

Resilience Planning & Adaptation On California's Outer Coast

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OFFICE FOR COASTAL MANAGEMENT
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

California's Coastal Management Program

- San Francisco Bay Conservation and Development Commission (BCDC)
- **California Coastal Commission (Outer Coast)**
- State Coastal Conservancy

The Adaptation Challenge is great: Most urban footprints established before modern CZM

Santa Cruz Co, Opal Cliffs -- 1943



Santa Cruz Co, Opal Cliffs -- 1967



Source: <http://library.ucsc.edu/maps/view-digitized-aerial-flight-photos-by-county>



Malibu, Surfrider Beach



**The Coastal
Squeeze is Real**

Pacifica, CA – 1940s



<https://thepacificaquarry.com/history/>

Pacifica, CA – 2019



Pacifica, CA – 2019



Coastal Act Hazards Management

PRC 30253 requires that **new development** minimize risks to life and property and not require the construction of shoreline protective structures.

PRC 30235 requires the Commission to approve shoreline structures for endangered **existing development** if it is the least environmentally-damaging, feasible alternative and sand supply impacts are mitigated.

→ 76 local coastal government must complete a Local Coastal Program (LCP) to implement the Coastal Act.

Change can be Sudden and Episodic -- Pacifica



Change can be Sudden and Episodic -- Pacifica



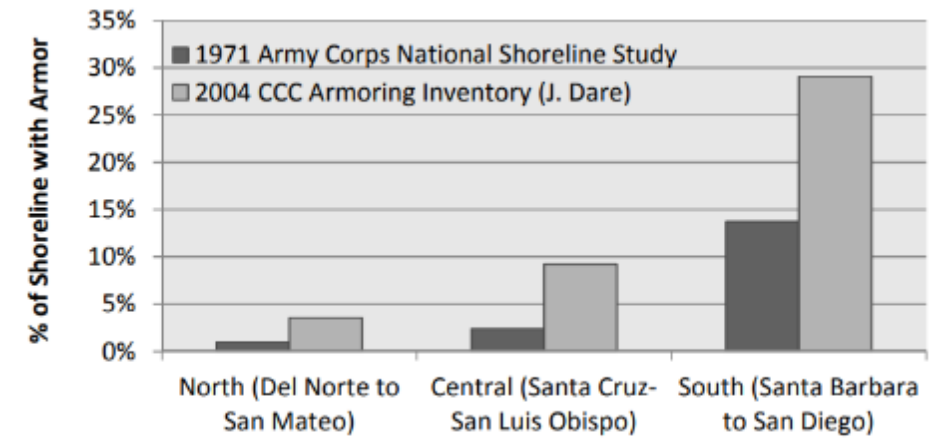
Required Hazard Setbacks

Required Setback

Pre-Coastal Act



Inevitable Seawalls – Solana Beach



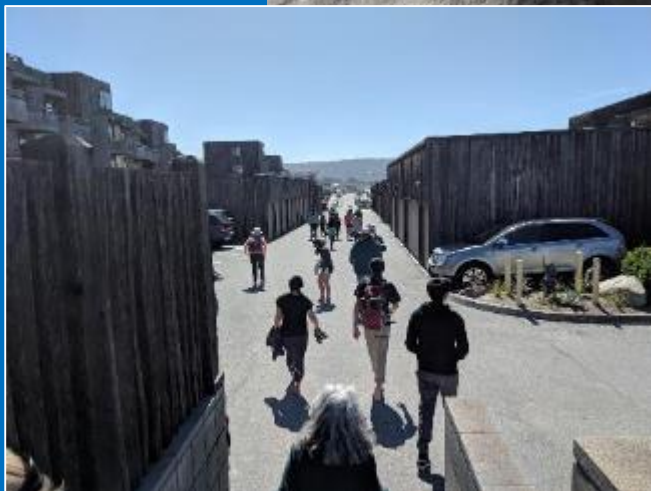
Ocean Harbor House, Monterey



A private taking of
the public beach?

