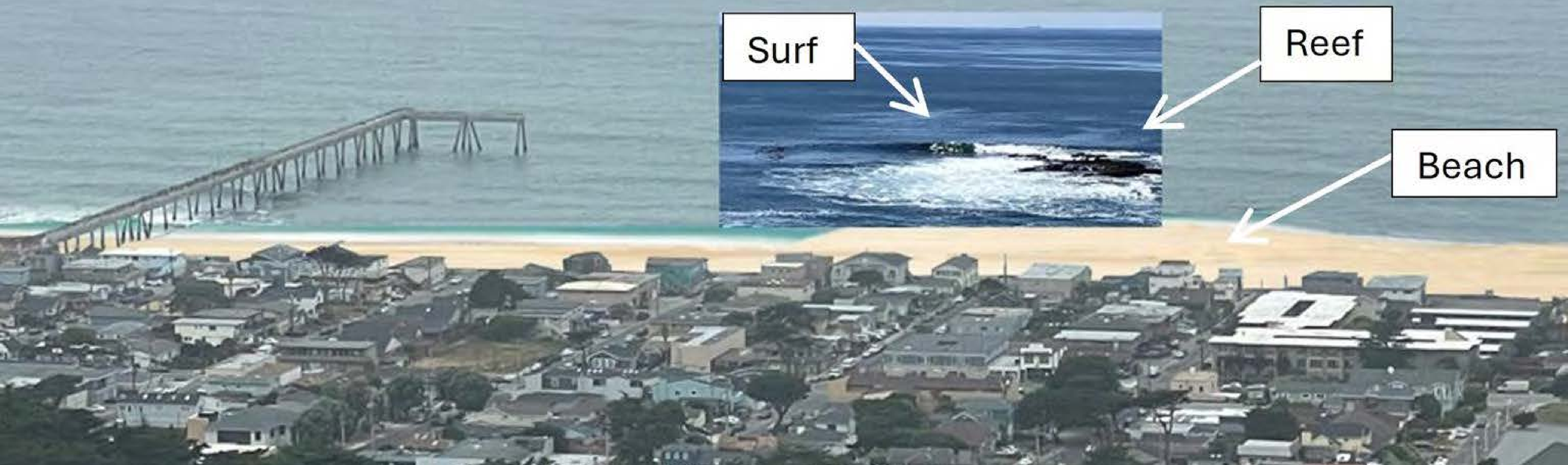
# REEF + SAND
# A VISION FOR PACIFICA

**REEFERS Reef + Sand Crew – Presented by Bob Battaio – CSBPA Nor Cal Conference Santa Cruz May 12 2026**



# REEF + SAND, PACIFICA

THE REEFERS

Bob Battalio

Rob Caughlan

George Domurat

Brian Gerrity

Tom Kendall

Adam Libert

Rob's Reef

Rob's Reef — Bigger Beaches, Better Waves | Pacifica, CA

https://robsreef.org/#

# Outline

1.Location and Setting

1.Problem Description

1.Concept Development and Description

# LOCATION AND VICINITY MAPS

Figure 6. City of Pacifica looking northeast from Mori Point on the south to Mussel Rock on the north (image from Google Earth).

Site is the north Sharp Park district, Pacifica, CA USA north of the pier (graphics: Griggs and Battalio 2025)

Figure 5. Map of California with coastal counties and locations of four developed back beach sites discussed.

# Problem Statement

- Beach narrow to non-existent

- Waves runup over seawall

- Seawall structure failing

- Development in high-velocity flood and damage zone

- No shore access, surf degraded

- Worsening conditions

2019 photograph from Grggs and Battalio 2025
(photo credit: Kenneth and Gabrielle Adelman, California Coastal Records Project)

# WAVE FLOODING AND DAMAGE

Photographs: Battalio

# EROSION- NO BEACH AT BEACH Blvd.

1985

Photograph 6. Recently constructed reinforced earth seawall with armor stone toe potection. This wall extends along Beach Boulevard north of the Fishing Pier in Pacifica (August 1985).

