
# CALIFORNIA COASTAL COMMISSION DRAFT SEA-LEVEL RISE POLICY GUIDANCE AND INTRODUCTION TO ADAPTATION

14 April 2015

Santa Barbara-Ventura SLR Workshop

CALIFORNIA COASTAL COMMISSION

# Overview of Presentation



- California Coastal Commission and Coastal Act
- Coastal Commission's Draft Sea Level Rise Policy Guidance
  - Planning Guidance for Local Coastal Programs
  - Permit Guidance for Coastal Development Permits
- Overview of some Options for Adaptation
- Next Steps

# Contents of the Draft Document



## Executive Summary

### Main Report

Chapter 1: Introduction
Chapter 2: Guiding Principles
Chapter 3: Science
Chapter 4: Guidance for LCPs
Chapter 5: Guidance for CDPs
Chapter 6: Additional Research
Chapter 7: Next Steps
Chapter 8: Glossary

### Appendices

Appendix A: Science
Appendix B: Coastal Engineering
Appendix C: Adaptation Options
Appendix D: LCP Resources
Appendix E: Other Agencies' Programs
Appendix F: Coastal Act Policies

# About the Draft Document



| IT ***IS*** | IT IS ***NOT*** |
|---|---|
| Draft | Final |
| Draft Guidance for addressing Sea-Level Rise in conformance with the Coastal Act | New regulations |
| Complement to other Commission materials | Replacement for other Commission materials |
| Multi-purpose guidance in which users may focus on particular chapters | Meant to be read cover to cover |
| A list of sea-level rise adaptation options to choose from | A checklist of adaptation measures where all items have to be accomplished |
| A living document | Static |

# Goals of the Document

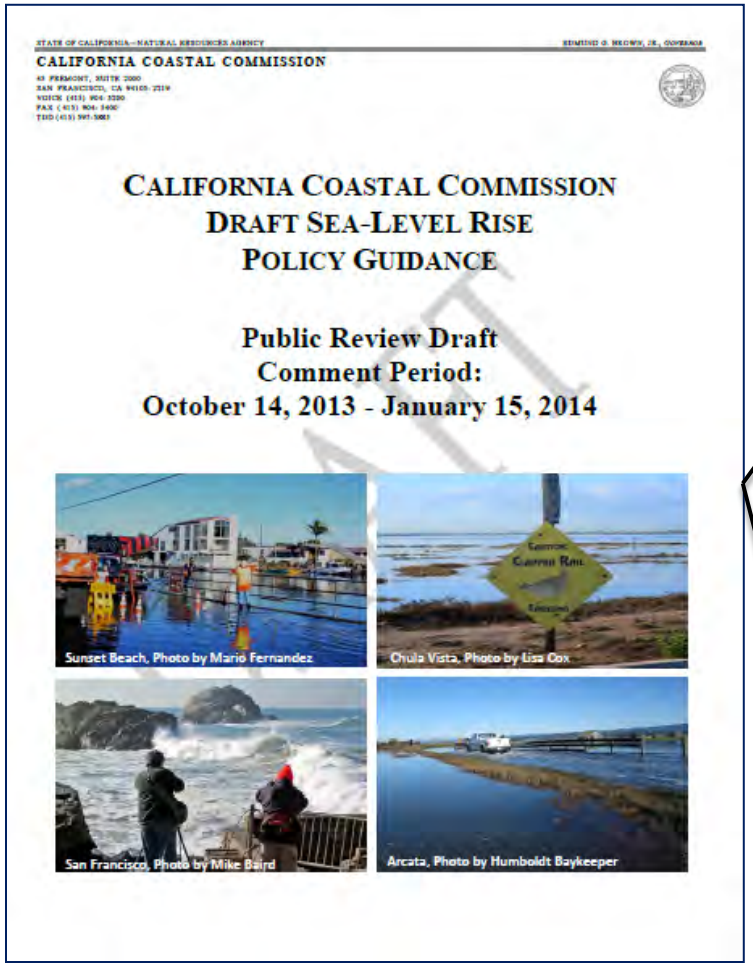


- Address sea-level rise in California
- Coastal Act: Minimize hazards and impacts to coastal resources due to sea-level rise
- Fulfill Strategic Plan item 3.1.1

Surf scene, San Diego | Nathan Rupert

# Applications of Best Science






Local Coastal Programs

Long-Range Development Plans
Port Master Plans
Federal Consistency

Coastal Development Permits

McGrath State Beach | www.caopensapce.org

Oxnard Beach | Flickr user Surfingsanders

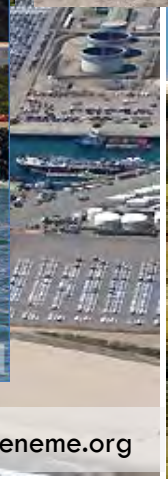
Oxnard Shores Mobile Home Park | California Coastal Records Project

