City of Pismo Beach
Sea Level Rise
Draft Adaptation Plan

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DUDEK

CALIFORNIA COASTAL COMMISSION

Sea Level Rise Adaptation Plan

What: An informational document that describes adaptation strategies that can reduce vulnerabilities associated with sea level rise and coastal hazards.

Why: To provide a bridging document between information presented in the VA and policies and ordinances included in the update General Plan/Local Coastal Program.

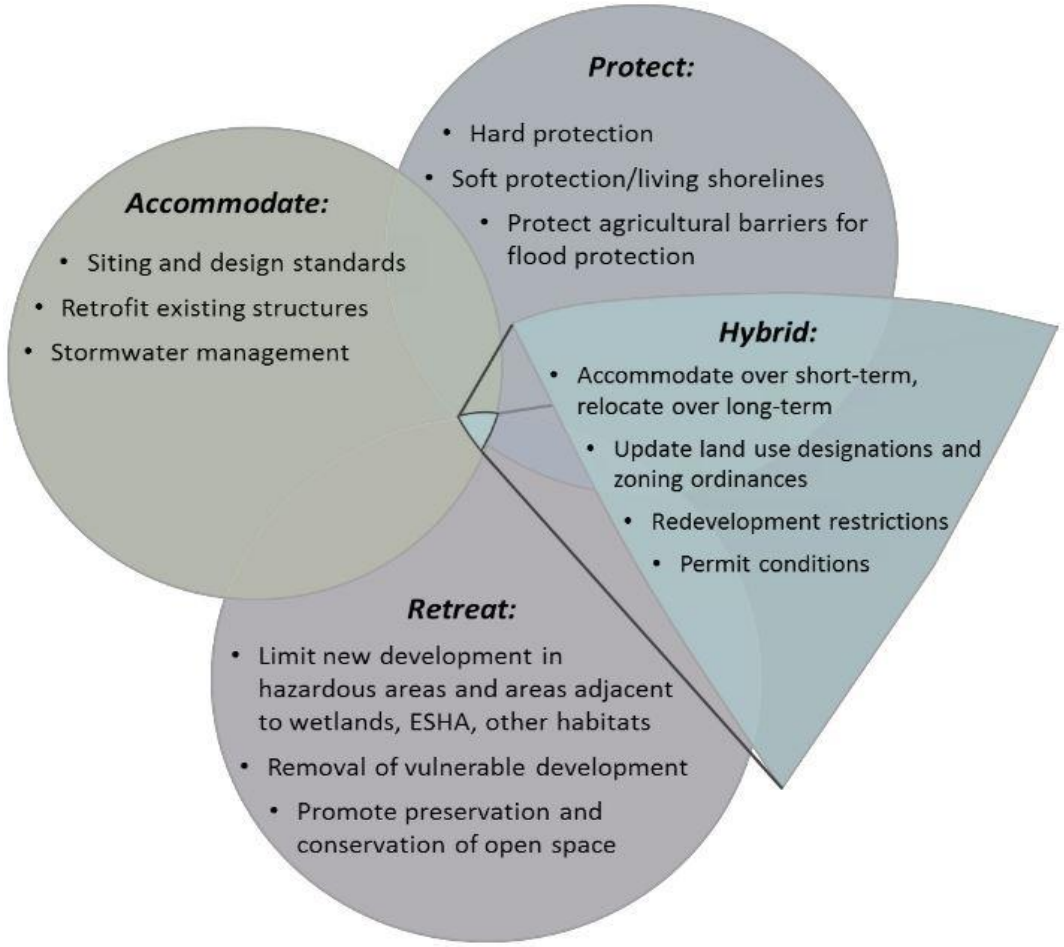
Guiding Principles for Adaptation

- Reduce potential for loss of life, health and property from current and future coastal hazards
- Promote responsible growth and resilient development, especially in areas exposed to current and future coastal hazards
- Preserve environmental resources, access and recreation opportunities along the coast which help make Pismo Beach an iconic tourist destination
- Pursue opportunities to increase adaptive capacity of coastal resources through local projects (i.e. Capital Improvement Plan) and regional projects
- Account for the uncertainty and probability associated with sea level rise and coastal hazards to develop adaptation strategies that are flexible and account for the risk tolerance of vulnerable coastal resources

