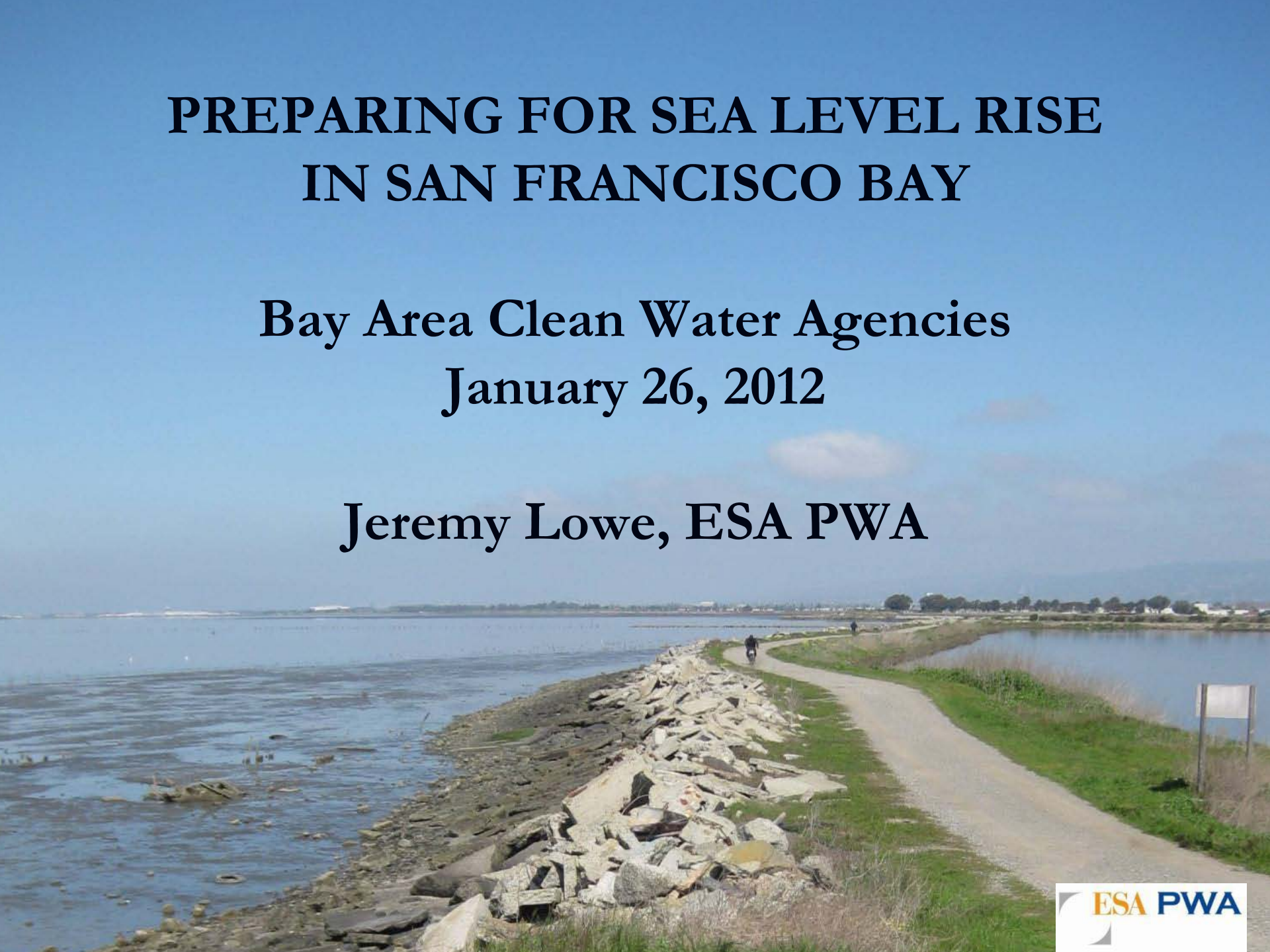
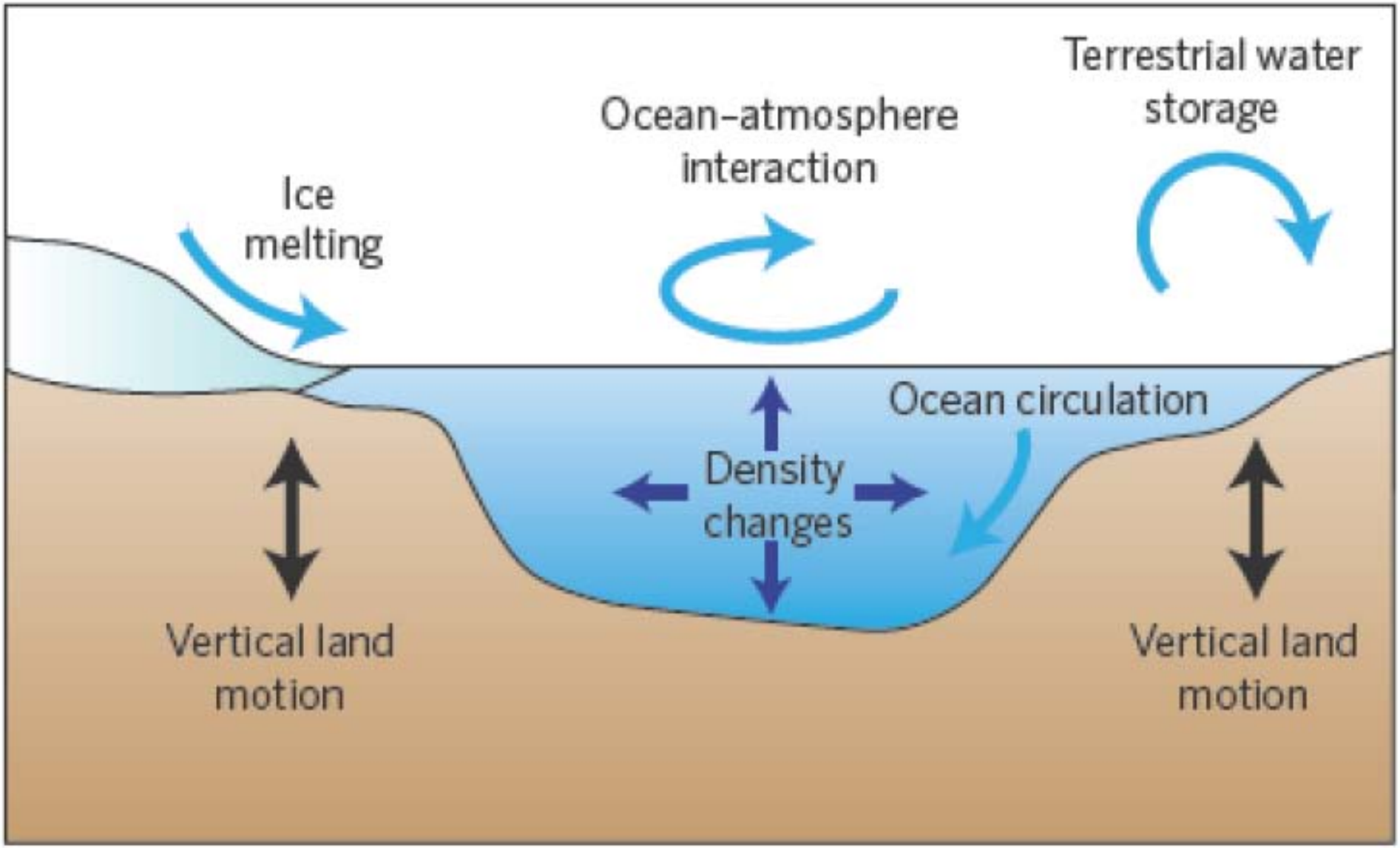
