Nature-Based Adaptation Projects
Challenges and Opportunities in California




Marilyn Latta, Project Manager
California State Coastal Conservancy

Restore America's Estuaries

State of California
Coastal Conservancy

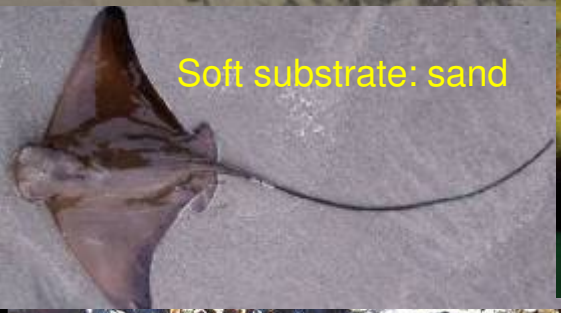
California State Coastal Conservancy

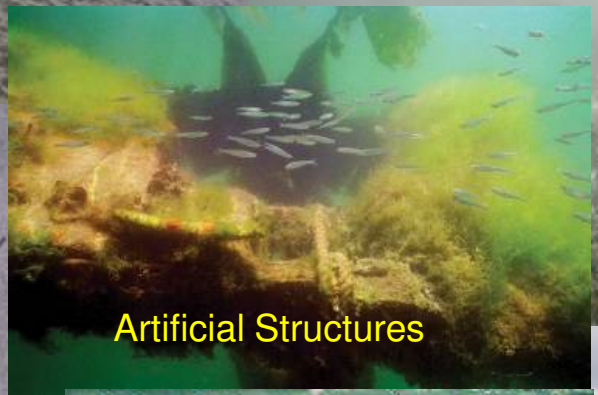
*The **Coastal Conservancy** acts with others to **preserve, protect, and restore** the resources of the California coast, ocean, and the San Francisco Bay Area.*

