



**CLIMATE READY WEBINAR**  
**Lessons Learned in Sea Level Rise  
Adaptation Planning**

*December 2, 2016  
10:00am-11:30am*

# Coastal Conservancy's Role in Adaptation Planning



# AGENDA

## 1. Introduction (10 min)

## 2. Case Studies

*San Mateo: San Mateo County (15 min)*

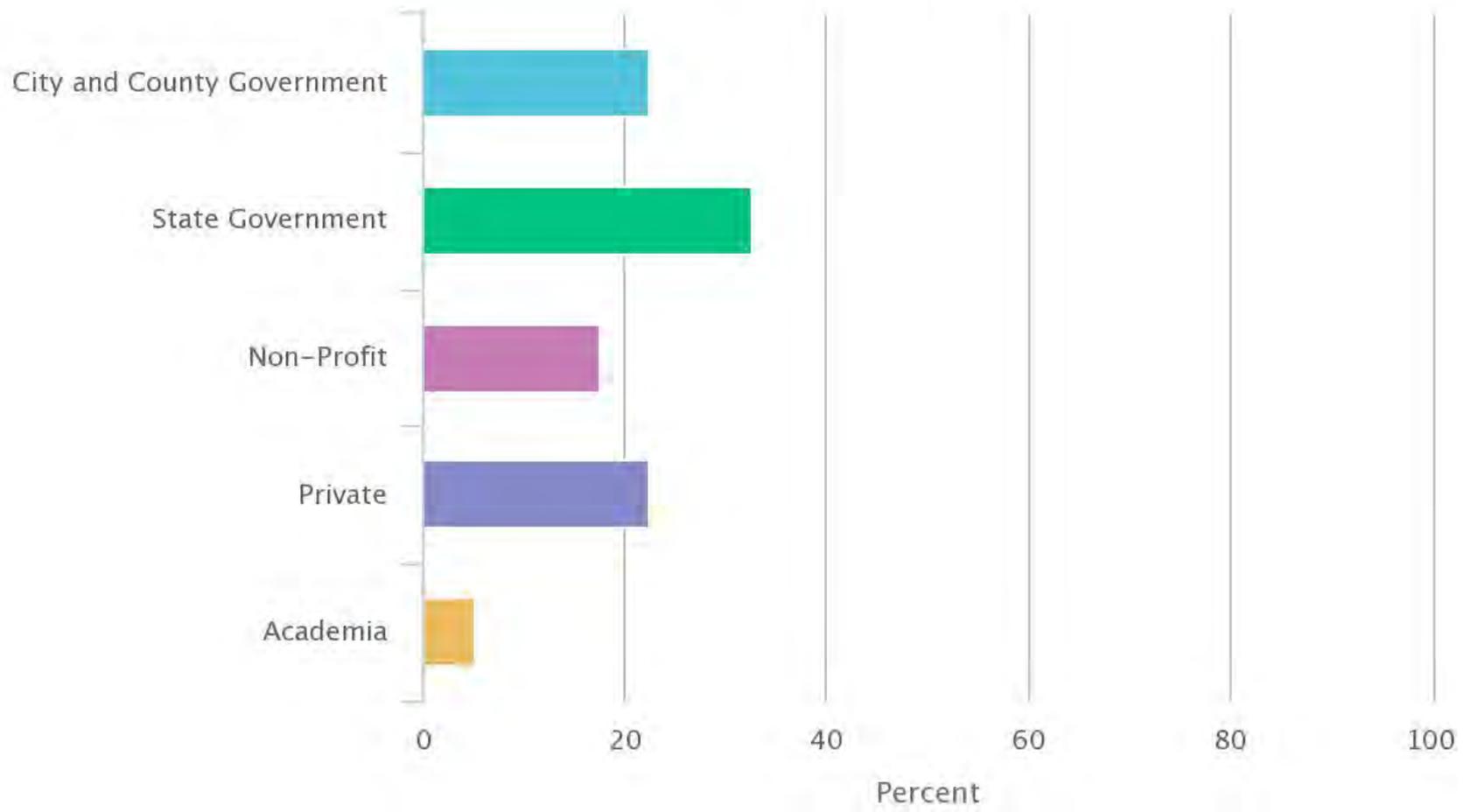
*Monterey Bay: The Nature Conservancy (15 min)*

*Los Angeles: USC Sea Grant (15 min)*

## 3. Question & Answer (30 min)

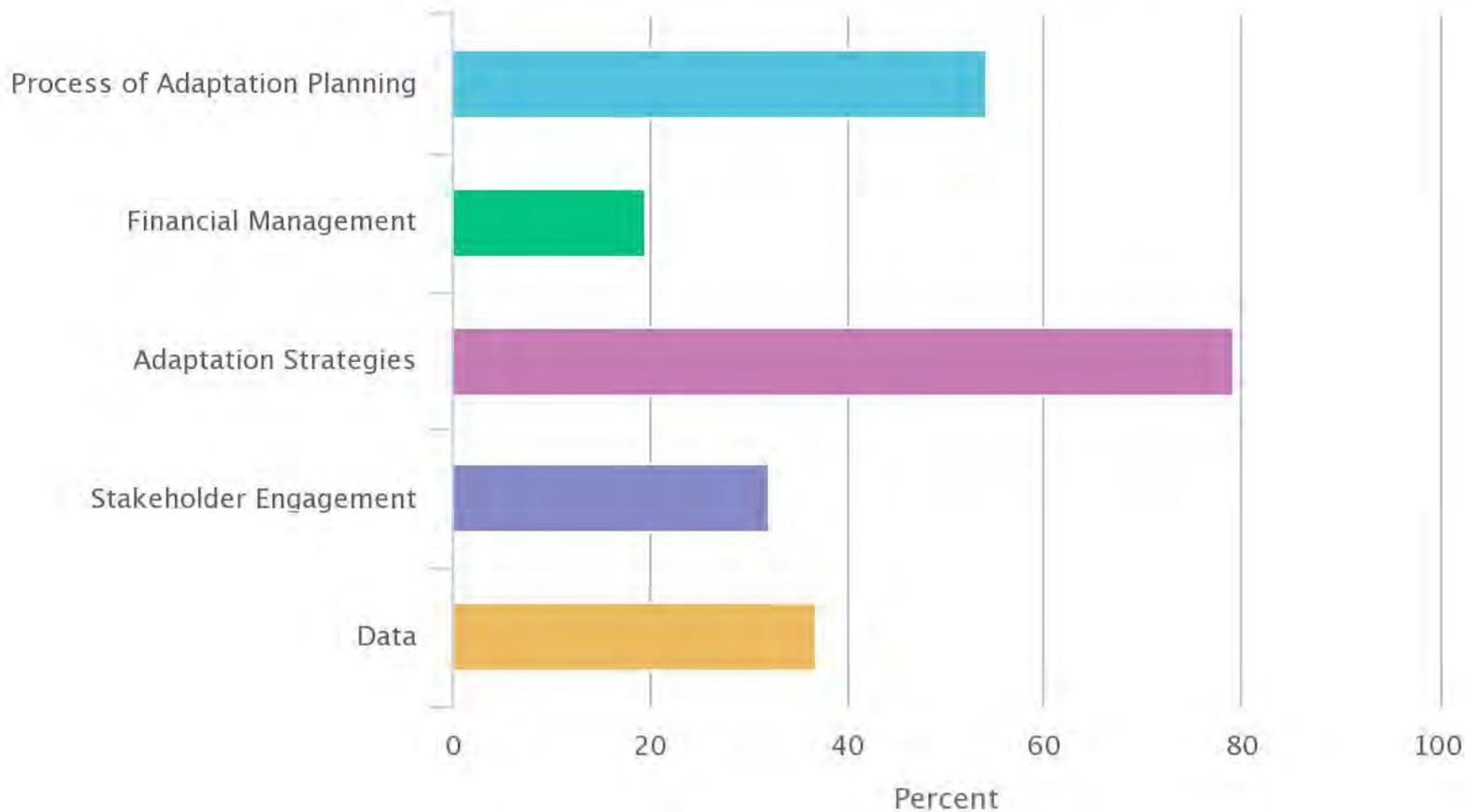
# Poll # 1

Which sector do you represent?

