Local Coastal Program Team

**City Staff:**  Mark Brodeur, CEDD Director  
Anastazia Aziz, Senior Planner  
Wendy Lao, Assistant Planner

**Consultant:** EMC Planning Group Inc.  
Michael Groves, Senior Principal  
Polaris Kinison Brown, Project Manager  
Candy Ingram, Principal, The Ingram Group

**Coastal Commission Staff:**  
Kevin Kahn, Central Coastal District Supervisor  
Brian O’Neill, Coastal Planner
Guest Presenter

David L. Revell, PhD
Principal and Chief Coastal Scientist
This Morning's Workshop Format and Focus

- Brief presentation to provide an overview of the Local Coastal Program Update process and where we are in the process
- Presentation by Dr. David Revell on Sea Level Rise
- Community Input/Round Table Discussion
- Summary
This Morning's Workshop Format and Focus

- Focus on:
  - Climate Change
  - Sea Level Rise
  - Adaptation Strategies
Local Coastal Program Overview

- Certified Local Coastal Program is required by the Coastal Act
  - “Local community has a better understanding of how best to manage the area’s unique coastal resources”

- Provide local jurisdictional review

- Increase administrative/procedural efficiency

- Two Year Process, 2014-2016

- Two Parts
  1. Land Use Plan (Policy)
  2. Implementation Plan (Ordinances)
Where is the Pacific Grove Coastal Zone Boundary?

Legend

- City of Pacific Grove
- Major Roads
- Coastal Zone

Source: City of Pacific Grove, Google Earth 2013
Land Use Plan Process

- Land Use Plan
  - Existing Land Use Plan (1989) and Coastal Parks Plan (1998)
  - Background Report and Vulnerability Assessment
  - Draft Land Use Plan
  - Coastal Commission Staff Review
  - Outreach/Meetings/Study Sessions/Workshops
  - Incorporate Feedback
  - Final Land Use Plan
Implementation Plan Process

- Implementation Plan
  - Tie Land Use Plan and Coastal Parks Plan to the Implementation Plan
  - City staff and consultant team update the 1999 Draft Implementation Plan
  - Review Implementation Plan and obtain Coastal Commission Staff feedback
  - Outreach/Meetings/Study Sessions/Workshops
  - Final Implementation Plan
  - Implementation Plan presented at City’s Planning Commission and City Council for consideration and adoption
Land Use Plan and Implementation Plan Process

- Adoption
  - Submission to Coastal Commission for consideration of adoption and certification of Land Use Plan and Implementation Plan
  - Back to City Council for acceptance
  - Once certified the permit authority will be transferred from the Coastal Commission to the City
Land Use Plan and Implementation Plan Process

- Grant
- Background Report
- Vulnerability Assessment
- Draft LUP
- Workshop #1
- You Are Here Workshop #2
- IP Workshop
- Final LUP Draft IP
- Final IP
- Submit LUP & IP to CCC

