California Coastal Commission

Plans and regulates the use of land and water in the coastal zone, in partnership with local cities and counties.
PRC 30253 requires that new development assure stability and structural integrity and minimize risks to life and property without requiring construction of shoreline protective structures.

PRC 30235 requires the Commission to approve shoreline structures to protect existing structures in danger from erosion if it is the least environmentally-damaging, feasible alternative and sand supply impacts are mitigated.
Sea-Level Rise Adaptation 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

- Fee Simple Acquisition
- Conservation Easements
- Present Use Tax
- Transfer of Development Rights
- Zoning Regulations/Downzoning
- Setbacks
Accommodation Options

- Adjustable Elevation
- Incremental Removal
- Floodproofing
Move Away from Hazards

- Fee Simple Acquisition
- Conservation Easements
- Present Use Tax
- Transfer of Development Credit
- Removal/Relocation
- Managed Retreat
- Setbacks
- Rolling Easements

Moving Cape Hatteras Lighthouse 1999
Photo Credit: National Park Service
Removal/Relocation/Managed Retreat

Top Left: Pacifica, 1998
Bottom Left: Big Lagoon
Top Right: Massachusetts
Removal/Relocation

Stillwell Hall, Monterey, CA
Photos: California Coastal Records Project
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
Maintain or Restore Natural Supplies of Sand to the Coast
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
Augment Sand Supplies
Retaining Sand – Beach Berms
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

Top: Topanga Creek
Right: San Mateo Creek
Photo Credit: California Coastal Records Project
Barriers to Hazards - Hard Protection

- Revetments
- Seawalls
- Gabions
- Sand Bags
Protective Barriers - Hard Protection

Vertical Seawalls
Barriers to Protect Development

Revetments, Gabions, Multiple designs
## Adaptation Strategies

<table>
<thead>
<tr>
<th>General Techniques</th>
<th>Technique Details</th>
<th>Spatial Scale</th>
<th>Temporal Scale (Implement/Effective)</th>
<th>Adaptive Capacity</th>
<th>Responsible Party</th>
<th>Costs</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Acquisition</td>
<td>Fee Simple Acquisition</td>
<td>One or more lots</td>
<td>Short/Long-term</td>
<td>Yes</td>
<td>Government, Non-Governmental Organization, Homeowner Association, Geologic Hazard Abatement District</td>
<td>High</td>
<td>Provides greatest control over land use and hazard response. Land can be purchased from willing sellers or by governments using eminent domain.</td>
</tr>
<tr>
<td>Conservation Easements</td>
<td>One or more lots</td>
<td>Short/Long-term – lessen with time</td>
<td>Yes</td>
<td>Government, Non-Governmental Organization, Homeowner Association, Geologic Hazard Abatement District</td>
<td>Low to Moderate</td>
<td>Provides less control than fee simple acquisition. Can be part of a permit action. Land can be purchased from willing sellers.</td>
<td></td>
</tr>
<tr>
<td>Transfer Development Credit</td>
<td>Jurisdiction, Region</td>
<td>Moderate/Long-term</td>
<td>Yes</td>
<td>Government, Geologic Hazard Abatement District</td>
<td>Low to Moderate</td>
<td>Provides fee simple acquisition of high hazard lots. Takes time to set up TDC Program and develop criteria for hazardous lot acquisitions. Costs to administer are low. Acquisition costs paid by developers. Cost of coastal land may make program infeasible.</td>
<td></td>
</tr>
</tbody>
</table>
Questions