Collaboration: Sea-level Marin Adaptation Response Team (C-SMART)

Public Kick-Off Meeting

July 10, 2014
Red Barn Classroom, Point Reyes National Seashore

Agenda

1. Welcome (Marin Supervisor Steve Kinsey)
2. C-SMART background and process overview (Jack Liebster, CDA)
3. CoSMoS model development (Patrick Barnard, USGS)
4. Our Coast, Our Future site (Michael Fitzgibbon, Pt. Blue Cons. Science)
5. Next steps regarding public participation (Jack Liebster)
6. Q & A
7. Thank you and closing
Sea-Level Rise Projections using 2000 as the Baseline


<table>
<thead>
<tr>
<th>Time Period</th>
<th>North of Cape Mendocino</th>
<th>South of Cape Mendocino</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 - 2030</td>
<td>-4 to 23 cm</td>
<td>4 to 30 cm</td>
</tr>
<tr>
<td></td>
<td>(-1.6 to 9.1 in)</td>
<td>(1.56 to 11.8 in)</td>
</tr>
<tr>
<td>2000 – 2050</td>
<td>-3 to 48 cm</td>
<td>12 to 61 cm</td>
</tr>
<tr>
<td></td>
<td>(-1.2 to 18.9 in)</td>
<td>(4.7 to 24 in)</td>
</tr>
<tr>
<td>2000 – 2100</td>
<td>10 to 143 cm</td>
<td>42 to 167 cm</td>
</tr>
<tr>
<td></td>
<td>(3.9 to 56.3 in)</td>
<td>(16.5 to 65.7 in)</td>
</tr>
</tbody>
</table>

Annual Mean Sea Level, San Francisco Tide Gauge
www.psmsl.org/data/obtaining/stations/10.php

Our Coast, Our Future website
data.prbo.org/apps/ocof/

What projections are likely to occur in a given year?

Move the slider control below the graph left and right to see how different climate experts projections of sea level rise compare to one another. Hold your mouse over each bar for details.
MARIN’S COASTAL FABRIC
Grant funding provided by:

Partner organizations:

Technical advisers:
Collaboration: Sea Level Marin: Adaptation Response Team
Stakeholder Advisory Committee Application

The Collaborating on Sea Level Marin: Adaptation Response Team (C-SMART) Stakeholder Advisory Committee (SAC) will play an integral role in assisting the Marin Community Development Agency (CDA) in assessing impacts that sea level rise may bring to people, and natural and built environment resources of Marin’s coastal area, and identifying adaptation strategies for consideration into the County’s Local Coastal Program updates as well as other existing planning and policy processes.

We need people who are committed to actively engaging and involving the people in their community, in addition to providing their own knowledge and advice. In addition, SAC applicants must pledge to participate in three in-person meetings (tentatively October 2014, February 2015, and November 2015), and provide timely review of draft study products, and other communications as needed.

Name

Home Address

City ___________________________ State ____________ Zip: ____________

Primary Contact #: __________________ Secondary Contact #: __________________

Email Address ____________________

1) Representative for Geographic Areas
   Please select the community in which you reside and are willing to engage.
   ___ Muir Beach  ___ Sausalito Beach  ___ Bolinas
   ___ Sausalito  ___ Bolinas
   ___ Inverness  ___ Pt. Reyes Station
   ___ East Shore/ Marshall  ___ North County

2) Representative for Topical Concerns
   Please select from one (or more) of the following categories relevant to expertise and advocacy to describe the representation you would provide on the SAC:
   ___ Agriculture  ___ Environment  ___ Local Businesses  ___ Recreation  ___ Other

C-SMART Process

Local SLR Projections

Exposure

Potential Impact

Sensitivity

Asset Mapping

Adaptive Capacity

Vulnerability

Adaptation Strategies

Action Plan

June 2014 – April 2015

March 2015 – January 2016

March 2015 – February 2016
Sea Level Rise Projections
ASSET MAPPING & INVENTORYING

Mapping people; livelihoods; environmental services and resources; infrastructure; or economic, social, or cultural assets

- Agricultural land
- Protected areas
- Public beaches and parks
- Dunes
- River & streams
- Wetland areas
- Habitat areas
- Oyster beds
- Sandspits

- Shorebirds
- Roads and transportation
- Trails
- Buildings
- Residential development
- Commercial buildings
- School
- Elderly/mobility limited facilities

- Hotels/Motels
- Harbors and marinas
- Fishing, aquaculture facilities
- Utilities & services
- Septic leach fields
- Water Supply wells
- Archeological/ Paleontological sites
- Historic sites
EXPOSURE

Extent to which an asset may potentially experience physical effects.
Sensitivity

Degree to which an asset could be impaired by exposure.
ADAPTIVE CAPACITY

The ability or potential of a system or asset to respond successfully to climate variability and change (IPCC, 2007).
POTENTIAL IMPACT

The types of effects on human and natural systems could experience.