- CCC Staff Review
- Staff Review
- Public Review

Timeline:
- Spring
## Land Use Plan and Implementation Plan Process

### Outreach Efforts and Opportunities

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>9/15/2014</td>
<td>Local Coastal Program Webpage updated and revised to highlight Update process</td>
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<tr>
<td>9/15/2014</td>
<td>Frequently Asked Questions developed and posted</td>
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<td>10/9/2014</td>
<td>Community Kick Off meeting</td>
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<td>Fall 2014</td>
<td>Stakeholder interviews</td>
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<tr>
<td>12/10/2015</td>
<td>Joint Planning Commission &amp; City Council kick off meeting</td>
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<tr>
<td>1/8/2015</td>
<td>Planning Commission - Lovers Point Uses</td>
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<td>1/22/2015</td>
<td>Planning Commission - Visitor Accommodation and Visitor Commercial</td>
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<td>1/31/2015</td>
<td>Online survey Nov. 22- Jan. 31 closes</td>
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<td>2/5/2015</td>
<td>Planning Commission - Climate Change and Sea Level Rise</td>
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<td>3/5/2015</td>
<td>Planning Commission - ESHA</td>
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<tr>
<td>4/2/2015</td>
<td>Planning Commission- water and marine resources and shoreline access</td>
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<td>4/16/2015</td>
<td>Coastal Walk</td>
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<td>5/7/2015</td>
<td>Planning Commission - Monterey Bay Adapt Climate Change presentation</td>
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<td>6/13/2015</td>
<td>Coastal Walk - ESHA</td>
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<td>6/18/2015</td>
<td>Planning Commission -Draft LUP</td>
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<td>7/14/2015</td>
<td>Architectural Review Board – Draft LUP</td>
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<td>7/18/2015</td>
<td>Planning Commission - Draft LUP</td>
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<td>7/21/2015</td>
<td>Beautification and Natural Resources Commission Draft LUP</td>
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<td>7/22/2015</td>
<td>Historic Resources Committee – Draft LUP</td>
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<td>8/19/2015</td>
<td>Coastal Commission - LUP Update and direction on additional outreach</td>
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<td>8/20/2015</td>
<td>Coastal Talk - Archaeology</td>
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<td>9/23/2015</td>
<td>Chamber of Commerce presentation</td>
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<tr>
<td>10/3/2015</td>
<td>Butterfly Bazaar</td>
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<td>10/7/2015</td>
<td>Pacific Grove High AP Environmental Science class presentation</td>
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<td>10/19/2015</td>
<td>Community Workshop #1 Land Use</td>
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<tr>
<td>10/27/2015</td>
<td>Joint Pacific Grove &amp; Monterey Planning Commission meeting on Sea Level Rise</td>
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<tr>
<td>11/11/2015</td>
<td>PG’s Changing Shoreline: How will we adapt</td>
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<tr>
<td>11/20/2015</td>
<td>Community Workshop #2 Sea Level Rise</td>
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</tbody>
</table>
## Land Use Plan and Implementation Plan Process

### Coastal Commission and City Staff / Consultant Meetings

<table>
<thead>
<tr>
<th>Date</th>
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<tr>
<td>8/08/2014</td>
<td>Kickoff Meeting</td>
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<td>9/08/2014</td>
<td>Bi-Monthly Meeting #1</td>
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<td>10/21/2014</td>
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<td>11/07/2014</td>
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<td>1/09/2015</td>
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<td>4/08/2015</td>
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<td>6/30/2015</td>
<td>Bi-Monthly Meeting #6</td>
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<td>10/13/2015</td>
<td>Bi-Monthly Meeting #7</td>
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Sea Level Rise, Coastal Flooding & Storm Impacts

Climate Cycles vs. Climate Change

Variations in the Earth’s orbit around the Sun played a major role in causing past climate change and sea level oscillations.

Three Orbital Cycles & Periods

1. Shape of orbit-100,000 years
2. Tilt of axis of rotation ~41,000 years
3. Wobble of Earth’s axis- ~26,000 years
As the Earth has cooled and warmed, glaciers and ice sheets have advanced and retreated, and sea level has fallen and risen.

20,000 years ago, ~3% of the ocean’s water, some 10 million cubic miles, was transferred to the continents as ice and sea level dropped about 400 feet (125 meters) and then rose again.
Sea Level

Ice Age ended

Present Rate
3.2 mm/yr
(12”/100 yrs)

Rapid Rise
11 mm/yr
45”/100 yrs

Very slow rise
<1 mm/yr

Very rapid rise
>20 mm/yr
78”/100 yrs

Thousands of Years Ago

Sea Level

Sea Level Change (ft)

390 ft

www.johnenglander.net
The rate of global sea-level rise was measured from tide gages historically and satellites since 1993.
Antarctica ~200 feet of SLR
Greenland ~22 feet of SLR
Mountain Glaciers ~ 2 feet of SLR

Potential future sea-level rise is very large (~225 feet total), but uncertainties in rate of rise.

"HOW ON EARTH DO WE TURN IT OFF?"
Global Causes of Sea Level Rise

Intergovernmental Panel on Climate Change (2007)
Regional Causes of Sea Level Rise

What causes the sea level to change?

