Resiliency Planning for Our Changing Coastline

Bluff Neighborhood Discussion Forum

City of Del Mar

Council Members Druker and Worden

August 14, 2017

Welcome

- Discussion Forum for Bluff Top Residents and Owners
  - To share information during planning process
  - Reach as many people as possible- avoid misinformation

Resiliency Planning In-Process

- Planning for the future of Del Mar
- Help property owners (public/private) prepare for projected flooding, bluff erosion, beach erosion, and rising tides
- Align options with community goals & values

How did we get here?

- **City is subject to various Federal and State obligations**
  - To protect public health and safety & public trust lands
- **In 2014/2016 City was awarded two Grants** ($311,220 total)
  - To help address State obligations via Coastal Commission
- **Council established Technical Advisory Committee** (STAC)
  - To provide public forum for recommendations to City Council
  - STAC held 13 public meetings and workshops since July 2015
- **FEMA released new coastal flood maps** (March 2017)
  - Accounts for flooding from wave action on oceanfront properties

Key Work Program Tasks

- **Local Risk Assessment**- Completed May 2016
  - Identifies local vulnerabilities (areas subject to flooding, beach erosion, bluff erosion)
  - Provides projections through year 2100

- **Adaptation Plan**- in process
  - To provide a menu of options customized to Del Mar
  - STAC recommended maintaining walkable beach as priority (adaptation strategy = beach nourishment)

- **Update to Coastal Bluff & Floodplain Overlays**- in process
  - To comply with FEMA and Coastal Act requirements

Obligations (State and Federal)

- **Sea Level Rise Planning deliverables (State)**
  - Local Vulnerability Assessment
  - Adaptation Plan policies
  - Regulations for new development that:
    - Protect public trust lands & maximize public access
    - Protect existing structures & minimize armoring

- **Floodplain Management deliverables (FEMA)**
  - Update to Floodplain regulations and mapping

State Guidance

Where feasible, Sea-Level Rise policies/regulations must:

- Maximize access to public trust lands
- Plan for projected landward shift in mean high tideline
- Preserve public use of dry sandy beach

Cost of No Action

- Penalties for default on commitment to grant funds
- FEMA Sanctions (i.e. no disaster relief, no insurance)
- Risk of harm to individuals (flood/erosion hazards)
- Risk of damage to public assets and infrastructure
- Risk of damage to private property
- Risk of State challenges over public trust lands

What is Sea-Level Rise?

- The thermal expansion & rising of ocean water
- Causes: global warming, tectonic movement, and slippage of land mass into ocean
- Consensus of scientific opinion is that:
  - Sea level will continue to rise
  - Intensity of storms and flooding are predicted to increase

The sea rose nearly 7 inches world-wide over the past 100 years…

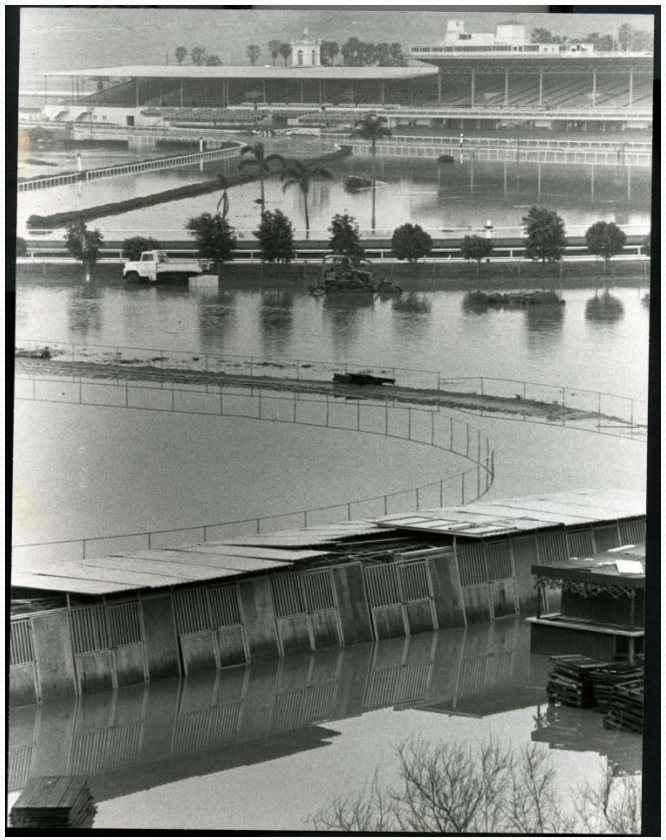
Monitoring in Del Mar will identify the unique level of rise locally

What does Sea-Level Rise look like?