Internalizing
Externalities

→ \$5.2 million
mitigation fee





CALIFORNIA COASTAL COMMISSION SEA LEVEL RISE POLICY GUIDANCE

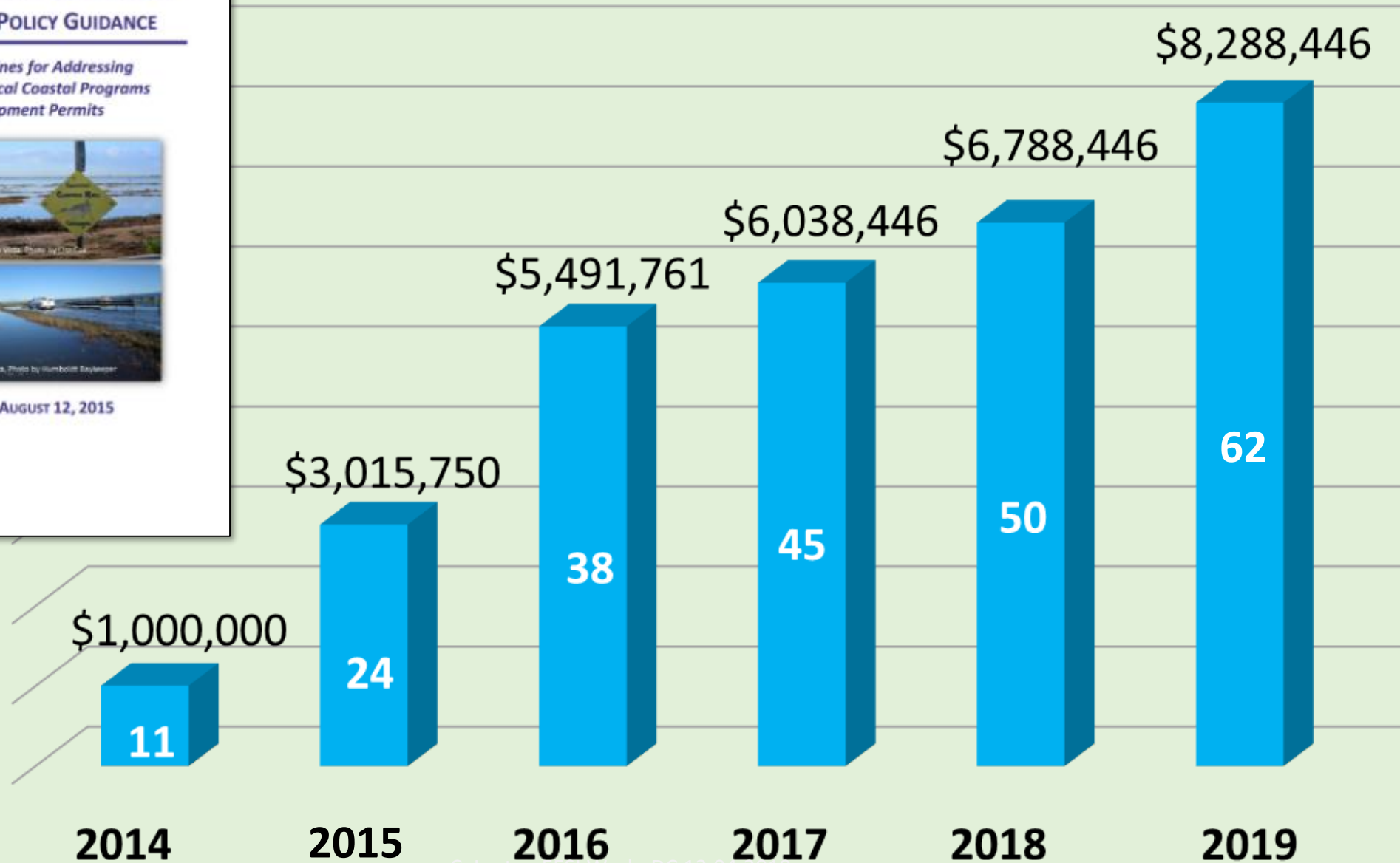
*Interpretive Guidelines for Addressing
Sea Level Rise in Local Coastal Programs
and Coastal Development Permits*