- Terrestrial water storage, extraction of groundwater, building of reservoirs, changes in runoff, and seepage into aquifers
- Surface and deep ocean circulation changes, storm surges
- Subsidence in river delta region, land movements, and tectonic displacements
- As the ocean warms, the water expands
- Exchange of the water stored on land by glaciers and ice sheets with ocean water

Intergovernmental Panel on Climate Change (2007)
**Sea Level Rise Impacts in Pacific Grove**

<table>
<thead>
<tr>
<th>San Francisco 2100 (inches)</th>
<th>2030</th>
<th>2050</th>
<th>2100</th>
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<tbody>
<tr>
<td>High Sea Level Rise</td>
<td>11.7</td>
<td>23.9</td>
<td>65.5</td>
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<tr>
<td>Average of Projections</td>
<td>5.7</td>
<td>11.0</td>
<td>36.2</td>
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<tr>
<td>Low Sea Level Rise</td>
<td>1.7</td>
<td>4.8</td>
<td>16.7</td>
</tr>
</tbody>
</table>

- Increased frequency and depth of coastal flooding & inundation
- Saltwater intrusion into coastal aquifers
- Accelerated beach erosion rates
- Beach loss
- Greater frequency of cliff failures
- Beach/shore/recreation access compromised
- Costly damages
WAVE ATTACK

FLOODING/INUNDATION

CLIFF OR BLUFF EROSION
What is El Niño?

“The Child” – first noticed in S. America around Christmas

A disruption of the ocean-atmosphere system in the tropical Pacific

Normally, northeasterly trade winds combined with upwelling off of the coast of Peru keep waters cool in the central and eastern Pacific.

During El Nino, trade winds relax in the western Pacific leading to warmer waters in the central and eastern Pacific.
Normal Circulation

(a) Normal conditions
El Niño Circulation

(b) El Niño conditions
El Niño vs. La Niña
Not all El Niños are the same
Impacts on Atmospheric Circulation

El Niño:
Extended
Pacific Jet Stream
El Niño Impacts on Wave Direction

Change in Wave Size
Shift in Wave Direction

Central California

“El Nino”

“Normal”
PACIFIC GROVE
Present Day
Waves breaking on Ocean View Avenue, Pacific Grove Dec. 10, 2014
FLOODS BUT NO BLACKOUTS

Central Coast beaches, roads hit heavily by storm-blown waves

By M. CRISTINA MEDINA
Herald News Writer

Fierce waves propelled by an unusually high tide and a strong seafaring storm blasted the beaches and coastal roadways Thursday, closing streets in Pacific Grove and parts of 17-Mile Drive in Pebble Beach, shutting state beaches and flooding the Carmel River Lagoon area.

The high tide and 40-mph gusts swept into the Monterey Bay at 10:40 a.m., creating 15-foot waves that set off a dramatic display attracting scores of sightseers to the shore. Despite efforts by police and fire officials to warn them away.

In a precautionary move, the Pacific Grove Fire Department set up a command center at Chase Park near Lovers Point to monitor the coastal activity.

A 24-foot boat broke loose from its mooring in Monterey Harbor and crashed into the breakwater, and a larger fishing boat dragging its anchor broke pilings on Municipal Wharf No. 2, said Harbor Master Steve Scheiblauer.

“We were fairly well sheltered from the direct waves,” Scheiblauer said, “but along the beach the surf is just enormous.”

Harry Robins, Monterey County emergency services director, said the waves caused major erosion on some beaches.

At the Timmy at Lovers Point in Pacific Grove, Debbie Briscoe and four other waitresses stared at the giant breakers behind the restaurant’s windows.

“You’ve got to respect Mother Nature,” Briscoe said.

Waves crash over Ocean View Boulevard in Pacific Grove, forcing city officials to close the street for several hours Thursday morning.

Enough stations hampered to create near power crisis

By STEVE LAWRENCE
The Associated Press

we’d go to blackouts, but now think it’s probable that we will avoid it.

Bush also picks Zoellick for trade post to round out his economic team

By TOM BAUM
The Associated Press

WASHINGTON — President-elect Bush, completing his economic team and reconstituting his Cabinet, chose former Peace Corps Director Elaine Chao as labor secretary and Robert Zoellick, a diplomat in two previous Republican administrations, to be U.S. trade representative.

Two days after his first labor nominee withdrew under fire, Bush also named a spirited defense of two other nominees who have generated opposition: former Sen. John Ashcroft, R-Mo., as attorney general and former Colorado Attorney General Gale Norton as interior secretary.

“You know, what happens in this town is, the voices of the special interests like to tear people down,” Bush said, showing irritation.

He urged “senators to tone down their rhetoric.”

Chao, the pick of a Republican senator, was Bush’s second selection for Labor. She did not return his first choice, Linda Chavez, withdrew following disclosures that she provided shelter and cash to an illegal immigrant who did household chores.