Impacted Services

Threatened Public Facilities:

- Fire Station by 2030
- Sewer Lift Station and
- 17th Street Beach Safety Center by 2050
- Fairgrounds by 2070



1980 Flood

What does Sea-Level Rise look like?

Impacted Roads

North Beach Flooding
by 2050-2070

- Camino Del Mar
- Jimmy Durante Blvd & bridge
- Ocean Front
- Coast Blvd
- Santa Fe Ave
- 17th Street north to 28th Street

Coast Blvd (1980)

What does Sea-Level Rise look like?

Narrowing of Beach

Projected loss of walkable beach:

- winter/spring by 2030-2070
- year round by 2050-2080

Miami Dade County

Typical tideline in future

What does Sea-Level Rise look like?

Erosion of Bluffs

Projected citywide bluff erosion:

- To railroad by 2030
- To bluff top/sewer by 2050

March 2017 Bluff Collapse

Anticipated Bluff Erosion:

Projected distance from Coastal Bluff Edge

Sea-Level Rise	0 feet	1 feet	2 feet	3 feet	5.5 feet
Railroad	15-110 feet	0-70 feet	0-40 feet	0-10 feet	0 feet
1st row of buildings	40-170 feet	0-140 feet	0-120 feet	0-80 feet	0 feet
Sewer Line	65-175 feet	10-190 feet	0-150 feet	0-100 feet	0-50 feet
4th row of buildings	270-450 feet	170-340 feet	140-300 feet	100-280 feet	10-210 feet

Historically, bluff erodes about one foot per year on average

What does Sea-Level Rise look like?

Increased Flooding

Coastal/River Flooding: by 2050

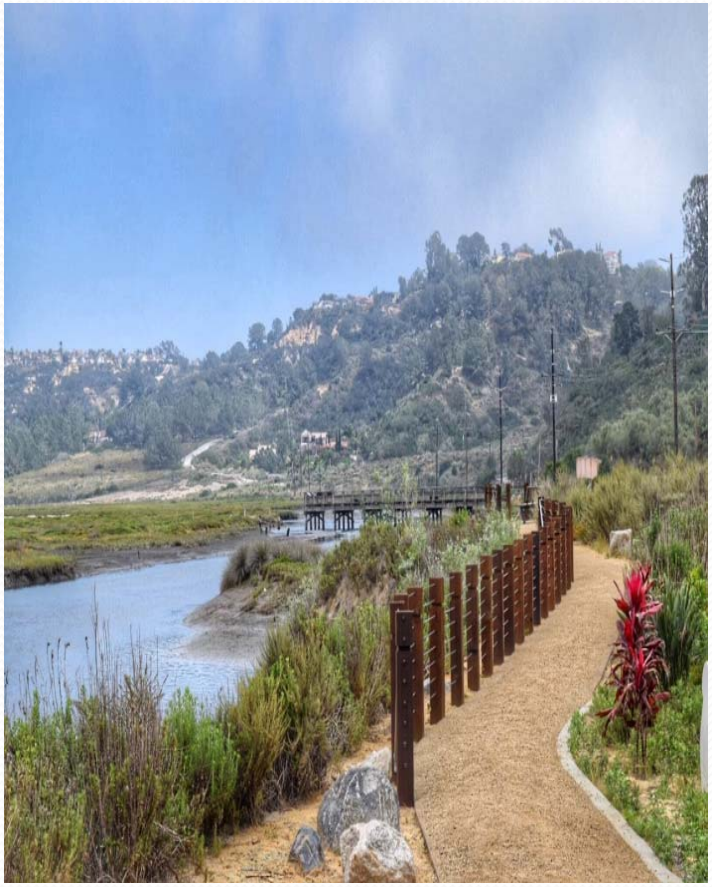
- Beach front properties
- And adjacent properties