UNANIMOUSLY ADOPTED – AUGUST 12, 2015

ura

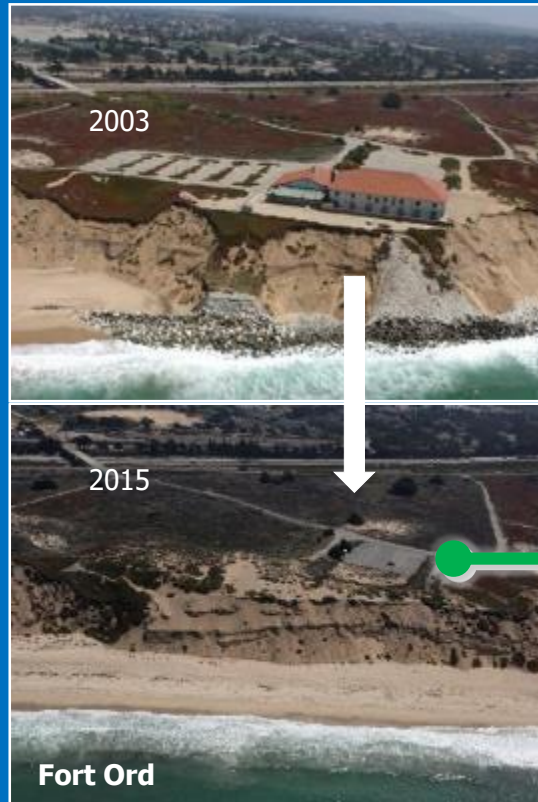
LCP Planning Grants



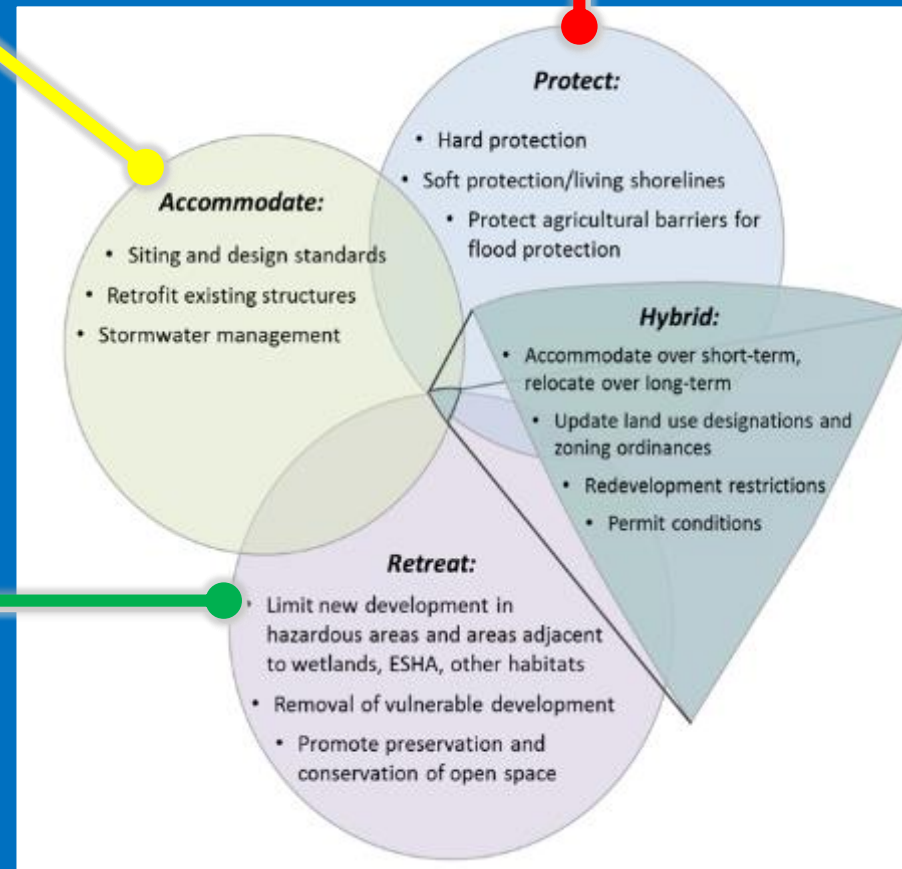
Stinson Beach



HMB Ritz Carlton



Fort Ord



Projected Shoreline at Goleta Beach – SB County:



Beach Widths Going to Zero

	Width (m)						Risk					
	Base-line	Scen 1	Scen 2	Scen 3	Scen 4	Scen 5	Base-line	Scen 1	Scen 2	Scen 3	Scen 4	Scen 5
SLR Amount	0 cm	25 cm	25 cm	50 cm	100 cm	200 cm	0 cm	25 cm	25 cm	50 cm	100 cm	200 cm
Bolinas	22	9	9	3	0	0	Low	High	High	High	High	High
Marshall	There are few beaches in the Marshall area, each is currently less than 10 meters wide						High	High	High	High	High	High
Seadrift	38	29	29	14	0	0	Low	Low	Low	Med	High	High
Stinson	53	48	48	32	9	2	Low	Low	Low	Low	Med	High