Coastal Conservancy

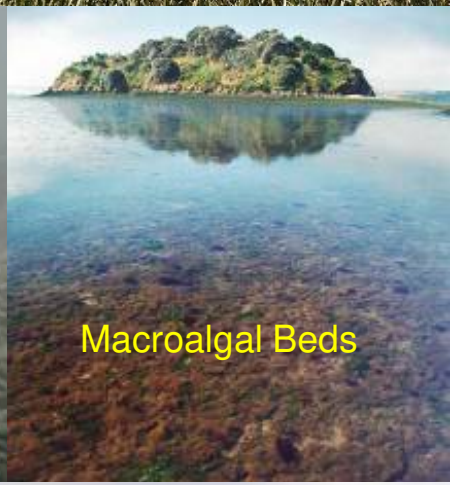

Tidal wetlands


Submerged Aquatic Vegetation


Soft substrate: sand


Artificial Structures


Rock Habitats


Macroalgal Beds

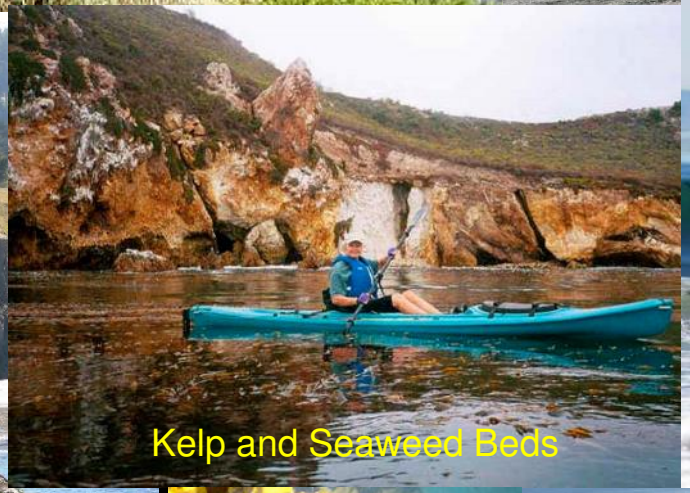

Shellfish Beds


Soft Substrate: Mud/ shell mix


Coastal Scrub


Coastal Bluffs


Headlands

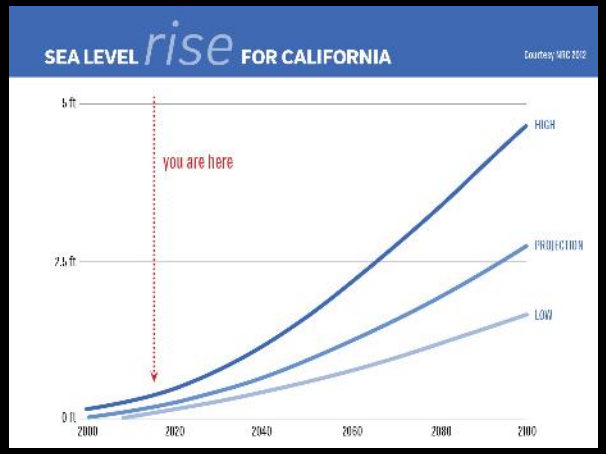

Kelp and Seaweed Beds

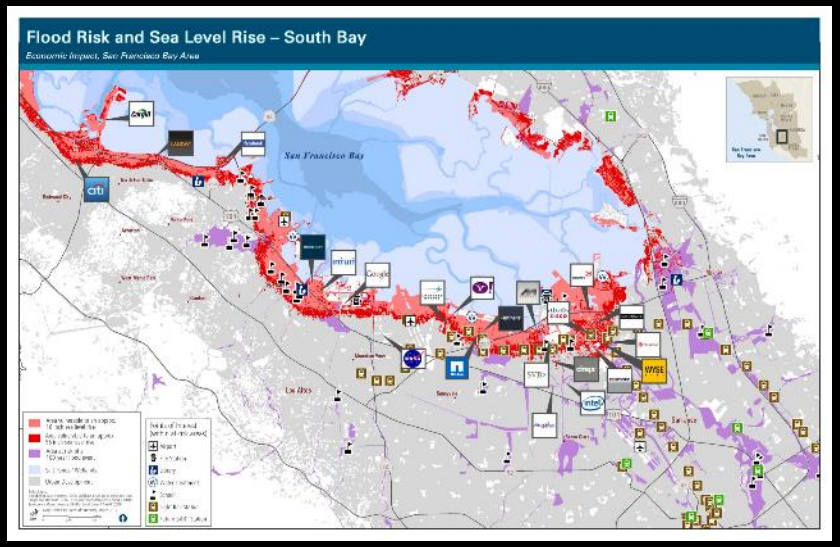

Coastal Dunes

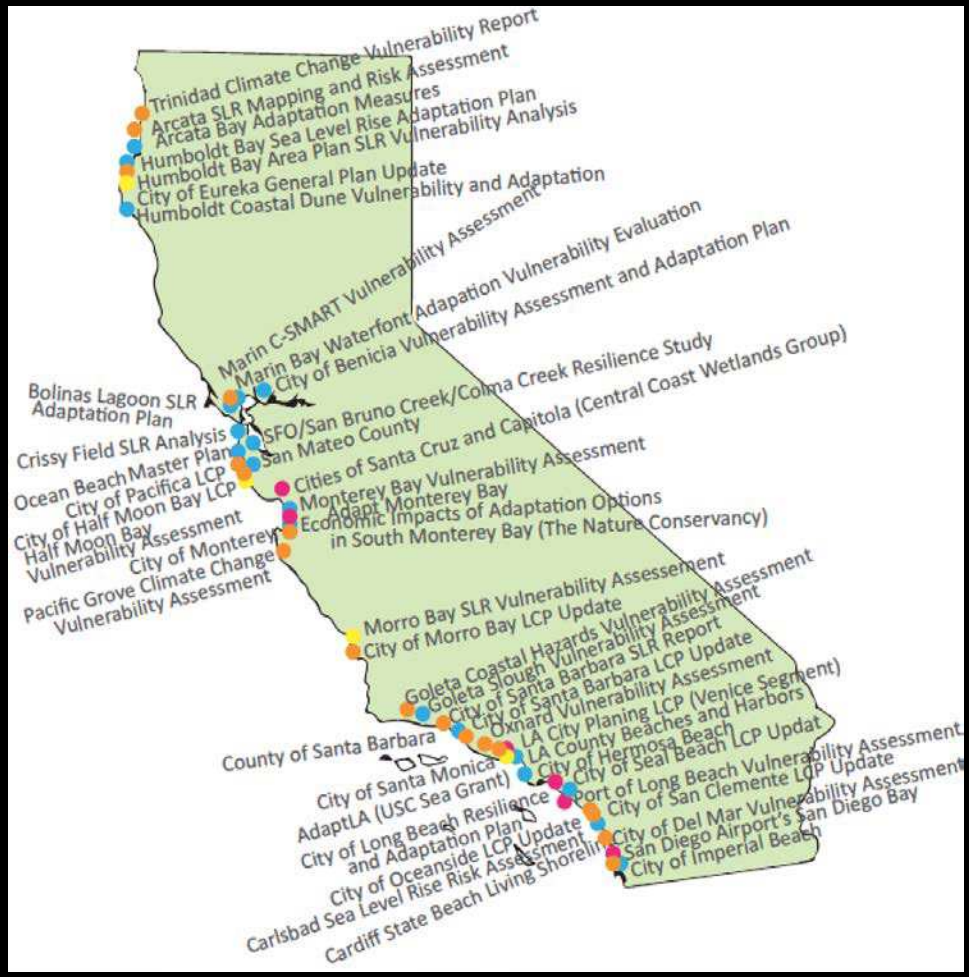

Beaches

At Risk In California:

- 1.4M SLR – 480,000 people
- Property valued at $1B
- Habitats and Species