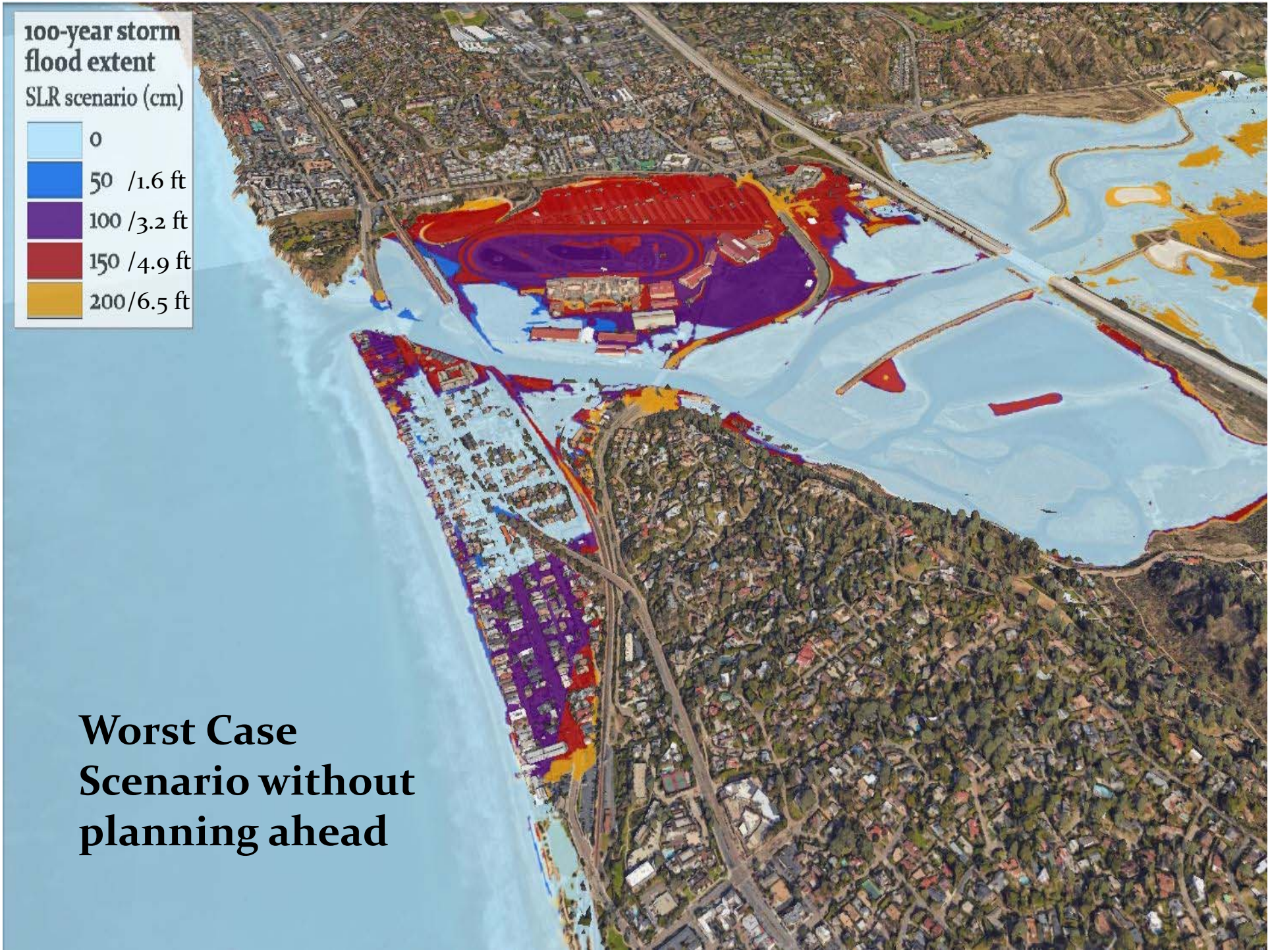
What does Sea-Level Rise look like?

