

# City of Dana Point Sea Level Rise Vulnerability Assessment

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Public Workshop  
December 4, 2019




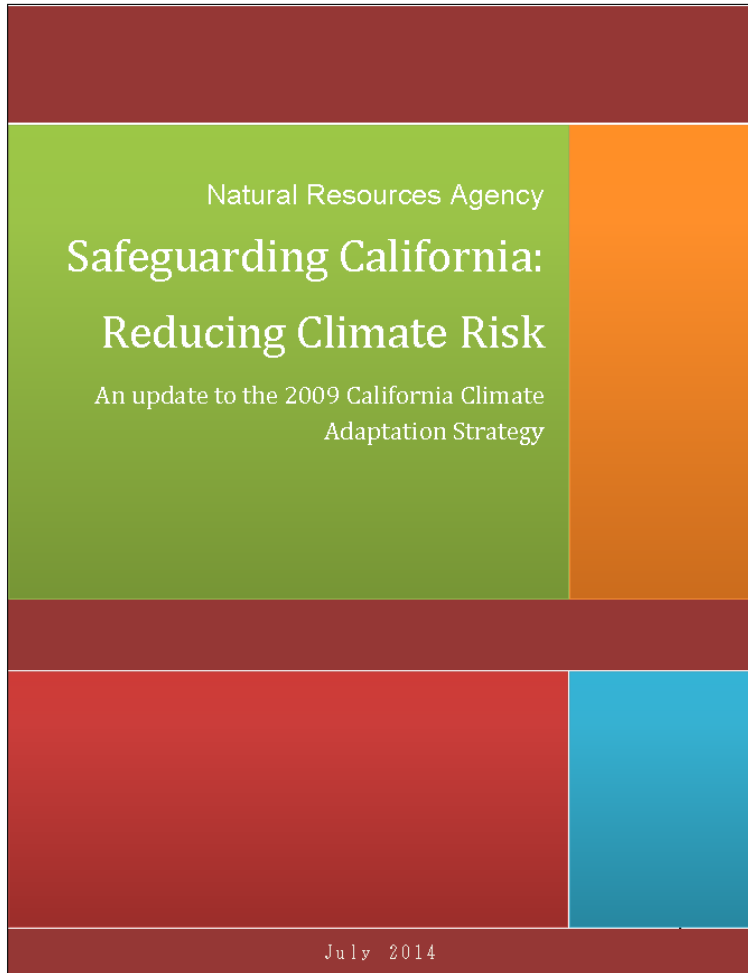
moffatt & nichol

**DUDEK**



CALIFORNIA  
**COASTAL**  
COMMISSION

# State Guidance Documents

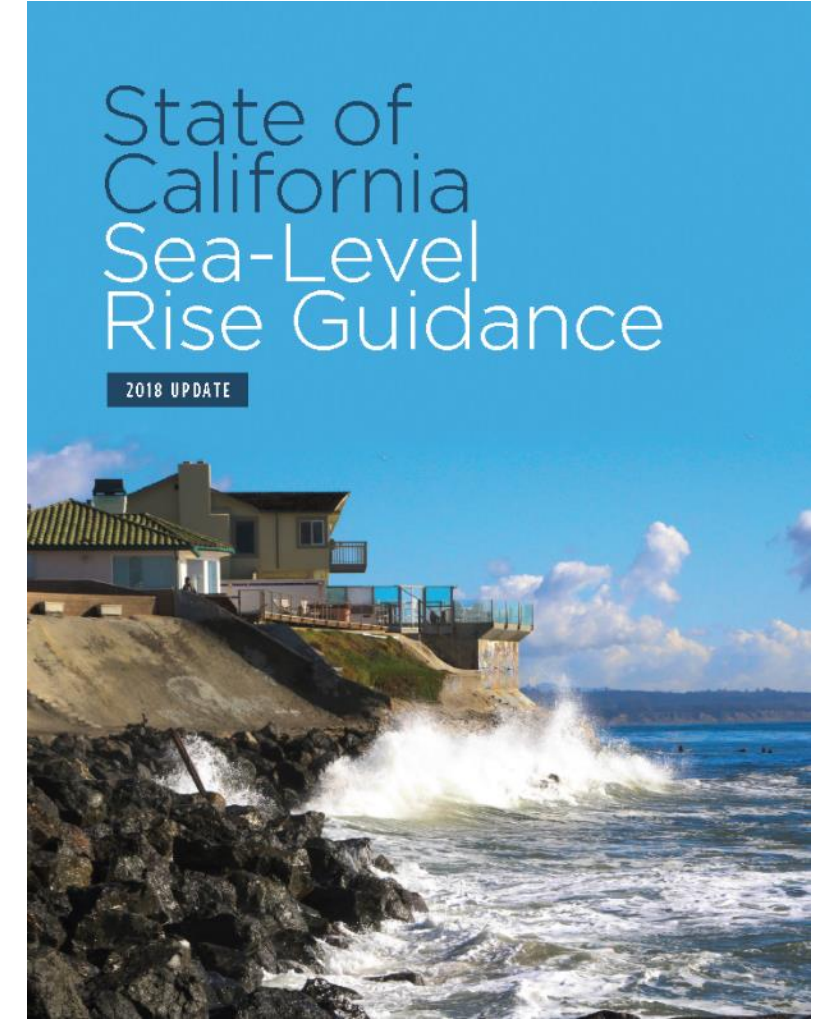


**CALIFORNIA COASTAL COMMISSION**  
**SEA LEVEL RISE POLICY GUIDANCE**

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



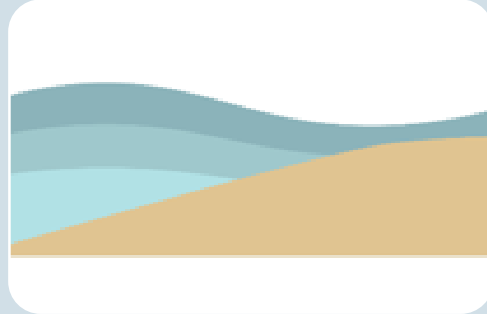
Original Guidance unanimously adopted – August 12, 2015  
Science Update unanimously adopted – November 7, 2018



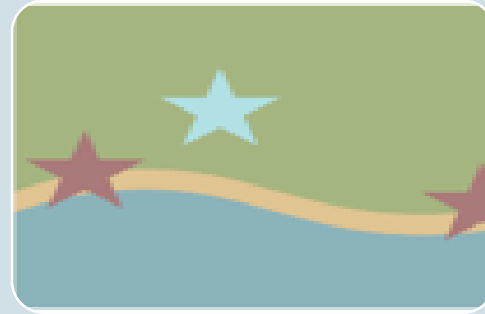
# Vulnerability Assessment – Key Questions



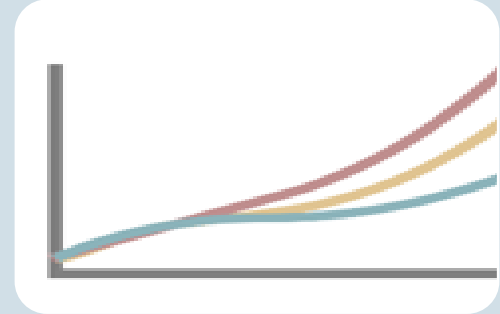
What are the hazards associated with sea level rise for Dana Point?



What magnitudes of sea level rise matter for Dana Point?