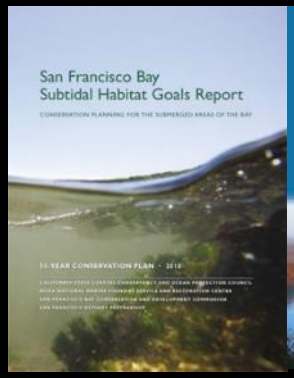
Affected flora and fauna

Shoreline access and uses

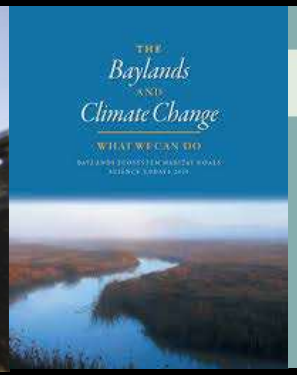
Policy Support in California
Exec Order B-30-15- *Prioritize natural infrastructure solutions*
SB 246: *Integrated Climate Adaptation and Resiliency Program*

ACOE Nationwide Permit 54- Living Shorelines

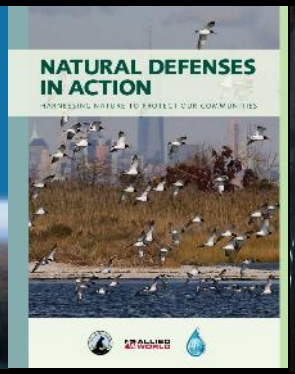
- CA Coastal Conservancy
- Safeguarding CA Plan
- 4th Climate Assessment
- CA Coastal Commission
- SF Bay BCDC



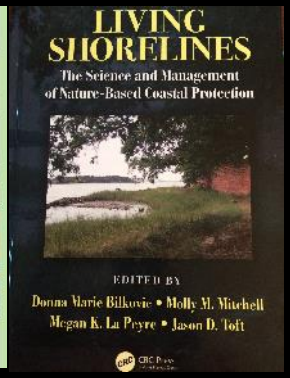
Subtidal Goals 2010
www.sfbaysubtidal.org