Oxnard Farm Fields

Reliant Ormand Beach Generating Station | California Coastal Records Project

Rincon Beach, Ventura, CA | Dec 2012

David Powdrell



Port of Hueneme | portofhueneme.org

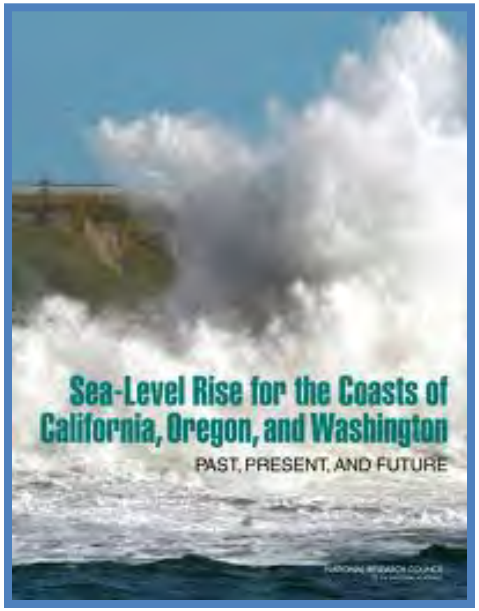
Ormand Beach Wetlands| Sierra Club

# Best Available Science on SLR



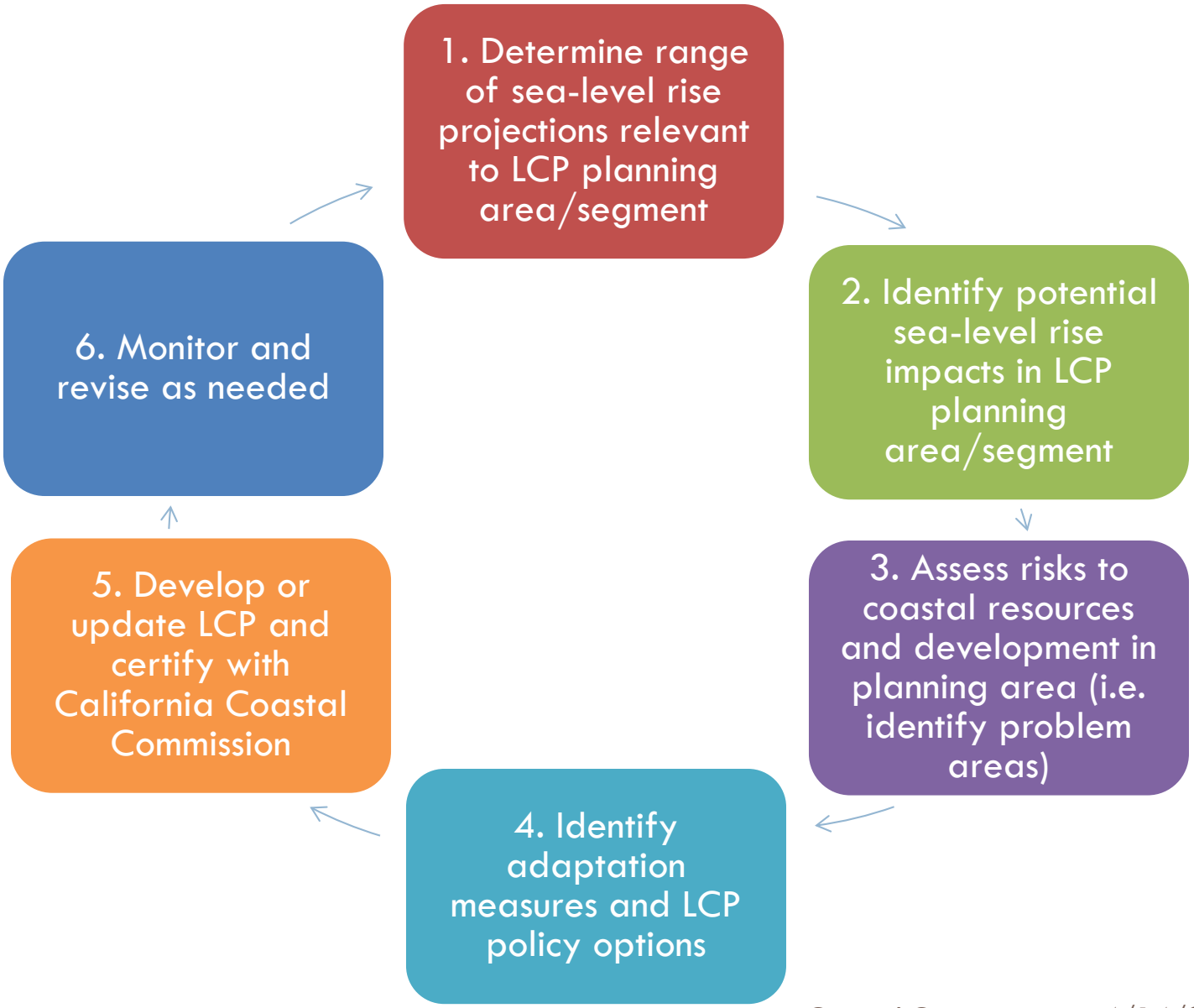
- National Research Council Report SLR Projections for California

| Time Period | South of Cape Mendocino | North of Cape Mendocino |
|---|---|---|
| 2000-2030 | 4 – 30 cm (1.5 – 12 inches) | -4 – +23 cm (-1.5 – 9 inches) |
| 2000-2050 | 12 – 61 cm (5 – 24 inches) | -3 – + 48 cm (-1.2 – 19 inches) |
| 2000-2100 | 42 – 167 cm (17 – 66 inches) | 10 – 143 cm (3.6 – 56 inches) |




- Most locations can use these projections without modification
- Humboldt Bay & Eel River Sea Level Rise
  - SLR is at faster rate than region North of Cape Mendocino
  - Modify projections to account for local vertical land motion

# Steps for Addressing SLR in LCPs



# Steps for Addressing SLR in CDPs

1. Establish the projected sea-level rise range for the proposed project
2. Determine how sea-level rise impacts may constrain the project site
3. Determine how the project may impact coastal resources over time, considering SLR
4. Identify project design alternatives to both avoid resource impacts and minimize risks to the project
5. Finalize project design and submit permit application

# CDP Analysis of Sea-Level Rise



**General Situations for considering sea-level rise:**

- On or near a floodplain, beach, wetland, lagoon or estuary
- Exposed to wave impacts or wave runup
- Protected by levees, dikes, bulkheads, seawalls, etc.
- On an eroding coastal bluff
- Reliant on shallow water well for water supply

Coastal dunes, Humboldt Bay | Lesley Ewing

# Step 1: Determine SLR Projections



## Expected Outcomes:

- Appropriate Planning Timeframes
- Proposed project life
- Scenarios of SLR for use in analysis

| Time Period * | South of Cape Mendocino | North of Cape Mendocino |
|---|---|---|
| by 2030 | 4 – 30 cm **(1.5 – 12 inches)** | -4 – +23 cm **(-1.5 – 9 inches)** |
| by 2050 | 12 – 61 cm **(5 – 24 inches)** | -3 – +48 cm **(-1.2 – 19 inches)** |
| by 2100 | 42 – 167 cm **(17 – 66 inches)** | 10 – 143 cm **(3.6 – 56 inches)** |
| * with year 2000 as a baseline | | |