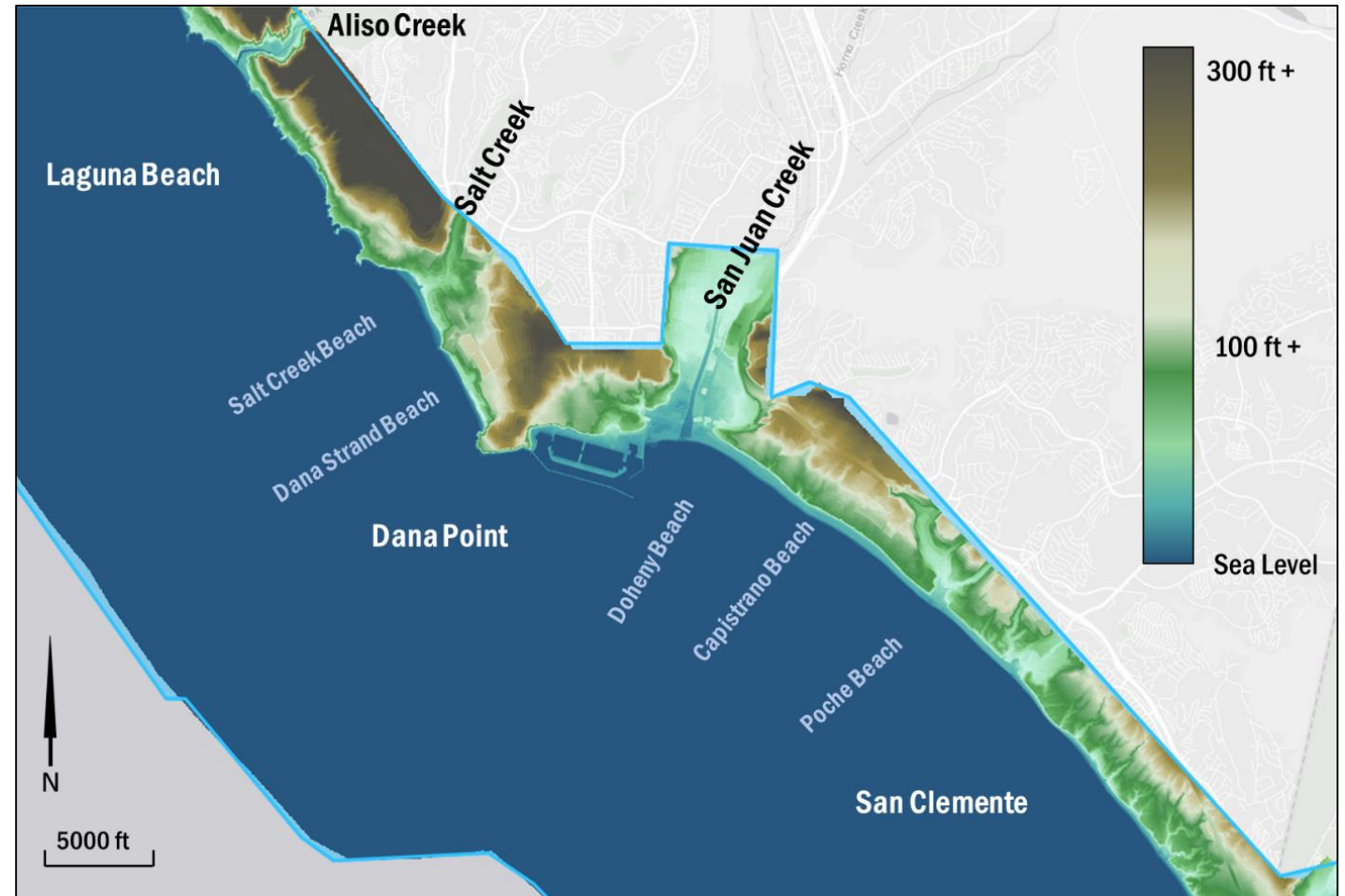
What resources are at risk?



When could these scenarios happen and how do we plan for them?

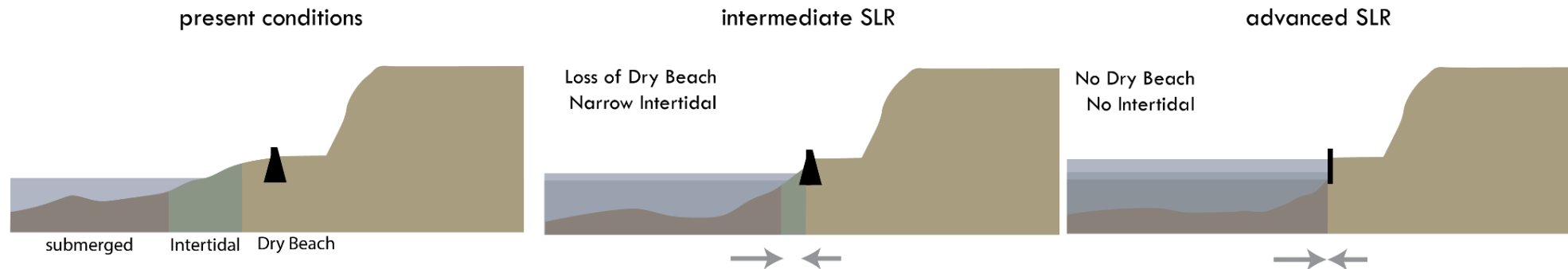
# What are the hazards associated with SLR for Dana Point?

- North
  - Coastal Erosion (shoreline & bluffs)
- Harbor/Central
  - High water levels
  - Breakwater capacity
- South
  - Coastal Erosion
  - Coastal and Fluvial Flooding



# North Dana Point - Coastal Squeeze

- Coastal squeeze impacts beaches & intertidal habitat\*
- Bluff-top development
- Infrastructure
  - Stormwater outfall (Salt Creek)
  - Beach amenities / paths



OC Register, photo by Jeff Antenore

\*Resources become "squeezed" between a non-erodible bluff face and rising sea level

# Dana Point Harbor (Central) – Coastal Storms

- High water levels
- Storm wave runup
- Infrastructure Capacity
  - Rubble mound breakwaters
  - Bulkhead walls