Loss of Habitat

San Dieguito Lagoon
Habitat Migration: by 2070

- Conversion and loss of vegetated wetland habitat




100-year storm flood extent
SLR scenario (cm)
0
50 /1.6 ft
100 /3.2 ft
150 /4.9 ft
200/6.5 ft
Worst Case Scenario without planning ahead

Purpose of Resiliency Planning

Planning ahead will…

- Help mitigate the worst effects
- Plan for public facility/infrastructure changes
- Help owners plan/protect development per Coastal Act
- Protect people from risk of harm
- Protect valued public assets: beaches, parks, bluffs, Lagoon

When will action be required?

- Best available science can only predict range of time
- City will monitor change in conditions
- Only new development and major remodels will be subject to new limits
- Council will decide “triggers” to require future action

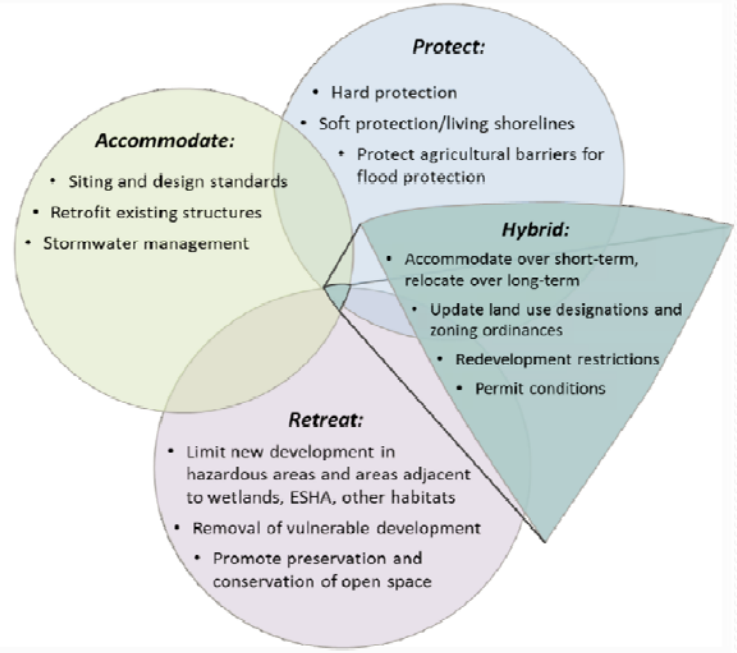
Monitoring of Changes

- **Sea-Level Rise**- How close to 1ft, 2ft, 3ft increase?
- **Beach width**- Change in width of usable sandy beach
- **Bluff edge**- Distance from bluff edge to development
- **Flooding/storms**- Frequency/extent of damage
- **San Dieguito River**- Tidal flow & habitat conversion