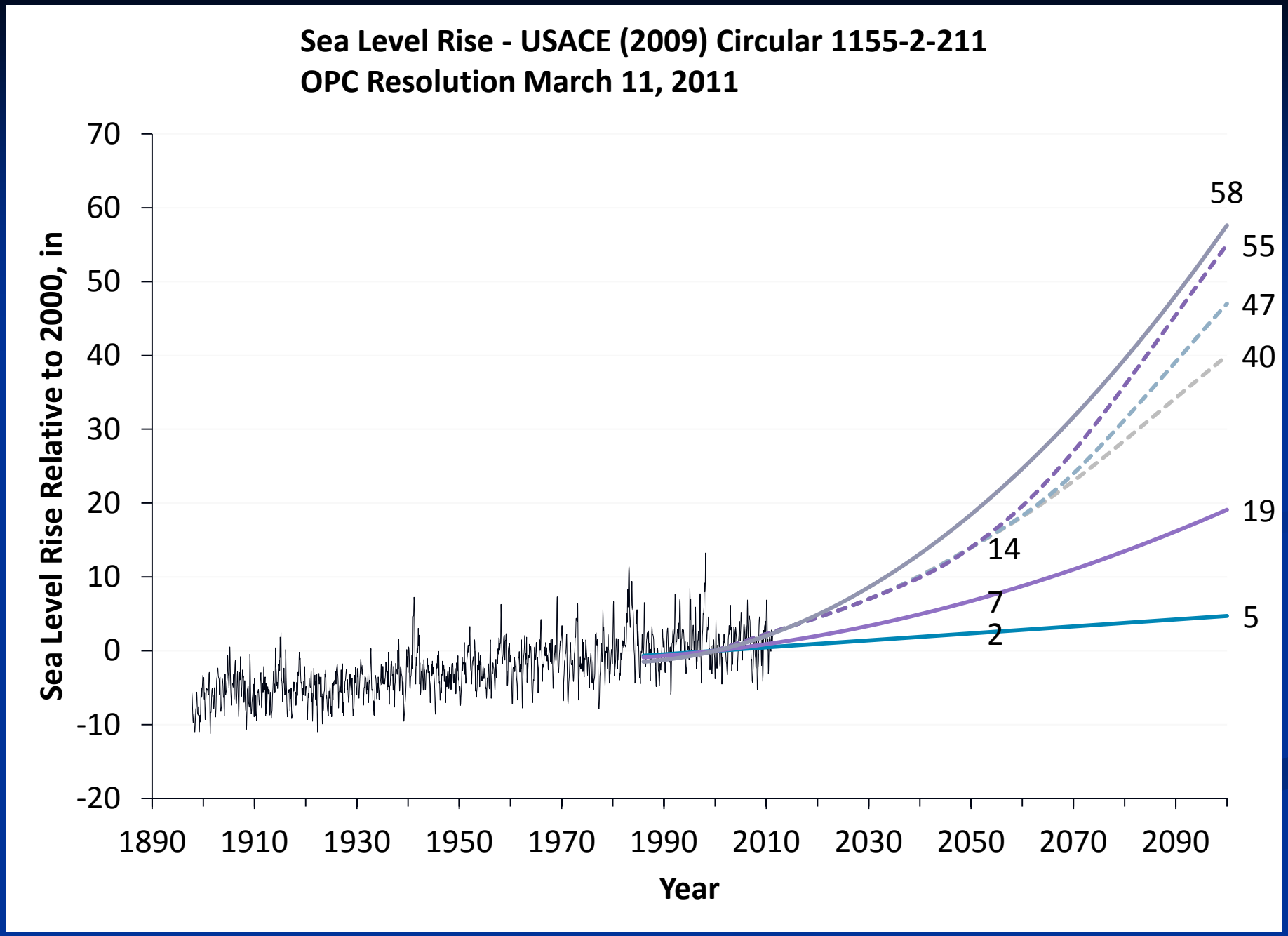
PREPARING FOR SEA LEVEL RISE IN SAN FRANCISCO BAY