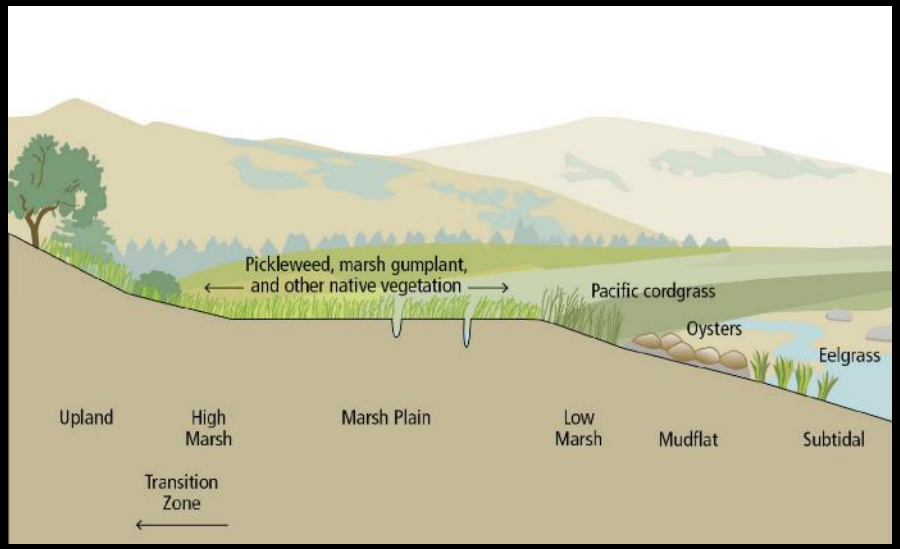
Baylands Goals 2015
www.baylandsgoals.org



NWF 2016
www.nwf.org



Bilkovic et al 2017
www.crcpress.com



Living Shorelines Engineering with Nature

Soft Shorelines Green Infrastructure Nature-based Adaptation …

Any elements used must not interrupt the natural water/land continuum to the detriment of natural shoreline ecosystems.

One Size Does Not Fit All

Design for specific conditions

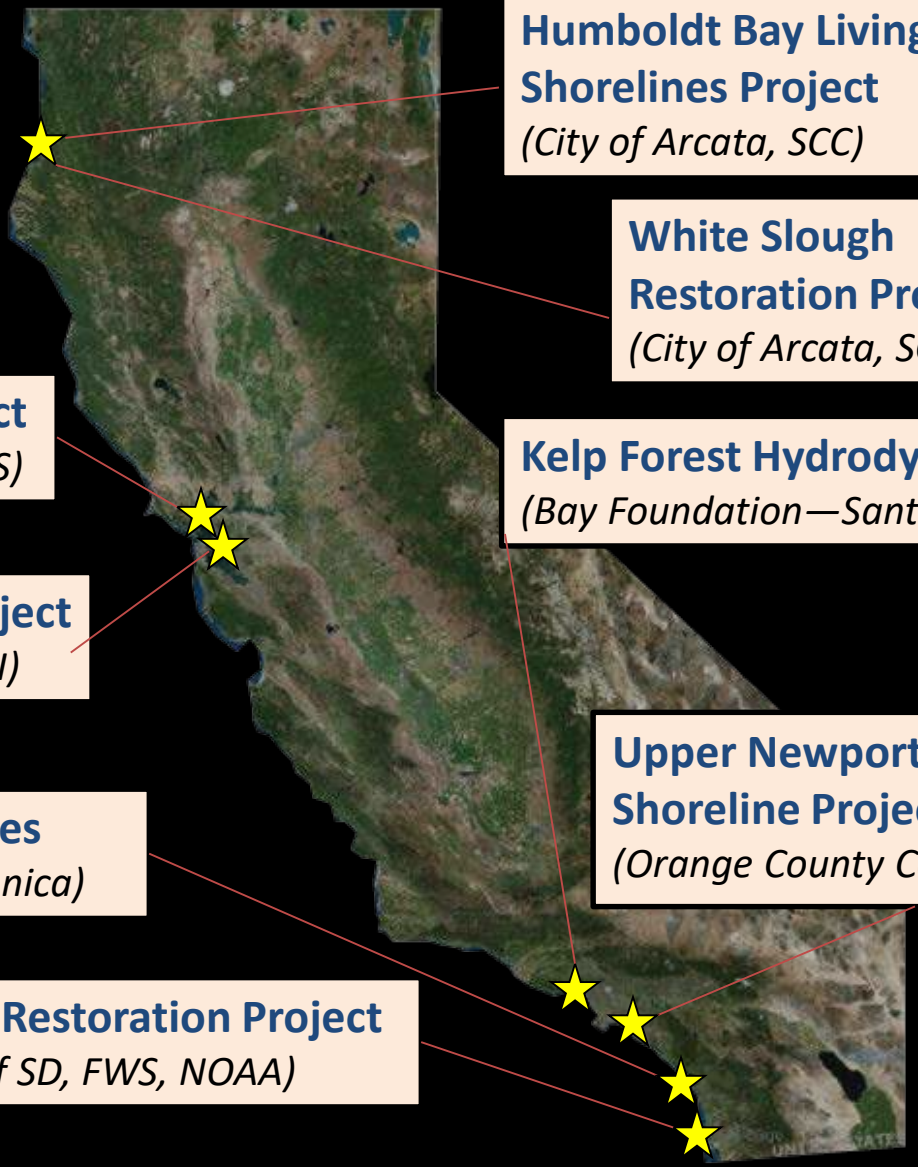
- Substrate/ soil
- Wave energy/ orientation
- Adjacent infrastructure

