

WHAT'S THE WORLD COMING TO?

using VR to imagine the future



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County of Marin, California

"COOL TOOLS FOR A WARMING WORLD SYMPOSIUM"

University of British Columbia, Vancouver

October 13, 2016



**Marin
County**

San Francisco



THE COST OF DOING NOTHING

1 meter SLR:
220,000 people at risk
\$49 Billion replacement
costs

1.4 meters SLR:
270,000 people at risk
\$62 Billion replacement
costs

Impacts of Sea Level Rise on the SF Bay Area

Source: "The Impacts of Sea Level Rise on the San Francisco Bay", a White Paper from the California Energy Commission's California Climate Change Center, dated July 2012.





Sorry, no miracles.





Preparing for Change Along Our Shore

Sea level rise is impacting us **HERE** in Marin County **NOW**, with more frequent and damaging floods. It is up to all of **US** to protect the bayside communities we love.

SEA LEVEL RISE VIRTUAL REALITY EXPERIENCE



TAKE A LOOK through the OWL viewer to see what higher tide levels mean for this very location now, what it could mean in the near future, and some possible responses to meet the challenge of living with water.

Please share your thoughts about what you see: answer a few questions in the OWL and/or leave an audio recording.

The OWL is awake every day from 5 AM – 10 PM and sleeps at night.



JOIN THE CONVERSATION with community members, business leaders, and elected officials as we discover what is most vulnerable to sea level rise in Marin County and explore the pathways of action we can take together.

BE A PART OF THE EFFORT.

Tweet us @HereNowUs using #OWLMARIN

Visit www.Here-Now-Us.org for more information and to get involved.



MARIN IS FACING THE CHALLENGE by planning for climate change so we can protect our communities now and into the future. Yet learning to live with rising sea levels is not enough. Reducing risk requires cutting the carbon emissions that drive climate impacts.

That's why:

- Marin Clean Energy supplies 50% renewable energy to its customers and promotes energy efficiency. You can run your household and business with MCE's "Deep Green" 100% renewable energy. For more information, visit www.mcecleanenergy.org.



- Marin County is taking other steps to cut carbon, such as reducing car traffic by expanding multi-use paths like the one you are standing on, creating a network of EV charging stations, and encouraging public transit use.

The Here-Now-Us Project is a public-private-community partnership. The OWL installation is a 12-week research project designed to test visualizations as an effective tool to engage the community in planning for climate change. Dr. Susanne Moser, in conjunction with Antioch University, is overseeing the project. All survey and video data collected will remain anonymous and confidential and kept separate from email contacts that are voluntarily submitted at Here-Now-Us.org. Data and responses may be analyzed and reported in scientific publications as part of this research.

Major Funding Provided by:



Project Leaders:



Project Advisors:



Project Researchers:



HERE – NOW – US



The Key Research Questions:

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

The OWL Experiment:

- Current conditions and flood risk
- Increased flood risk due to sea level rise
- 2 adaptation options:
a sea wall and a horizontal levee