Bay Area Clean Water Agencies
January 26, 2012

Jeremy Lowe, ESA PWA




Terrestrial water storage
Ocean–atmosphere interaction
Ice melting
Ocean circulation
Density changes
Vertical land motion
Vertical land motion


Sea Level Rise - USACE (2009) Circular 1155-2-211
OPC Resolution March 11, 2011
Sea Level Rise Relative to 2000, in
70
60
50
40
30
20
10
0
-10
-20
1890
1910
1930
1950
1970
1990
2010
2030
2050
2070
2090
Year
58
55
47
40
19
14
7
2
5

2000 - 0 in

2050 14 in

2100 55 in

2100+ ?? in

Inundation

Frank's Dump West - New Year's Eve 2005
8.9 ft tides; 40mph westerly winds

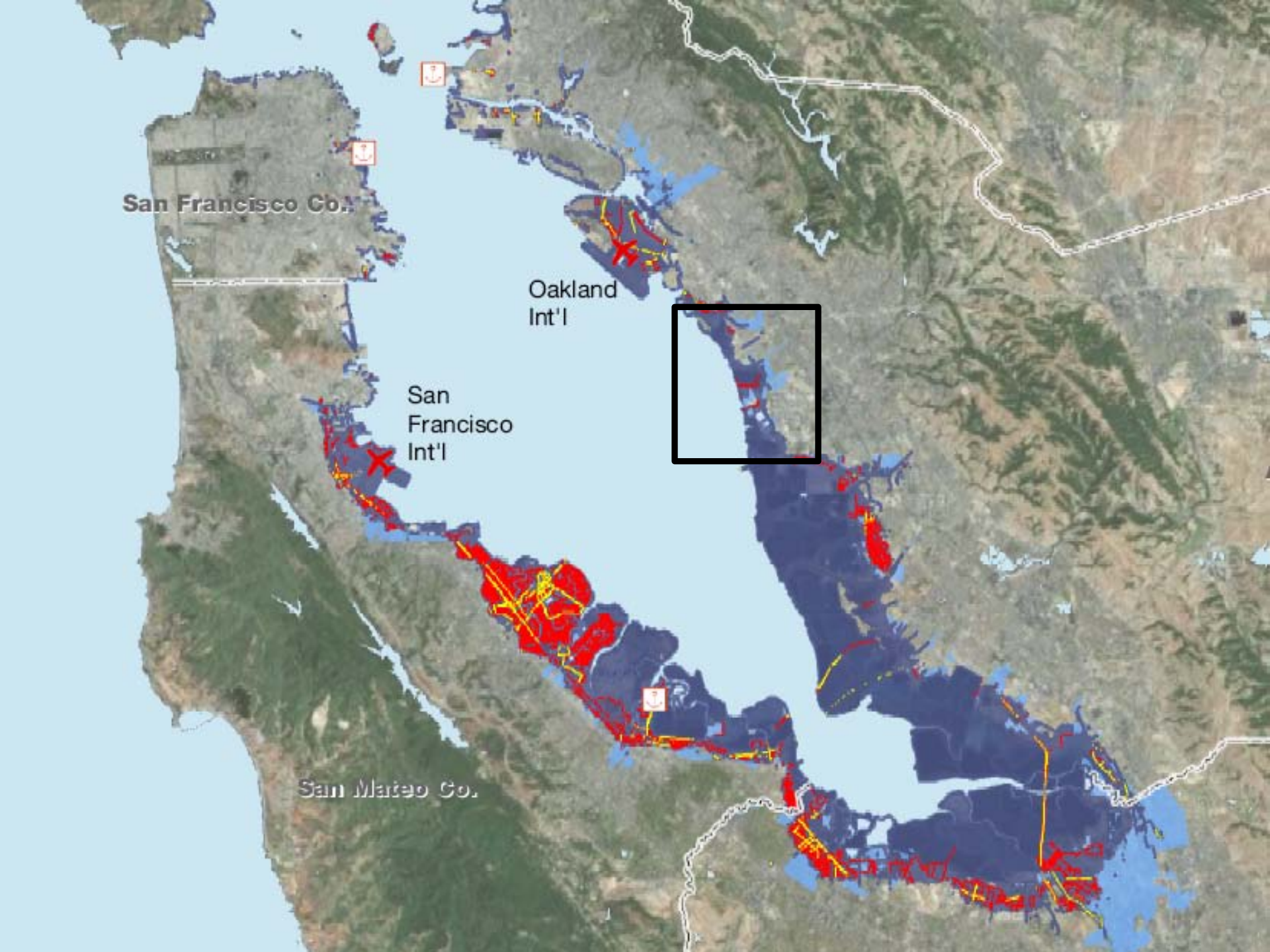
Photo: Mark Taylor

Erosion

Hayward Marsh - New Year's Eve 2005

8.9 ft tides; 40mph westerly winds

Photo: Mark Taylor


San Francisco Co.
Oakland
Int'l
San
Francisco
Int'l
San Mateo Co.

Functions

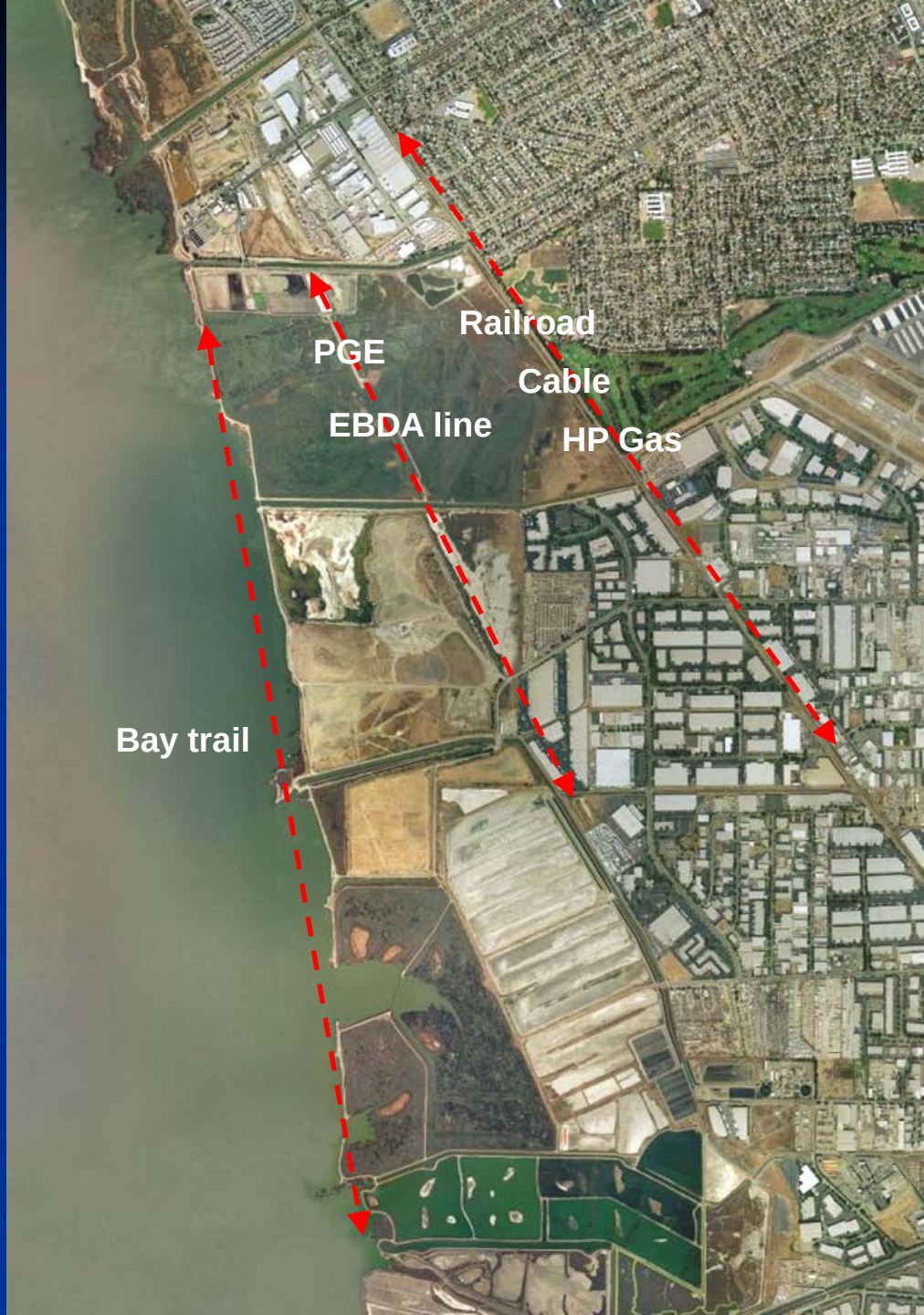
- Urban
- Habitat
- Storm drainage
- **Land fill**
- **Wastewater**
- Utility corridors
- Trails