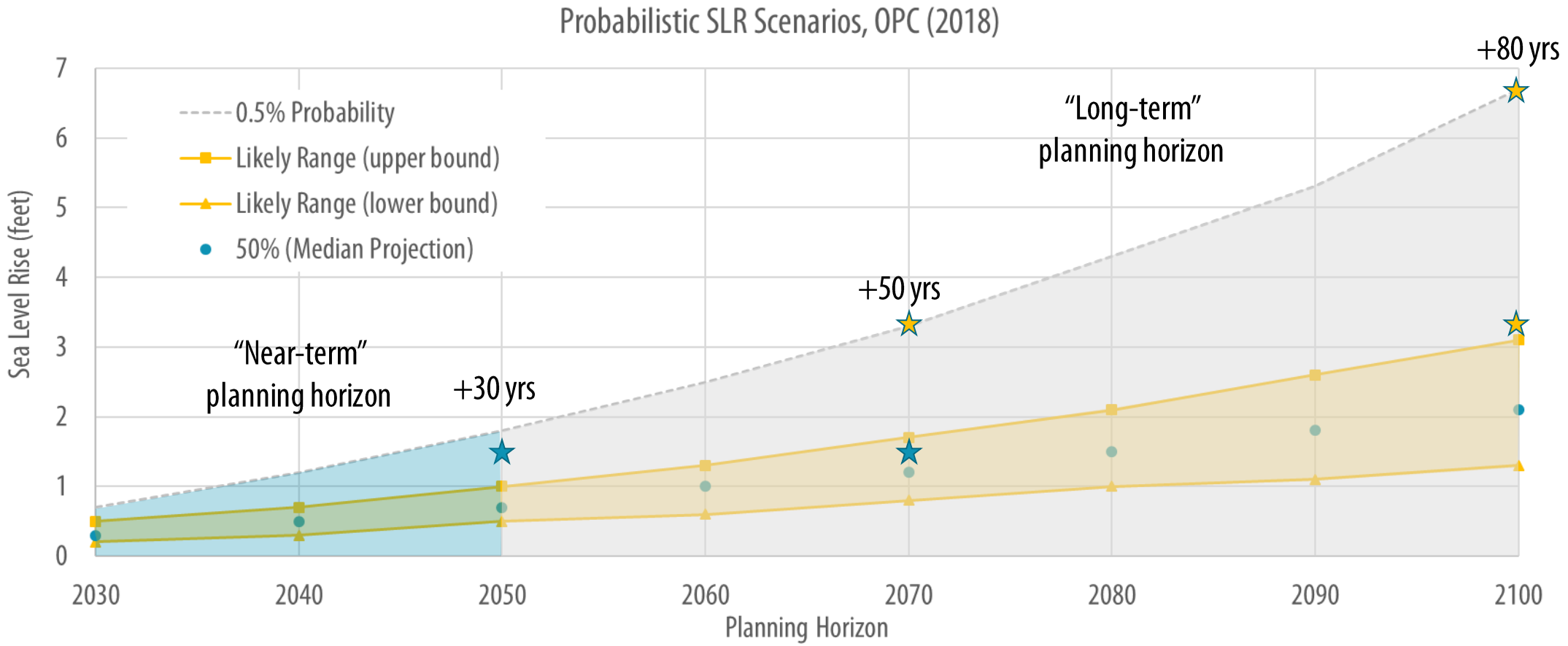
Adaptation Overview

- Protect:
  - Engineered structures or other measures (beach nourishment) to protect resources
- Accommodate:
  - Modify existing resources & new resources to reduce SLR vulnerability
- Retreat:
  - Relocation or removal of resources in hazard zones

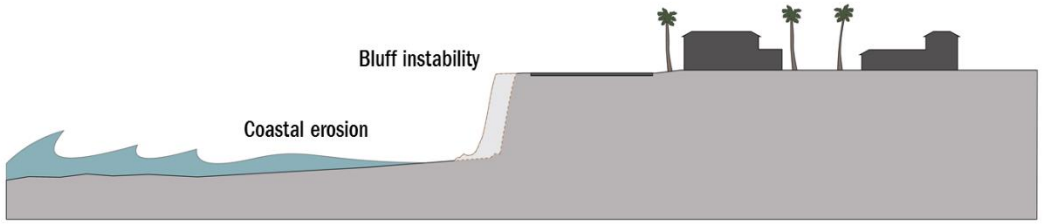
General Adaptation Strategies (CCC, 2015)



