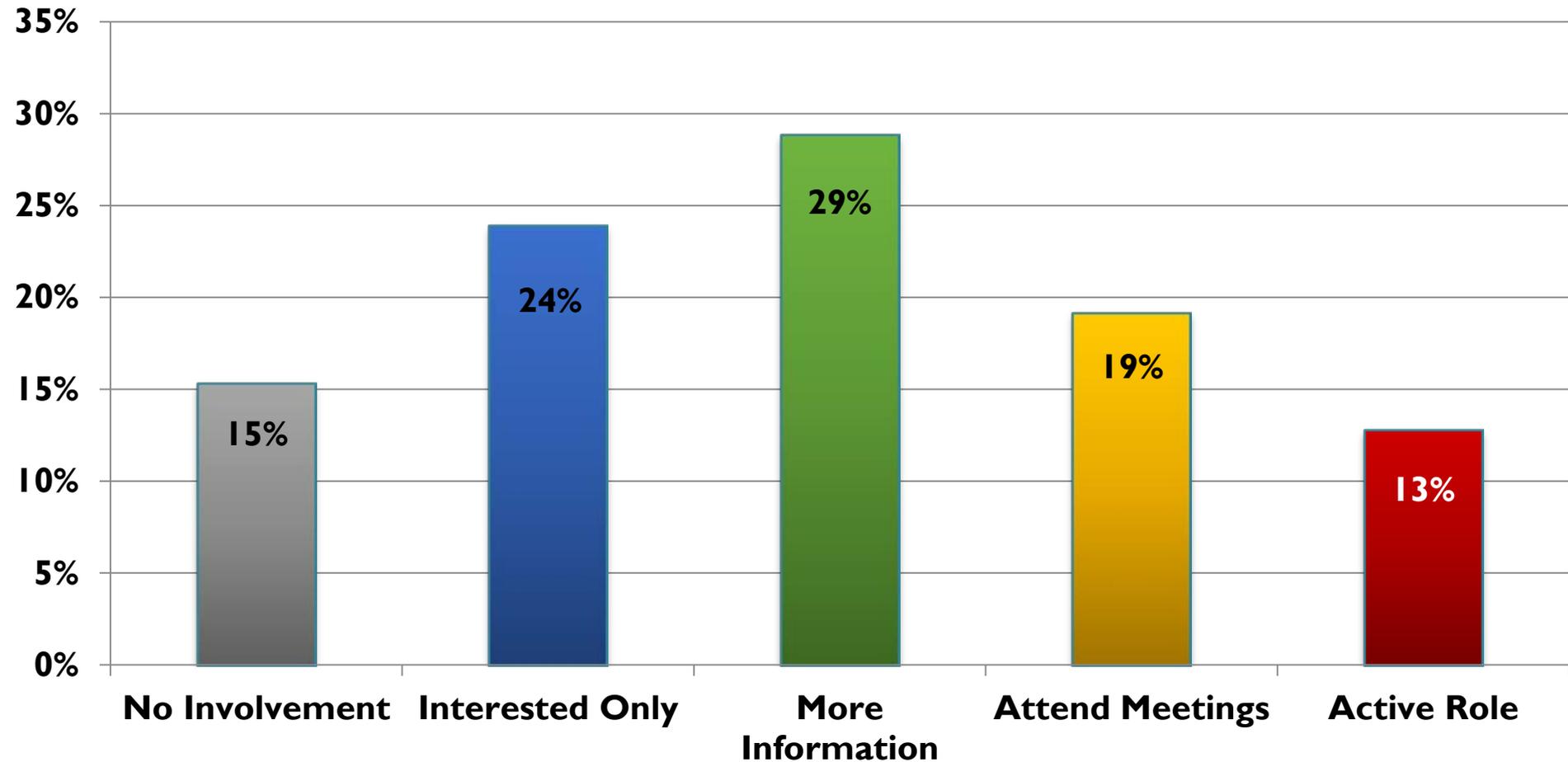
Desire for More Information about Different Adaptation Options (no null answers)



WHAT WE LEARNED

Desired Level of Engagement in Adaptation Process

(No null answers)