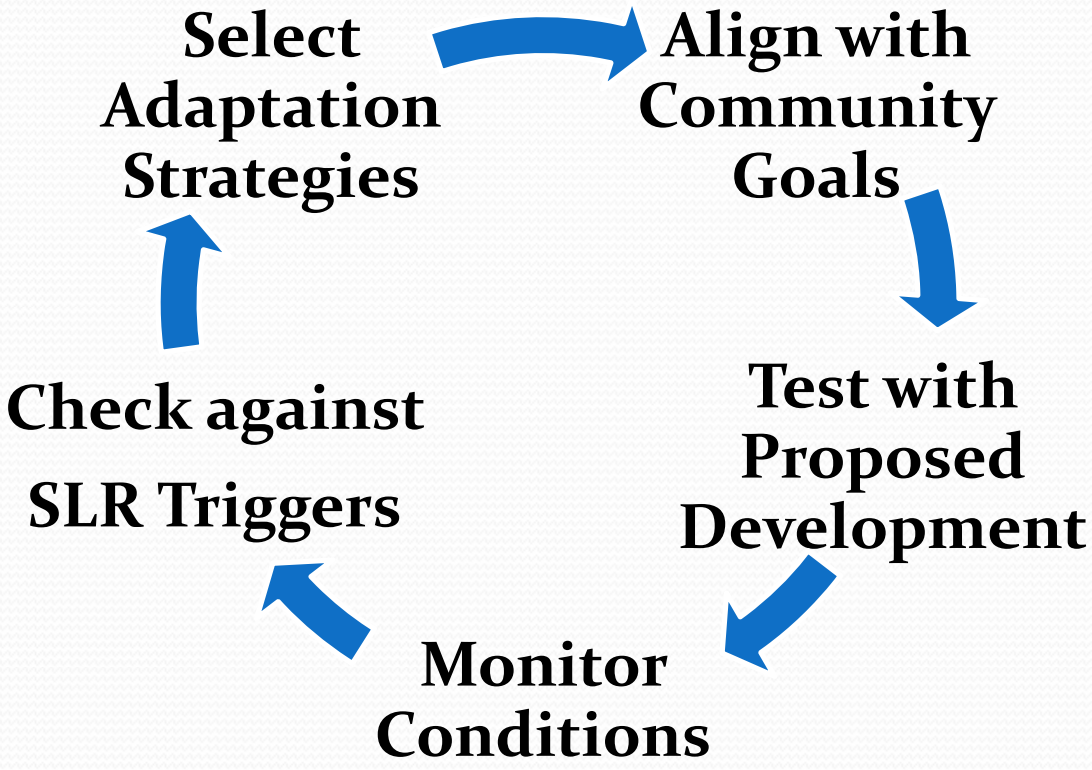
Adaptation Strategies

When "trigger" is reached, the owner (City for public property; private owner for private property) will choose from combination of:

- Natural "soft" solutions
- Engineered solutions
- Whether to relocate development



Iterative Process



Which Adaptation strategies work best may change over time

Natural Solutions

- **Sand Replenishment**
- **Dune Creation/Restoration**

Cardiff Beach Living Shoreline Project

Sand Replenishment

Placement of sediment-water slurry on the beach.

Opportunities	Constraints
Use sediment trapped on land or from dredging projects	Transportation of sediment to receiver sites
Use offshore sediment	Immediate, short-term biological impacts
Rebuild cobble lag, dunes	Habitat conversion long-term

Pros	Cons
• Preserves beach • Lower impact	• Limited sand sources • Less effective over time with increasing SLR

Engineered Solutions

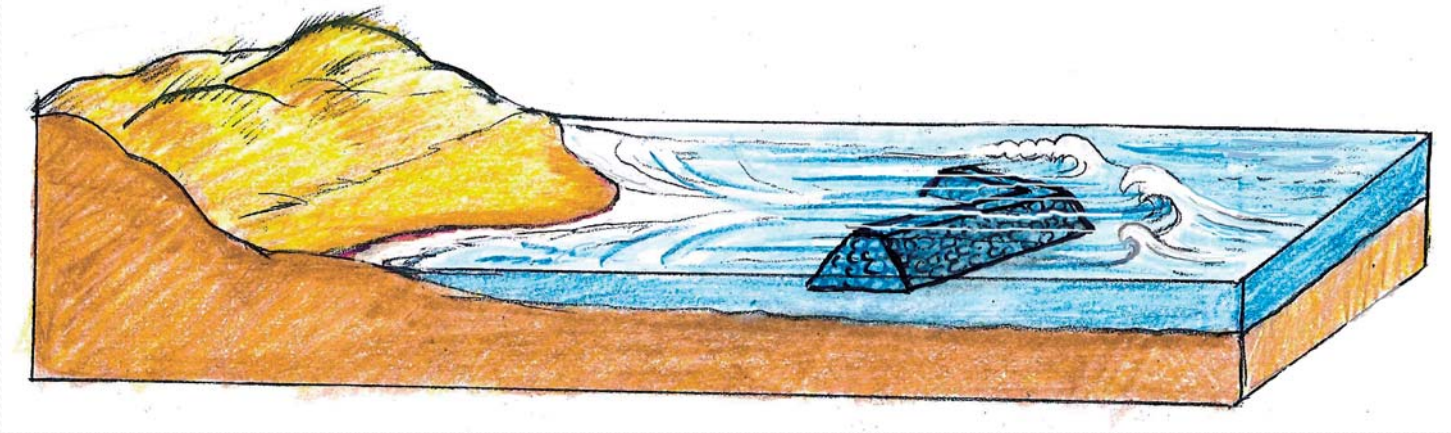
- Multi-purpose reefs
- System of levees along River
- Offshore breakwater system
- Groin/Jetty
- Raise and improve sea walls
- Elevate and flood-proof structures
- Storm water management