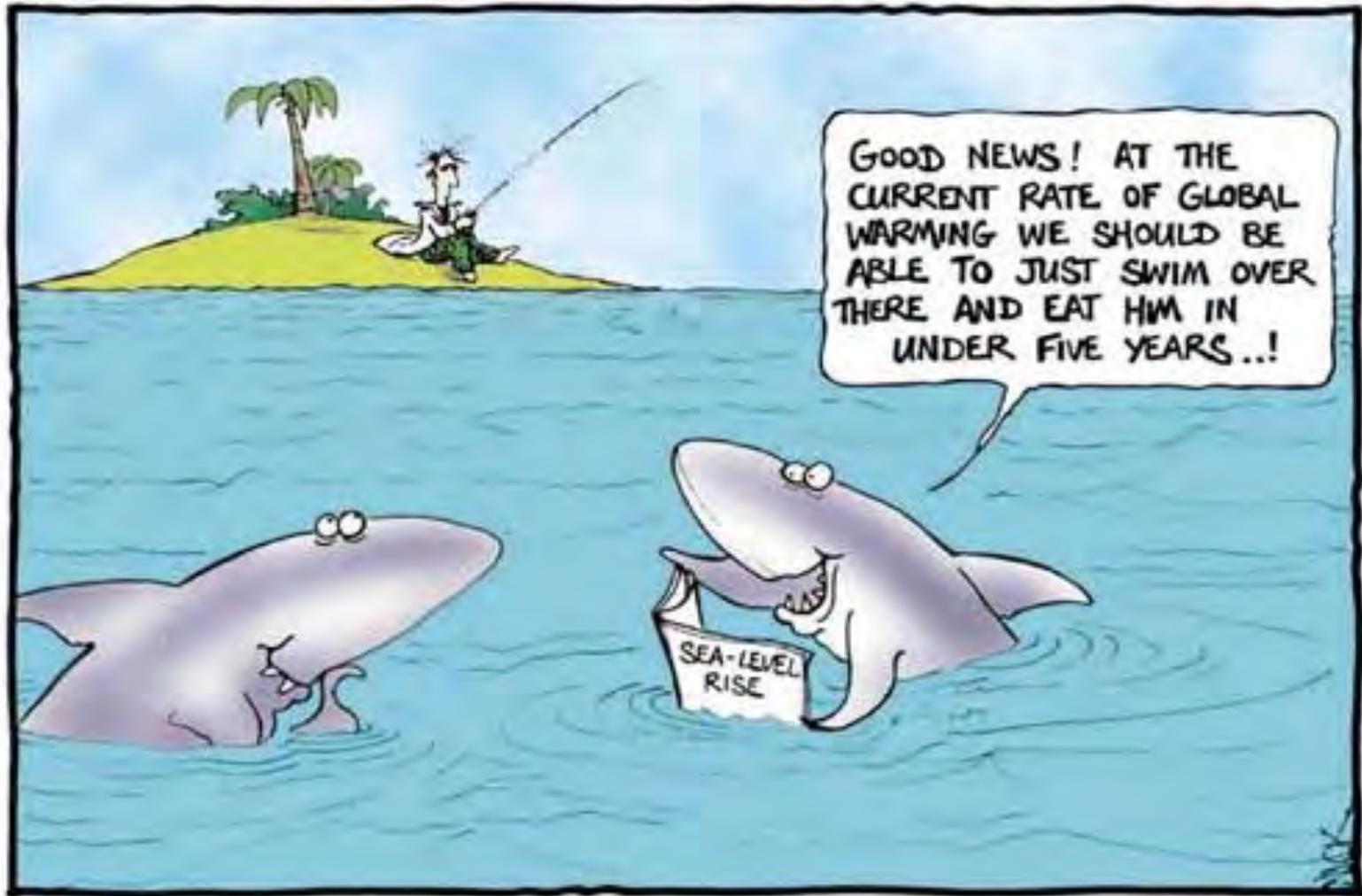


# Poll # 2

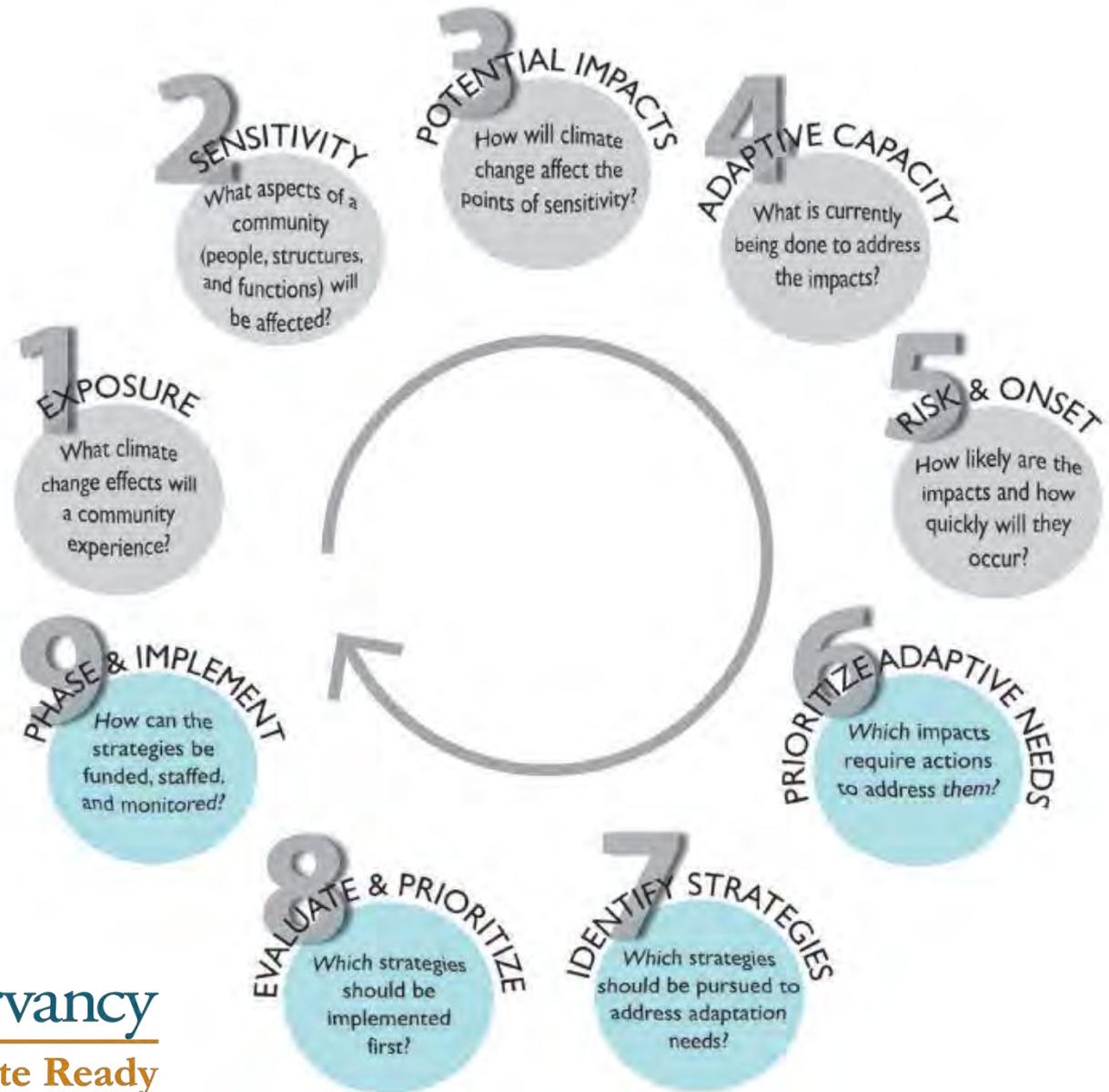
What are you most interested in learning?