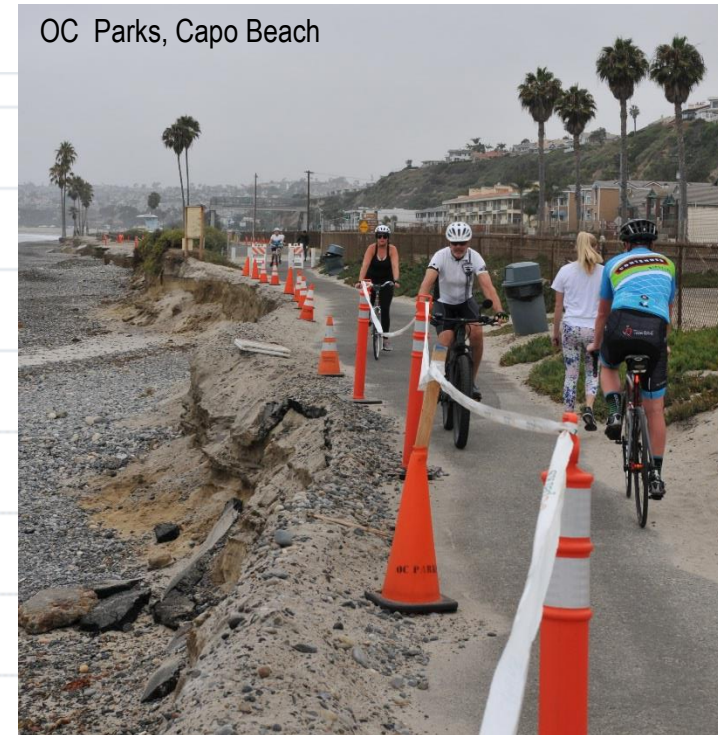
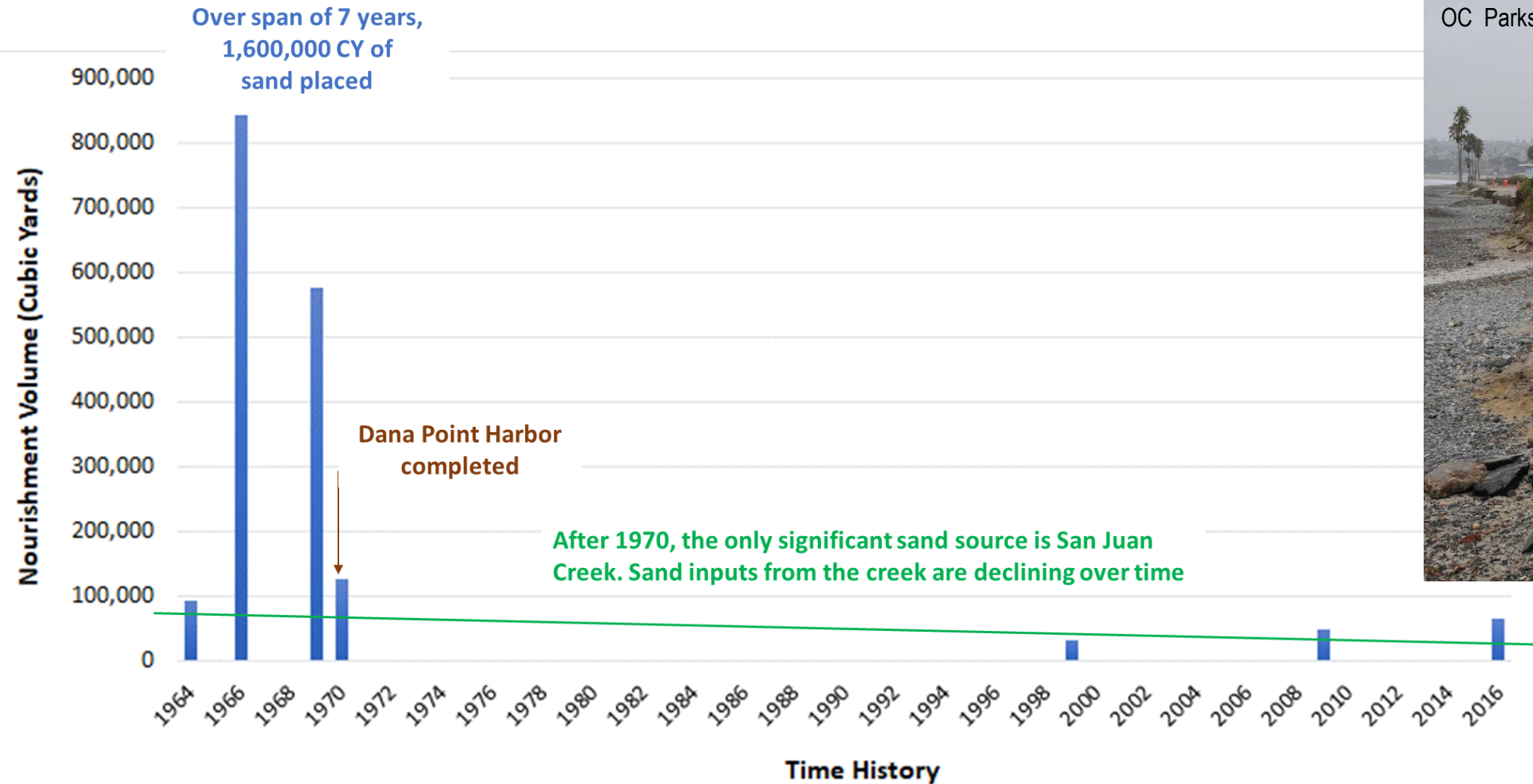


# South Dana Point – Beach Erosion

- Seasonal and storm related erosion
- Chronic erosion (drought related)
- Long-term (reduced sediment supply)



# Long-term Sediment Supply Deficit





# Sea Level Rise and Coastal hazards

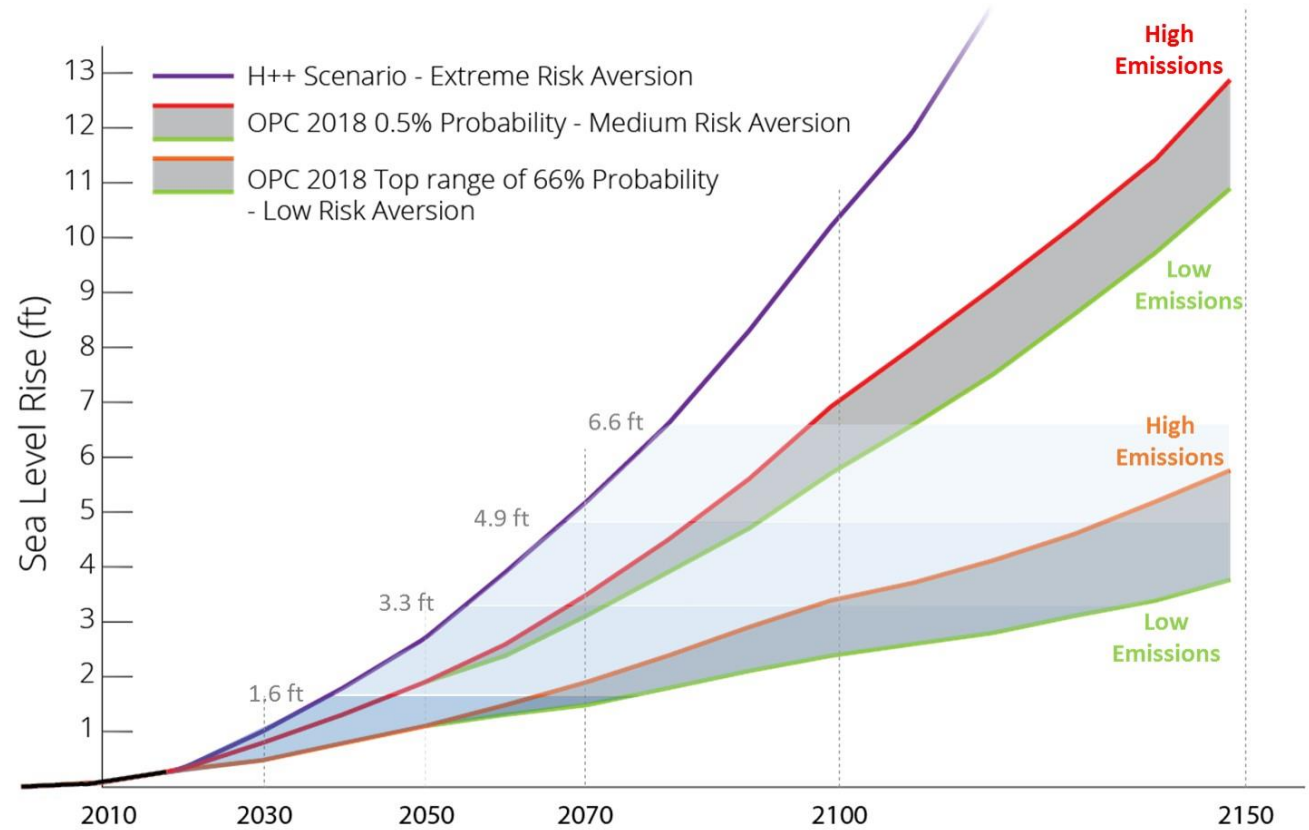
- Regional effort led by USGS – Southern California
- Intended for SLR planning at City/County scale
- Coastal flood hazards (1-yr, 20-yr and 100-yr)
- Shoreline erosion
- Bluff erosion



Our Coast Our Future Interactive web viewer:

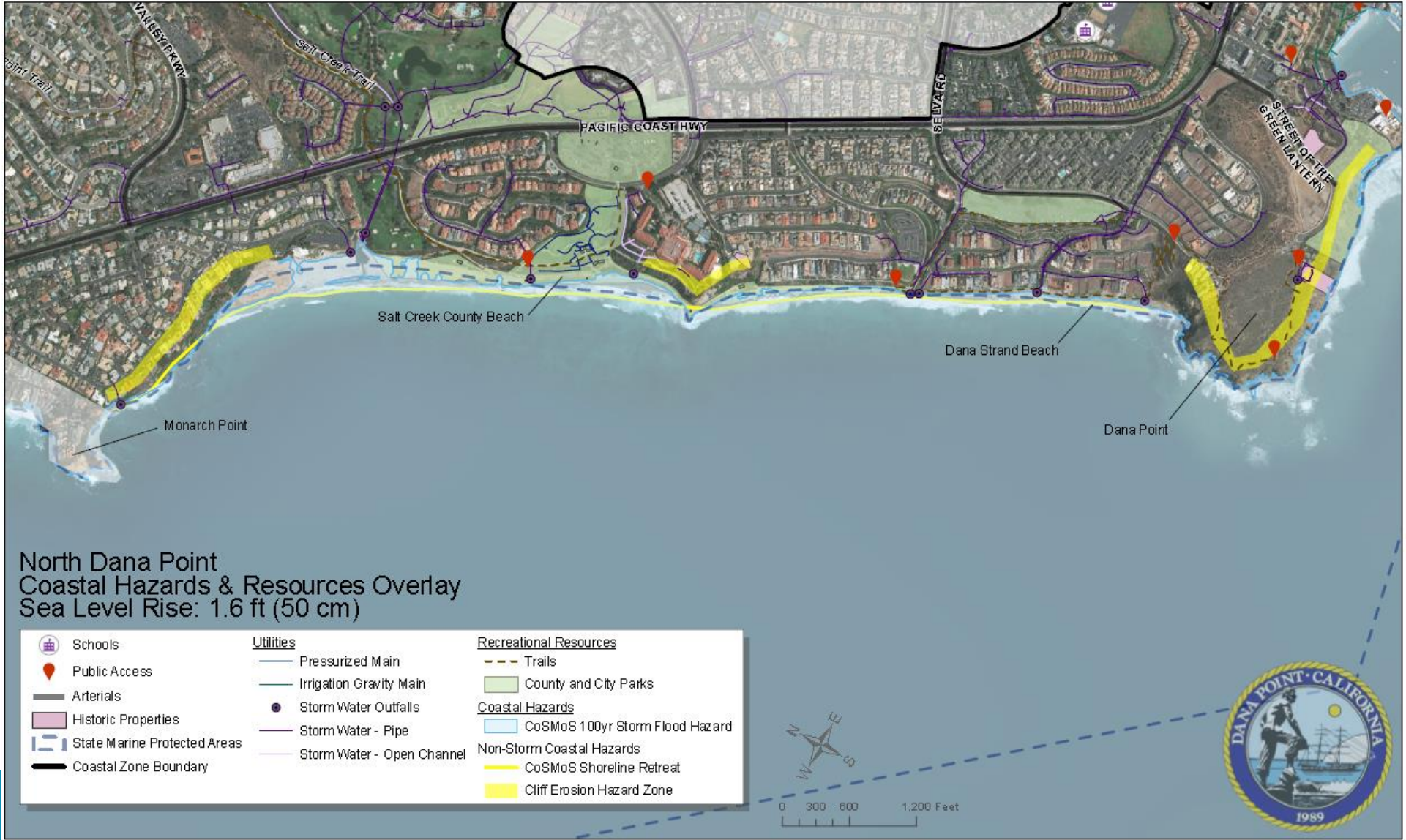
<http://data.pointblue.org/apps/ocof/cms/>