NOW

Sources: (left) Geomatrix 1987 (right) Bob Battalio

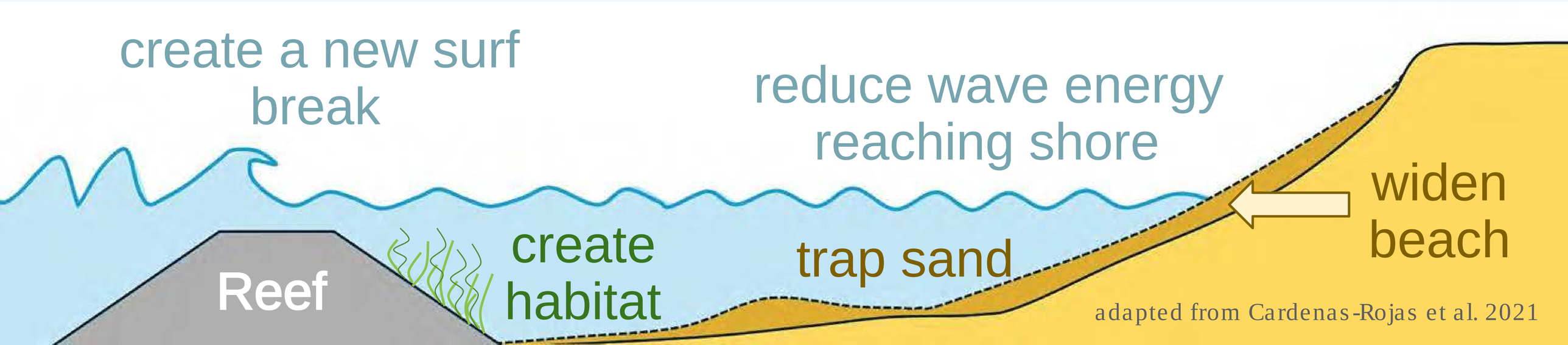
Rocky’s reef nearby..no longer breaks well because of loss of sand and reflection from shore armor - plus, access is dangerous.