Adaptation Planning Horizons



Overview of SLR hazards described in VA

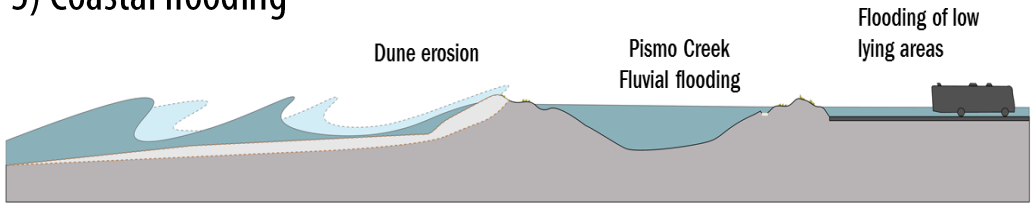


1) Bluff erosion

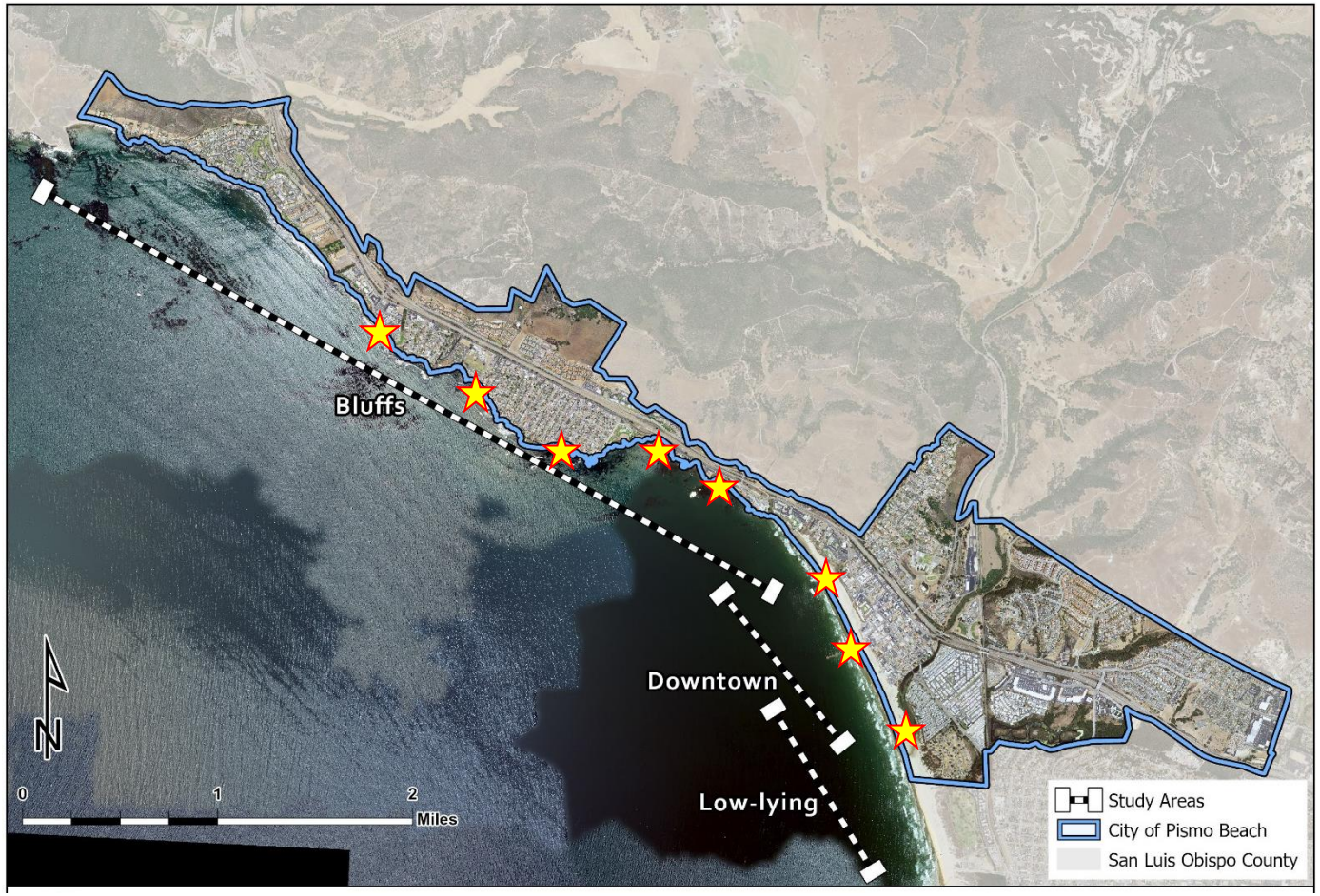


2) Shoreline erosion

3) Coastal flooding



4) Fluvial flooding



What magnitudes of SLR matter over the near-term*?