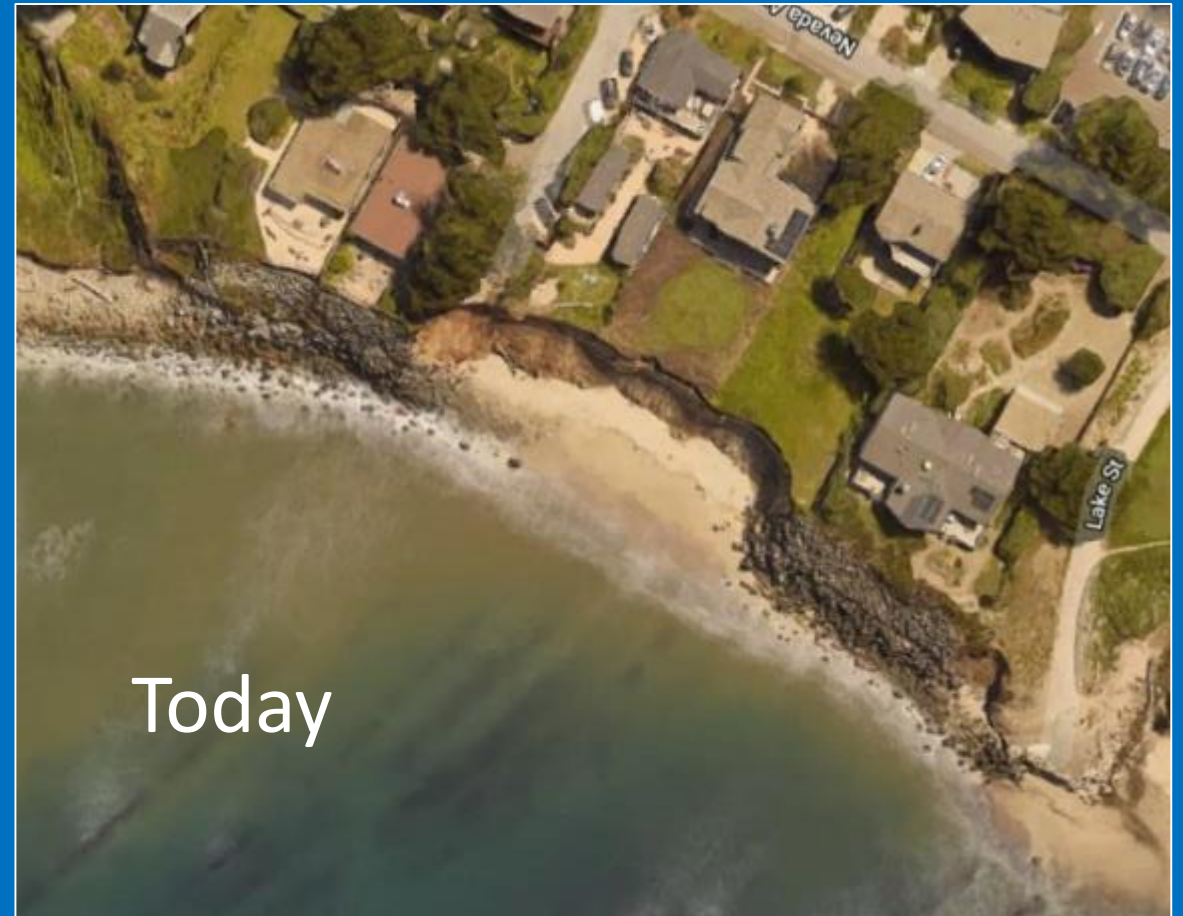
Del Mar

Marin County

TABLE 4
BEACH WIDTHS OVER TIME WITH SLR

Beach Width (ft)	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Historic Rate (no SLR)	95	95	95	95	95	95	95	95	95	95
Historic Rate + Low SLR	95	92	88	84	79	73	66	57	48	38
Historic Rate + Mid SLR	95	84	76	67	55	41	26	9	0	0
Historic Rate + High SLR	95	69	53	34	12	0	0	0	0	0

Moss Beach Loss



Accommodating the Public Trust



Future vistas along the beach?





What to do about future private encroachments on public land?

Adaptation Strategy: Unplanned Retreat?

Gleason's Beach, Sonoma County





Pacifica – Demo on the Esplanade



Pacifica: Unplanned Retreat



Defend, Elevate, Replenish, Retreat?