Photo by K. Duhring

Nca2014globalchange.com

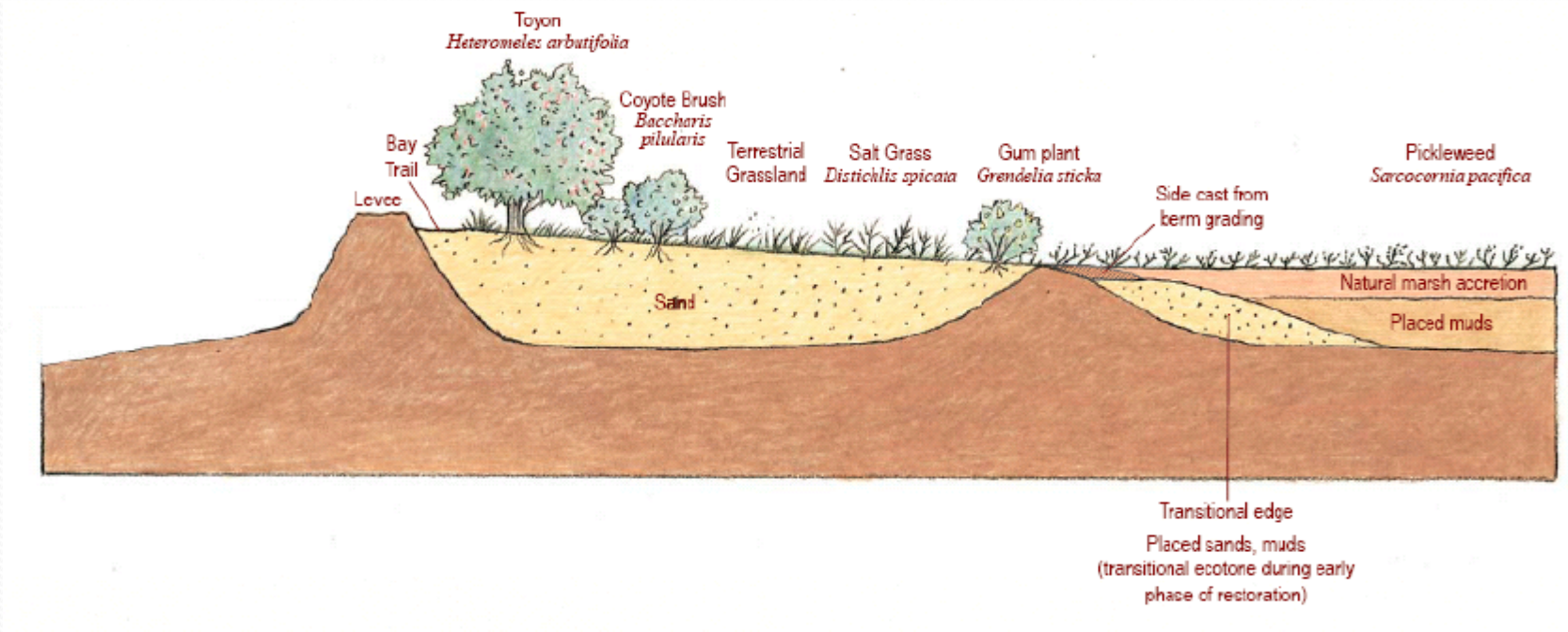
Multi-Purpose Reefs

Reefs can address dissipating wave energy, but not sea level rise



Opportunities	Constraints
Create new habitat	High energy coastline
Enhance surf opportunities	Limited experience
Increase sediment retention	High cost (economic and environmental)

“Living” Levee Concept



Protect with levees along north and south river banks

Offshore Breakwater System

- Creates a natural harbor to address beach erosion
- Reduces wave energy to help protect development
- Design must account for wave height, wind direction, sand movement & submerged vegetation

Cons:

- Expensive to build
- Impacts habitat
- Impacts Surfing opportunities
- Disfavored by permit agencies