“I never expected our nominees to be approved without a fight,” Bush said.
BOAT RAMP AND CARETAKERS COTTAGE - January 11, 2001
Tide gages from San Francisco to Baja California have been running 6 to 8 inches above predicted since mid-September 2015.

### Chart Table

<table>
<thead>
<tr>
<th>Month</th>
<th>Tides</th>
<th>Monterey</th>
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<tbody>
<tr>
<td>November</td>
<td>Tides &gt; 6 ft.</td>
<td>23rd-27th</td>
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<tr>
<td></td>
<td>Tides &gt; 7 ft.</td>
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<tr>
<td></td>
<td>Tides &gt; 8 ft.</td>
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</tr>
<tr>
<td>December</td>
<td>Tides &gt; 6 ft.</td>
<td>21st-26th</td>
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<tr>
<td></td>
<td>Tides &gt; 7 ft.</td>
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<td></td>
<td>Tides &gt; 8 ft.</td>
<td></td>
</tr>
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<td>January</td>
<td>Tides &gt; 6 ft.</td>
<td>9th-11th</td>
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<td></td>
<td>Tides &gt; 7 ft.</td>
<td>20th-23rd</td>
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<td>February</td>
<td>Tides &gt; 6 ft.</td>
<td>1st-8th</td>
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<td></td>
<td>Tides &gt; 7 ft.</td>
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<td>March</td>
<td>Tides &gt; 6 ft.</td>
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<td></td>
<td>Tides &gt; 7 ft.</td>
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<tr>
<td>April</td>
<td>Tides &gt; 6 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tides &gt; 7 ft.</td>
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</tbody>
</table>
El Niño Impacts to California

**Physical**
- Increase Sea Surface Temperature and sea levels – 8-25 inches
- Increase Wave Heights and shift in wave direction
- Increase in Precipitation – variable but generally wetter

**Cultural**
- Coastal Erosion
- Economic Impacts - $25 Billion in 1997-98 ENSO event – Ag, Rec, Retail, Construction, Energy distribution

**Biological**
- Fishery Collapses – due to decreased upwelling - Anchovy, Sardine
- Redistribution of Fisheries – Barracuda, Tuna, Marlin
FINAL

City of Pacific Grove Climate Change Vulnerability Assessment

PREPARED FOR
City of Pacific Grove

January 12, 2015
Pacific Grove's LCP Update and Climate Change

Existing LUP
1989

Existing LUP Amendment
1998

General Plan
1994

Draft LUP
May 2015

Final LUP
Early 2016

Draft Implementation Plan
Spring 2016

Final Implementation Plan

Update

Certified
Local Coastal Program
Adopted

Draft Local Coastal Program

January 2015
Background Report

Existing Coastal Resources

Existing Coastal Policies

Historic Context Statement

Final Background Report

Pacific Grove Local Coastal Program Update

Prepared for
City of Pacific Grove
January 2015
Vulnerability Assessment

**Draft Sea-Level Rise Policy Guidance Public Review Draft**
(California Coastal Commission 2013)

**California Adaptation Planning Guide**
(California Emergency Management Agency and California Natural Resources Agency 2012)

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**Monterey County Multi-Jurisdictional Hazard Mitigation Plan – Final Draft** (Monterey County Hazard Mitigation Planning Team with Professional Planning Assistance from AECOM 2014)

**Pacific Institute Sea Level Rise maps (2009)**

**Cal-Adapt**
Vulnerability Assessment

Inundation Level
Flood
Coastal Erosion

Exposure – Sea Level Rise

Recreation/Access
Biodiversity and Habitat
Coastal Development and Infrastructure

Sensitivity

Potential Impacts

Adaptive Capacity

Risk and Onset

City of Pacific Grove Climate Change Vulnerability Assessment

PREPARED FOR
City of Pacific Grove
January 2015
Vulnerability Assessment

Findings

55-Inch Sea Level Rise by Year 2100

Inundation at High Tide in Feet of Sea Level Rise
(80% confidence)
- six feet
- five feet
- four feet
- three feet
- two feet
- one foot
- zero feet

Legend
- Planning Area Boundaries
- City of Pacific Grove
- Major Roads
- Coastal Zone

Source: AECOM 2014, City of Pacific Grove, Google Earth 2013
Vulnerability Assessment

Findings

Sea Level Rise With Potential Flooding, Erosion, and Tsunami

Sea Level Rise and 100-Year Base Flood
- Coastal Flooding Year 2000
- Coastal Flooding Year 2100

Tsunami
- Tsunami Line

Erosion Hazard
- Erosion Hazard Zone Year 2100

Legend
- Planning Area Boundaries
- City of Pacific Grove
- Major Roads
- Coastal Zone

Note: Coastal erosion data not available for the coastal area from Point Pinos south past Sunset Drive.