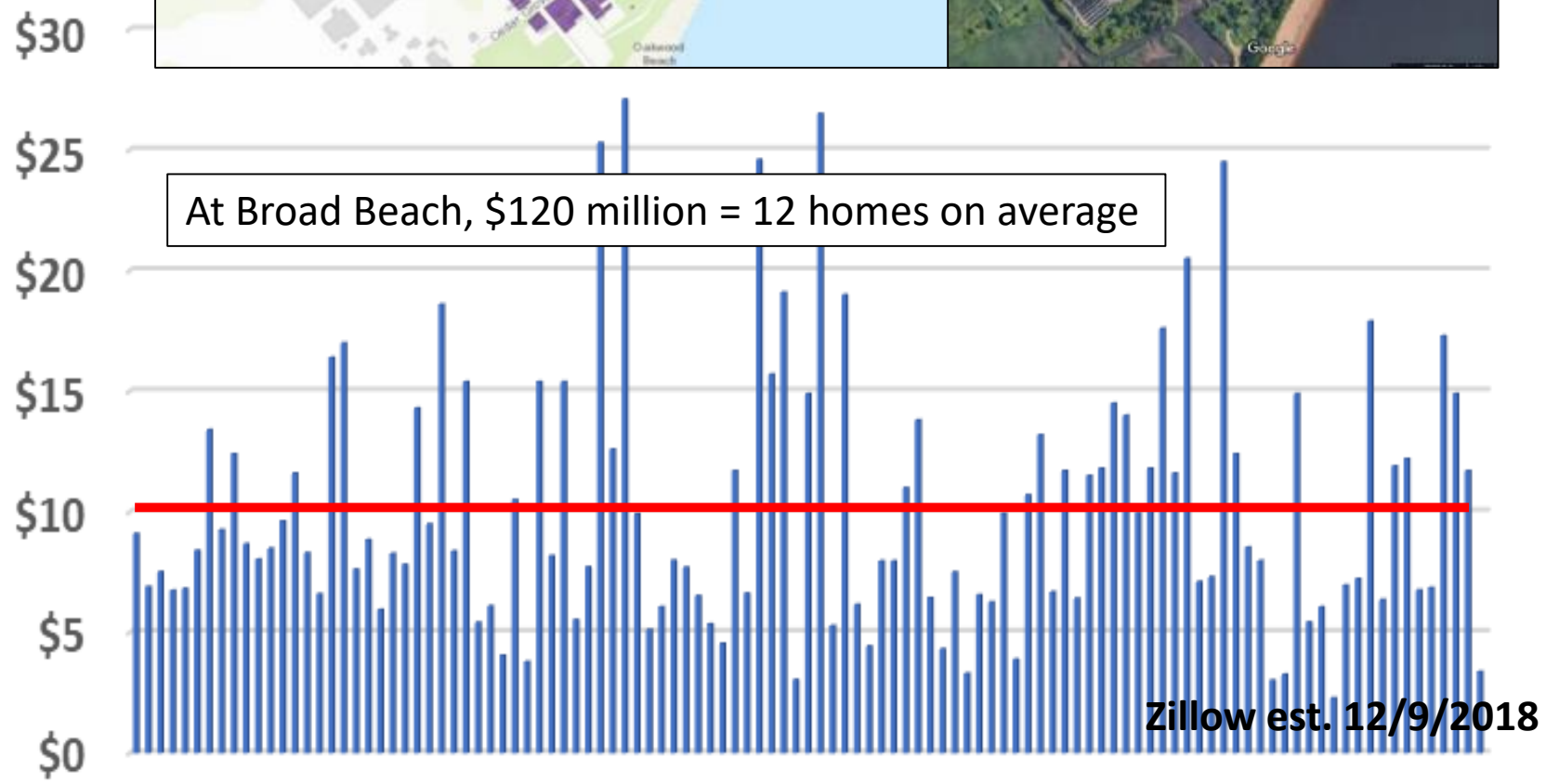


Defend, Elevate, Replenish, Retreat?