Local support

- Government willingness
- Community engagement

CA Nature-Based Adaptation

(Kelp, Oysters, Eelgrass, Dunes, Tidal Marsh)



Humboldt Bay Living Shorelines Project
(City of Arcata, SCC)

White Slough Restoration Project
(City of Arcata, SCC)

SF Bay Living Shorelines Project
(SCC, SF State, UC Davis, ESA, USGS)

Kelp Forest Hydrodynamics Study
(Bay Foundation—Santa Monica)

Ora Loma Demonstration Project
(Sanitary District Save SF Bay, SFEI)

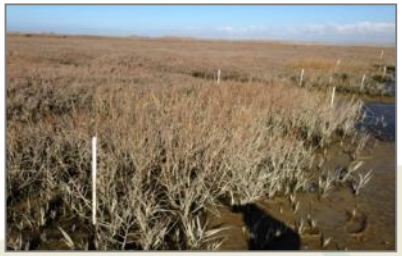
Upper Newport Bay Living Shoreline Project
(Orange County Coastkeeper, SCC)

Cardiff Dunes Living Shorelines
(SCC, Bay Foundation—Santa Monica)

San Diego Bay Native Oyster Restoration Project
(SCC, SWIA, CSU Fullerton, Port of SD, FWS, NOAA)