Storm drainage

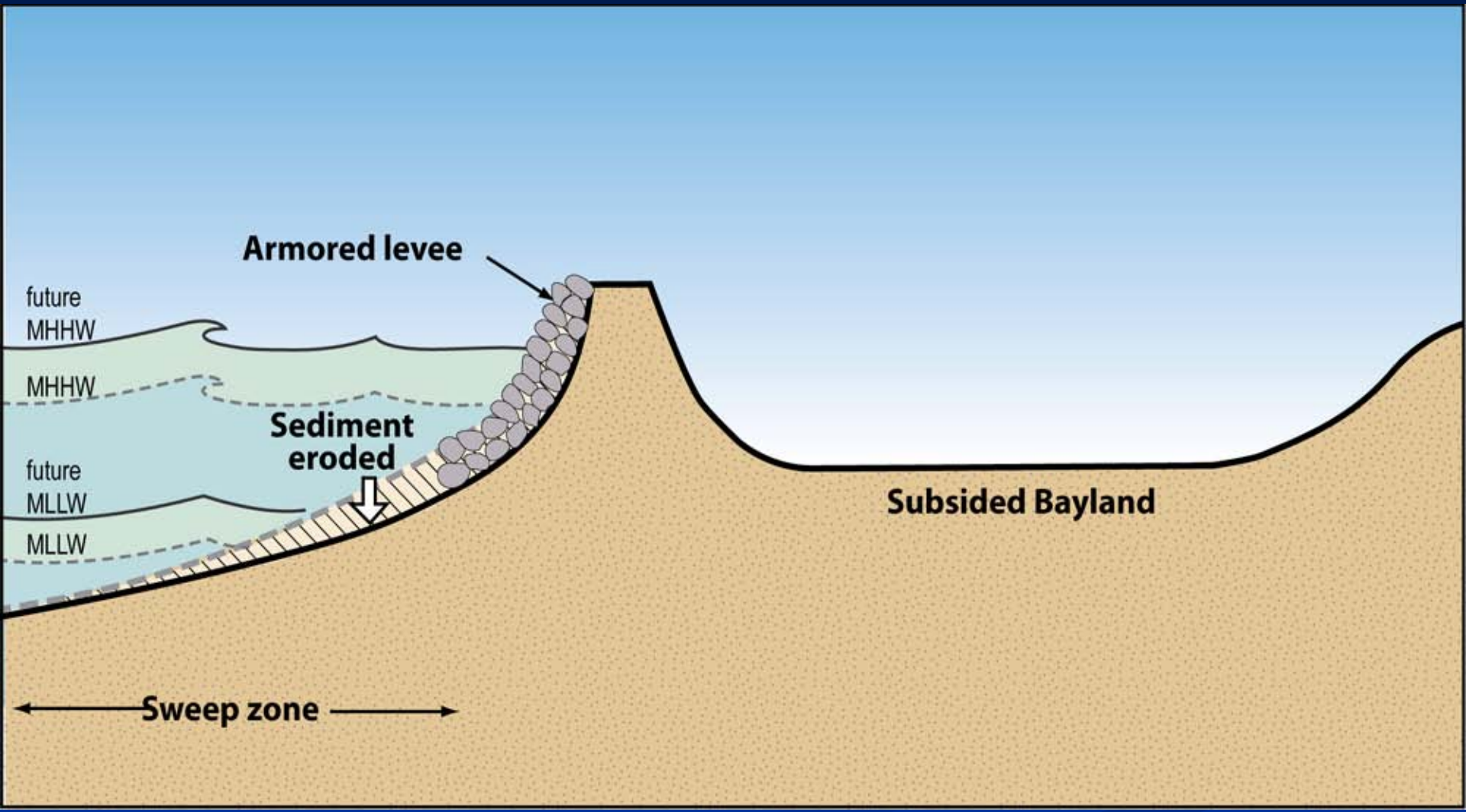
- Designed for a certain bay elevation
  - Lack of drainage as MLLW rises
  - Structures fixed relative to tide frame
  - Upstream impacts will increase
- Exposure increases with time
- Adaptation may require pumping
- Opportunity to consolidate