Levees along Wintersberg Channel, Huntington Beach | Lesley Ewing

# Step 1: Determine SLR Projections



| Time Period | South of Cape Mendocino | North of Cape Mendocino |
|---|---|---|
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Tomales Bay Wetland Restoration | CA King Tides Initiative | Jan 2012 | Sarah Allen

**Scenario Based Planning: A tool for developing science-based decisionmaking framework to address SLR uncertainty. Used to inform decision making refarging the range of impacts and vulnerabilities. (Adapted from NOAA 2010)**



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# Step 2: Identify SLR Impacts & Constraints

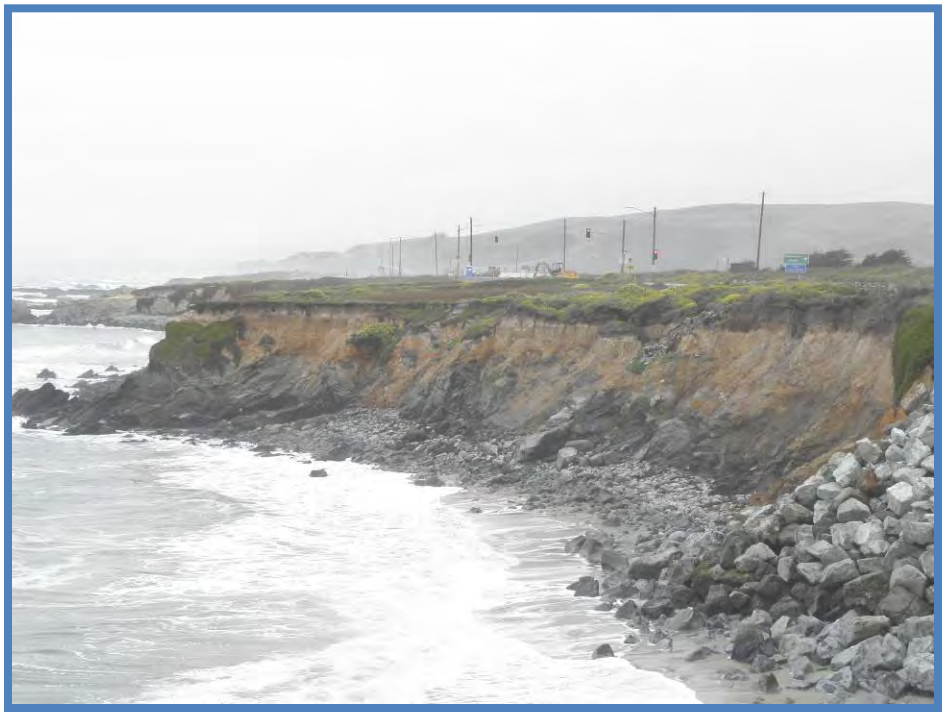


## Hazard Analysis Types:

- Geologic Stability
- Erosion
- Waves and wave runup
- Flooding and inundation

## Expected Outcomes:

- Maps of site-specific hazards
- Areas that can safely support development
- Regional-scale for planning, site-specific scale for projects



Highway 1 near Pescadero, San Mateo County | Lesley Ewing

# Step 3: Assess Impacts to Coastal Resources



## Coastal Resources to Consider:

- Public access, beaches, recreation areas
- California Coastal Trail
- Wetlands, ESHA, other habitats
- Agricultural areas
- Cultural sites
- Coastal-dependent uses
- Critical infrastructure
- Coastal Highway 1
- Existing and new development

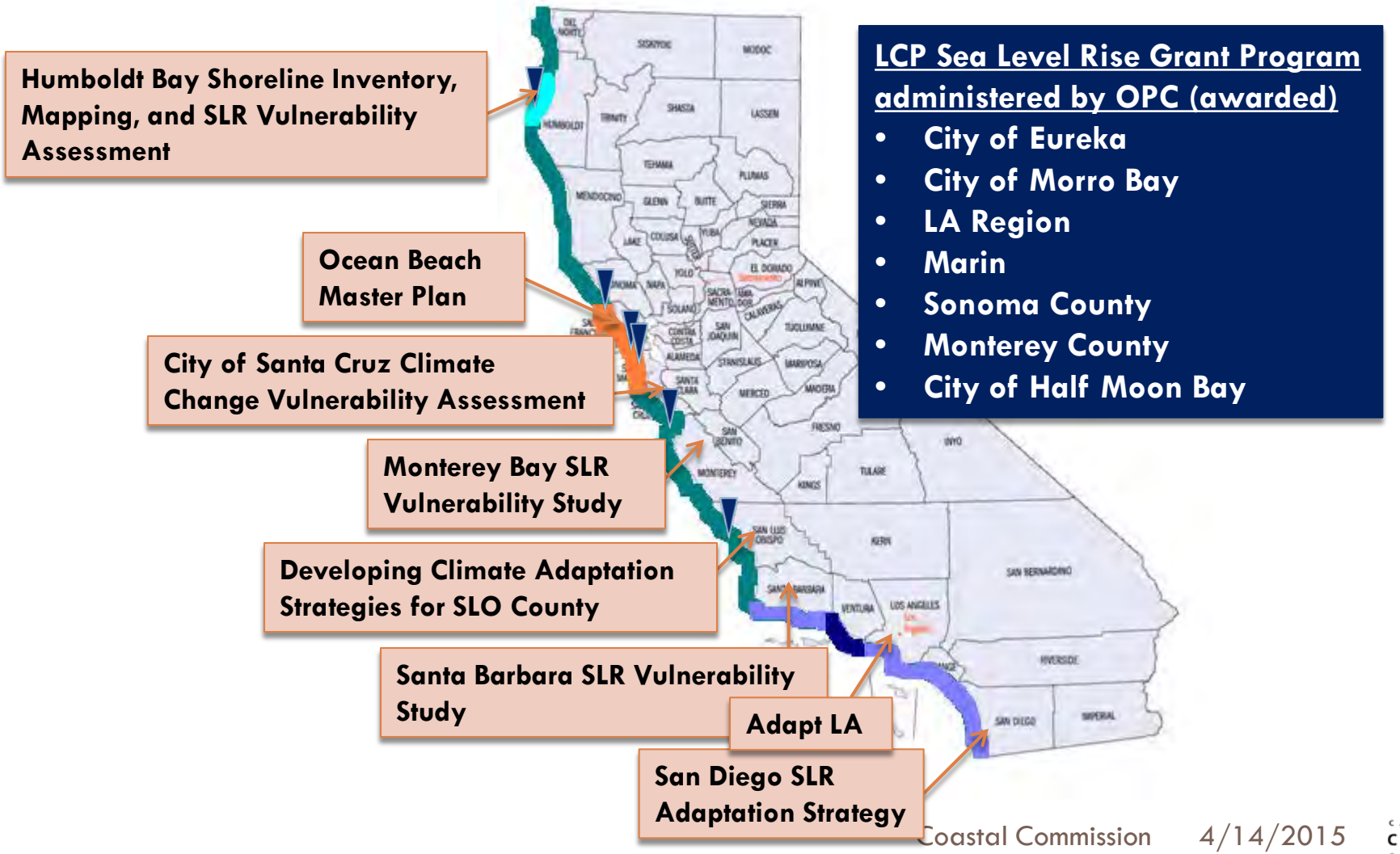
Ocean Beach, San Francisco | Lesley Ewing