The "OWL" Project - 2015



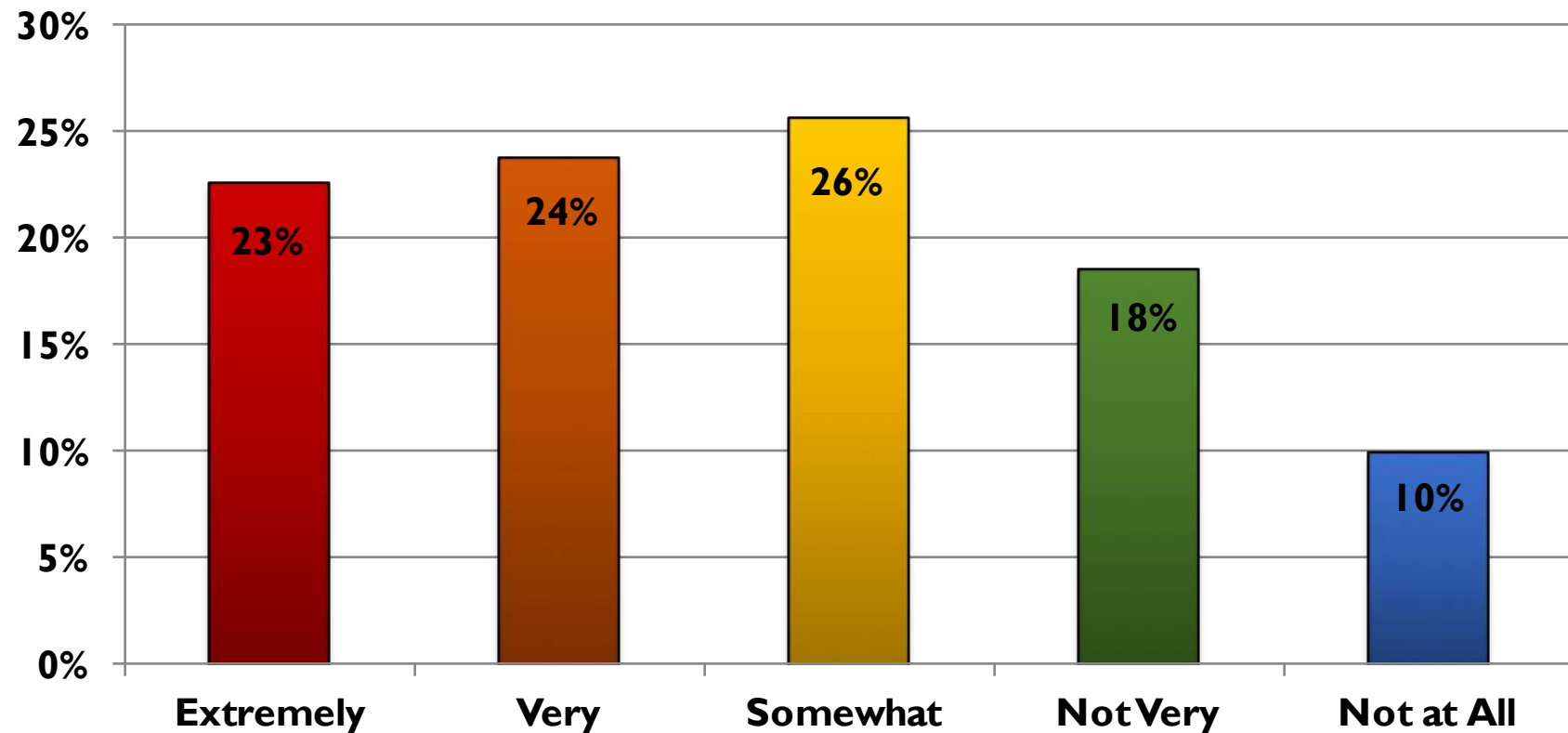


...and three feet of sea level rise



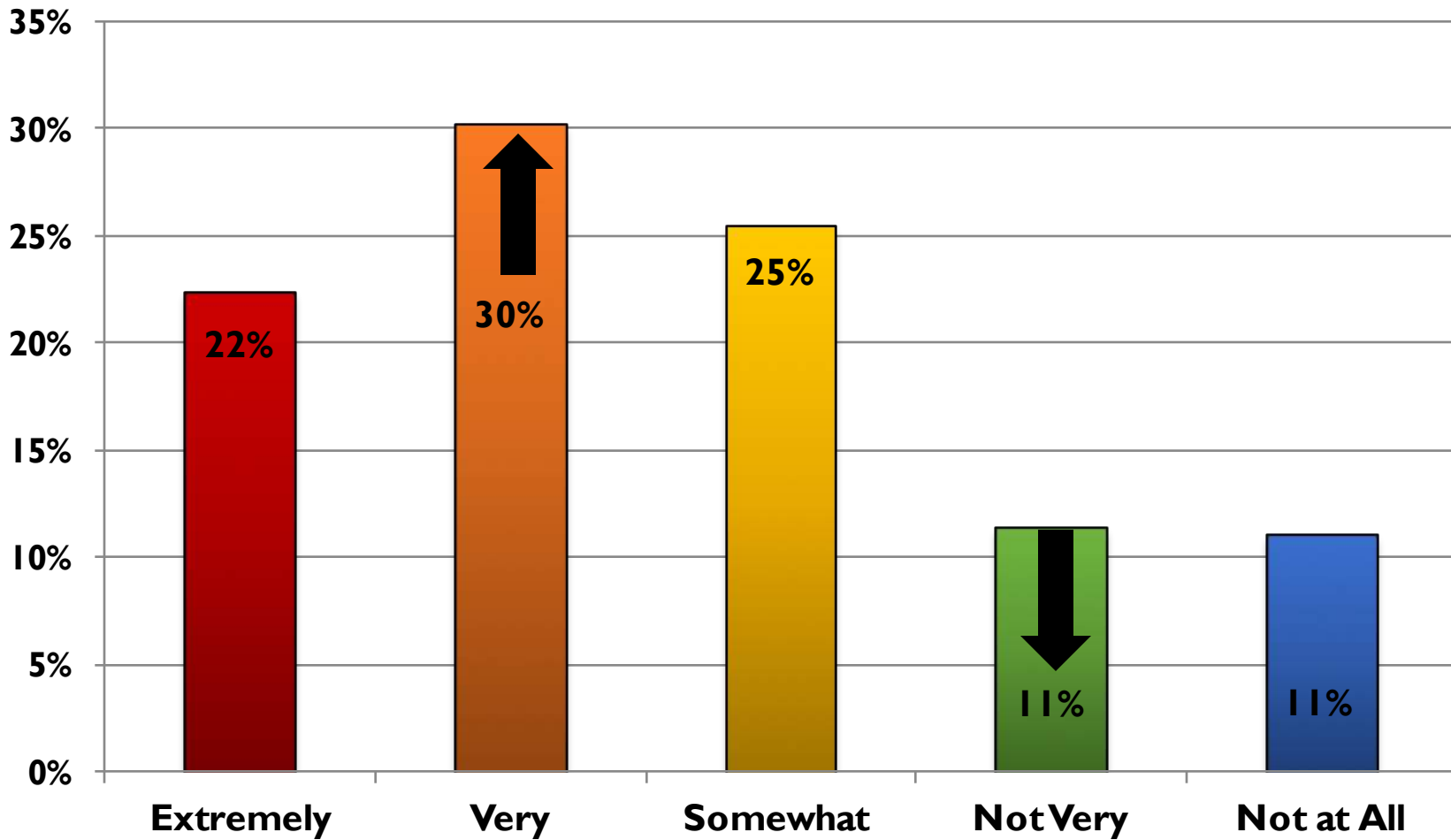
Level of Concern about Current Flood Risk