Functions

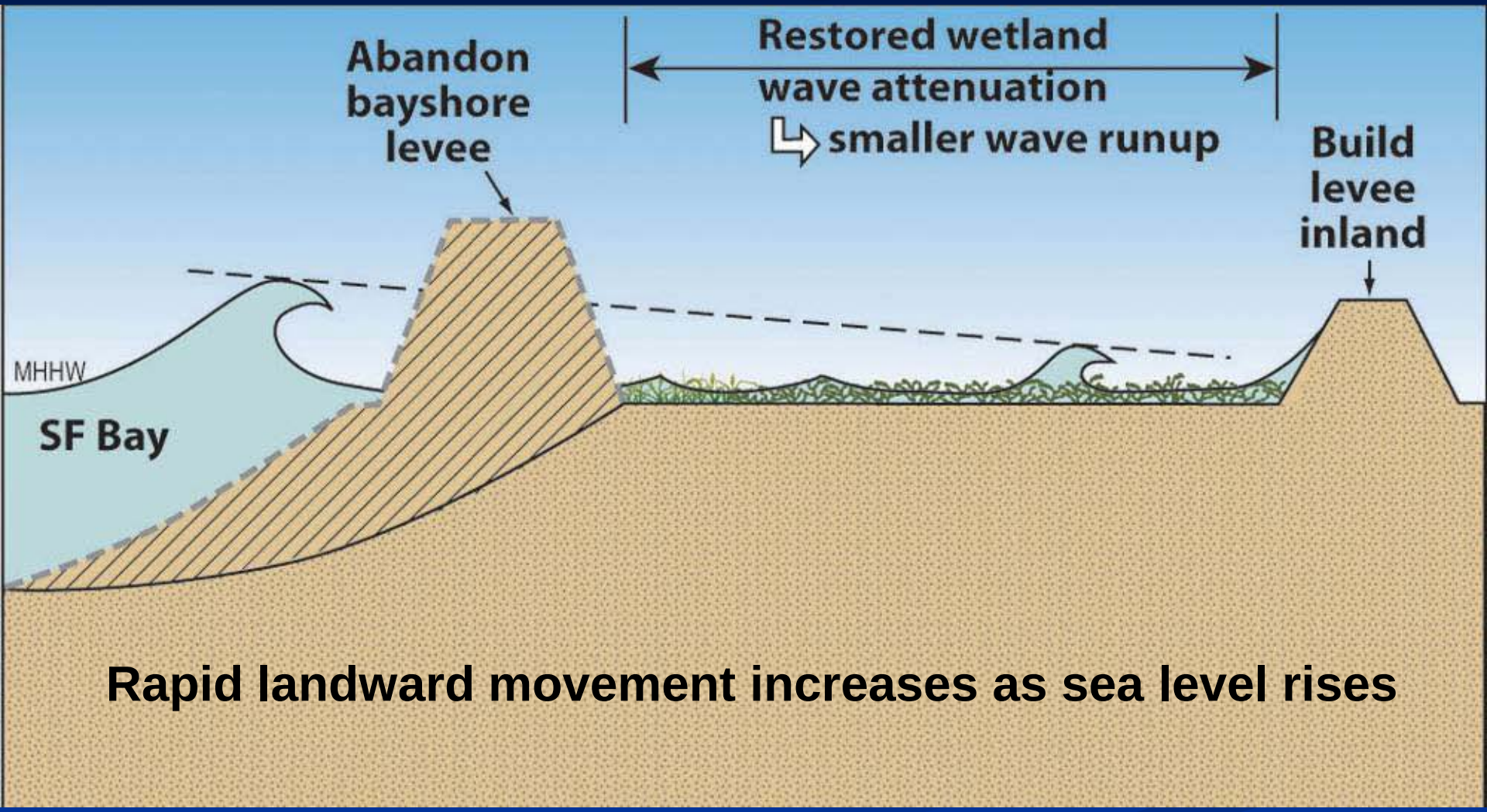
- Urban
- Habitat
- Storm drainage
- Land fill
- Sewage treatment
- **Utility corridors**
- **Trails**