Giant Marsh Living Shorelines Project- Richmond, CA

Multiple habitat types across complete shoreline gradient



CA sea-blite:
Suaeda californica

Pacific cordgrass:
Spartina foliosa

Pickleweed, marsh gumplant, and other native vegetation

Pacific cordgrass

Terrestrial transition zone

Enhancements to existing vegetation

Oysters

Eelgrass

Upland

High Marsh

Marsh Plain

Low Marsh

Mudflat

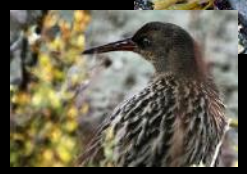
Subtidal

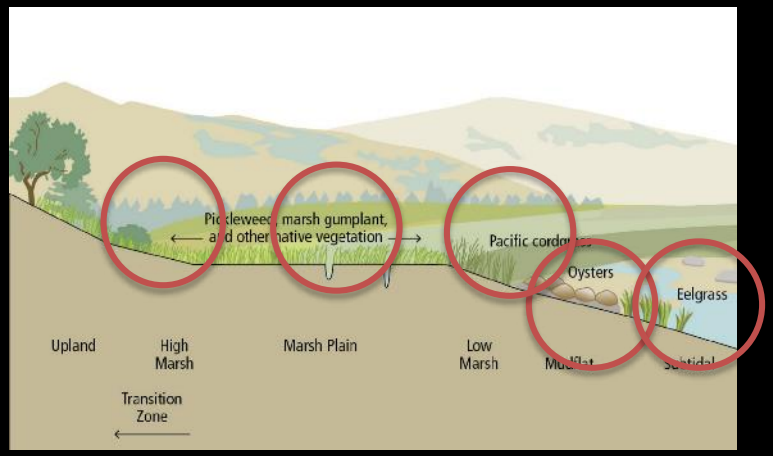
Transition Zone

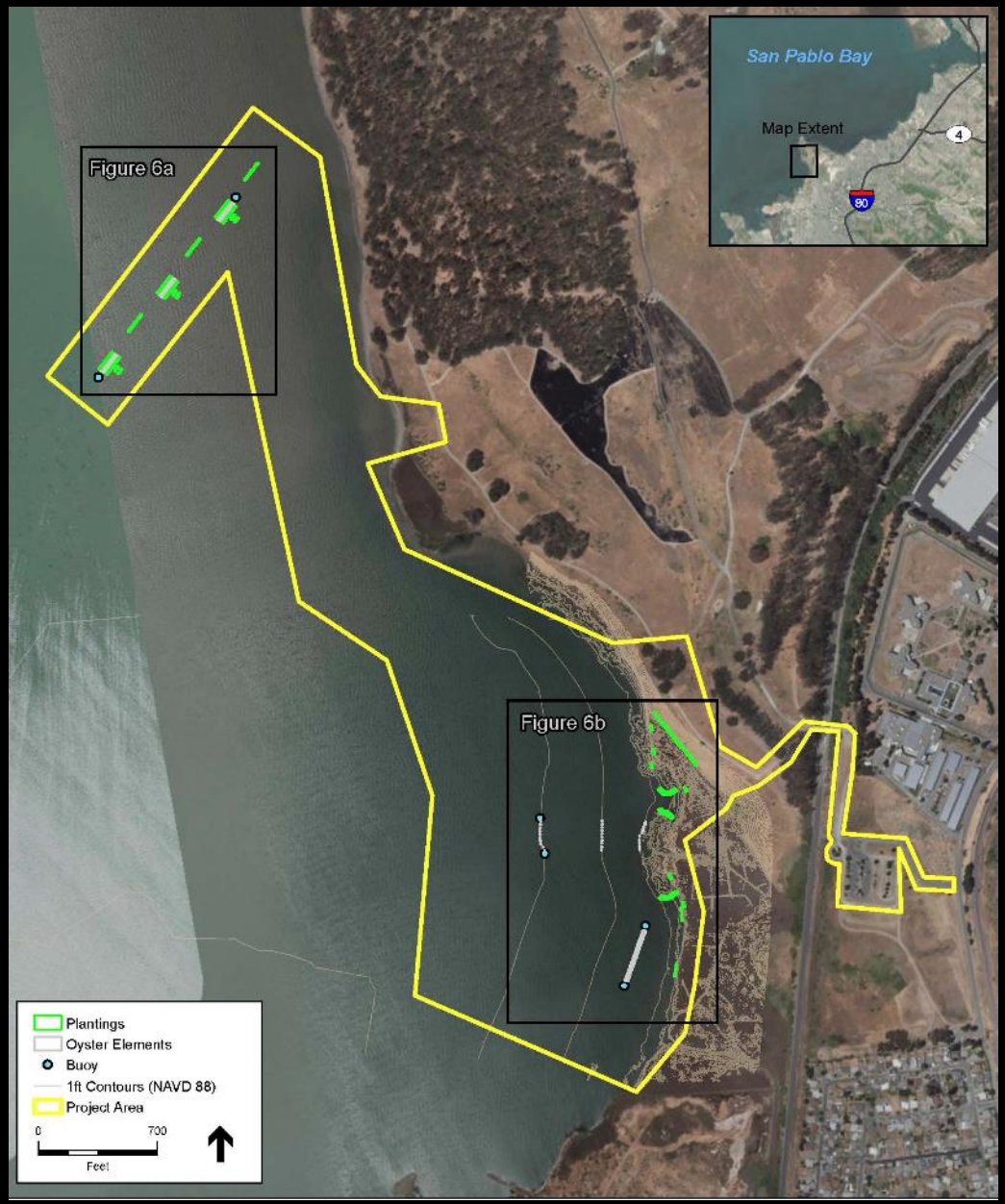
Giant Marsh Living Shorelines Project

Oysters, Eelgrass, Rockweed, Tidal Marsh, Upland Ecotone

- Tidal marsh habitat
- Endangered Species
- High Marsh/ Ecotone
- High Tide Refugia







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CA Nature- Based Adaptation

Beaches and Dunes

Humboldt Coastal Dune Vulnerability and Adaptation Project
(Friends of the Dunes)