Source: Pacific Institute 2009, City of Pacific Grove, Google Earth 2013

Areas of Potential Sea Level Rise Hazard
What are Adaptation Strategies?

- Retreat
- Accommodate
- Protect

More Disasters
Higher Costs

Community Acceptance of Risk

Time or Sea Level Elevation

Risk
Do Nothing

“Failure to plan is planning to fail.”
- Ben Franklin
Escalating Costs

Recurrence Intervals of Extreme Water Levels

Sea Level Relative to MSL in 2000, in

1950
2020
2045
2060
2077

50 Yr.
10 Yr.
1 Yr.
2 MTh
1 MTh

Cost / year
$500
$2,500
$25,000
$150K
$300K

-20
0
20
40
60
80
100
120
140

Retreat

- Fee Simple Acquisition
- Realignment / Phased relocation
- Rolling Easements
- Hybrid – Purchase with lease back option

Source: California Coastal Records Project
Policy Options for Adaptation

• Transfer of Development Rights in high risk areas
• Utilizing zoning regulations to support strategies
  ✓ Hazard overlays
  ✓ Site specific report triggers
  ✓ Real estate disclosures for hazards
• Regular public education
• Monitoring effectiveness of strategies
• Financing for public acquisition of high risk areas
Accommodate

- Elevate
- Setbacks
- Moveable Foundations
Protect

Green
- Sediment Management
- Beach Nourishment
- Cobble Nourishment

Gray
- Seawalls and Revetments
- Breakwaters
- Jetties
- Artificial Reefs
- Perched Beaches
Implementation Timelines

Implementation Timeline

PROTECT
- Existing flood control channels

PROTECT, ACCOMMODATE, RETREAT
- Enhance habitats, inlet management, retrofit infrastructure

ACCOMMODATE, RETREAT
- Elevate roadways and structures, improve sediment management

RETREAT
- Phased relocation of infrastructure, acquisition of upland adjacent properties

Tipping point Decision Planning Implemented
Secondary Impacts

- Construction Costs
- Escalating Maintenance Costs
- Ecology
- Recreation
- Views
- Aesthetics

Seawalls destroy beaches

Land Use Plan Policy Update – Key Topics

- Climate Change
- Sea Level Rise
- Adaptation Strategies
Key Topics

Climate Change, Sea Level Rise and Adaptation

Sea Level Rise With Potential Flooding, Erosion, and Tsunami

Sea Level Rise and 100-Year Base Flood
- Coastal Flooding Year 2000
- Coastal Flooding Year 2100

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- Tsunami Line

Erosion Hazard
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Legend
- Planning Area Boundaries
- City of Pacific Grove
- Major Roads
- Coastal Zone

Source: Pacific Institute 2009, City of Pacific Grove, Google Earth 2013

Areas of Potential Sea Level Rise Hazard
1. What is your community vision for Pacific Grove's future coastline?

2. What methods or types of adaptations do you suggest be considered regarding potential/anticipated impacts of climate change and rising sea water levels as they relate to public trails, parks, parking lots, roads and natural resources (i.e. beaches and habitat)?

3. When considering anticipated/potential impacts from climate change and rising sea water levels, what methods or adaptations do you suggest be considered to protect existing community/public water and sewer systems?

4. What other ideas, comments, suggestions, and/or preferences would you like the City to consider with respect to planning for sea level rise?
What's Next?

- Fill out your comment cards tonight or send your comments to aaziz@cityofpacificgrove.org
- Visit the Local Coastal Program Update webpage by following the link on the City’s website to stay informed
- Sign up list at today’s meeting so you will be sent notice of all future public hearings
- Attend future Planning Commission, City Council and Coastal Commission hearings over the next 6-8 months
Thank You for Your Participation!

WELCOME TO PACIFIC GROVE