York River Shoreline, Photo by K. Duhring

Groin/Jetty

- Can build upstream beaches

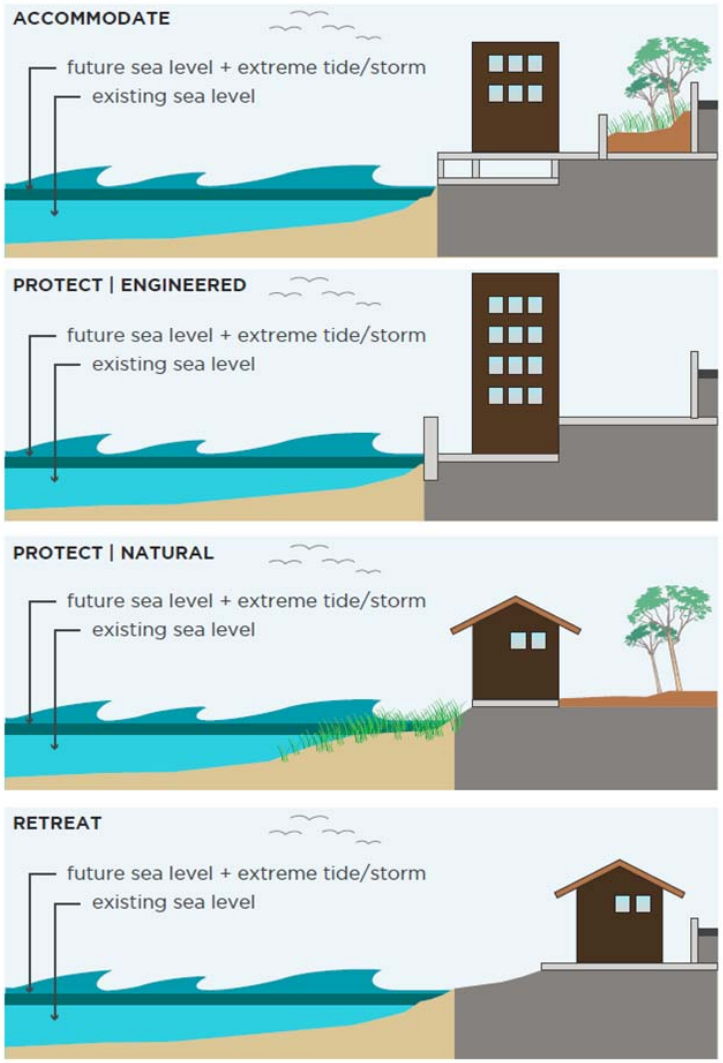
Cons:

- Strips sand from downstream
- Relocates sand, but does not increase overall volume
- Disruptive to ocean and beach environment