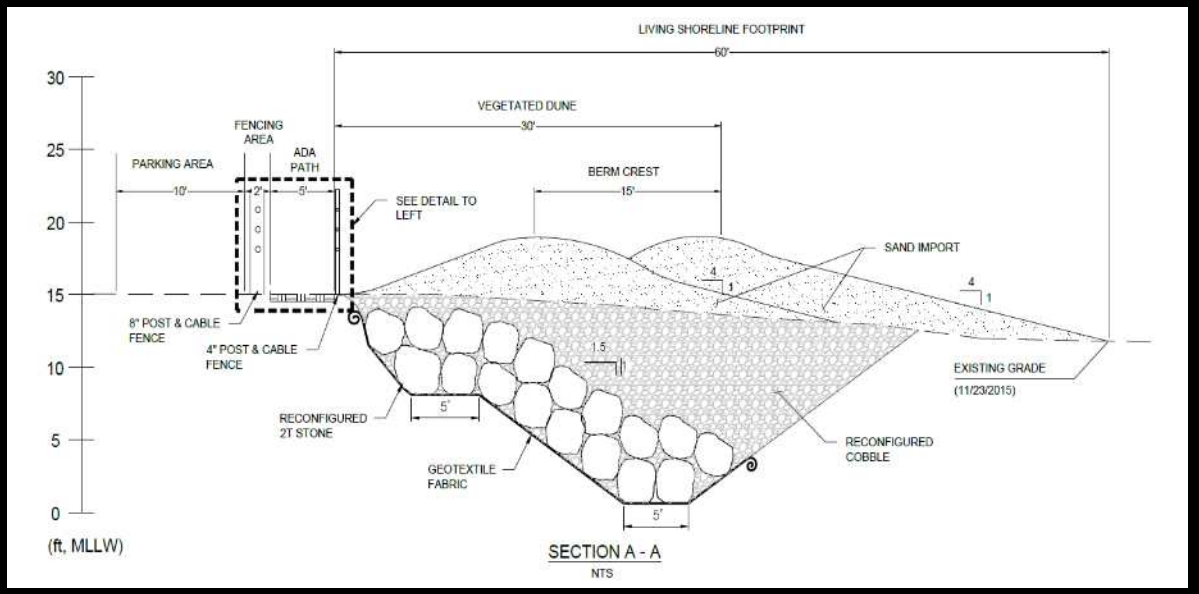
Ocean Beach Master Plan
(SPUR)

Surfers Point Managed Retreat
(City of Buenaventura)

Salinas River State Beach Dune Restoration
(Central Coast Wetlands Group)

Cardiff State Beach Living Shoreline Project
(City of Encinitas)

Cardiff State Beach Design Concept









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CA Nature-Based Adaptation

Tidal Wetlands

White Slough Restoration
(SCC, USFWS)

Arcata Bay Adaptation Measures
(City of Arcata)

Bolinas Lagoon Wetland Enhancement/SLR Adaptation
(Marin County Open Space)

South Bay Salt Pond Restoration Project
(SCC, CDFW, USFWS)

Seal Beach Sediment Augmentation
(Southwest Wetlands Interpretive Association)