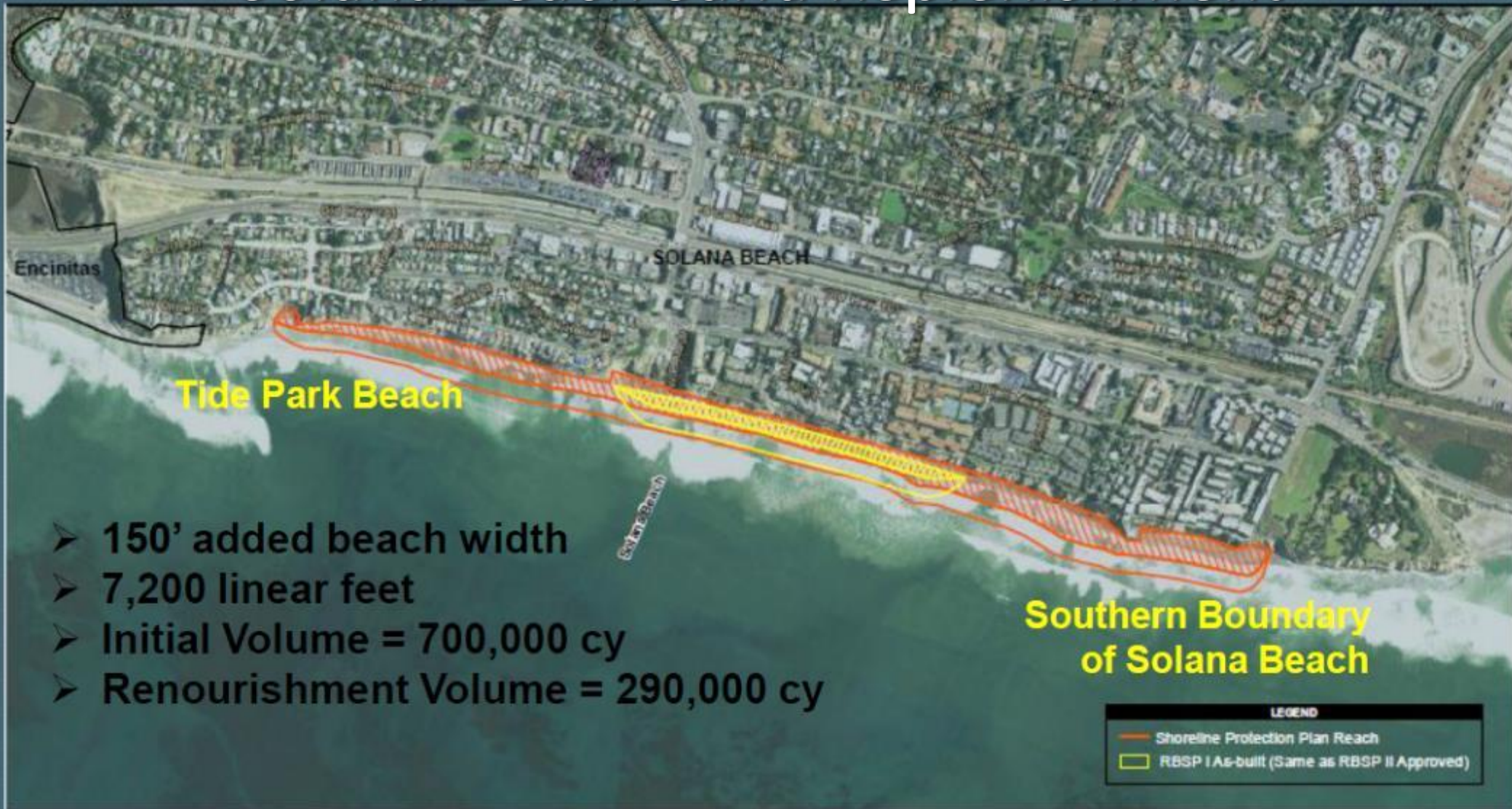


The Cost of Retreat

\$120 million in Oak Park, Staten Island = 300 properties . . .



Solana Beach Sand Replenishment



Beach Sand Replenishment Sites, Solana Beach, California

AFTER



BEFORE

Pre-Project Conditions
January 24, 2012 photo

Photo-Simulation of Dune Restoration and Beach Nourishment
(Not To Scale)

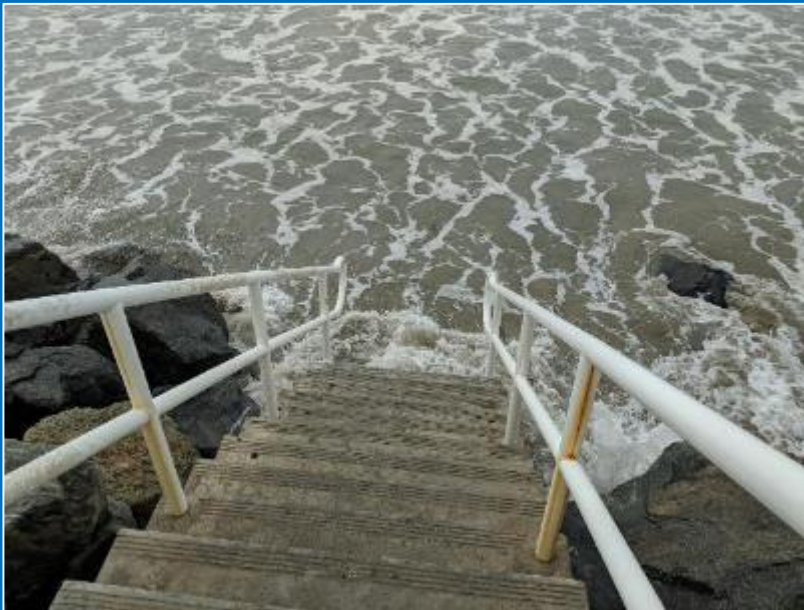
Broad Beach GHAD:

“DEDICATED TO RESTORING AND PROTECTING MALIBU’S
HISTORIC BROAD BEACH”

When will the public beach be made whole?



Environmental Justice Impacts of Eroding Beaches



SB 5: Local-State Sustainable Investment Incentive Program



SENATE BILL No. 5

Introduced by Senators Beall and McGuire
(Principal coauthor: Senator Roth)

December 3, 2018

An act to add Part 4 (commencing with Section 55900) to Division 2 of Title 5 of the Government Code, and to add Section 97.68.1 to the Revenue and Taxation Code, relating to local government.

LEGISLATIVE COUNSEL'S DIGEST

SB 5, as introduced, Beall. Local-State Sustainable Investment Incentive Program.