# Sea Level Rise Scenarios Evaluated



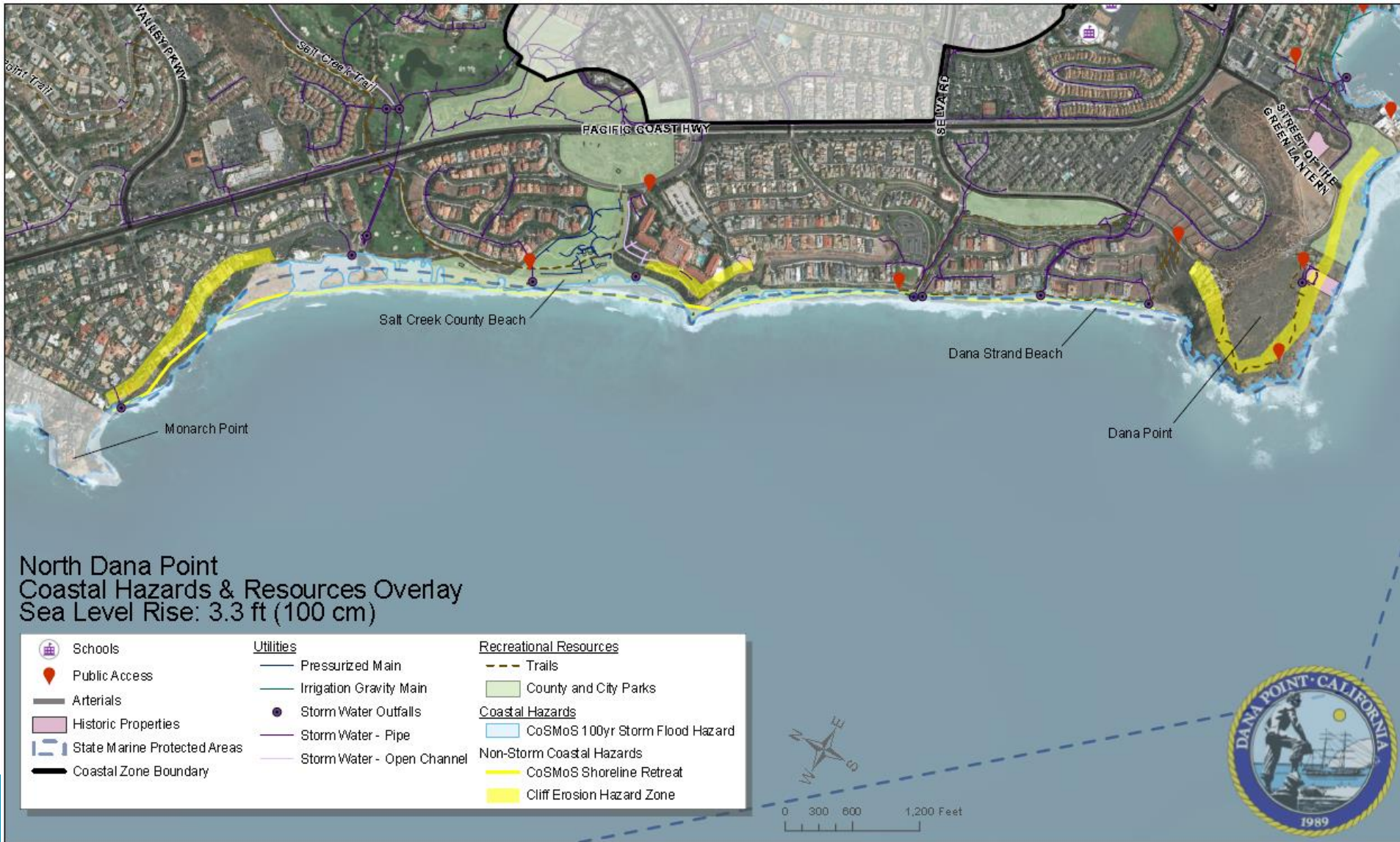
# North Dana Point – SLR Hazards

1.6ft SLR



# North Dana Point – SLR Hazards

3.3ft SLR



# Central Dana Point – SLR Hazards

3.3ft SLR



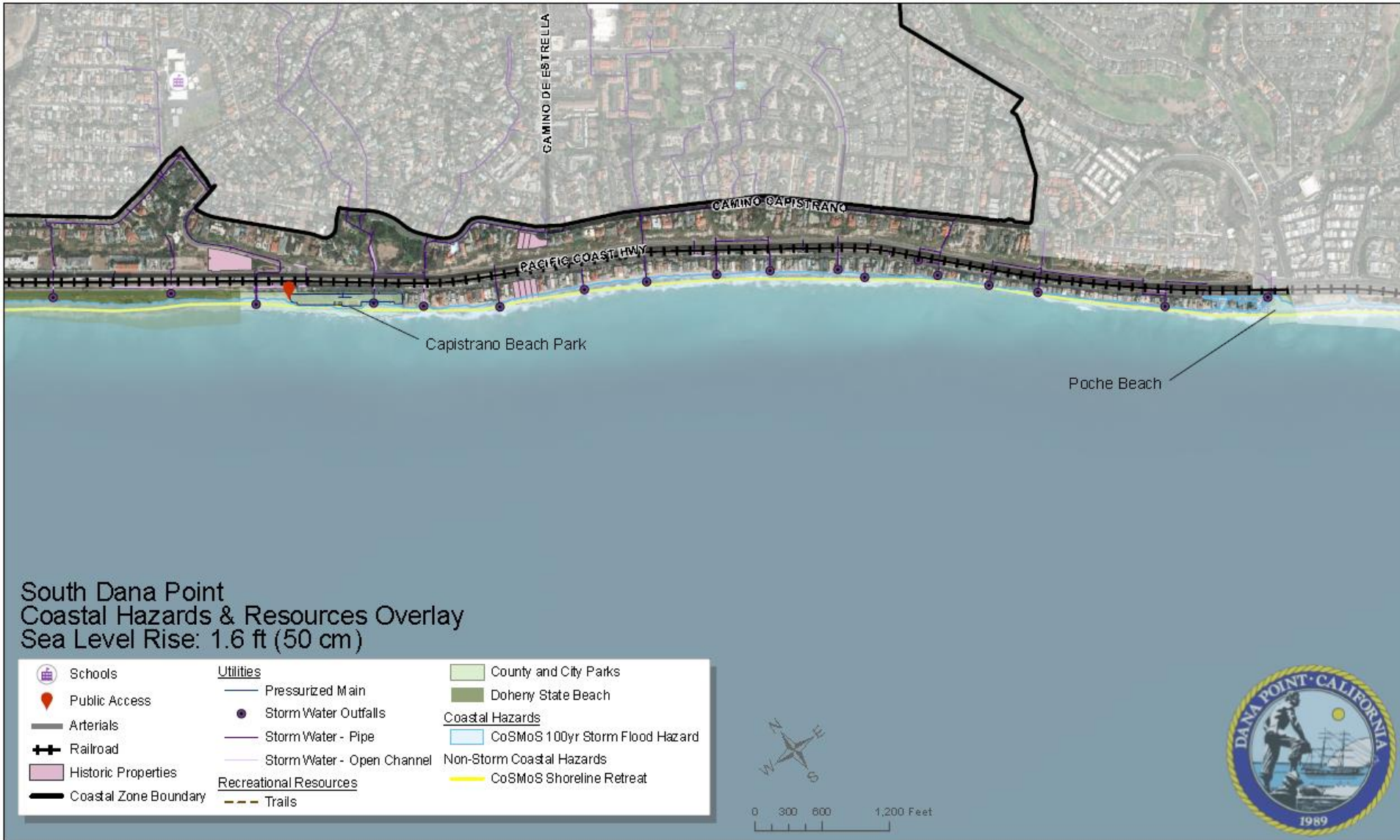
# Central Dana Point – SLR Hazards

6.6ft SLR



# South Dana Point – SLR Hazards

1.6ft SLR



# South Dana Point – SLR Hazards

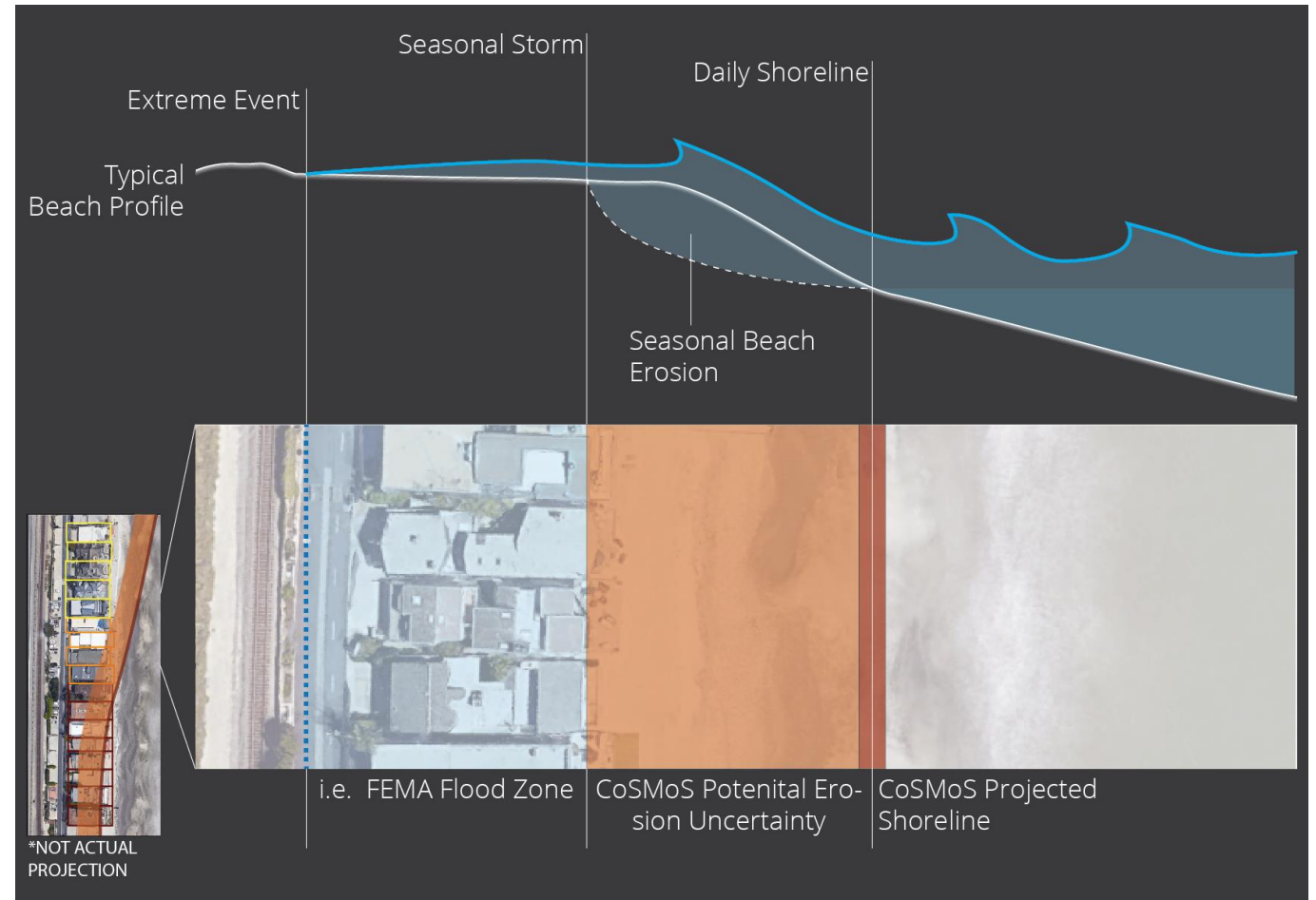
3.3ft SLR





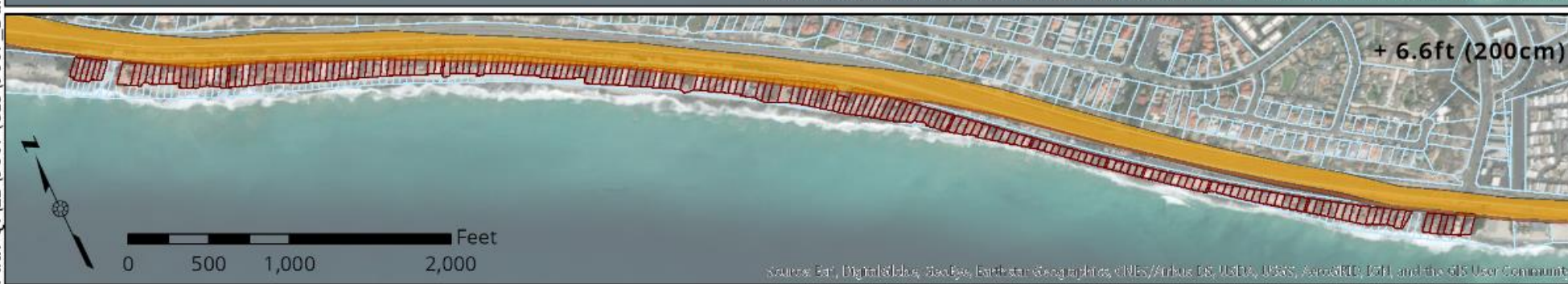
# South Dana Point - Erosion Hazards

- Parcel Analysis