## Expected Outcomes:

SLR risks to coastal resources; map overlaying development and resource constraints

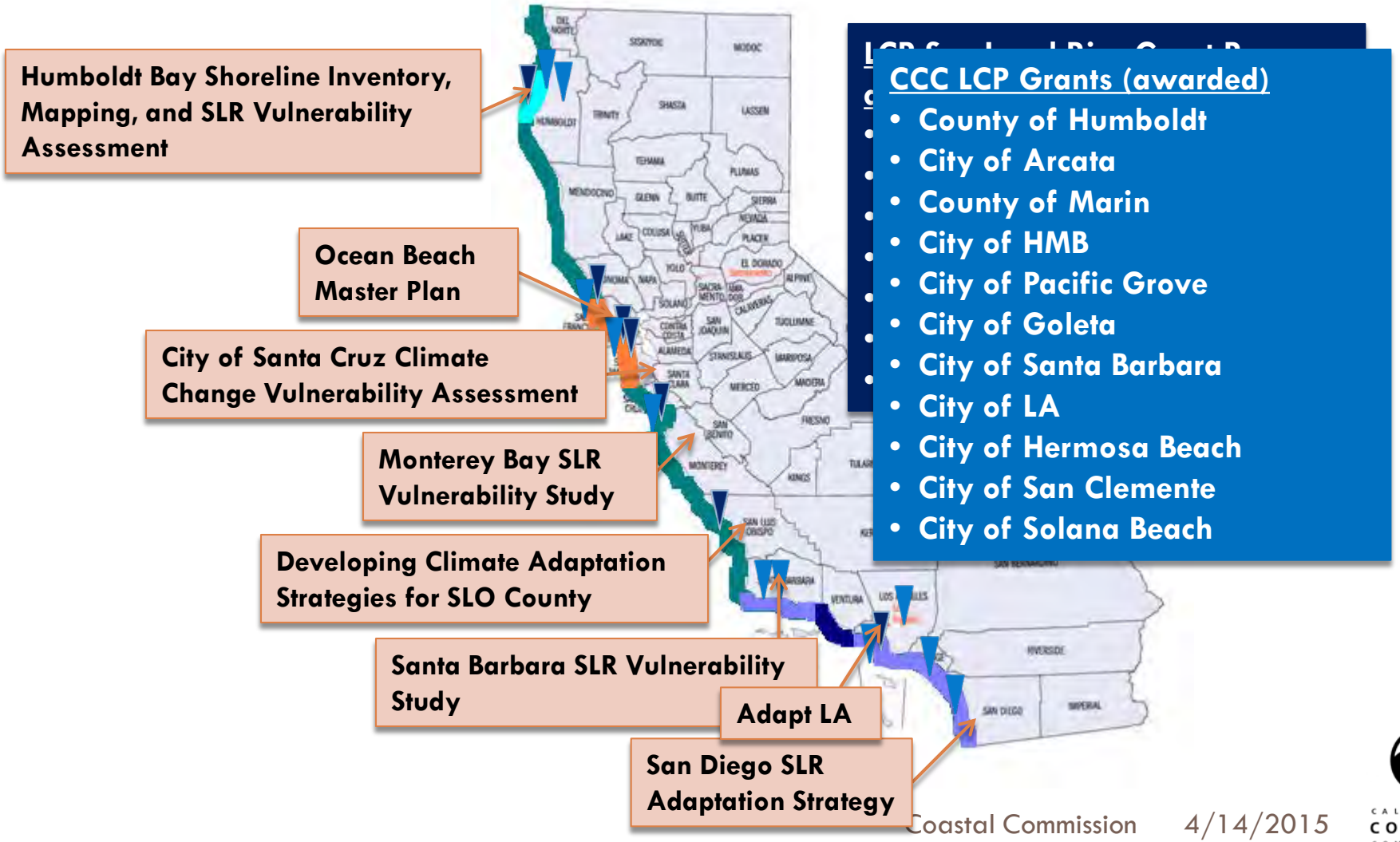
# Vulnerability - Tools and Resources





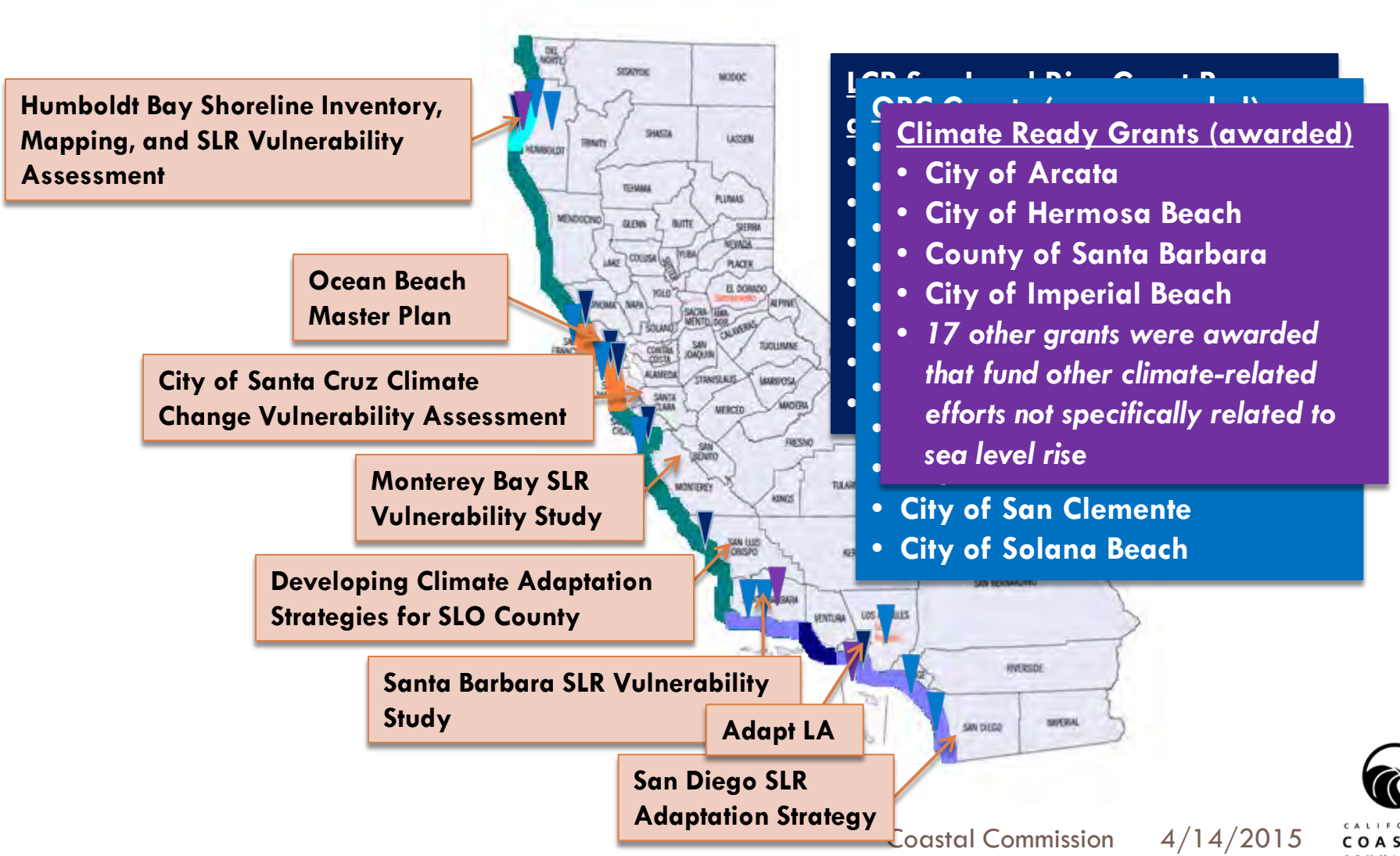
# Vulnerability - Tools and Resources





# Vulnerability - Tools and Resources





# LCP Step 4: Identify LCP Adaptation Measures



Tomales Bay Wetland Restoration | CA King Tides Initiative | Jan 2012 | Sarah Allen

**Expected outcomes:**

Identification of necessary updates, list of applicable adaptation measures applicable, new implementation policies/ordinances

# CDP Step 4: Identify Project Alternatives




Surfers Point Managed Retreat Project, Ventura, CA

## Expected Outcomes:

- Project modifications and reexamination of impacts
- 1+ project alternatives
- Possible adaptation options



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# Sea-Level Rise Hazard Options

- Avoid Siting Development in Hazard Areas
- Design for the Hazard (accommodation)
- Move Development Away from Hazards (retreat)
- Move Hazards Away from Development (soft protection)
- Build Barriers to Protect from Hazards (hard protection)

**ADAPTATION**
**Human activities taken to limit the negative or take advantage of the positive effects of climate change**

# Avoid Siting Development in Hazard Areas (Avoidance)

Sometimes the Biggest Decision is the Decision to DO NOTHING

# Avoidance Options

| | |
|---|---|
| + | Public Access and Recreation |
| + | Coastal Habitats |
| + | Agricultural Resources |
| + | Water Quality |
| + | Paleo/Archeological Resources |
| + | Scenic Resources |
| 0 = neutral; + = better; -- = worse | |

- Fee Simple Acquisition
- Conservation Easements
- Present Use Tax
- Transfer of Development Rights

# Move Away from Hazards

| | |
|---|---|
| + | Public Access and Recreation |
| + | Coastal Habitats |
| 0 | Agricultural Resources |
| + | Water Quality |
| 0 | Paleo/Archeological Resources |
| + | Scenic Resources |
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- Fee Simple Acquisition
- Conservation Easements
- Present Use Tax
- Transfer of Development Credit