Existing property tax law requires the county auditor, in each fiscal year, to allocate property tax revenue to local jurisdictions in accordance with specified formulas and procedures, subject to certain modifications.

Existing from local Augment education

Existing infrastructure village development authority housing.

This Sustainable by the State authorize infrastructure revitalization district

(E) Protecting communities dealing with the effects of sea level rise, which is one of the most significant threats of climate change, including the construction, repair, replacement, and maintenance infrastructure related to protecting communities from sea level rise.

PROP 68 -- California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018.

CHAPTER 10. Climate Preparedness, Habitat Resiliency, Resource Enhancement, and Innovation

80130. The sum of four hundred forty-three million dollars (\$443,000,000) shall be available, upon appropriation by the Legislature, as competitive grants for projects that **plan, develop, and implement climate adaptation and resiliency projects.**

Surfer's Point, Ventura



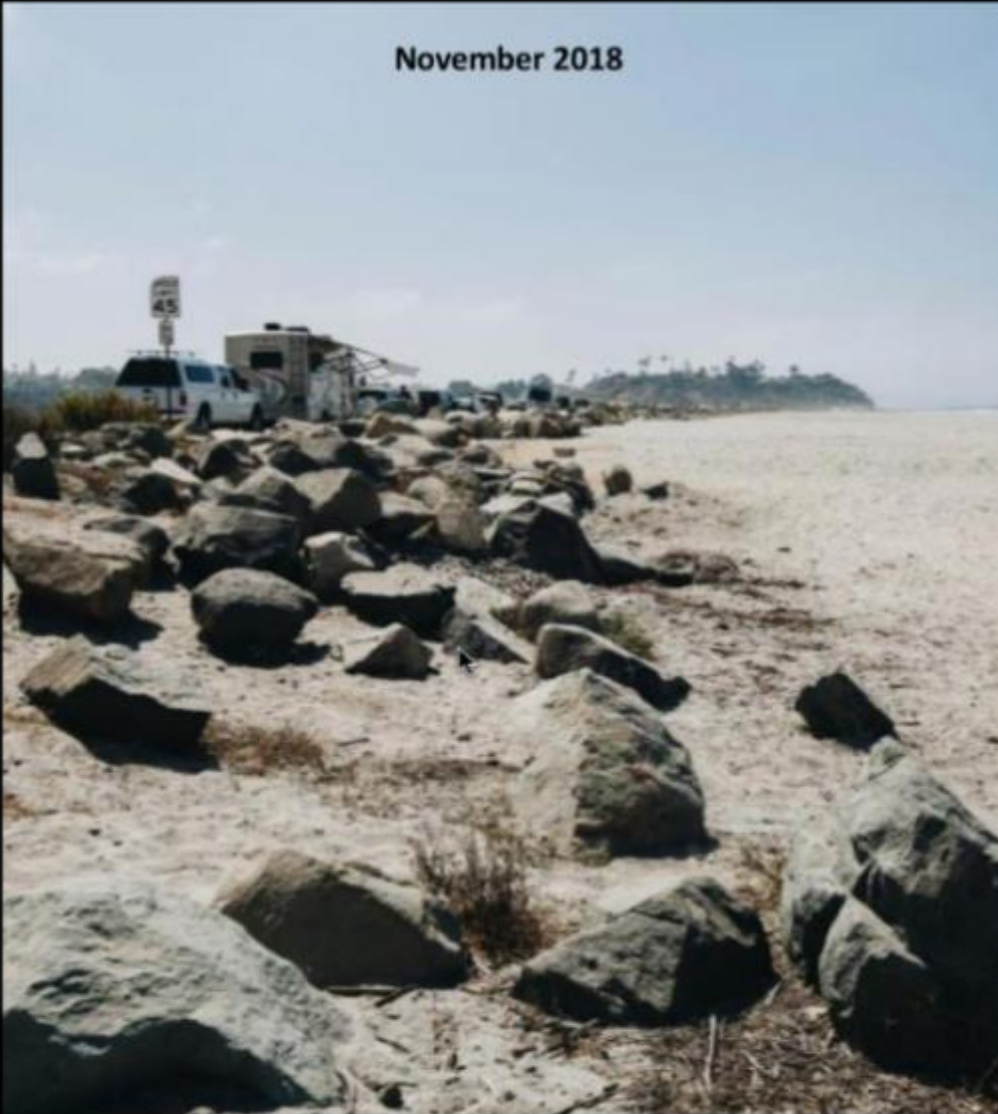
Surfer's Point, Ventura



Judge, J., Newkirk, S., Leo, K., Heady, W., Hayden, M., Veloz, S., Cheng, T., Battalio, B., Ursell, T., and Small, M. 2017. Case Studies of Natural Shoreline Infrastructure in Coastal California: A Component of *Identification of Natural Infrastructure Options for Adapting to Sea Level Rise* (California's Fourth Climate Change Assessment). The Nature Conservancy, Arlington, VA. 38 pp.