# Sea Level Rise Adaptation Planning

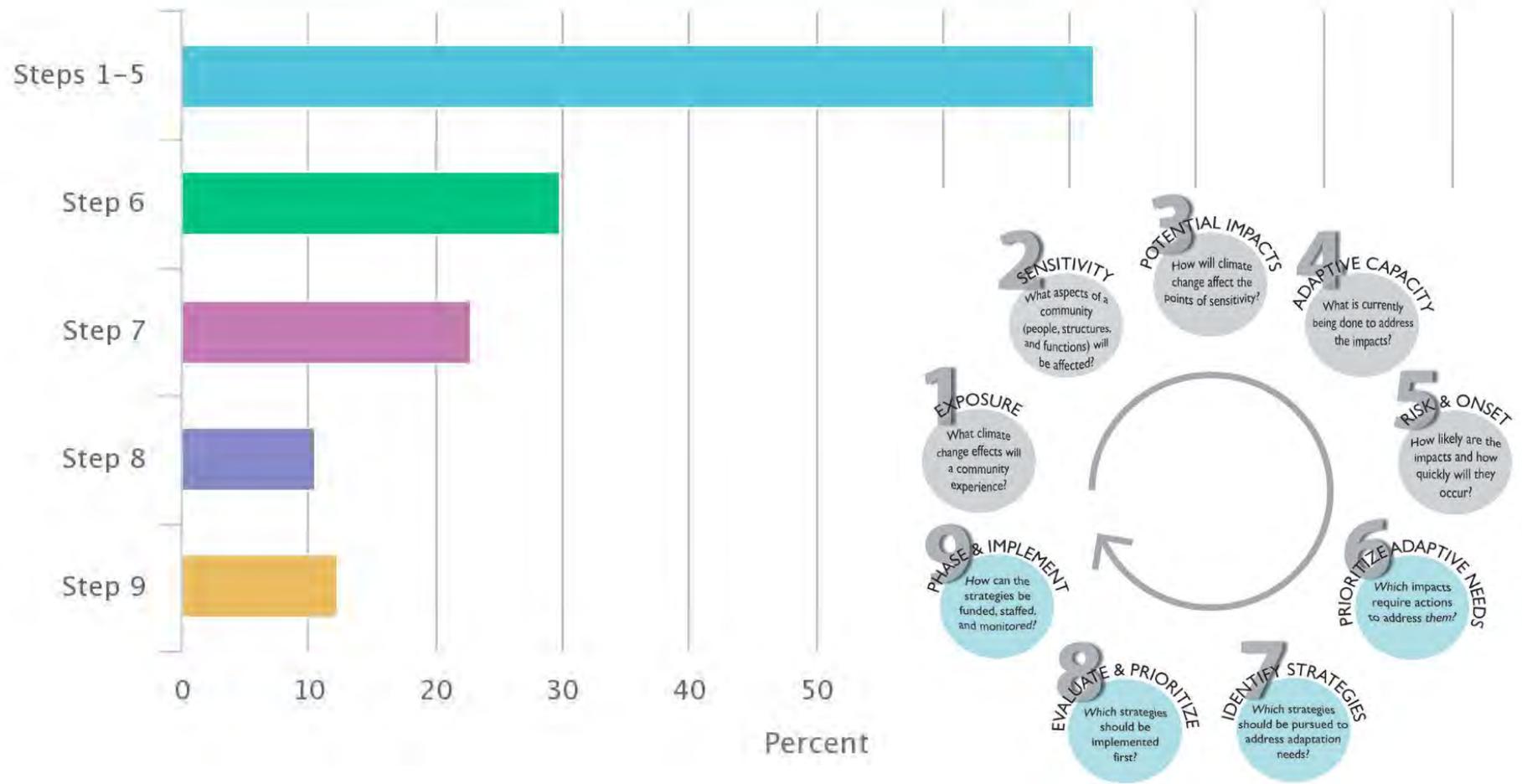


# Sea Level Rise Adaptation Planning



# Poll # 3

What steps of the adaptation planning cycle have you worked on?



# Sea Level Rise Adaptation Planning

- Coastal Conservancy (SCC)
- Coastal Commission (CCC)
- Ocean Protection Council (OPC)
- Other Efforts



# SAN MATEO COUNTY SEA LEVEL RISE INITIATIVE

COASTAL CONSERVANCY WEBINAR // 12/2/16

Jack Sutton  
Wildbagarea.com

# SAN MATEO COUNTY



Photo credit: San Mateo County

# SEACHANGE SMC

Phase I: Assess

Phase II:  
Adaptation  
Planning

Phase III:  
Implementation

Assess: 2015 - 2017

Planning:  
Spring 2017 - 2018

Implementation:  
2018 - ongoing

# VULNERABILITY ASSESSMENT STEPS

**Develop County-specific approach**

**Gather data and categorize assets**

**Inundation exposure analysis and mapping**

**Vulnerability and risk analysis**

**Initial adaptation planning**

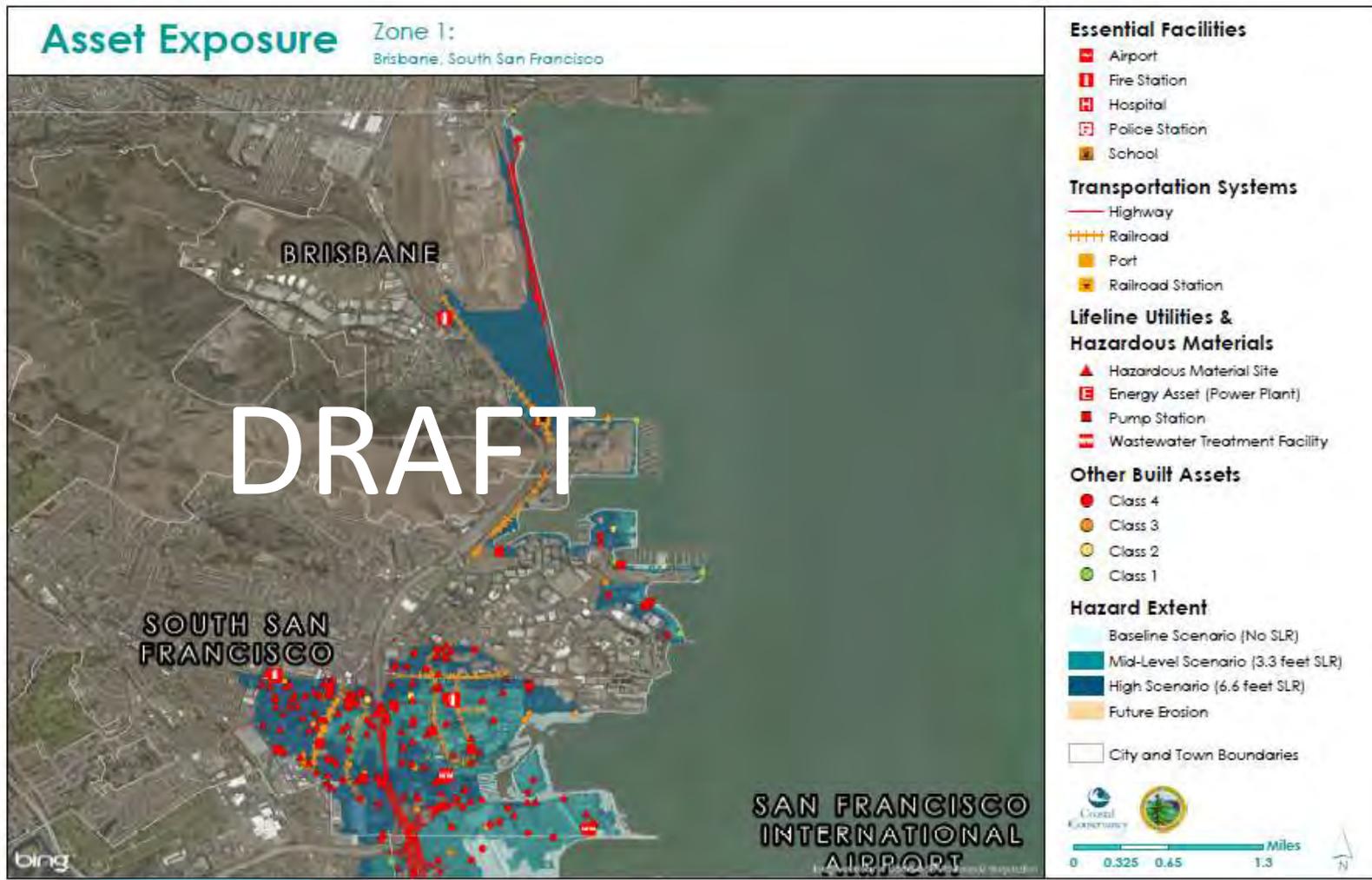
**ACTIONABLE OUTCOMES**

# STAKEHOLDER INVOLVEMENT & OUTREACH

- Technical Working Group
- Policy Advisory Committee
- Community Task Force
- Public Outreach



# PRELIMINARY RISK MAP



# CASE STUDIES – 30 ASSETS



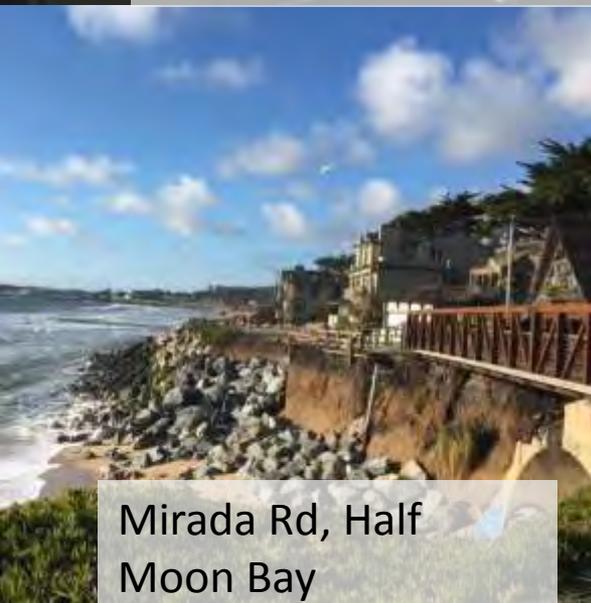
SAM Plant (wastewater)



California Coastal Trail



Highline Canal, Millbrae



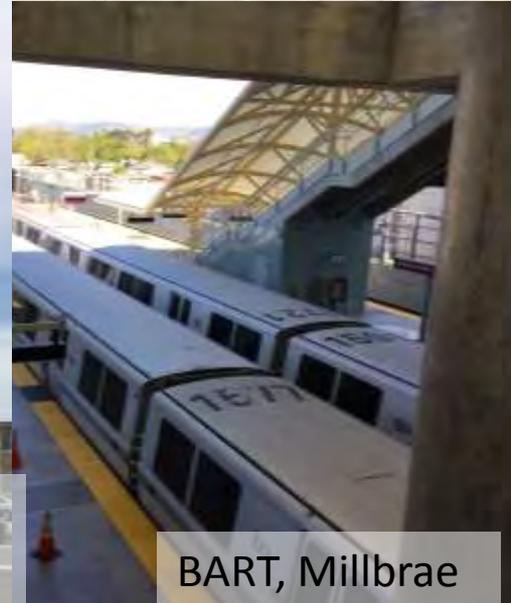
Mirada Rd, Half Moon Bay



SamTrans Depot



Pacifica Nursing & Rehab Facility



BART, Millbrae

# WHERE ARE WE HEADED?

## GOALS:

- Integrate climate change into existing plans & operations
- Broaden focus to include multi-hazard approach
- Continue to build city & community partnerships