Considering Local Conditions

REFUGE BOUNDARIES

EAST WHITE SLOUGH
16.1 ACRES

TOMPKINS HILL ROAD
INTERCHANGE

Project Area

REFUGE BOUNDARIES

US 101

WHITE SLOUGH

WEST WHITE SLOUGH
40.1 ACRES

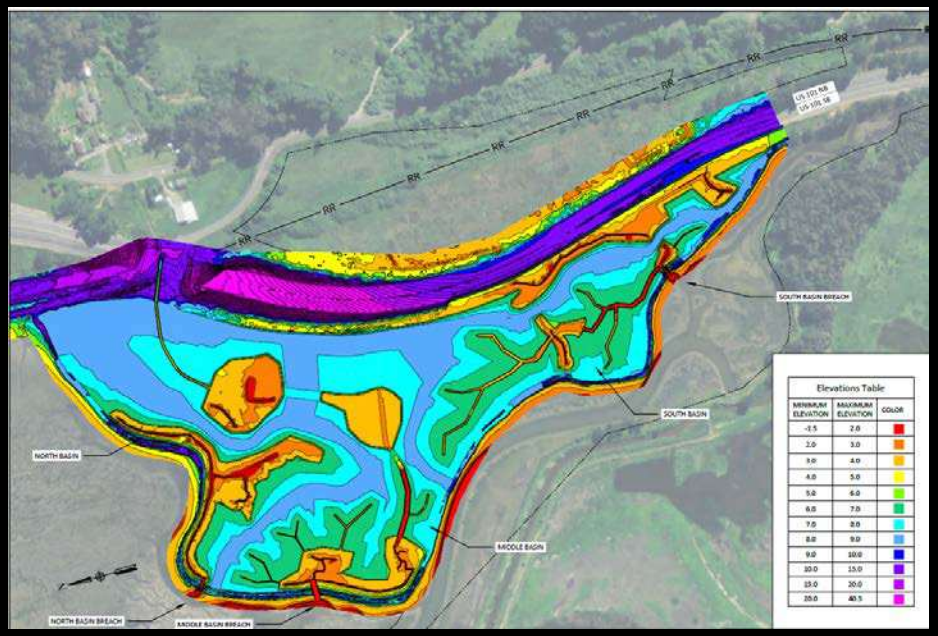
HBNWR
SALMON CREEK
UNIT

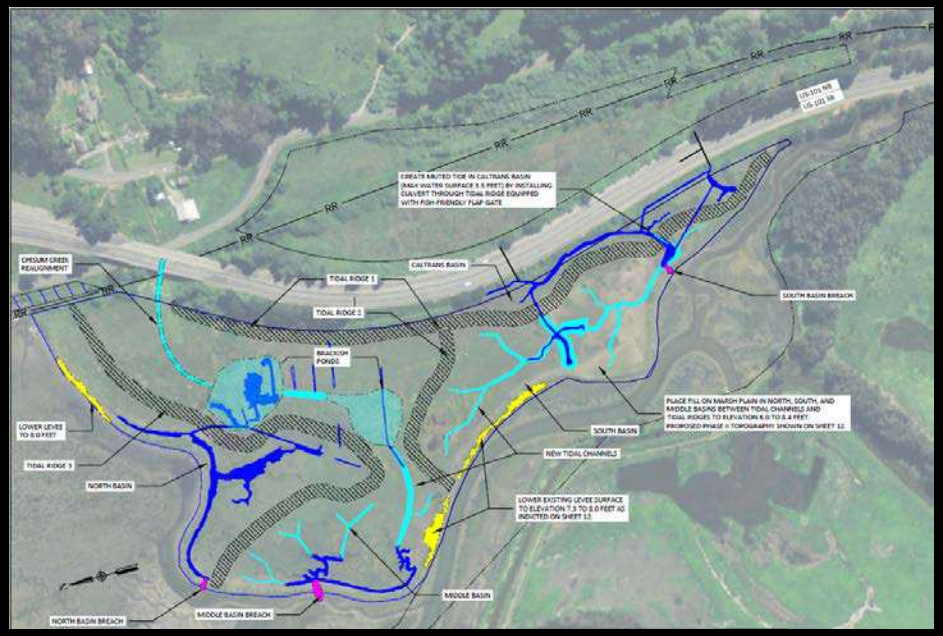
NCRR
(NOT IN OPERATION)

NORTH WHITE SLOUGH
15.8 ACRES

HUMBOLDT
BAY

Proposed topography and actions





- import ~250,000 cy of sediment to raise project area to tidal marsh elevation
- Proposed marsh elevations of 7-9 ft with ponds and channels
- Redesigned to leave a basin alongside the embankment

Regulatory Challenges

- Lack of data- need more pilots
- Beneficial Fill
- Suitable Materials
- Construction Methods/ Timing
- Sequential permits
- Long timeframes
- High cost

Threading the Needle

Innovation and Feasibility

Barriers to Innovation:

- Science and data gaps
- Institutional Inertia
- Lack of broader context
- Lack of an advocate

Importance of Feasibility:

- Habitat and species
- Pilot projects – test
- Develop Best Management Practices
- Document success before scaling up
- Monitor long-term benefits and impacts

California is building demonstration projects to address these challenges

Monitor for both physical & biological performance

Habitat potential for green-grey infrastructure

Pilot projects – test & evaluate before scaling up

Marilyn Latta
marilyn.latta@scc.ca.gov