- CoSMoS shoreline erosion
  - Daily shoreline (high tide line)
  - Seasonal erosion
  - Shoreline protection not included



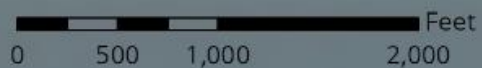
# Capistrano Beachfront Development Shoreline Hazards

Path Q:\LB\9867\GIS\9867 DanaPointSLR\9867\_DanaPointSLR\_Central.aprx Date Saved 4/23/2018 9:56 AM

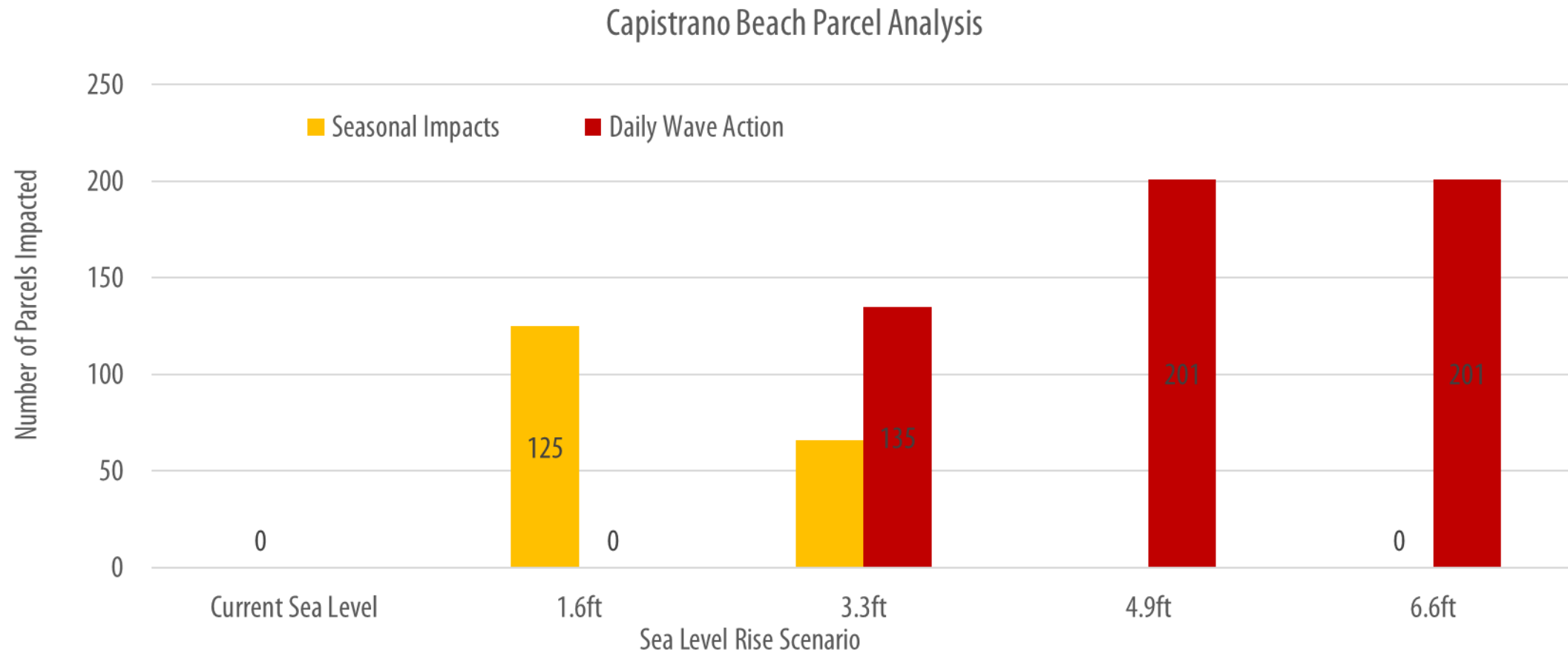


## Legend

- Projected Shoreline
- Potential Erosion
- Shoreline Uncertainty
- Parcels exposed to:
  - Extreme Events
  - Seasonal Storm Impacts
  - Daily Wave Action