## ACTIONS:

- Adaptation Plan Framework
- County Sea Level Rise Policy & Guidance
- Toolkit with sample policy language
- Pilot Projects
- Partnerships across sectors



LESSONS  
LEARNED

# LEADERSHIP

- Having a political champion is key
- Develop a strong project management team



DAVE PINE  
DISTRICT 1



DON HORSLEY  
VICE PRESIDENT  
DISTRICT 3

# PARTNERSHIPS

- Establish good working relationships with all levels of city partners: staff, city managers, and elected officials
- Meet in person – get to know people!
- Tailor your message to different audiences

# PROJECT MANAGEMENT

- Be adaptive – things will change!
- Frame the report as you go
- Be ready to remind, and remind, and remind...

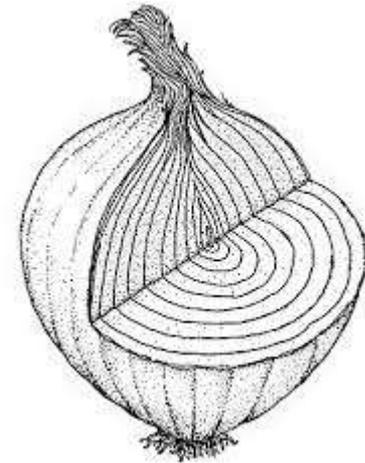


# DATA AND MAPPING

- Data may be your biggest challenge
- Build in time for QA/QC
- Accept data gaps and move on
- Understand limitations in mapping and modeling
- Develop data systems that are easy to use and easy to update if data needs to be changed

# COMPLEXITY

- The work is like an onion, the more you learn, the more you realize you don't yet know



# QUESTIONS?

## CONTACT:

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# Economic Impact of Climate Adaptation Strategies for southern Monterey Bay



Kelly Leo, The Nature Conservancy, [kleo@tnc.org](mailto:kleo@tnc.org)



PEOPLE

+



NATURE

+



MONEY

# Shoreline erosion high, study says

By WILL HOUSTON , Herald Correspondent

POSTED: 08/26/13, 12:01 AM PDT

0 COMMENTS

The shores of Monterey Bay are known for their beauty, but some of it is being slowly washed away. A 2006 U.S. Geological Survey found that the Monterey Bay shoreline has the **highest** average erosion rate in California, narrowing the beaches by about 2 feet a year.



National Assessment of Shoreline Change Part 3:  
Historical Shoreline Change and Associated  
Coastal Land Loss Along Sandy Shorelines of the  
California Coast

Devin J. Boye, David Beck, Bruce M. Richmond, Tamar Roggen and Jeff Liu

Open-File Report 2006-1219  
U.S. Department of the Interior  
U.S. Geological Survey





**The Project Team**

# Step 1: Stakeholder Engagement



## Step 2: Physical Modeling



## Step 3: Beach Ecosystem Index



## Step 3: Beach Ecosystem Index



## Step 4: Economic Analysis



# Step 5: CoastalResilience.org

Regional Planning

Community Planning

Economics of Nature-Based Adaptation

Switch To Map 2

Split View

Save & Share

### Economics of Nature-Based Adaptation

**Adaptation Strategy:** Nature-based  view map layer

**Hazard:** -  view map layer

**Damage Estimate:** -  view map layer

**Climate Year:** Current 2030 2060 2100

net benefits of **natural** solutions exceed that of **engineered** by **\$26.5M**

Storm Frequency (years)	Engineering-based (\$ Millions)	Nature-based (\$ Millions)
20	~2400	~2300
50	~750	~750
75	~400	~400
100	~200	~250
200	~0	~0

(based on a 3% discount rate and 1 in 100 year storm)

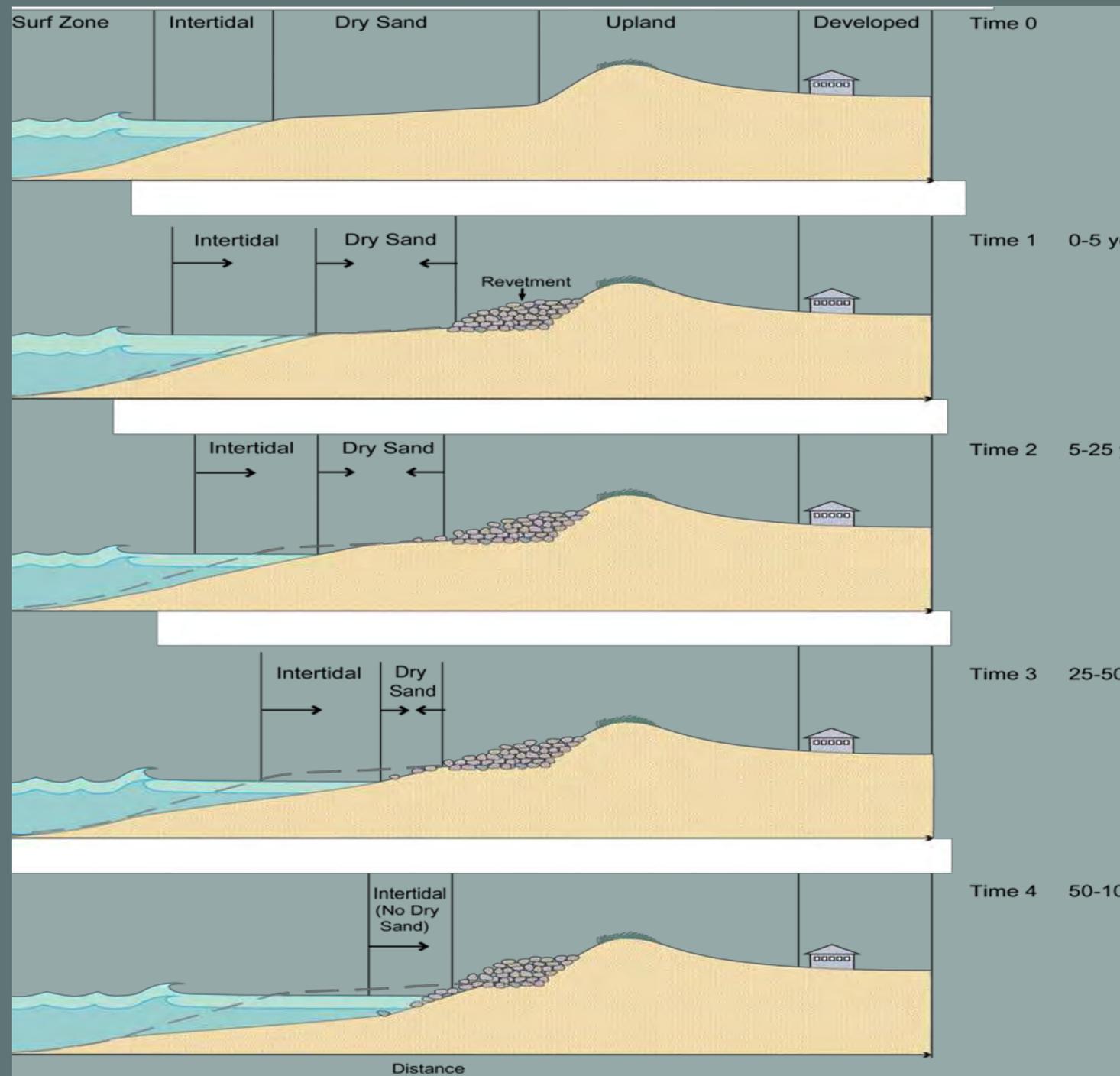
Topographic

#### Map Legend

- Nature Based Approach Point Feature**
  - Tide Gate
  - Wetland Restoration
- Nature Based Approach Linear Feature**
  - Elevate Road
  - Elevate Bulkhead
  - Lower Levee
  - Construct Levee
  - Reinforce Seawall and/or Revetment
- Nature Based Approach Areal Feature**
  - Elevate Harbor Neighborhood
  - Managed Retreat
  - Beach and Dune Restoration
  - Wetland Restoration
  - Wetland Transgression