(No null answers)



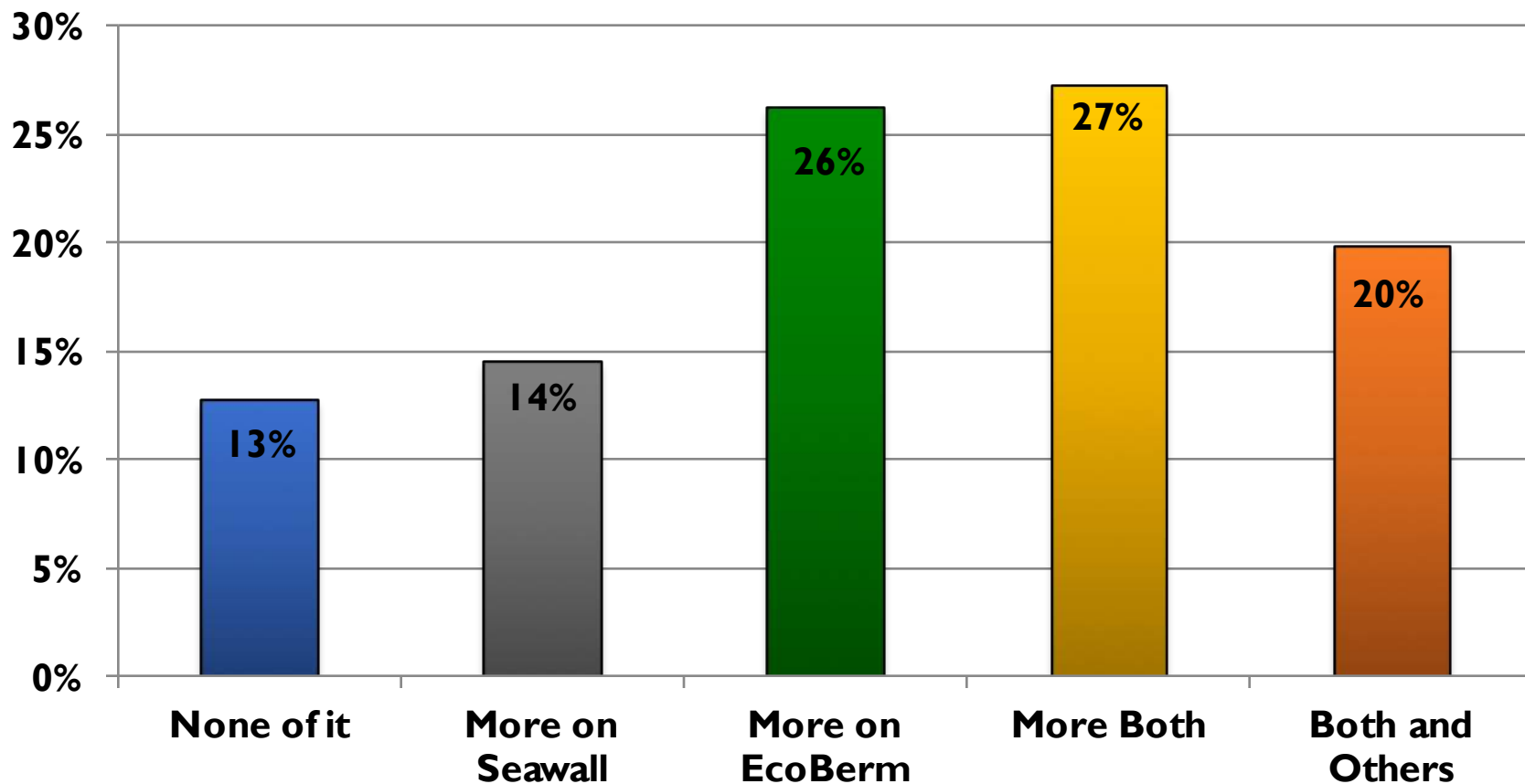
WHAT WE LEARNED

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



WHAT WE LEARNED

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



WHAT WE LEARNED



WHAT WE LEARNED

Research Conclusions:

Virtual Reality appears to be one of the most effective tools that we currently have

- But people must be given actionable connections to engage them

Using visualization tools raises awareness and concern

- Particularly among the least concerned and the oldest

There is a clear desire to be engaged among the “concerned”

- Those who start with a high level of concern, or increase their level of concern, express a greater desire to be engaged

Levels of engagement are generally low

- But it is higher among older participants

Potential for moving people to action remains uncertain

- This is being explored further in a follow-on study in San Mateo County and in San Francisco

SEA LEVEL STORIES



URBAN FABRICK
WITH SUPPORT FROM
TRCA
OF PLANNING

#SEALEVELSTORIES

JCHANNHOFFMAN.COM
GENEVIEWHOFFMAN.COM
SUBFRANK.PW
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THE GAME OF FLOODS

Your Island

1. To begin, one player picks the sea level rise scenario that they wish to use.
2. Next, the players take turns to determine who goes first. The highest roll goes first. If it is a tie, the tied players must re-roll. Players take turns in clockwise order.

3. In turn, each player selects an asset to accommodate, defend, or retreat from. No need to duplicate assets. Use the worksheets provided to record your choice, costs, and pros and cons.
4. Next, in turn, each player places and stores their preferred adaptation strategies so as to minimize the impact of the sea level rise on the island.
5. Consider the following factors to inform the proposal: (1) Catastrophic (2) Private property impacts, (3) Environmental impacts, (4) Equity/social justice concerns, (5) Others. Use your worksheet to take notes.

Sea Level Rise 2050 Scenario Key

R2D2 (R2) = Permanent Sea level rise flooding
R1 (R1) = Temporary Sea level rise flooding
R1.5 (R1.5) = Temporary 100-year Storm Flooding



- Evacuation Route
- Storm Shelter
- Electrical Sub-Station
- Marina
- Gas Station
- Sewage Lift Station
- Mammal Habitat
- Seabird Colony
- Aquaculture
- Ranch
- Agriculture
- Shrimp
- Grocery
- Public Well
- Home
- Water
- Roadway
- Beach
- School Site
- Restaurant
- Boat Launch
- Parking
- Library
- Historic Church
- Hospital
- Fire Station
- Post Office

LEGEND

Retreat Move here Managed Retreat	Post-storm prohibitions Stricter land use zoning Accommodate Water	Elevate Buildings Floodable Buildings Accommodate Water	Revetment/Seawall Traditional Levee Tide Gate Wall & Pump Station Hard Engineering	Horizontal Levee Wetland/shoreline vegetation Offshore Structure Beach Maintenance Soft Engineering
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GAME PIECES

THANK YOU!



CLIMATE ACCESS
www.climateaccess.org

OWLIZED
www.owlized.com

Dr. SUSANNE MOSER
www.susannemoser.com

MARIN COUNTY SEA LEVEL RISE PROJECT
www.marinslr.org

MARIN COUNTY SUSTAINABILITY TEAM:
ENERGY EFFICIENCY, GREEN BUSINESSES, GREEN BUILDING, ETC.
www.marinsustainability.org

MARIN COUNTY DEPARTMENT OF PUBLIC WORKS:
FLOOD CONTROL AND STORM WATER MANAGEMENT
www.marincounty.org/depts/pw/divisions/flood-control

MARIN CLEAN ENERGY
www.marincleanenergy.org

LOCAL ENERGY AGGREGATION NETWORK – LEAN ENERGY US
<http://www.leanenergyus.org>

BAY CONSERVATION AND DEVELOPMENT COMMISSION
<http://www.bcdc.ca.gov>

STRATEGY FOR A SUSTAINABLE REGION
www.abag.ca.gov

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
<http://www.noaa.gov/climate>

YALE ENVIRONMENT 360
<http://e360.yale.edu>

CLIMATE READINESS INSTITUTE
<http://climatereadinessinstitute.org>

350.Org
www.350.org
100 RESILIENT CITIES
<http://www.100resilientcities.org>

CITIZENS CLIMATE LOBBY
www.citizensclimatelobby.org

THE CLIMATE MOBILIZATION
<http://www.theclimatemobilization.org>

RESILIENT NEIGHBORHOODS
www.resilientneighborhoods.org

RESOURCES

“OWL” VR: perch.club

“Game of Floods”:
www.marinslr.org

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