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

California Shore and Beach Preservation Association

Photo Credit: Lighthawk Aerial

Community Development Agency
3501 Civic Center Drive, Rm. 308
San Rafael, CA 94903
415 4736269 T
www.marinslr.org

4/16/18
Sea Level Rise Adaptation Process

1. Evaluate Science Info.
2. Identify Assets
3. Assess Vulnerability
4. Evaluate Adaptations
5. Plan Action
6. Implement & Monitor
Identifying Future Risk with CoSMoS

1. Global forcing using the latest climate models

2. Drives global and regional wave models

3. Scaled down to local hazards projections
## State of California Official Guidance

<table>
<thead>
<tr>
<th>Period</th>
<th>Projected Range of SLR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2030</td>
<td>1.6 - 11.8 in. (4 - 30 cm)</td>
</tr>
<tr>
<td>2050</td>
<td>4.7 - 24 in. (18 - 61 cm)</td>
</tr>
<tr>
<td>2100</td>
<td>16.6 - 65.8 in. (42 - 167 cm)</td>
</tr>
</tbody>
</table>

NRC Sea-Level Rise Projections for California (SF Region), NAS-NRC 2012
EXPOSURE – SLR VS. ANNUAL STORM

25 cm, 0 Storm

100 cm, 0 Storm

25 cm, 1 Yr Storm

100 cm, 1 Yr Storm
### 40 different SLR scenarios

<table>
<thead>
<tr>
<th>SLR Level</th>
<th>No storm</th>
<th>Annual storm</th>
<th>20-year storm</th>
<th>100-year storm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0cm SLR</td>
<td>Blue</td>
<td>Red</td>
<td>Red</td>
<td>Orange</td>
</tr>
<tr>
<td>25cm SLR</td>
<td>Red</td>
<td>*</td>
<td>*</td>
<td>Yellow</td>
</tr>
<tr>
<td>50cm SLR</td>
<td>Red</td>
<td>*</td>
<td>*</td>
<td>Yellow</td>
</tr>
<tr>
<td>75cm SLR</td>
<td>Orange</td>
<td>Orange</td>
<td>Orange</td>
<td>Orange</td>
</tr>
<tr>
<td>100cm SLR</td>
<td>Yellow</td>
<td></td>
<td>*</td>
<td>Yellow</td>
</tr>
<tr>
<td>125cm SLR</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>150cm SLR</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>175cm SLR</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200cm SLR</td>
<td>Yellow</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

* Marin County selected SLR scenarios
**ASSET MAPPING & INVENTORYING**

- 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
- Schools
- 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

Mapping people; livelihoods; environmental services and resources; infrastructure; and economic, social, & cultural assets
The Vulnerability Assessment Tool

C-SMART
Collaboration Sea-level RISE MODERN RESPONSE TEAM
ASSET VULNERABILITY ASSESSMENT TOOL AND SCRUT

[County of Marin logo]

[Interviewer's name]
[Interviewee's name]
[Date]
[Phone]

Asset:

Instructions to CDA: Use this script to conduct interview (in-person or on phone) with identified asset managers. Read the instructions to the asset manager and provide an overview of the process. Be sure to ask the questions as they are written to ensure consistency across interviews.

CDA: Hello, my name is __________ from Marin County Community Development Agency, and I am calling here for our appointment to discuss your asset risk impact public assessment. (Allow silence)

CDA: Thank you for agreeing to this interview. We hope that this process is useful to you and the future management of capital assets. In particular, we hope that lessons learned public assets relating to your area of expertise will help us to get over what the long-term impacts are.

2. Asset impacts:

3. Asset impacts:

We think this process could take 20-30 minutes per asset, and answers about 25 questions. For each asset, I will ask several yes or no questions or a yes/no answer questions, followed by rating degree of sensitivity, adaptive capacity, and risk factors associated with sea level rise and storms. Completing this for each asset will enable us to complete a vulnerability assessment and facilitate subsequent planning.

Before I get started, do you have any questions? (Allow Q&A)

CDA: We will begin with the [asset name] (if needed). The first set of questions may be useful in the planning process and will help us to prioritize the use of resources.

1. Are these efforts underway to address SURF/SURF emergency or climate change efforts for the asset? [Allow response, and clarify if needed]

2. What is your level of awareness of sea level rise? [Allow response, and clarify if needed]

3. What is your general knowledge of mean sea level rise? (Allow response, and clarify if needed)

Please provide the necessary information for each question.

Are there existing obstacles, are they likely to improve or worsen?

[Allow response, and clarify if needed]

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If yes, what is the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)

If no, the [asset name] capacity of the asset to recover from the damage or have any questions about adaptive capacity? (Allow Q&A)
Asset Mapping In Action

Additional Natural Resources in area includes:
- Steelhead Trout habitat
- Coho Salmon habitat
- Harbor Seal Haul Outs and Pupping sites
- Brown Pelican Roosting sites
Public Workshops!

What could MARIN SEA LEVEL RISE mean to you?

JOIN US!
Thursday, July 10, 2014
6:30 PM to 8:00 PM
Red Barn Classroom
Point Reyes National Seashore
3 Bear Valley Road
Nicasio, CA 95464

Collaboration: Sea-level Marin Adaptation Response Team (C-SMART) welcomes YOUR participation!

- Learn about C-SMART
- See areas that could be impacted in the future
- Understand future public involvement opportunities
- Get questions answered

For more information and opportunities to participate: www.marinslr.org

Community Development Agency
Collaboration: Sea-level Marin Adaptation Response Team
February 2018 | www.marinslr.org
4,700 acres exposed at mean higher high water

Mean higher high water: The average high tide, thus some sites could be dry during lower tides.
1,100 buildings
1,300 parcels | 22% of residential, 33% of commercial
$300 million in assessed value, market value is higher
$7 million in property tax
$700,000 in Transient Occupancy Tax
Beaches could flood and erode
Marshes could convert to mud flats or move upland
Marshes could convert to mud flats, and may move upland
Adaptive management

/əˈdaptɪv/ man-ij-muh nt (Noun)

An iterative method of decision making in the face of uncertainty that reduces uncertainty by continuous monitoring; used especially in the management of ecosystems etc.
Adaptation Report

- Informational document compiling adaptation options proposed to date
- Next steps to carry forward potential options
- Non-regulatory, not-a-plan
Geomorphic Change
Stinson Beach

This map was developed for planning and discussion purposes. The County of Marin is not responsible or liable for use of this map beyond its intended purpose. This map is representational only and does not constitute an official map or dataset of the County of Marin.

Sea Level Rise (SLR) Scenarios
- Beach around end of century
- Beach Loss @ 50 inches SLR
- Beach Loss @ 40 inches SLR
- Beach Loss @ 20 inches SLR
- Beach Loss @ 10 inches SLR
Combined Riverine and SLR Flooding
Stinson Beach Strategies

- **Raise Homes** (89 structures in V Zone) = $29 M
  - Norishment would also be required for beach to maintain ecological/recreation function at 2060/2090 = $22 M total
- **Beach and Dune Nourishment** = $44 M over long term
- **Revetment Extension** = $24 M (additional nourishment would be required)
- **Cobble Berm** = $55 M per mile
THANK YOU!

Marin County Board of Supervisors
2/27/18