Hold the Line



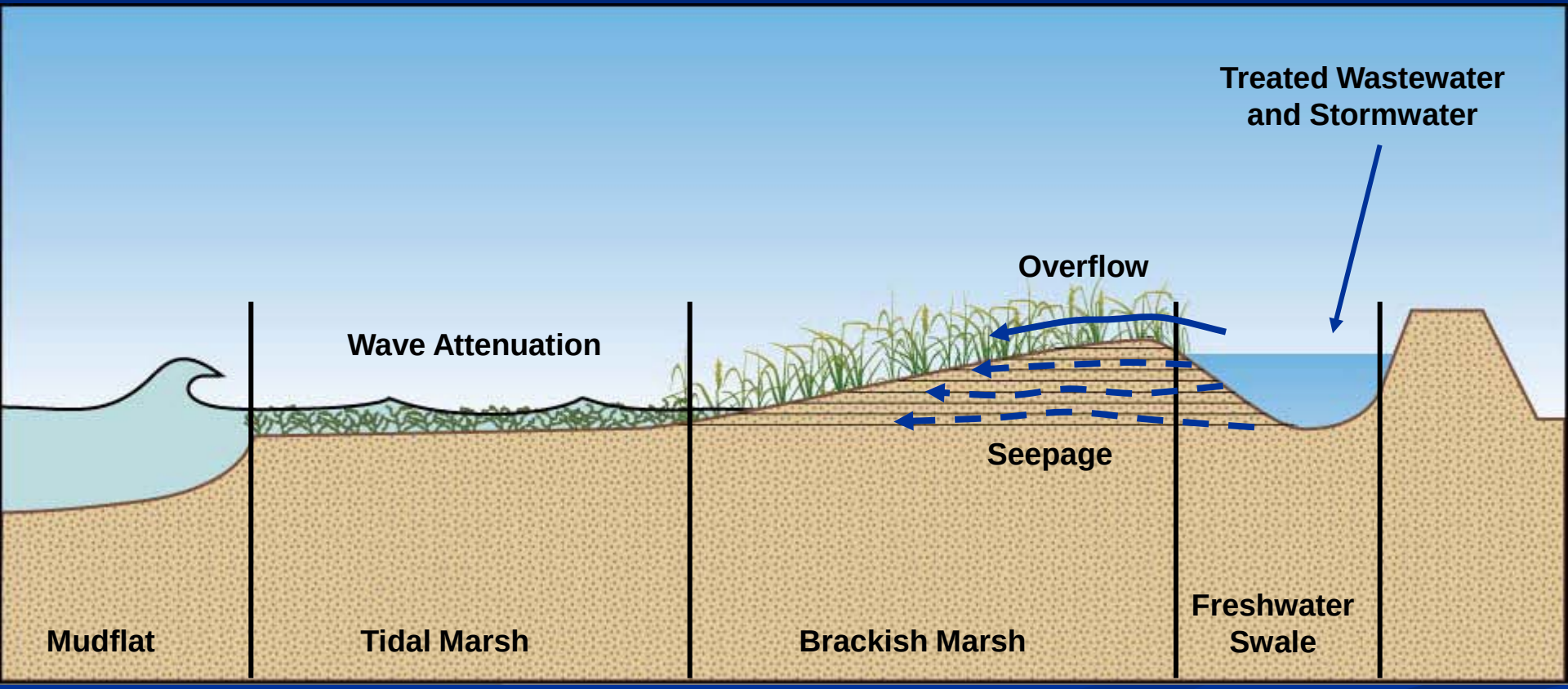
Realign



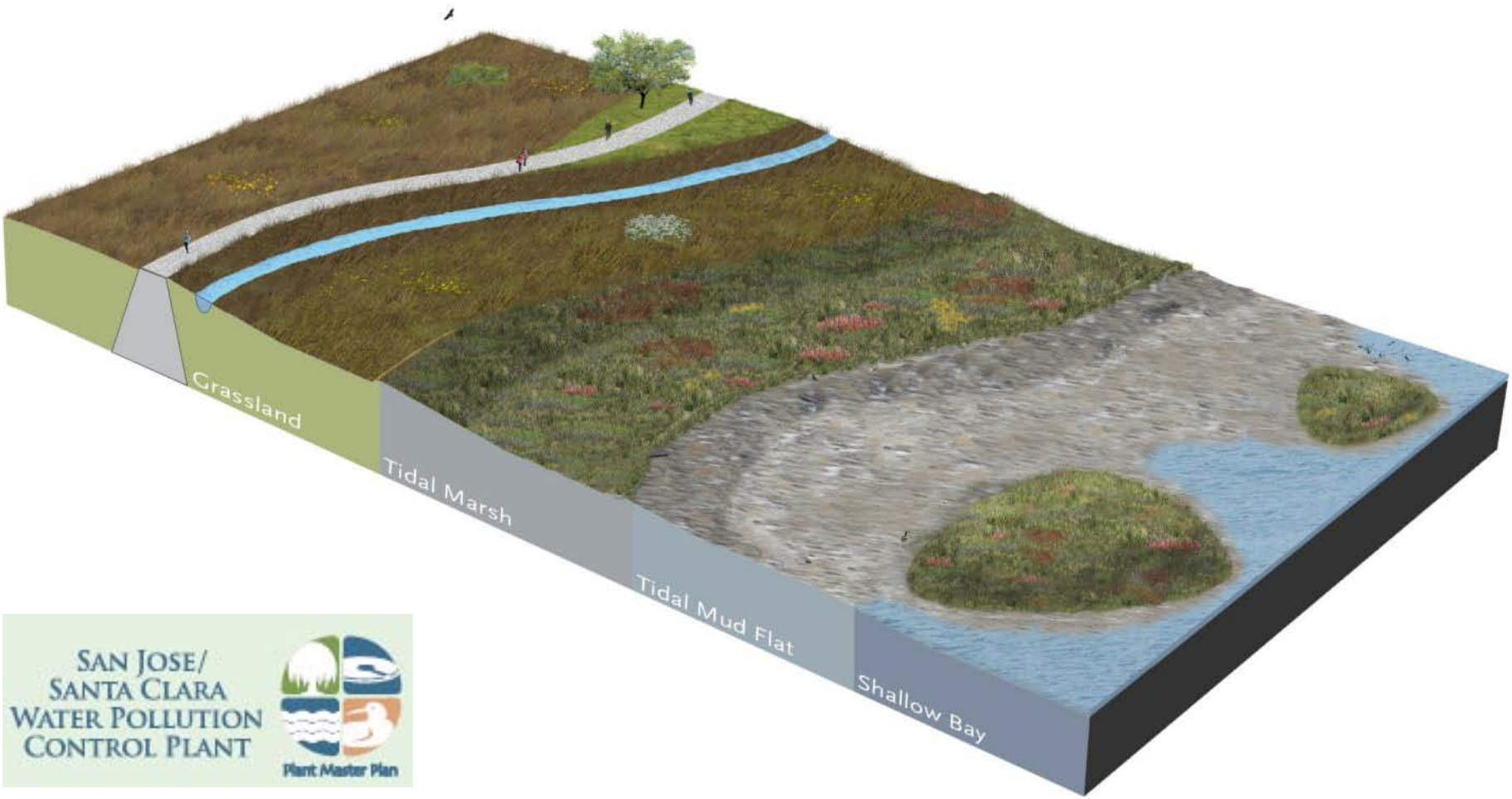
Rapid landward movement increases as sea level rises