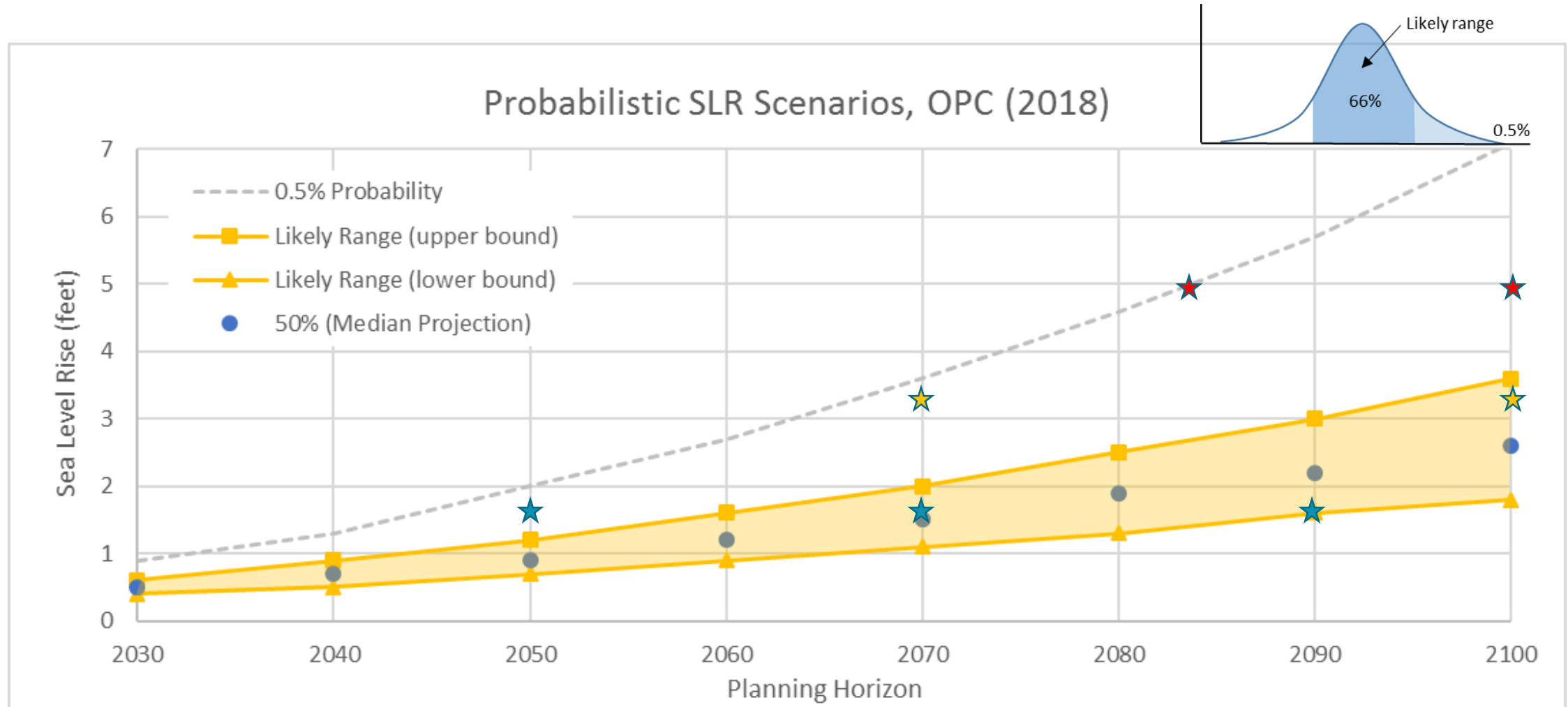
# South Dana Point - Erosion Hazards



# What magnitudes of SLR matter for Dana Point?

SLR Scenario	Timing & Probability	Key Impact Thresholds
1.6 ft	2060-2100 “likely range” 5% chance in 2050	Beach erosion and coastal squeeze impacts – intertidal habitat, access & recreation Seasonal & extreme storm impacts to beachfront development
3.3 ft	2100-2150 “likely range” 0.5% chance in 2070	Potential for storm/high tide flooding around Dana Point Harbor Limited dry beach, over half of Capistrano beachfront exposed to daily wave action Increased bluff erosion potential due to wave attack at base of bluff
4.9 ft	2130+ “likely range” 0.5% chance in 2085	Breakwater overtopping & frequent flooding around Dana Point Harbor Loss of dry beach throughout City, Capistrano beachfront exposed to daily wave action

# When could these SLR scenarios occur?



# When could these scenarios occur and how do we plan?

Planning Horizon	Likely Range of SLR (ft)*	0.5% Chance SLR (ft)*	SLR scenarios for adaptation planning
2050	0.7 – 1.2	2.0	1.6 ft – conservative scenario for 2050 planning horizon
2070	1.1 – 2.0	3.6	1.6 ft – most likely scenario for 2070 planning horizon 3.3 ft – conservative scenario for 2070 planning horizon
2100	1.8 – 3.6	7.1	3.3 ft – most likely scenario for 2100 planning horizon 4.9 ft – about 3% probability exceeded by 2100 6.6 ft – conservative scenario for 2100 planning horizon

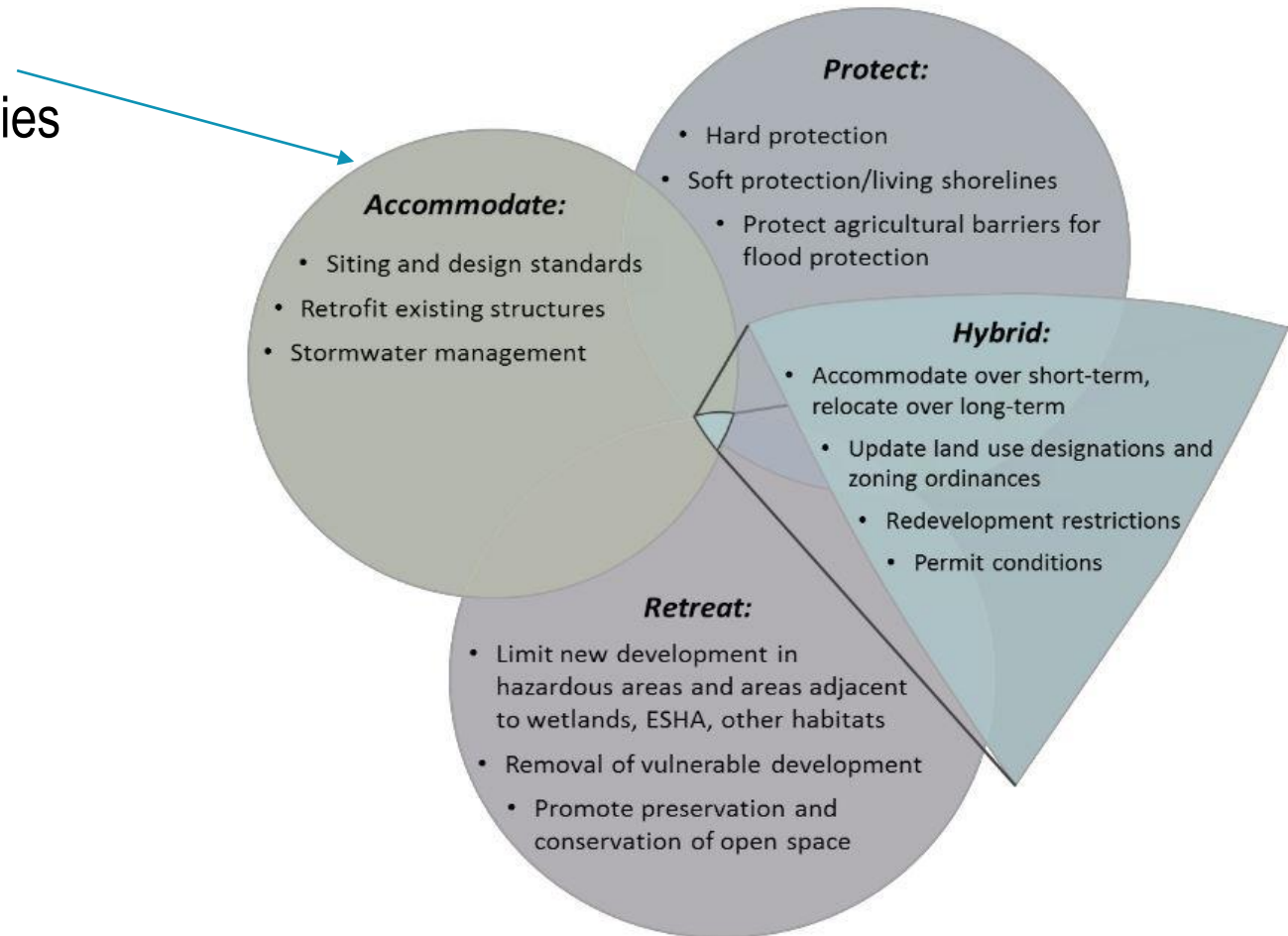
\*Probabilities based on OPC SLR guidance document (2018) projections for La Jolla



# Adaptation Planning

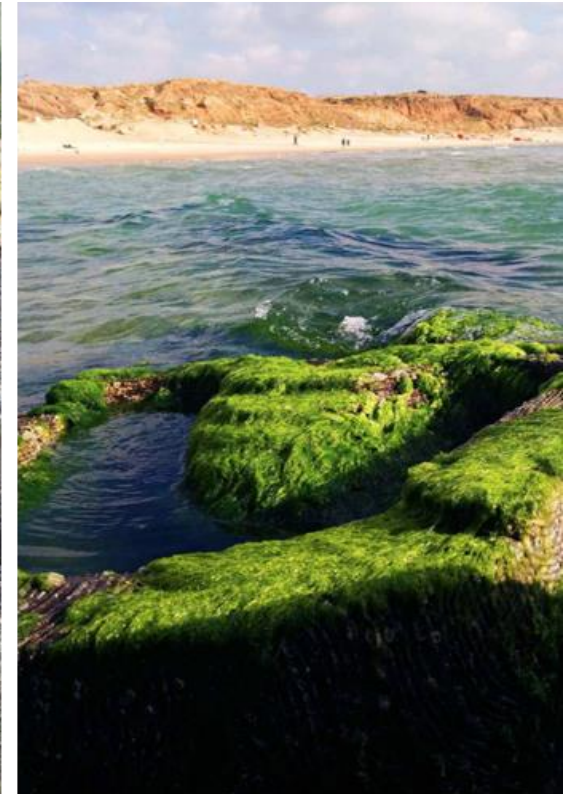
- Develop an adaptive management approach
  - Develop a “toolbox” of potential strategies
- Update local planning documents
  - General Plan
  - Local Coastal Program
  - Local Hazard Mitigation Plan (FEMA)
- Collaborate with jurisdictions & stakeholders
  - Orange County
  - State Parks
  - Caltrans
  - Railroad