Cardiff Beach Before & After

November 2018



February 2019



May 2019



Two Decades of Rolling Easements

- ❖ Assumption of Risk
- ❖ No Future Seawall
- ❖ Removal Required
- ❖ Foundation Design



Isla Vista Managed Retreat



Resilience :Stilwell Hall, Fort Ord, 2003



Resilience: Fort Ord Dunes State Park, 2013



Planned Retreat of Infrastructure: Relocation of the Morro Bay Wastewater Treatment Plant to Water Reclamation Facility site.



Regulating Realignment of Highway One – Piedras Blancas



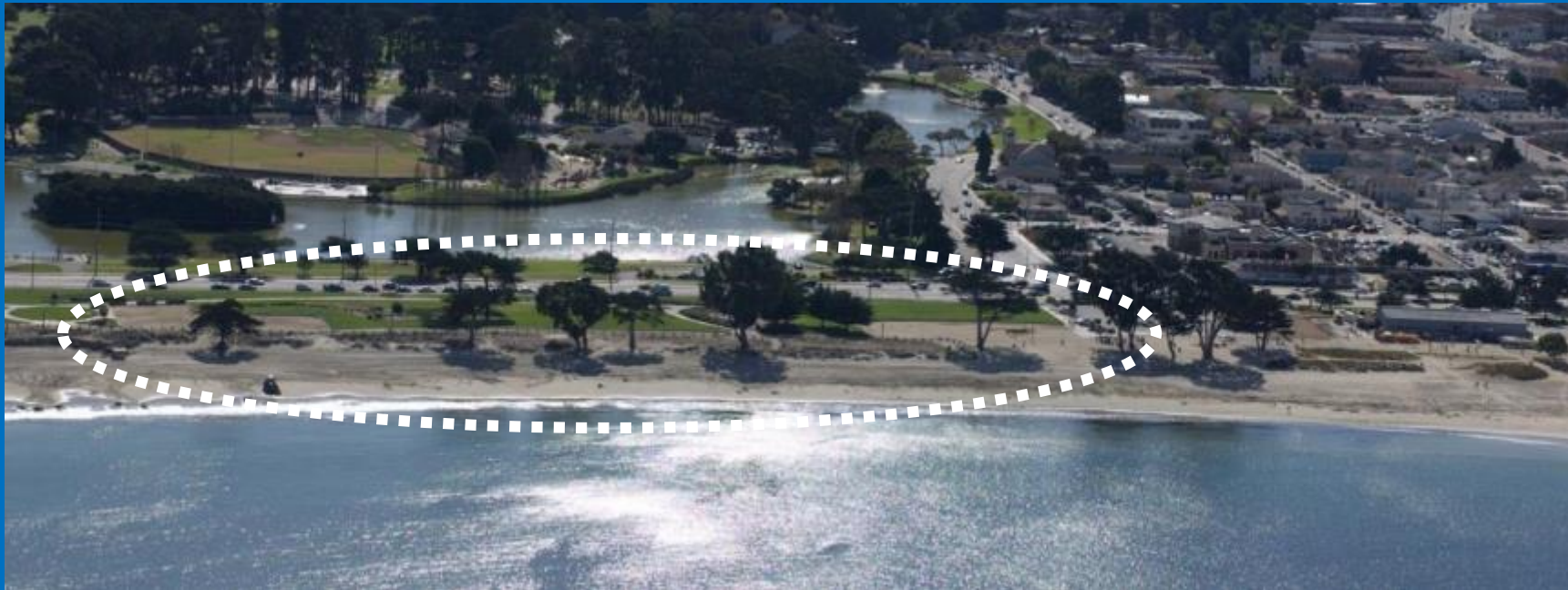
Realignment, 300-500 ft. inland -- 2017



Monterey – Window on the Bay



Monterey – Window on the Bay





Planned & Managed Retreat begins at the Half Moon Bay Ritz Carlton...



Concluding Observations

- ✓ Context Matters -- no single strategy is right
- ✓ Planning takes time and investment, and meaningful engagement
- ✓ Phased implementation with monitoring, thresholds for action
- ✓ Combination of strategies to structure incentives and provide options
- ✓ Fed, state, local partnerships are essential
- ✓ Social cost benefit assessment of alternatives
- ✓ Significant \$\$ is needed for adaptation
- ✓ Managing change over decades in a dynamic, complex system
- ✓ Resilience is balance of cost effective risk reduction, environmental protection & stewardship and social equity.

Thank You!

Thank you to the California Coastal Records Project
<https://www.californiacoastline.org/>