Opportunities

Terraced Levee - Brackish Marsh



Terraced Levee - Brackish Marsh



SAN JOSE/
SANTA CLARA
WATER POLLUTION
CONTROL PLANT

Plant Master Plan

::: Hargreaves Associates :::

2011

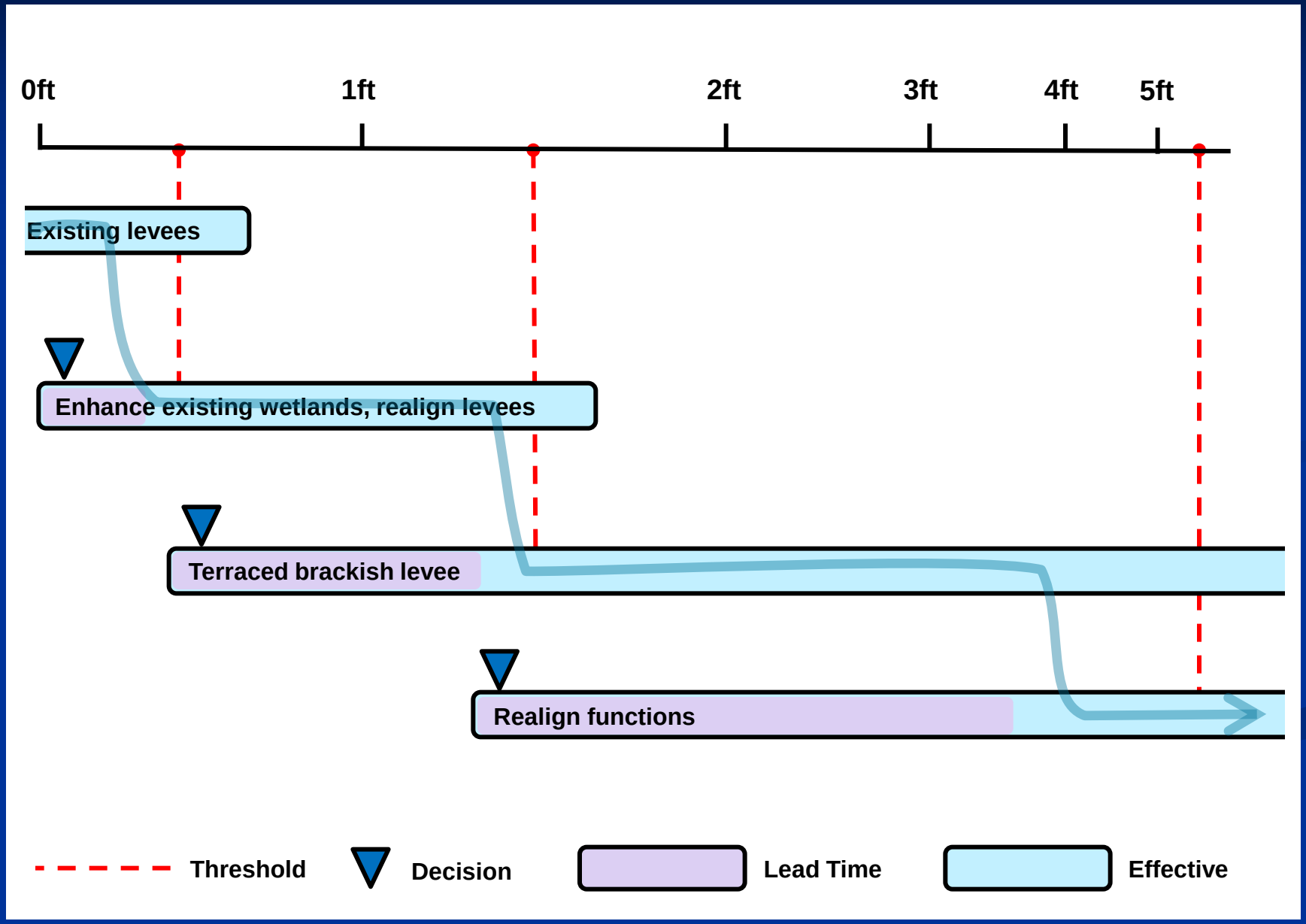
2047

Main Breaches

High marsh/transitional habitat/buffer

Break up levee

An Adaptation Strategy?



Next Steps

- Understand vulnerabilities and thresholds
  - Focus on priority climate risks
  - Balance both climate and non-climate risks
- Look for low regrets and win-win options
  - Avoid actions that limit future options
  - Demonstration projects
- Use adaptive management to cope with uncertainty
  - Monitor the effectiveness of decisions
- Work together