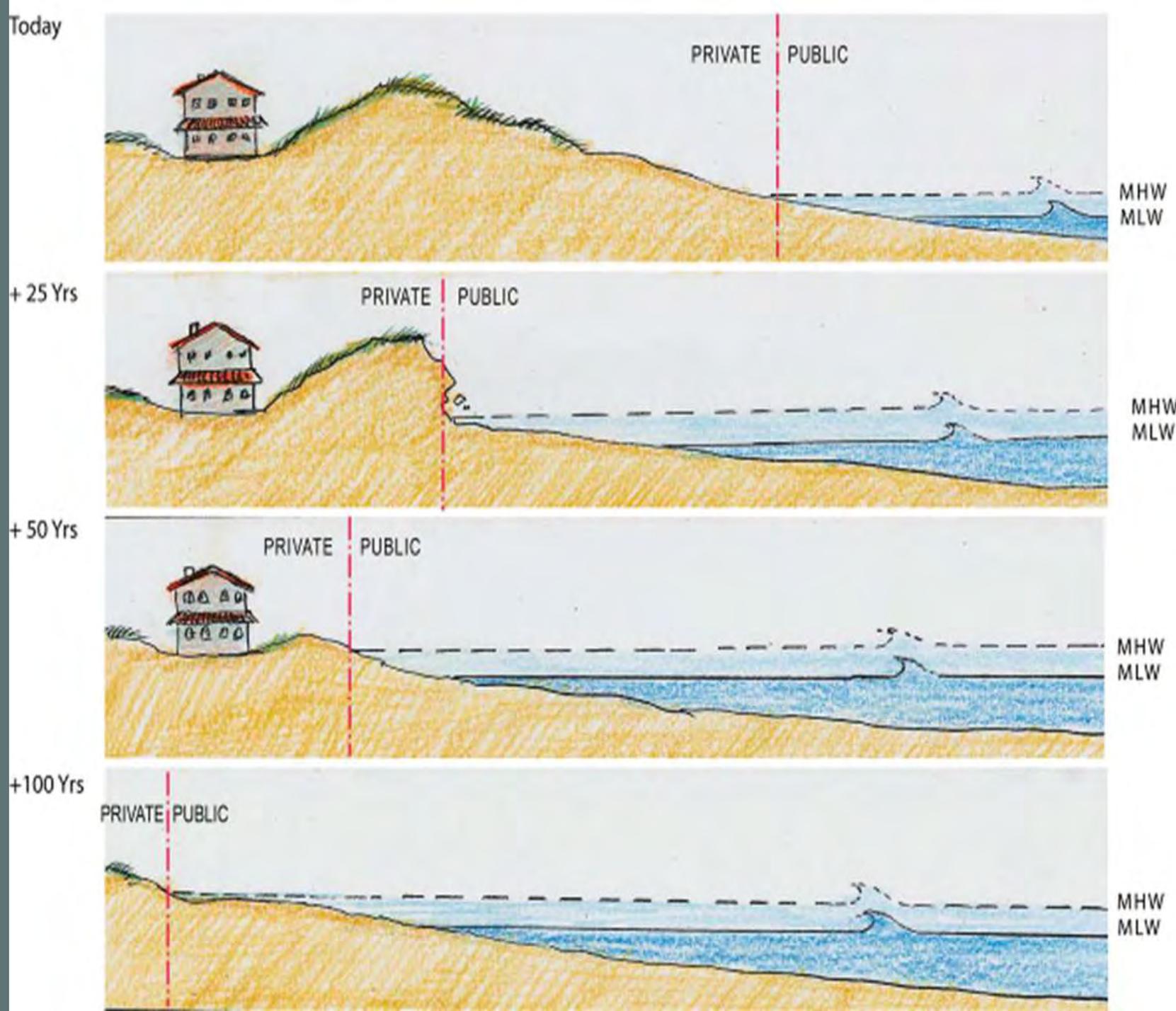
Example of armoring  
adaptation approach:

building revetments



Example of non-  
armoring adaptation  
approach:

Allowing erosion &/or  
managing retreat

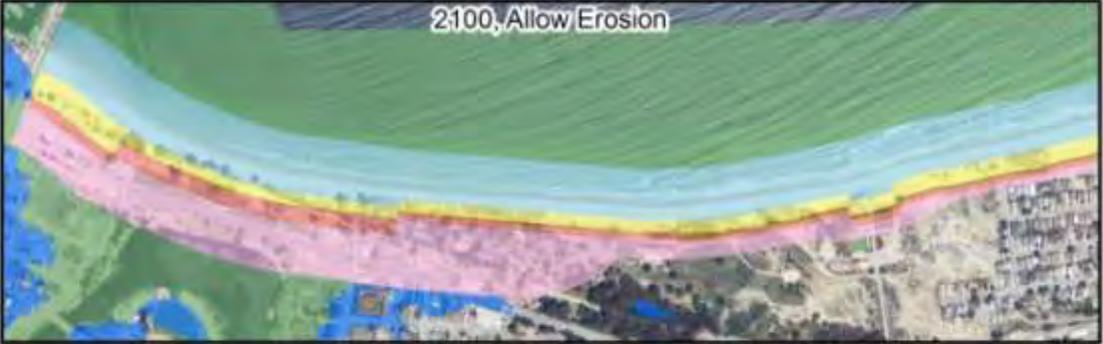
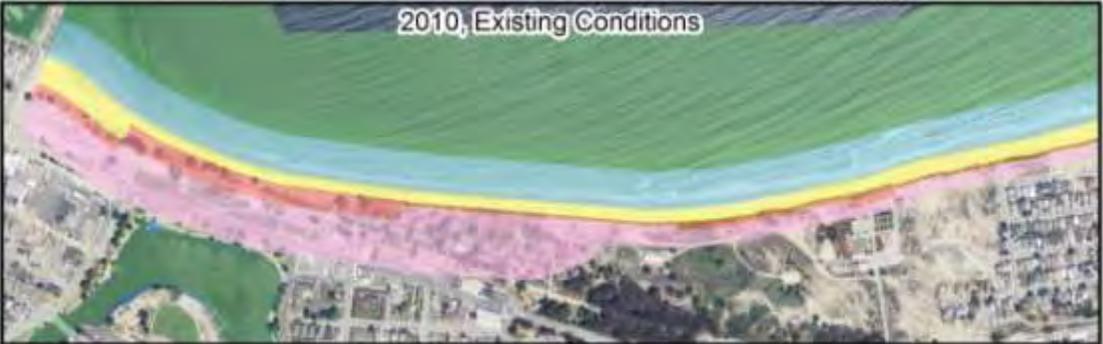


Geospatial results for:

Allowing Erosion

Beach Nourishment w/ groins

Building a Revetment



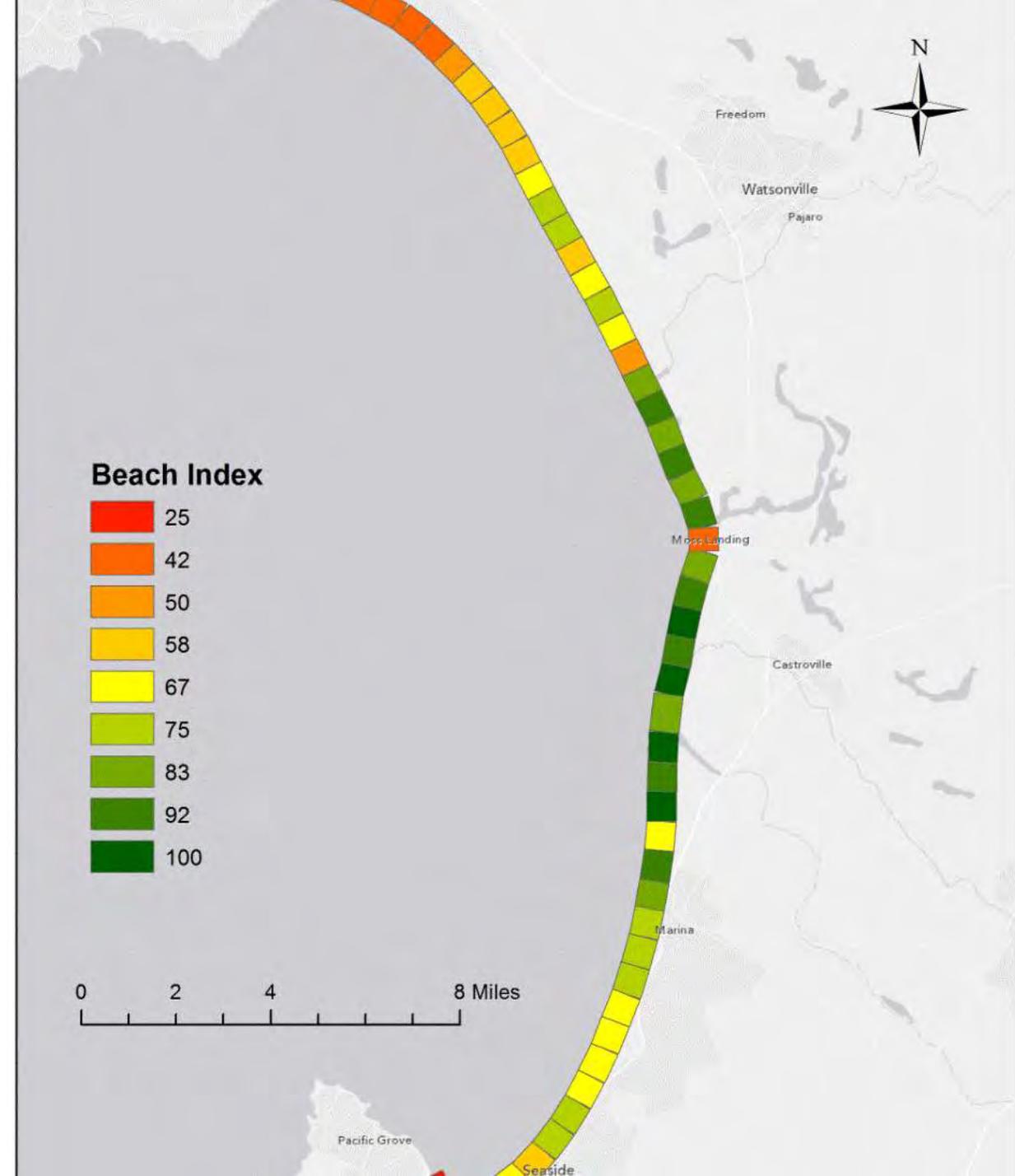
# Beach Ecosystem Index

Average of 3 components:  
 $BI = (PC + BC + HI) / 3$

1. PC – Physical

2. BC – Biotic

3. HI – Human Impact





**Physical Component**



© "Mike" Michael L. Baird flickr.bairdphotos.com

# Biotic Component



# Human Impact Component



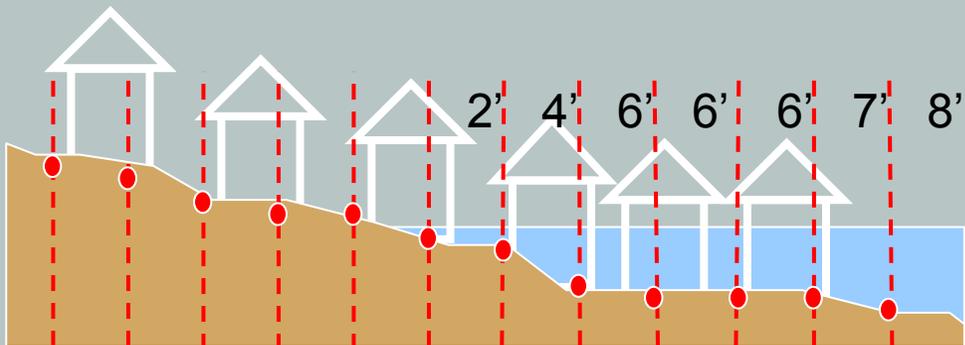
**Beach Ecosystem Index was calculated for:**

- **each adaptation approach**
- **each sea level rise scenario**

# Economic Benefits and Impacts

- Recreational Benefits
- Loss of Land/Property
- Ecological Losses/Benefits

Flood Depth Grid



# Sensitivity & Robustness

We changed the value of key parameters to see if it would change our results.

Our results were robust.



# Non-armoring & Nature-based Solutions Economically Outperform Shoreline Armoring



# Beach Nourishment Yields Benefits For Some Locations, If Sand Is Available & Affordable



## Managed Retreat Is An Economically Smart Strategy



# Planning Ahead is Really Important





PEOPLE

+



NATURE

+



MONEY

**where**

**do we go**

**from**

**here?**

**Now what?**



# Monterey Bay Adaptation Blueprint

# LESSONS LEARNED

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No, no, no. I love it when you give me unsolicited advice. Please, continue.

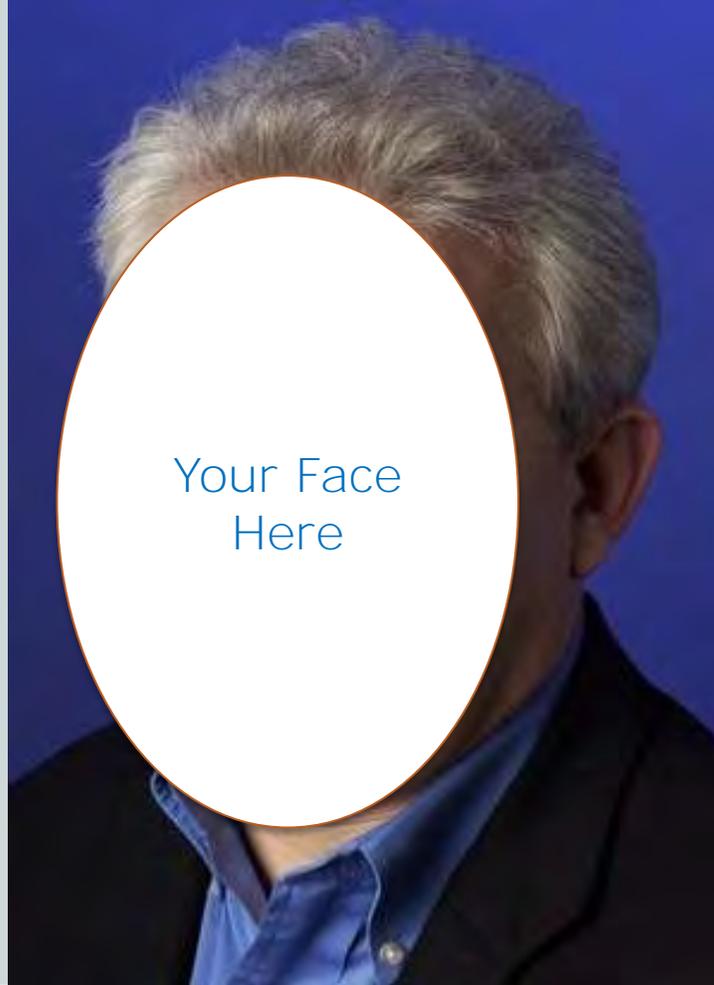




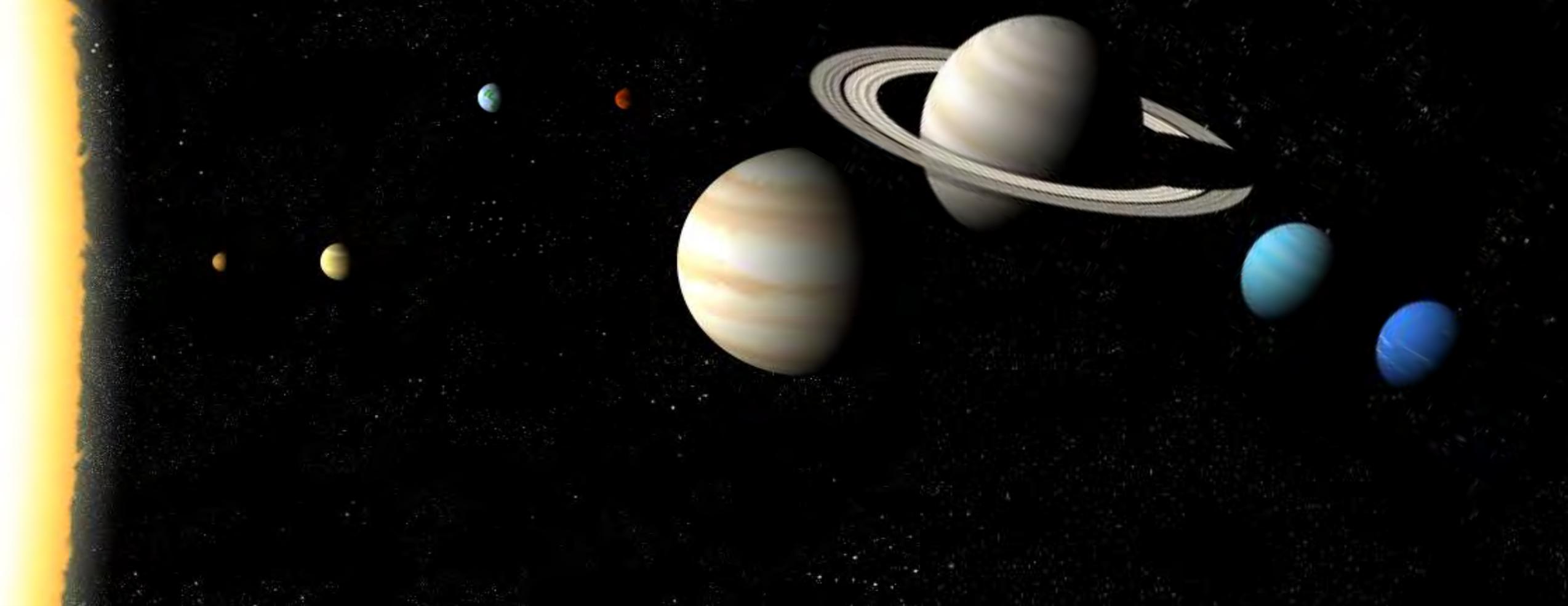
Be realistic about timelines, budgets & scope



**The Project Team**



**Stakeholders help design project applications**



Our alignment is still off...

THANK YOU!



