San Mateo County
Sea Level Rise Vulnerability Assessment

C/CAG Board Meeting
November 12, 2015
Hilary Papendick, San Mateo County Office of Sustainability
OFTEN REFERRED TO AS “GROUND ZERO” FOR SEA LEVEL RISE, SAN MATEO COUNTY IS ONE OF THE MOST VULNERABLE REGIONS OF THE BAY AREA TO THE PROBLEM OF RISING SEA LEVELS FROM CLIMATE CHANGE. The County of San Mateo is spearheading an effort to address this challenge under the leadership of County Supervisor Dave Pine, Assemblyman Rich Gordon, and Congresswoman Jackie Speier, and with funding from the Coastal Conservancy. We are working with a broad coalition of governments across jurisdictional boundaries to create proactive solutions for our communities. The two main efforts the County is currently pursuing include a technical study on the effect of sea level rise on the SFO, San Bruno Creek, and Colma Creek region, and a County-wide vulnerability assessment that will identify high risk areas along the bay and coast.
San Mateo County has $24 billion in assets at risk from sea level rise

Pacific Institute 2009
Transportation Networks

Highway 101 at Oyster Point

Lea Suzuki / The Chronicle
Communities in Low-Lying Areas

Le Mar Trailer Park, Redwood City
John Green/ Bay Area News Group
El Niño Flooding in 1998

Embarcadero Road in Palo Alto, 1998
Len Vaughn-Lahman/Bay Area News Group
Bluff Top Communities

Photo by L Ewing

Pacifica
Coastal Records Project
Toxic Sites & Closed Landfills

Closed Landfills & Active Solid Waste Facilities

Brisbane Lagoon filled in by San Francisco garbage, 1940-1994

Highway 101
Wastewater treatment facilities

South San Francisco Water Quality Control Plant
Businesses & Tech Industry
Public Access

Surfers’ Beach, Half Moon Bay. Photo by Ben Pittenger
Wetlands & Coastal Habitats

South Bay Salt Ponds

Photo by Don McCullough

Photo by HPapendick
# Best Available Science on SLR

- National Research Council Report on SLR Projections for California

<table>
<thead>
<tr>
<th>Year</th>
<th>Projections</th>
<th>Ranges</th>
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<tbody>
<tr>
<td>2030</td>
<td>6 +/- 2 inches</td>
<td>2 to 12 inches</td>
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<tr>
<td>2050</td>
<td>11 +/- 4 inches</td>
<td>5 to 24 inches</td>
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<tr>
<td>2100</td>
<td>36 +/- 10 inches</td>
<td>17 to 66 inches</td>
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*Sea Level Rise Projections for San Francisco; Ranges for South of Cape Mendocino*
The Bay with 3.3 feet Sea Level Rise

3.3 feet sea level rise, no storm

http://data.prbo.org/apps/ocof/
The Bay circa 1850

Map by Oakland Museum, available
http://explore.museumca.org/creeks/WholeMaps/10_San%20Mateo%20Creek%20Map.pdf
Sea Level Rise Vulnerability Assessment
Vulnerability Assessment Steps

1. Develop County-specific approach
2. Gather data and categorize assets
3. Inundation exposure analysis and mapping
4. Vulnerability and risk analysis
5. Initial adaptation planning

Actionable outcomes
Actions to Date

- Methodology Report complete
- Asset Categorization Report complete
- Sea Level Rise Scenarios
- Convened Technical Working Group & Policy Advisory Committee
- Community Task Force
### Scenario Examples

<table>
<thead>
<tr>
<th>SLR / Storm</th>
<th>MHHW</th>
<th>King Tide</th>
<th>1 yr</th>
<th>20 yr</th>
<th>100 yr</th>
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<tr>
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<td></td>
<td>HMB</td>
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<td>Marin</td>
<td>HMB</td>
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<tr>
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<td></td>
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<tr>
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<td>Humboldt</td>
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<td></td>
<td>Marin</td>
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## Scenario Examples + SMC Scenarios

<table>
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<tr>
<th>SLR / Storm</th>
<th>MHHW</th>
<th>King Tide</th>
<th>1 yr (100%)</th>
<th>20 yr (5%)</th>
<th>100 yr (1%)</th>
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<td>Humboldt</td>
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<td>SMC</td>
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<td>HMB</td>
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<tr>
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<td>Humboldt</td>
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<td>SMC</td>
<td>Marin</td>
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Asset Categorization

Assets will be organized into *classes* based on:

- Public health, safety, welfare (built assets)
- Ecosystem and habitat (natural assets)
- Social vulnerability (human assets)
Next Steps

- Inventory of Assets
- Stakeholder review of assets
- Draft 30 assets
- Stakeholder review of 30 assets
- Asset manager interviews and research
- Develop Asset Vulnerability Profiles
- Adaptation strategy recommendations
- Implementation of adaptation options
Upcoming Meetings & Engagement Opportunities

- **Technical Working Group Meetings**
  - December 10, 1-4pm – Sobrato Center
  - February 9, 9-12pm – San Mateo Library

- **Policy Advisory Committee Meetings**
  - March 8

- **Public Workshops:**
  - December 12
  - Early Spring
Public Engagement Opportunities

- **Community Task Force**
  - 1st meeting Nov 23

- **Public Workshops**
  - December 12
  - Early Spring

For more info:
Contact TJ Carter
tjcarter@smcgov.org
or visit
www.seachangesmc.com
What can we do to prepare?

- Avoid hazardous areas
- Design to accommodate risks
- Remove at-risk structures
- Protect critical structures
- Restore wetlands
- Use hybrid approaches
Restore Tidal Marsh

Wetlands reduce wave energy

http://www.southbayrestoration.org/
Create Living Shorelines

In San Rafael, 2 million oysters colonized a living shoreline reef.

Wave attenuation increased by 30-50%

http://www.sfbaylivingshorelines.org/sf_shorelines_about.html

SF Bay Living Shorelines Project
Build Horizontal Levees

A new kind of levee
The Bay Institute, an environmental group, has proposed a number of "horizontal levees" for San Francisco Bay that blend a traditional earthen levee with restored tidal marshes. The marshes would be built up with sediment from local flood control channels. Marsh vegetation would be irrigated with reclaimed wastewater.

Marshes as barriers
Tidal marshes can slow down storm surges, meaning levees fronted by marshes can be built half as tall, and at half the cost, as traditional levees made of earth and clay.

WITH NO MARSCH
13.5-foot-high levee

WITH MARSCH
7-foot-high levee

Note: Not to scale

Source: The Bay Institute

DOUG GRISWOLD/BAY AREA NEWS GROUP
California King Tides Project

Highest Tides of the Year
- November 24, 25, 26
- December 22, 23, 24
- January 21, 22

For times and locations visit:
http://california.kingtides.net/
El Niño – Warmer Waters

During the last four weeks, tropical SSTs were above average across the central and eastern Pacific and most of the Indian Ocean. SSTs were below average near Indonesia.
Warmer Water = Higher Water Levels

Tuesday, Oct 27, 2015
Predictions: 6.67ft
Preliminary Observed: 7.22ft
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