<table>
<thead>
<tr>
<th>Year</th>
<th>None</th>
<th>Annual</th>
<th>20 Year</th>
<th>100 Year</th>
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<tbody>
<tr>
<td>2010</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2030</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>2050</td>
<td>X</td>
<td>X</td>
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<td>X</td>
</tr>
<tr>
<td>2100</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
Vulnerability

The result of applying exposure, sensitivity, adaptive capacity and potential impact analyses over time.
Geomorphic Change

The coastline could change in response to higher sea levels and more frequent or intense storms.

Pacific Institute, The Impacts of Sea-Level Rise on the California Coast, 2009
ADAPTATION STRATEGIES

The process of adjustment to actual or expected climate change and its effects, in order to moderated harm or exploit beneficial opportunities (*IPCC, 2012*).

1. Elevated Development
2. Floating Development
3. Floodable Development
4. Coastal Armoring (Levees/Seawalls)
5. Living Shorelines
6. Managed Retreat
Science Serving the Community

PATRICK BARNARD, US GEOLOGICAL SURVEY
MICHAEL FITZGIBBON, POINT BLUE CONSERVATION SCIENCE
ADAPTATION STRATEGIES

The process of adjustment to actual or expected climate change and its effects, in order to moderated harm or exploit beneficial opportunities (IPCC, 2012)

1. Elevated Development
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4. Coastal Armoring (Levees/Seawalls)
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1) Elevated Development

Stinson Beach
2) Floating Development

Sausalito

SF Guardian

ARCTIC CIRCLE

IN A TIME OF RISING SEAS, I'M PROUD TO DECLARE OUR FIRST FLOATING SUBURB OPEN!

ARCTICCIRCLECARTOONS.COM

Oops.

THAT WAS THE MOORING TETHER.

Hallatt 5-29 © 2014 Alex Hallatt arcticcirclecartoons.com, distributed by King Features Syndicate
3) Floodable Development

Floodable Parking Garage - Rotterdam

Rain Garden – San Francisco

AIA NY

SF Environment
4) Coastal Armoring

“Super Levee” construction near Lathrop (Sacramento-San Joaquin Delta)

Levee Protecting House from Mississippi

Seawall - Bolinas

CA Department of Water Resources

Scott Olson/Getty Images
5) Living Shorelines

The Bay Institute

Horizontal Levees

Oyster Beds
6) Managed Retreat

Pacifica State Beach

Conceptual Managed Retreat Scenario, Fraser River Delta

South Delta - Sea Wall View
Managed Retreat Scenario (hypothetical year 2100)
1.2 metres of sea level rise
Strategic Action Plan for Sea Level Rise

PRELIMINARY IMPLEMENTATION PLAN:

- Strategy description/recommended responsibilities (Office of Emergency Services, Department of Public Works, Local Coastal Plan Amendments, Building Codes)
- Potential funding mechanisms
- Monitoring and Evaluation Table (including adaptive management)
- Monitoring protocol
- Periodic reviews to allow re-calibrating
GET INVOLVED!

Stakeholder Advisory Committee (SAC)

Meeting #1
- Kick-off

Meeting #2
- Exposure - Sensitivity

Meeting #3
- Adaptation Strategies

Meeting #4
- Local Coastal Plan Amendments

Public Meetings

Public Meeting #1
- Kick-off

Community Meetings #2
- Exposure - Sensitivity

Community Meetings #3
- Adaptation Strategies

Public Meeting #4
- Local Coastal Plan Amendments

- Local SLR Projections
- Exposure
- Sensitivity
- Asset Mapping

Adaptive Capacity

Potential Impact

Vulnerability

Action Plan

Adaptation Strategies
Questions?