[kleo@tnc.org](mailto:kleo@tnc.org)

# The Stakes are Rising – Lessons in Coastal Adaptation from AdaptLA

|  
Alyssa Newton Mann ♦ USC Sea Grant  
Phyllis Grifman ♦ USC Sea Grant

California Coastal Conservancy Webinar  
December 2, 2016



# USC Sea Grant – The Urban Ocean Program



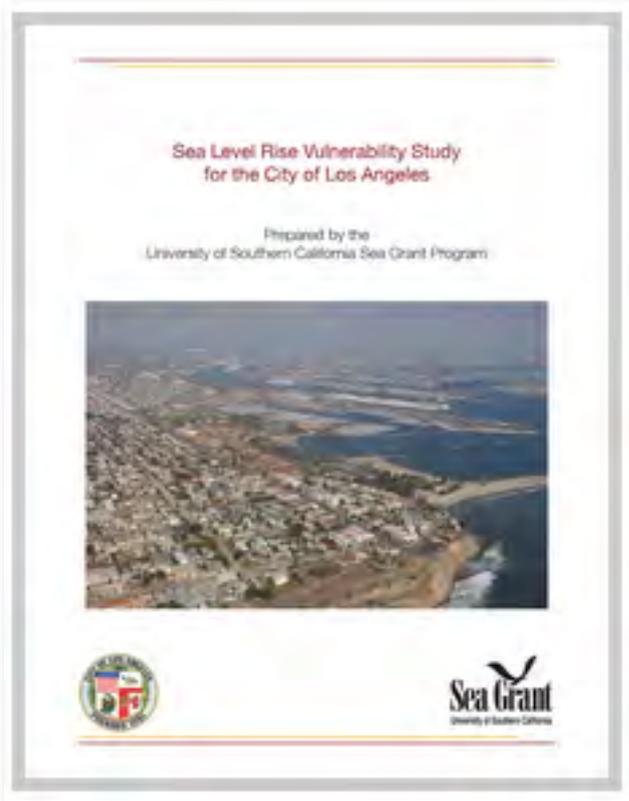
- Fund research
- Community outreach & education
- Technical assistance to local/regional government

## 10 Million by the Sea...

- Water Quality
- Coastal Management
- HABs
- Maritime Affairs
- Sea Level Rise & Coastal Impacts



# AdaptLA: Building Community Capacity A Regional Approach



## Regional AdaptLA: Coastal Impacts Planning in the Los Angeles Region

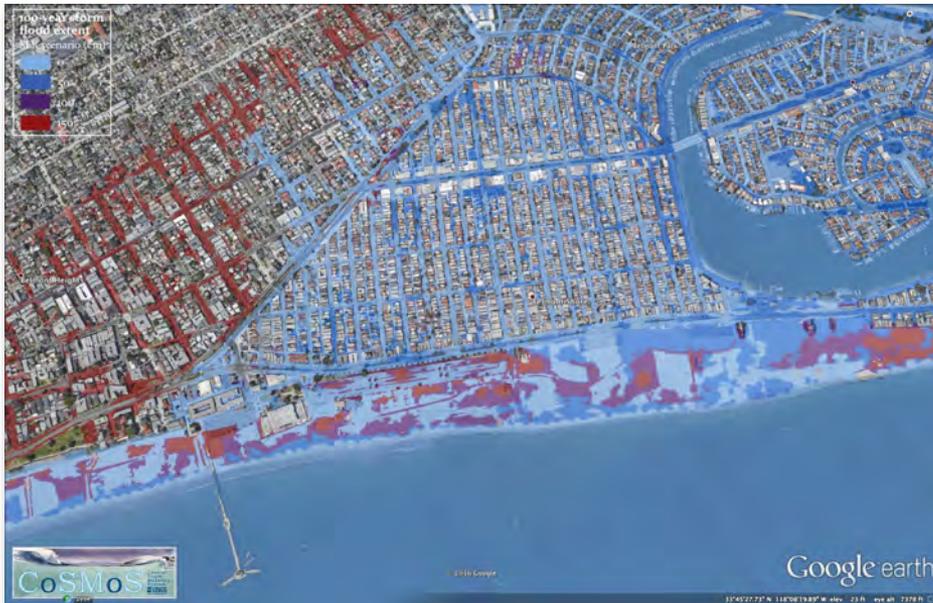
*Focus Areas > Climate Change > AdaptLA*

Los Angeles is known for its wide sandy beaches, coastal boardwalks, and beach commerce and tourism. However the impacts of climate change not only threaten our treasured beaches but also critical infrastructure, including power plants; sewage treatment plants; and two of the busiest ports in the U.S., along the coast. Planning for the impacts of climate change (adaptation planning) is therefore a priority for the region. To fully understand the impacts of climate change and how they can inform regional planning polices require a link between the best available scientific tools and local governments. *Regional AdaptA: Coastal Impacts Planning in the Los Angeles Region* is a multi-year project that strives to provide this link to local coastal jurisdictions and to develop a community of practice for the L.A. region.



# The Role of Boundary Organizations in Adaptation Planning

- Link scientific understanding with public policy and management
  - Ensure understanding of scientific principles, research, and applications
- Requires participation from both worlds – science and policy
  - Provide resources to scientific and practitioner communities



# A Place-Based Advantage

- Continuity and consistency over time
  - Mutually understood geographies
- Established and engaged stakeholder base
  - Common trust and language
- Partner with other boundary organizations
  - Economies of scale
  - “what works”
- Resilient to political change
  - Political cycles & administrations



*Analysis of attendee list from 30 USC Sea Grant-supported events from 2010-2016 focused of climate change science and adaptation planning.*

# Science Translation and Communication

- 2011 Climate Adaptation Needs Assessment: IDs technical barriers
- Requires appropriate and effective messengers
- Determine appropriate level of detail
- Helps show stakeholders how to make science info locally actionable
- “Communicate key talking points ... better than giving them everything.”



# Science Translation and Communication

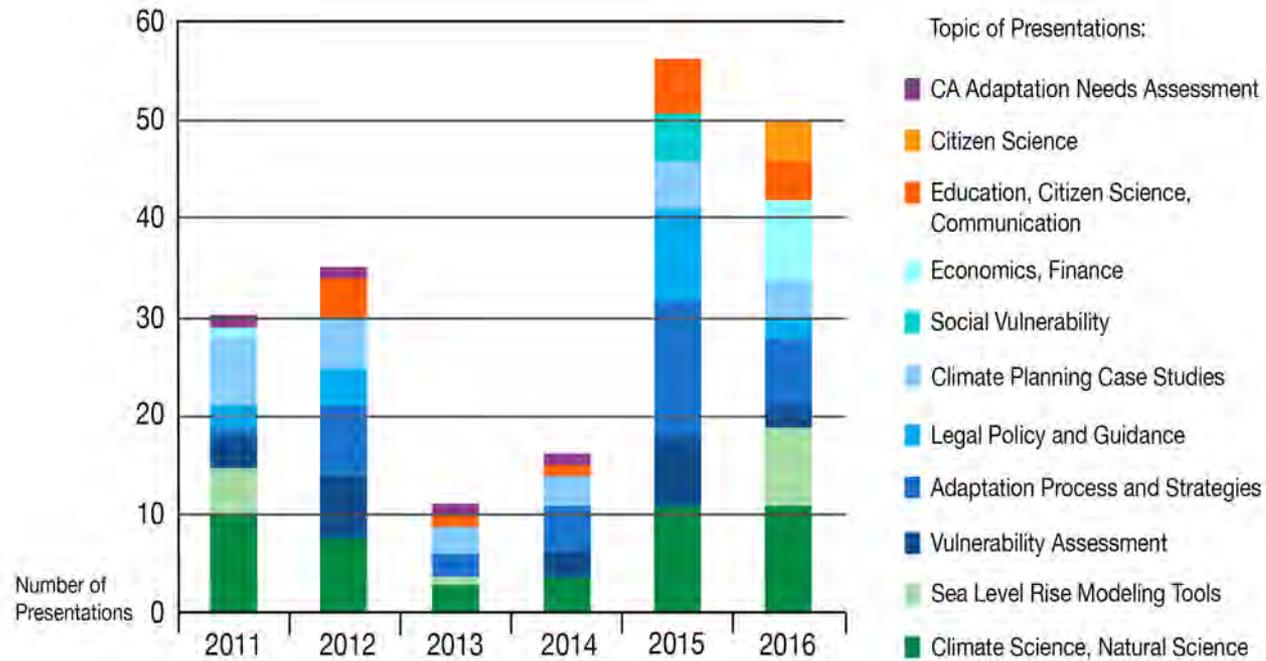
## Workshop Topics



- Processes/strategies
- SLR science and models
- Vulnerability assessments
- Policy/Law/SLR guidance
- Social vulnerability
- Citizen science/education

Sea Grant helps *“interpret academic findings and helps people digest the information, particularly for those who are not specialized and will benefit.”*