- Removal/Relocation
- Managed Retreat
- Setbacks
- Rolling Easements

# Removal/Relocation

# Removal/Relocation

BEACH RECOVERY
STILLWELL HALL
Monterey County, CA

# Managed Retreat - Example

## Surfers Point, Ventura

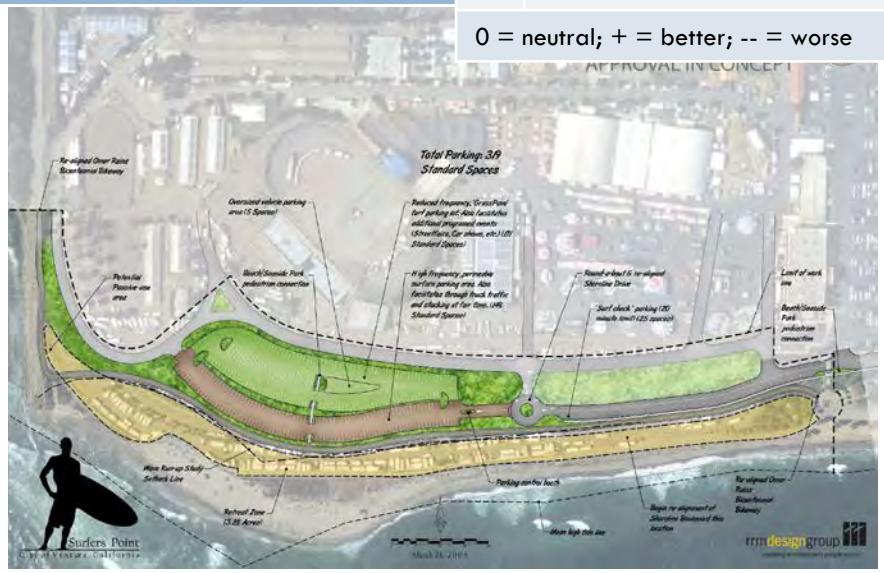
- Shoreline Erosion
- Property Damage
- Development too close to Shoreline
- Loss of Public Access
- Polluted Run Off
- Structures Impede Watershed Sediment
- Established Surf Resource at River Delta

# Managed Retreat Example

| | |
|---|---|
| + | Public Access and Recreation |
| + | Coastal Habitats |
| 0 | Agricultural Resources |
| + | Water Quality |
| 0 | Paleo/Archeological Resources |
| + | Scenic Resources |

0 = neutral; + = better; -- = worse

- Managed Retreat of Bike Path & Parking
- Reconfigure Parking to Maintain Access
- Vegetated buffers and Permeable Pavement for Water Quality
- Cobble Berm for Shore Protection
- Restore Sediment Supplies




# Move Hazards Away (Soft Protection)

| | |
|---|---|
| + | Public Access and Recreation |
| +/- | Coastal Habitats |
| + | Agricultural Resources |
| +/- | Water Quality |
| + | Paleo/Archeological Resources |
| + | Scenic Resources |
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- Maintain or Restore Natural Sand Sources
- Beneficial Reuse of Sand
- Improve or Augment Sand Supplies
- *Innovative Sand Sources*
- Retain Sand at Specific Locations
- *Innovative Sand Retention Efforts*

# Maintain or Restore Natural Supplies of Sand to the Coast

Matilija Dam, Ventura County, CA

Sand Mining in San Juan Creek, CA

# Beneficial Reuse of Sand

Harbor By-passing at Santa Cruz Harbor

Photo Credit: California Coastal Records Project

# Beneficial Reuse of Beach Sand

Sand Back-passing at East Beach, Long Beach, CA

Photo Credit: California Coastal Records Project

# Augment Sand Supplies

| | |
|---|---|
| + | Public Access and Recreation |
| +/- | Coastal Habitats |
| + | Agricultural Resources |
| +/- | Water Quality |
| 0 | Paleo/Archeological Resources |
| +/- | Scenic Resources |
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Over 35 Million Cubic yards of Sand added to Santa Monica Bay Beaches since late 1930s

# Augment Sand Supplies – Offshore Sand Supplies

# Retaining Sand – Beach Berms

| | |
|---|---|
| - | Public Access and Recreation |
| - | Coastal Habitats |
| 0 | Agricultural Resources |
| - | Water Quality |
| 0 | Paleo/Archeological Resources |
| - | Scenic Resources |

0 = neutral; + = better; -- = worse

**Berm Building/**

**Beach Scraping**

# Retaining Sand - Groins

| | |
|---|---|
| + | Public Access and Recreation |
| +/- | Coastal Habitats |
| 0 | Agricultural Resources |
| +/- | Water Quality |
| 0 | Paleo/Archeological Resources |
| +/- | Scenic Resources |
| 0 = neutral; + = better; -- = worse | |

Will Rogers Beach with Groins

Photo Credit: California Coastal Records Project

# Retaining Sand - Breakwaters





Venice Breakwater

Photo Credit: California Coastal Records Project

# Retaining Sand – Dune Nourishment

Beach Dunes
Stinson Beach and Ocean Beach
Photo Credit: California Coastal Records Project

# Retaining Sand – Artificial Headlands

**Laguna Beach**

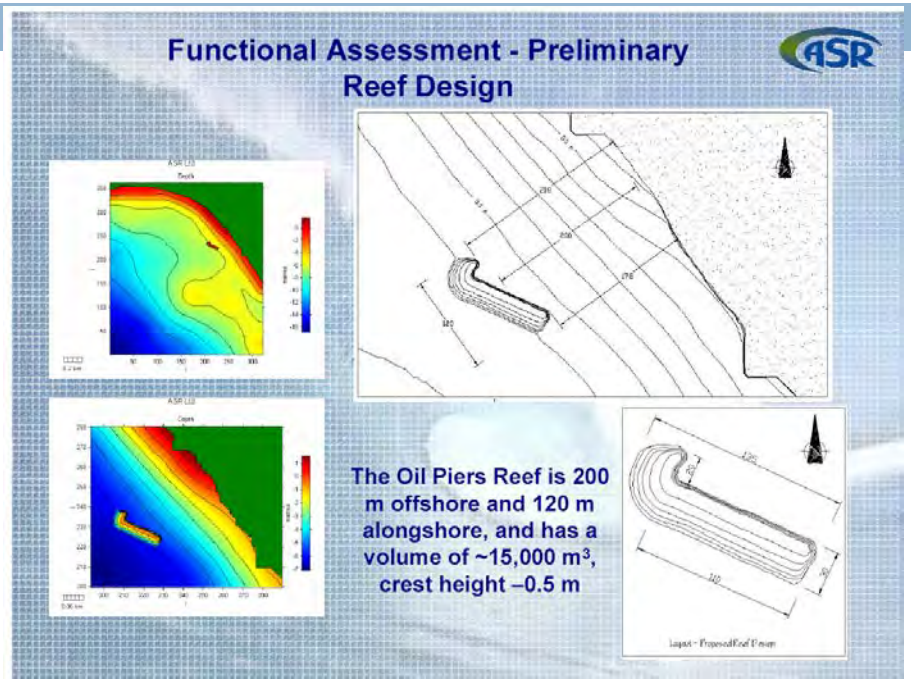
Photo Credit: California Coastal Records Project

