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

14 April 2015

Santa Barbara-Ventura SLR Workshop
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
About the Draft Document

<table>
<thead>
<tr>
<th>IT IS</th>
<th>IT IS NOT</th>
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<tbody>
<tr>
<td>Draft</td>
<td>Final</td>
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<tr>
<td>Draft Guidance for addressing Sea-Level Rise in conformance with the Coastal Act</td>
<td>New regulations</td>
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<td>Complement to other Commission materials</td>
<td>Replacement for other Commission materials</td>
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<tr>
<td>Multi-purpose guidance in which users may focus on particular chapters</td>
<td>Meant to be read cover to cover</td>
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<tr>
<td>A list of sea-level rise adaptation options to choose from</td>
<td>A checklist of adaptation measures where all items have to be accomplished</td>
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<td>A living document</td>
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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
Applications of Best Science

Local Coastal Programs
- Long-Range Development Plans
- Port Master Plans
- Federal Consistency

Coastal Development Permits
Best Available Science on SLR

- National Research Council Report SLR Projections for California

<table>
<thead>
<tr>
<th>Time Period</th>
<th>South of Cape Mendocino</th>
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<tbody>
<tr>
<td>2000-2030</td>
<td>4 – 30 cm (1.5 – 12 inches)</td>
<td>-4 – +23 cm (-1.5 – 9 inches)</td>
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<tr>
<td>2000-2050</td>
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<tr>
<td>2000-2100</td>
<td>42 – 167 cm (17 – 66 inches)</td>
<td>10 – 143 cm (3.6 – 56 inches)</td>
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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

1. Determine range of sea-level rise projections relevant to LCP planning area/segment
2. Identify potential sea-level rise impacts in LCP planning area/segment
3. Assess risks to coastal resources and development in planning area (i.e. identify problem areas)
4. Identify adaptation measures and LCP policy options
5. Develop or update LCP and certify with California Coastal Commission
6. Monitor and revise as needed
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
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
Step 1: Determine SLR Projections

Expected Outcomes:

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

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* with year 2000 as a baseline

Levees along Wintersberg Channel, Huntington Beach | Lesley Ewing
Step 1: Determine SLR Projections

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)
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

Expected Outcomes:

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

Ocean Beach, San Francisco | Lesley Ewing
Vulnerability - Tools and Resources

Humboldt Bay Shoreline Inventory, Mapping, and SLR Vulnerability Assessment

Ocean Beach Master Plan

City of Santa Cruz Climate Change Vulnerability Assessment

Monterey Bay SLR Vulnerability Study

Developing Climate Adaptation Strategies for SLO County

Santa Barbara SLR Vulnerability Study

Adapt LA

San Diego SLR Adaptation Strategy

LCP Sea Level Rise Grant Program administered by OPC (awarded)

- City of Eureka
- City of Morro Bay
- LA Region
- Marin
- Sonoma County
- Monterey County
- City of Half Moon Bay
Vulnerability - Tools and Resources

- Humboldt Bay Shoreline Inventory, Mapping, and SLR Vulnerability Assessment
- Ocean Beach Master Plan
- City of Santa Cruz Climate Change Vulnerability Assessment
- Monterey Bay SLR Vulnerability Study
- Developing Climate Adaptation Strategies for SLO County
- Santa Barbara SLR Vulnerability Study
- Adapt LA
- San Diego SLR Adaptation Strategy

LCP Sea Level Rise Grant Program
- CCC LCP Grants (awarded)
  - County of Humboldt
  - City of Arcata
  - County of Marin
  - City of HMB
  - City of Pacific Grove
  - City of Goleta
  - City of Santa Barbara
  - City of LA
  - City of Hermosa Beach
  - City of San Clemente
  - City of Solana Beach

- Santa Barbara SLR Vulnerability Study
- Monerrey Bay SLR Vulnerability Study
- Ocean Beach Master Plan
- Humboldt Bay Shoreline Inventory, Mapping, and SLR Vulnerability Assessment

Coastal Commission 4/14/2015
LCP Sea Level Rise Grant Program
- City of Eureka
- City of Morro Bay
- LA Region
- Marin
- Sonoma County
- Monterey County
- City of Half Moon Bay
- OPC Grants (recommended)
  - County of Humboldt
  - City of Arcata
  - County of Marin
  - City of HMB
  - City of Pacific Grove
  - City of Goleta
  - City of Santa Barbara
  - City of LA
  - City of Hermosa Beach
  - City of San Clemente
  - City of Solana Beach
- Climate Ready Grants (awarded)
  - City of Arcata
  - City of Hermosa Beach
  - County of Santa Barbara
  - City of Imperial Beach
  - 17 other grants were awarded that fund other climate-related efforts not specifically related to sea level rise
- Santa Barbara SLR Vulnerability Study
- City of Santa Cruz Climate Change Vulnerability Assessment
- Monterey Bay SLR Vulnerability Study
- Developing Climate Adaptation Strategies for SLO County
- Humboldt Bay Shoreline Inventory, Mapping, and SLR Vulnerability Assessment
- Ocean Beach Master Plan
- Adapt LA
- San Diego SLR Adaptation Strategy

Coastal Commission 4/14/2015
LCP Step 4: Identify LCP Adaptation Measures

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

Tomales Bay Wetland Restoration | CA King Tides Initiative | Jan 2012 | Sarah Allen
CDP Step 4: Identify Project Alternatives

Expected Outcomes:

• Project modifications and reexamination of impacts
• 1+ project alternatives
• Possible adaptation options
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
Sometimes the Biggest Decision is the Decision to DO NOTHING

Avoid Siting Development in Hazard Areas (Avoidance)
Avoidance Options

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

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

0 = neutral; + = better; -- = worse
Move Away from Hazards

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

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

| + | Public Access and Recreation |
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Coastal Commission 4/14/2015
Removal/Relocation

BEACH RECOVERY
STILLWELL HALL
Monterey County, CA

Photos: Copyright (C) 2002-2005
Kenneth & Gabrielle Adelman,
California Coastal Records Project
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

- 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)

- 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*

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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

Over 35 Million Cubic yards of Sand added to Santa Monica Bay Beaches since late 1930s

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Augment Sand Supplies – Offshore Sand Supplies
# Retaining Sand – Beach Berms

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Retaining Sand - Groins

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

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Barriers to Protect Development

Revetments,
Gabions,
Multiple designs
LCP Steps 5 & 6: Finalize LCP

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
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.
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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


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