Mission Beach Jetty

sunkissedhiker.com

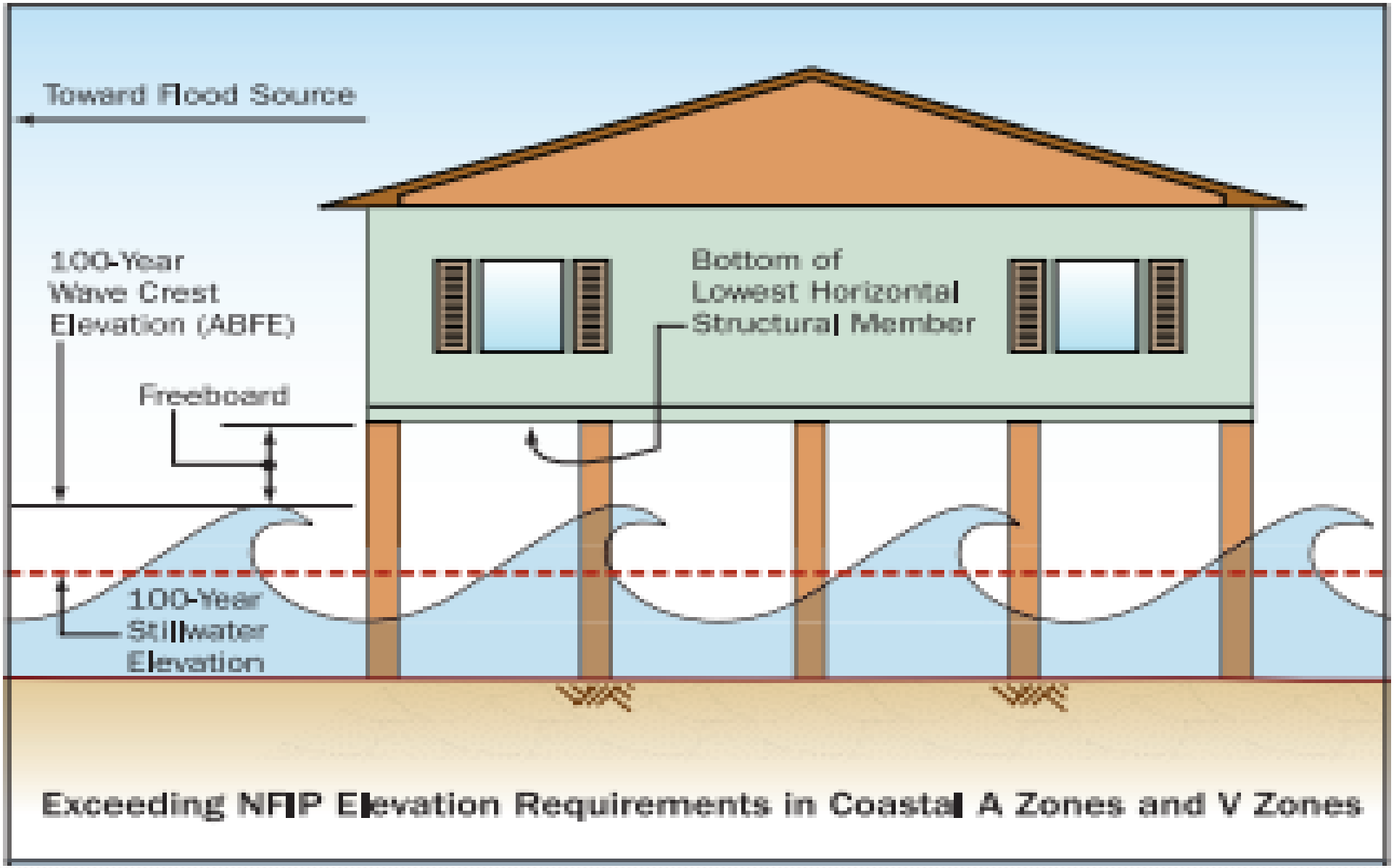
Options for Structures



SAN FRANCISCO SEA LEVEL RISE ACTION PLAN

- Raise/floodproof
- Seawall protection
- Living shoreline
- Relocate

Upgrade/Elevate Seawalls



Beachduneguide.uconn.edu

Managed Retreat

- To relocate structures and retreat line of development

- Scenarios where strategy could be used:
  - To relocate railroad from bluff
  - To retreat sewer from bluff edge
  - To relocate fire station out of floodplain
  - To address shift of mean high tideline and bluff edge

- Controversial option for private property with implementation challenges:
  - Property rights
  - How will it work?
  - Typically a last resort option

City wants input

Trainweb.org

What can you do to help?

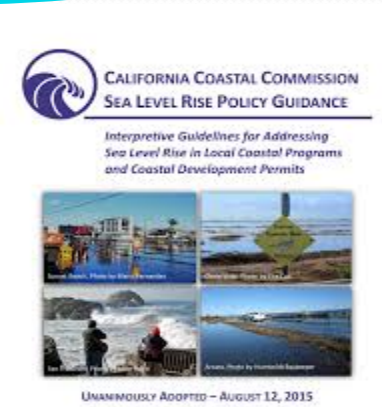
- Participate
  - Public meetings, workshops, and hearings
- Tell your neighbors
- Provide feedback on public drafts
- Follow information on City's website:
  - www.delmar.ca.us

Next Steps

- Decision points will occur in phases
  - **Phase I- Vulnerability Assessment, Adaptation Plan, and Regulations for New Development**
    - Public workshop- November 2017
  - **Phase II- Sediment Management Plan, Wetland Habitat Migration Plan, and Refinement of LCP**
  - **Additional phases will occur based on monitoring**

Resources

- Coastal Commission SLR Policy Guidance and Menu of Options for Residential Adaptation Strategies



- FEMA & CDWR Flood Management Resources
- City Sea Level Rise Local Coastal Program Web Page
- Council Liaisons: David Druker & Dwight Worden
- SLR Technical Advisory Committee (STAC)
- Staff Contacts: Kathy Garcia & Amanda Lee

We want to hear from you

- What additional information will help you?
- What else should we investigate?
- How can we help you and the City plan long term?
- How can we better reach your neighbors with this information?