# Retaining Sand – Augment Deltas

**Topanga Creek (top) and San Mateo Creek (right)**

Photo Credit: California Coastal Records Project

# Innovative Retaining Structures




Artificial Seaweed, Multi-purpose Reefs, Concrete Unit Reefs, Floating Breakwaters

# Protective Barriers – Hard Protection

| | |
|---|---|
| - | Public Access and Recreation |
| - | Coastal Habitats |
| 0 | Agricultural Resources |
| +/- | Water Quality |
| + | Paleo/Archeological Resources |
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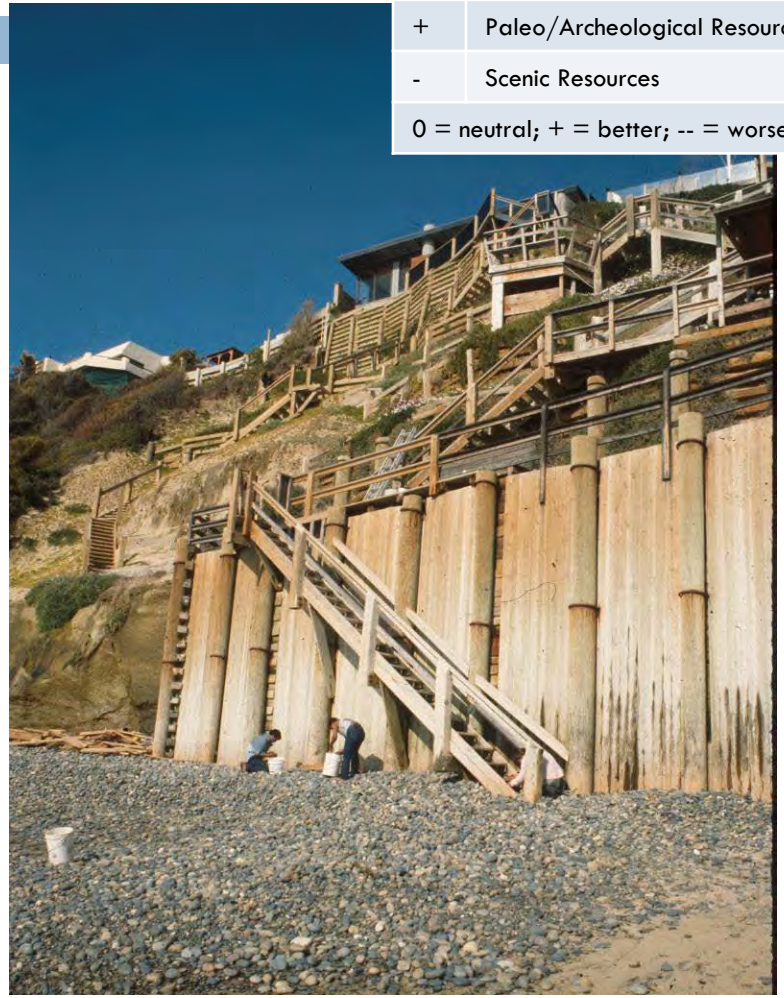
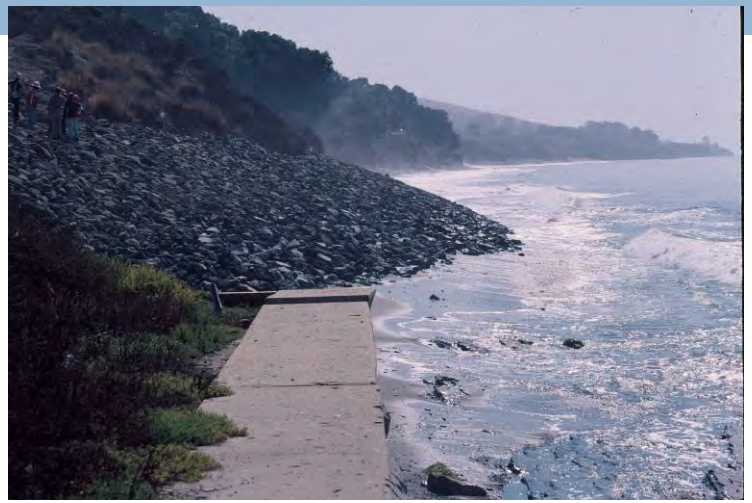


Vertical Seawalls

# Barriers to Protect Development

**Revetments,**
**Gabions,**
**Multiple designs**



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# LCP Steps 5 & 6: Finalize LCP



Image by California Coastal Commission

**Step 5 expected outcomes:**

Certified/updated LCP with policies and land use designations that address sea-level rise and the related hazards

**Step 6 expected outcomes:**

Plan to monitor the LCP planning area for SLR and other impacts; revisions when conditions change or science is updated

# CDP Step 5: Finalize Application



**Expected Outcomes:**

- Analysis of sea-level rise concerns for inclusion in a CDP application
- Combine with other application items for a complete submittal

Pacifica State Beach, Linda Mar Area, Pacifica, CA

# How is California addressing sea-level rise?



- Statewide efforts
  - 2014 Safeguarding California Plan (update to 2009 Plan)
  - General Plan Guidelines (2015 Update in progress)
  - OES State Hazard Mitigation Plan (update in progress)
  - OPC: 2013 State SLR Guidance
  - 2012 Adaptation Planning Guide
  - CCC, OPC and Climate Ready Grants
- California Coastal Commission efforts
  - Local Coastal Programs & Coastal Development Permits
  - Strategic Plan
  - Draft SLR Policy Guidance