General Adaptation Strategies (CCC, 2015)



# North Dana Point

- Bluff monitoring
- Rocky intertidal / artificial reef
- Beach nourishment

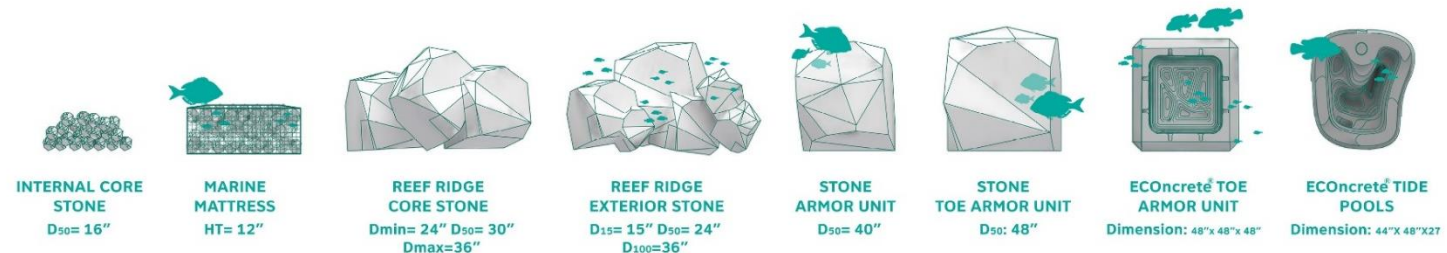
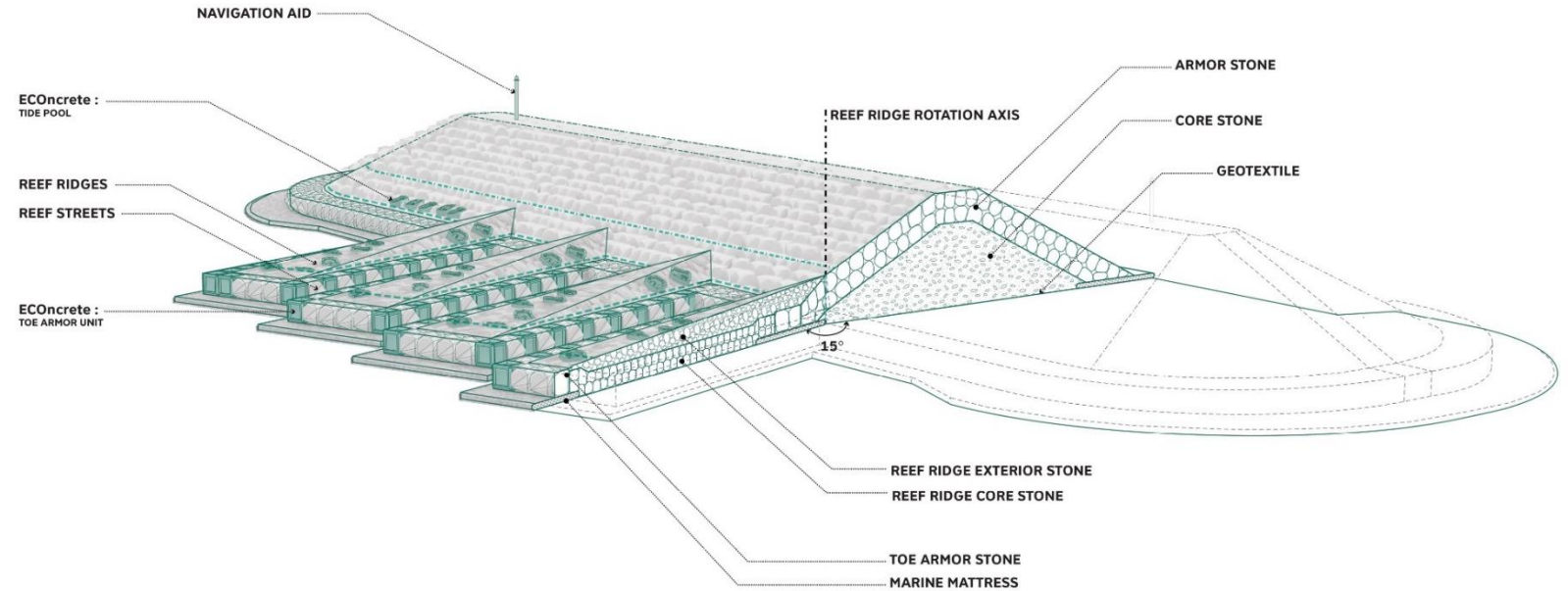


ECOncrete® tide pools



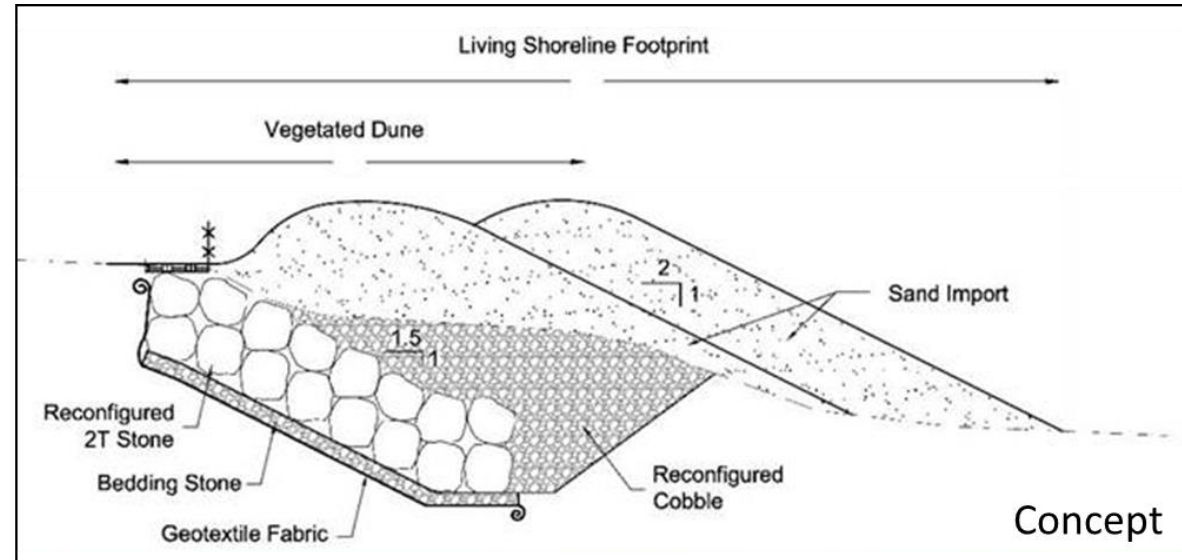
# Central Dana Point

- Infrastructure Upgrades
  - Drainage Improvements
  - Flood proofing
- Coastal Protection
  - Breakwater
  - Bulkhead walls
  - Moorings & docks



# South Dana Point

- Regional beach nourishment
  - Similar to SANDAG program
- Living shoreline
  - Dunes
  - Cobble
- Stakeholder coordination
  - OC Parks
  - State Parks
  - OCTA
  - Caltrans



Concept



Rendering

# Next Steps

- Community outreach
- Stakeholder coordination
- Draft Local Coastal Program Amendment
  - Additional grant funding received from CCC
  - Develop policies to address SLR hazards