Sequence Photos: Franco circa 1990s
Surfer: Bob Battalio

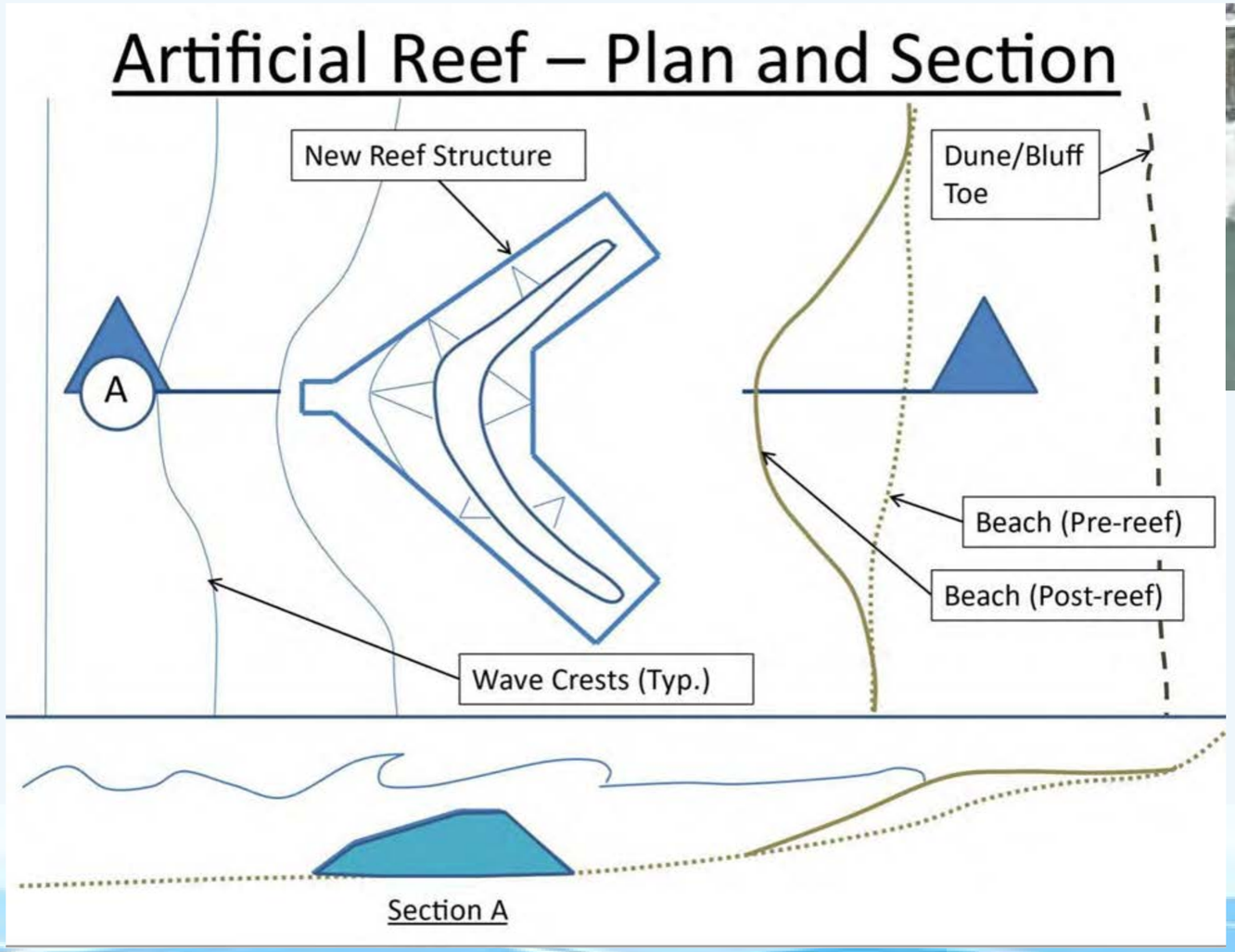
# The Reef & Sand Concept

**A multi -purpose reef combined with beach nourishment to reduce erosion and improve coastal resilience.**

A partially submerged reef could:

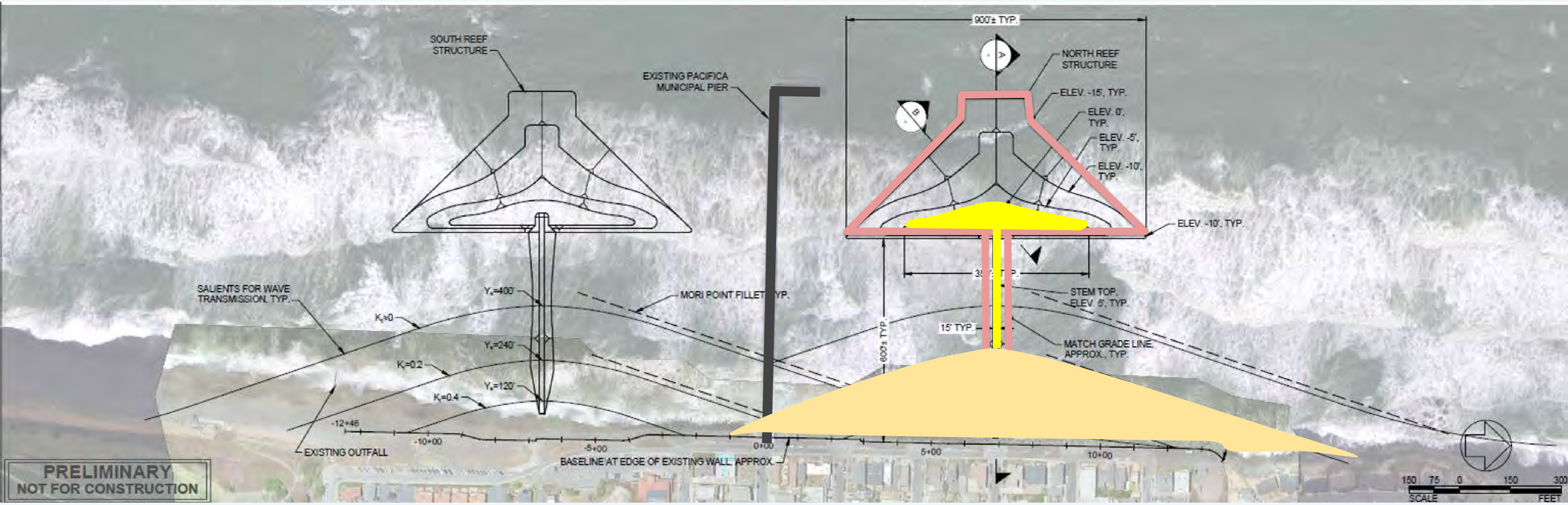


# The Reef and Beach concept



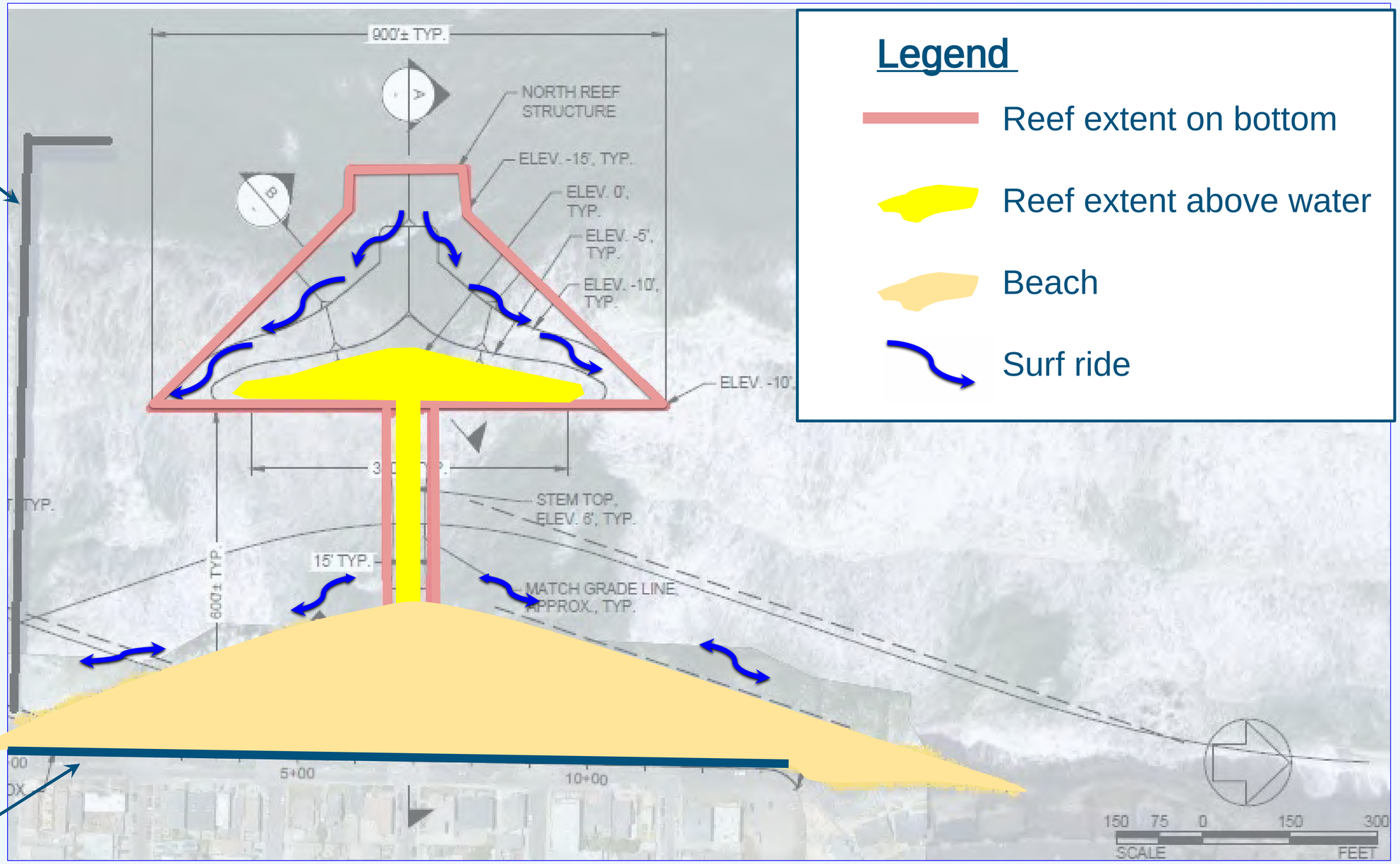
Sources:
(left) San Francisco Littoral Cell RSM 2010
(above) Pacifica SLR Adaptation Plan 2018

# The Reef and Beach concept




Source: ESA 2021 Beach Nourishment Alternatives,
Pacifica Beach Boulevard Infrastructure Resiliency Project

# Reef Headland and Beach



# Study Area
## Mori Point to north end of Beach Blvd.

Proposed artificial reef headland and wide beach

Pier ~1040 feet

Seawalls along Beach Blvd., Paloma to Clarendon

Levee from Clarendon to Mori

Mori Point headland and wide beach

Waves shift sand back-and-forth, primarily moving south.

Coarse sand is mostly retained to the north of the headland.

Bigger waves break offshore on headland's rock reefs, facilitating sand trapping near shore

# Basis of Conceptual Design

**reef and beach dimensions**

- Reference Site - Mori Point Headland and updrift 'fillet' beach
- California reef guidelines (MNE EVERTS MEC 2001)
- Reef crest above water - Browder et al. 1996; Buckley et al. 2016

**beach persistence, re-nourishment**

- Diffusion model – existing shoreline as equilibrium
- can we create new equilibrium shoreline ? (Leidersdorf et al. 1994)
- sand grain size - important

**surf reef delta shape**

- Seaward reef salient (HiWave, Gary Ross)
- large size (experience, personal communication Kimo Walker)
- size relative to wavelengths (long period wave exposure in California)

**materials**

- fabric bags not preferred (Kimo Walker per comm 1980s; Leidersdorf et al. 2011)
- rock or concrete preferred for ecology (CARP Plan in press).

**community sentiments**

- desire for a solution to hazard exposure, loss of beach, water access and surf
- resistant to landward realignment -retreat and associated built asset losses
- resistant to armoring and associated beach and ocean access losses
- building the shore seaward has support if functional and funding can be found
- Ecology, natural coastal resources are important
- Pier fishing resource important

## A COMMUNITY PROJECT FOR THE PACIFICA COAST

# Robb's Reef

*Loving the sea is just planetary patriotism. — Rob Caughlan*

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