WHAT WE LEARNED

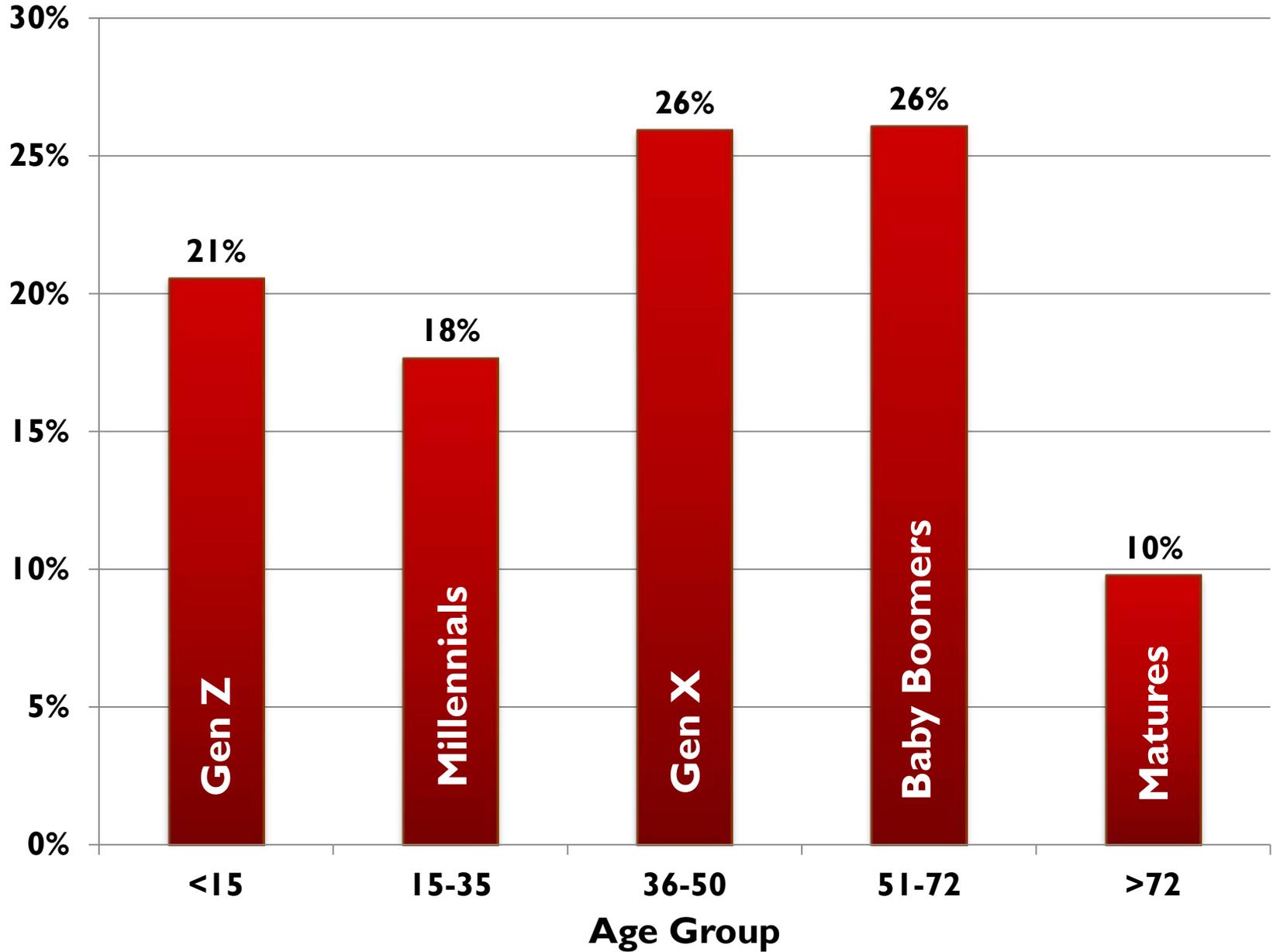
More Insights from Statistical Tests

- Chi Square test of pre- and post-LOC and engagement:
 - The higher the LOC, the higher the desired level of engagement
 - “Not at all” also more engaged
- Change in LOC is strongly correlated with greater level of engagement
 - The greater the CiC in positive direction, the greater the desire to get more engaged

WHAT WE LEARNED

Age Distribution of Owl Users

(No null answers)



Concern & Engagement across the Ages?

- **CONCERN**

- Two youngest and the oldest generation are most concerned (% of “extremely” and “very” concerned)
- Two older age groups have greatest % of “not at all” concerned
- Majorities in all age groups are “somewhat” or “not very” concerned
- Older people show greater increase in concern seeing SLR scenario

- **ADAPTATION INTEREST**

- Youngest most interested in seawall; oldest in all adaptation options

- **ENGAGEMENT**

- Age correlates with engagement
 - Youngest are the largest group that doesn't want to get engaged at all
 - Baby Boomers much more likely than anyone else to attend meeting
 - Matures 3-4 x more likely than others to take an active role
- More info and attending a meeting are two most likely options



CONCLUSIONS

Conclusions

- **Visualization works to raise concern**
 - Particularly among the least concerned and the oldest
- **Clear desire to be engaged among concerned**
 - Those who come in with high concern or increase their concern express a greater desire to be engaged
- **Levels of engagement are generally low,**
 - but higher among the older
- **Potential for moving people to action remains uncertain**
 - Will be explored in follow-on study in San Mateo Co. and San Francisco.





THANK YOU!

For More Information:

Susanne Moser, Ph.D., Director
Susanne Moser Research & Consulting
promundi@susannemoser.com

Cara Pike, Executive Director
Climate Access
cara@climateaccess.org