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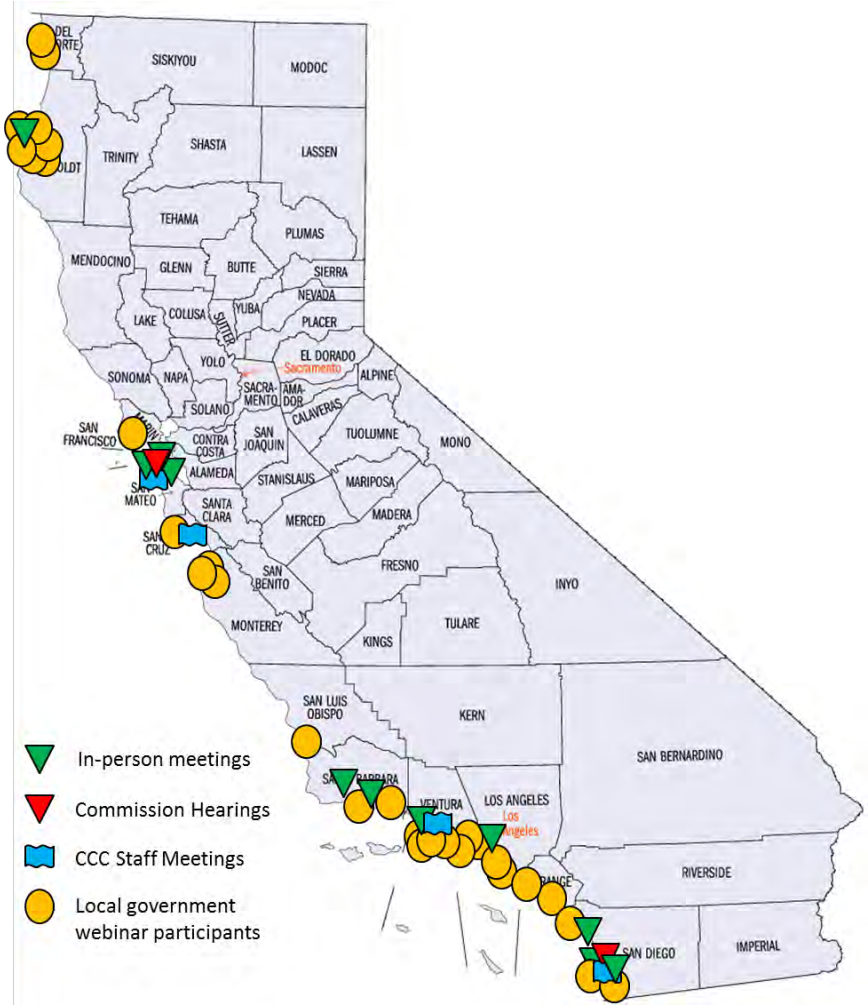
# Next Steps






**Outreach To date:**

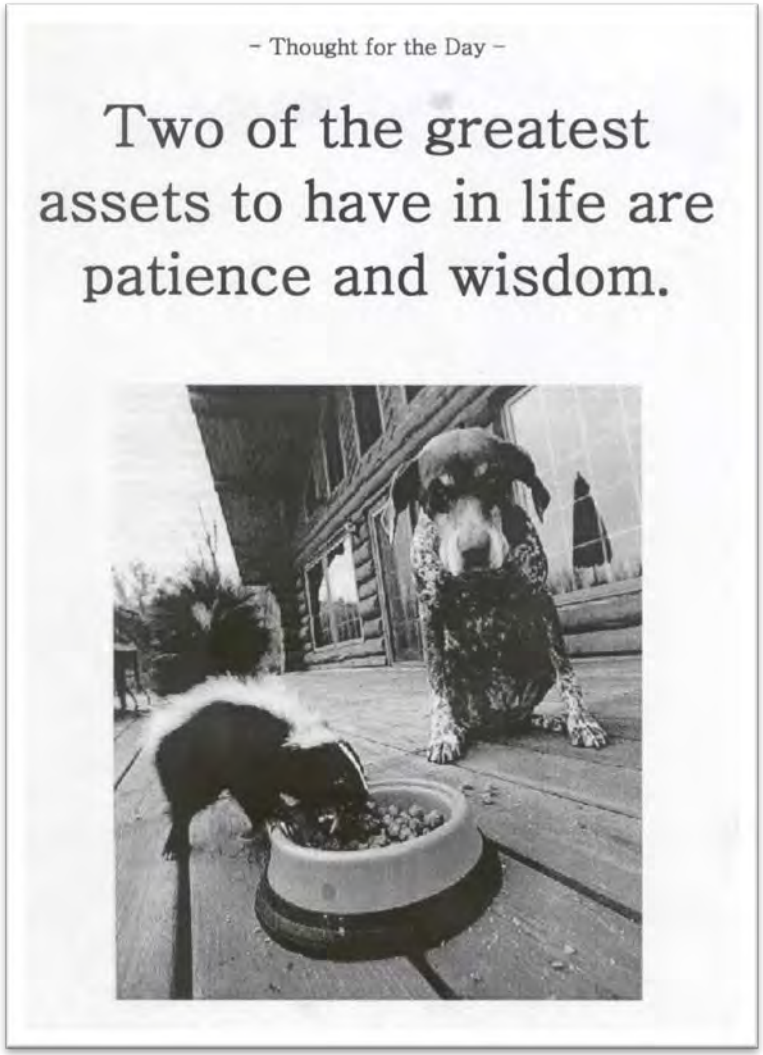
- 120-day comment period
- 3 webinars
- 14 in-person meetings
- District office meetings
- 350+ people

**Next Steps:**

- Revised Draft to Commission
- Trainings and symposia
- Grant support for local governments
- Targeted interest groups

# Thank you for your attention






California Coastal Commission,
Draft Sea Level Rise Policy Guidance:
http://www.coastal.ca.gov/climate/SLRguidance.html

Lesley Ewing, Ph.D., P.E.
lewing@coastal.ca.gov
415-904-5291

**There will be time to deal with climate change…… But there will not be a better time. There will only be worse times."**

**David Remnick, No More Magical Thinking, New Yorker, 19Nov2012.**

# Questions

California Coastal Commission,
Draft Sea Level Rise Policy Guidance:
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Lesley Ewing, Ph.D., P.E.
lewing@coastal.ca.gov
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