# Science Translation and Communication



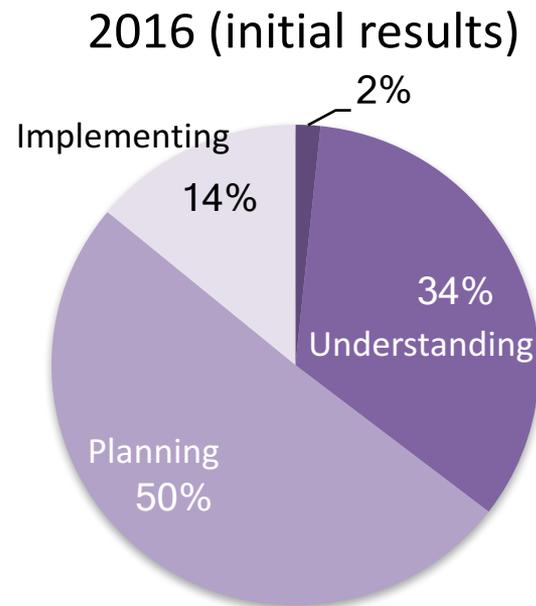
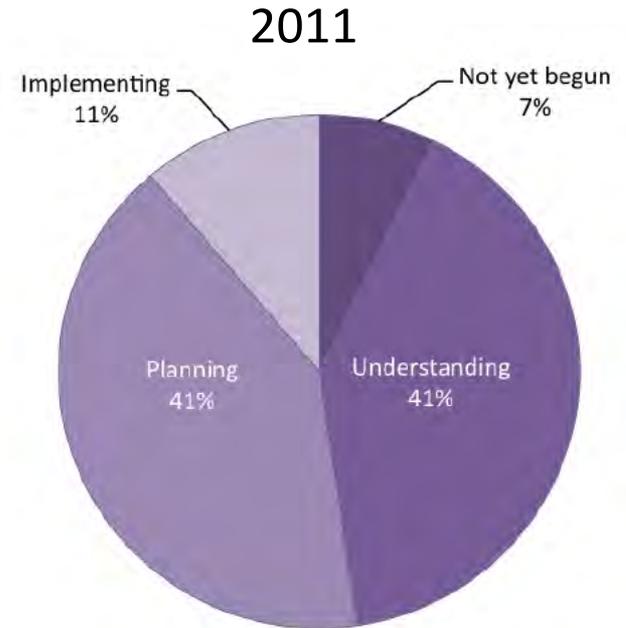
*Content analysis by topic from ~ 50 climate adaptation-related workshops 2010-2016*

# Adaptive Management

- New science and models almost constant
- Communities need to be comfortable w/ changes,
- Shape processes and methodologies to accommodate
- Approaches:
  - Use flexible language in adaptation plans and documents
  - Create productive relationships between scientists and decision-makers
  - Conduct iterative assessments of vulnerability and risk
  - Embrace uncertainty by developing range of possible outcomes
  - Plan re-evaluation of policies and robust monitoring

# Communities want examples!

- 2011 and 2016 update of the *CA Coastal Adaptation Needs Assessment Survey*
- Many communities actively planning, but still few “implementing”
- With scarce resources, need examples to move forward!



# Funding, Investments and Community Success

- 2011: coastal practitioners identified funding and staff as primary challenge
- Survey results spurred investments from the State of California
- A small investment, strategically placed and strategically leveraged, can have significant impacts
- Timing of investments is critical



*Impact in Southern California of the initial investment in USC Sea Grant's Coastal Climate Change Adaptation Program*

# Lessons

- *Regional Approach* in adaptation planning will be critical for interconnected region
- *Place-based boundary organizations* are effective in establishing trust among stakeholders
- The *ever-evolving and complex nature of climate science* can overwhelm stakeholders with too much/too complex information
- Important to *emphasize key messages* provided by the scientific information rather than providing all of the technical detail
- *Adaptive Management* useful to help communities move forward without “perfect” information, but few examples of adaptive approaches to emulate
- Communities have expressed the need for *tried and tested examples* to move forward in implementing adaptation strategies

## ....And Forward....

- *Lack of significant and sustained funding* continues to limit progress in California; however, even modest investments made at the right time can be very impactful
- *Lack of mandate* at state or federal level directing local communities to plan and adapt for climate risk, with corresponding funding to support action, stymies progress at the community level
- Need *consistent and effective* ways to empower communities to utilize available information and start implementing adaptation plans and activities

# Thank you!

For more information on SLR Adaptation programs or USC Sea Grant:

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**Phyllis Grifman**

[grifman@usc.edu](mailto:grifman@usc.edu) 213.740.1963

**Nick Sadrpour**

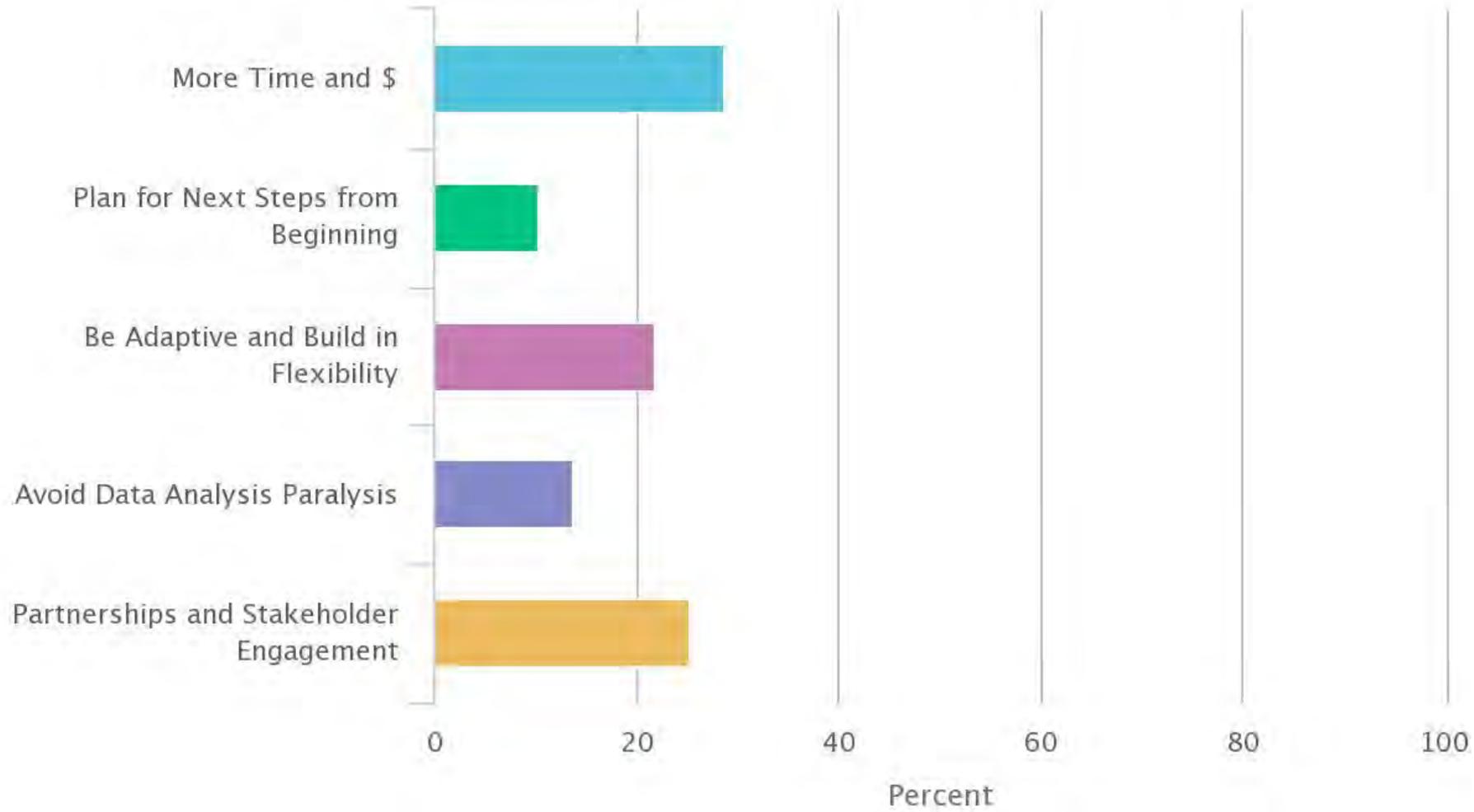
[sadrpour@usc.edu](mailto:sadrpour@usc.edu) 213-740-1937

<http://dornsife.usc.edu/uscseagrant/climate-change>

# Key Lessons Learned from Case Studies

- A. More Time and \$ than you think
- B. Plan for Next Steps from Beginning
- C. Be Adaptive and Build in Flexibility
- D. Avoid Data Analysis Paralysis
- E. Partnerships and Stakeholder Engagement are Crucial and Require \$/ Time. Good Relationships should be maintained! Be ready to deal with sensitive issues.

## What Key Lessons Learned Resonated with You?



# Questions & Answers



*Photo by Jose Bedolla*

Contact [hilary.walecka@scc.ca.gov](mailto:hilary.walecka@scc.ca.gov) with further questions