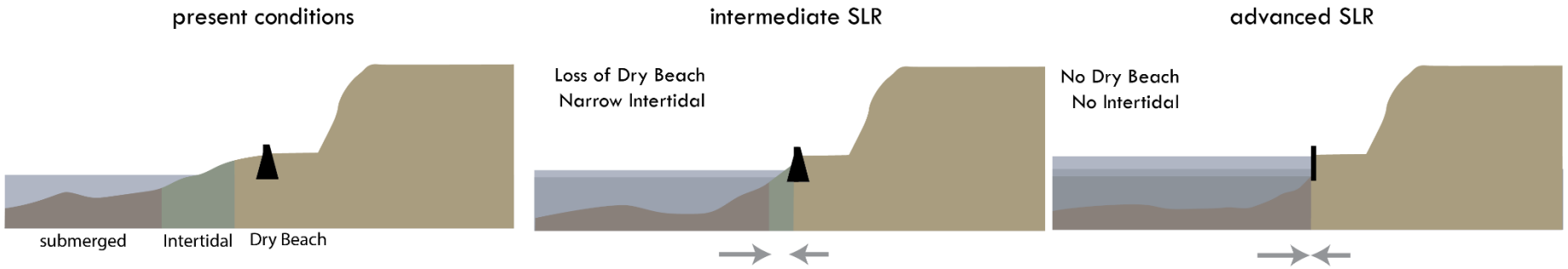
SLR Scenario	Location	Key Impact Thresholds
0 ft (Present day)	Bluffs	Development & infrastructure exposed to bluff erosion Variety of shoreline/bluff stabilization measures in place
0 ft (Present day)	Low-lying Areas	Fluvial hazards along Pismo Creek & Meadow Creek
1.6 ft	Bluffs	Coastal squeeze impacts beaches, intertidal and subtidal habitats Reduced opportunity for access & recreation along pocket beaches
1.6 ft	Downtown	Partial loss of sandy beach width
1.6 ft	Low-lying Areas	Coastal storm results in flooding of RV resort Berm closure at creek mouth could increase risk of fluvial hazards

* Near-term refers to vulnerabilities projected over the next 30 years. There is a ~2% probability than SLR will exceed 1.6 feet by 2050.

What coastal resources are at risk?

- Coastal squeeze impacts beaches & intertidal habitat*
- Bluff-top development (un-protected)
- Infrastructure (un-protected)
  - 50 Stormwater outfalls
  - Ocean Blvd & utilities





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

Pismo Creek - existing fluvial hazards

- Large areas within present day 100-year floodplain
- No record of significant damages from Pismo Creek flooding
- BFE's range from 13 to 18 feet (NAVD)
- Several bridges do not have capacity for the 100-year flood
- Overtopping/road closures and damage would be expected



Near-term – Planning Measures

- Identify SLR hazard zones
- Public outreach and education associated with GP/LCP update
- Local Adaptation Planning
  - General Plan/Local Coastal Program Update
    - Apply consistent planning & development policies throughout the City
  - Capital Improvement Plan (CIP) process
    - Incorporate SLR probability and coastal hazards into existing budgeting & planning process
    - SLR adaptation strategies can be incorporated into a variety of projects
- Support Regional Adaptation Planning
  - Local Hazard Mitigation Plan (LHMP) and Coastal Regional Sediment Management Plan (CRSMP)

Near-term – Policy Measures

- Understand SLR hazards
  - Identify and use best available science
  - Develop standards and methods for site-specific coastal hazard analyses
  - Real estate disclosure of coastal hazard information
- Manage development in hazard zones
  - Siting & design requirements for new development in hazard zones
  - Managing redevelopment to limit repetitive loss structures
- Mitigate coastal hazard impacts
  - Shoreline & bluff protection devices – evaluation, maintenance and repairs
- Maximize protection of coastal resources

Near-term – Project Measures (Bluffs)

- Opportunistic Beach Nourishment
- Maintain and improve bluff stabilization in critical areas
- Rocky intertidal habitat restoration





Near-term – Project Measures (Downtown)

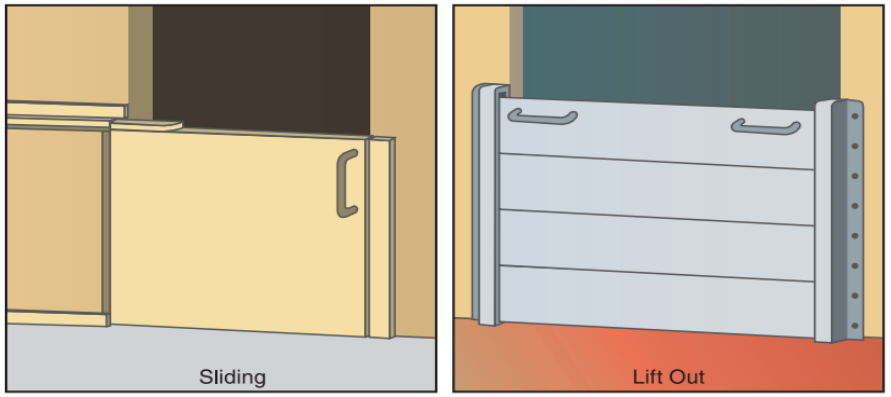
- Maintain and improve shoreline protection in critical areas
- Dry floodproofing in high-hazard areas (e.g. Vespera parking garage)
- Explore options for beach nourishment





Near-term – Project Measures (Low-lying Areas)

- Deployable flood protection barriers
  - Critical resources in advance of extreme event
- Drainage improvements
  - Low impact development techniques
    - Green/pervious surfaces
    - Flood storage & conveyance





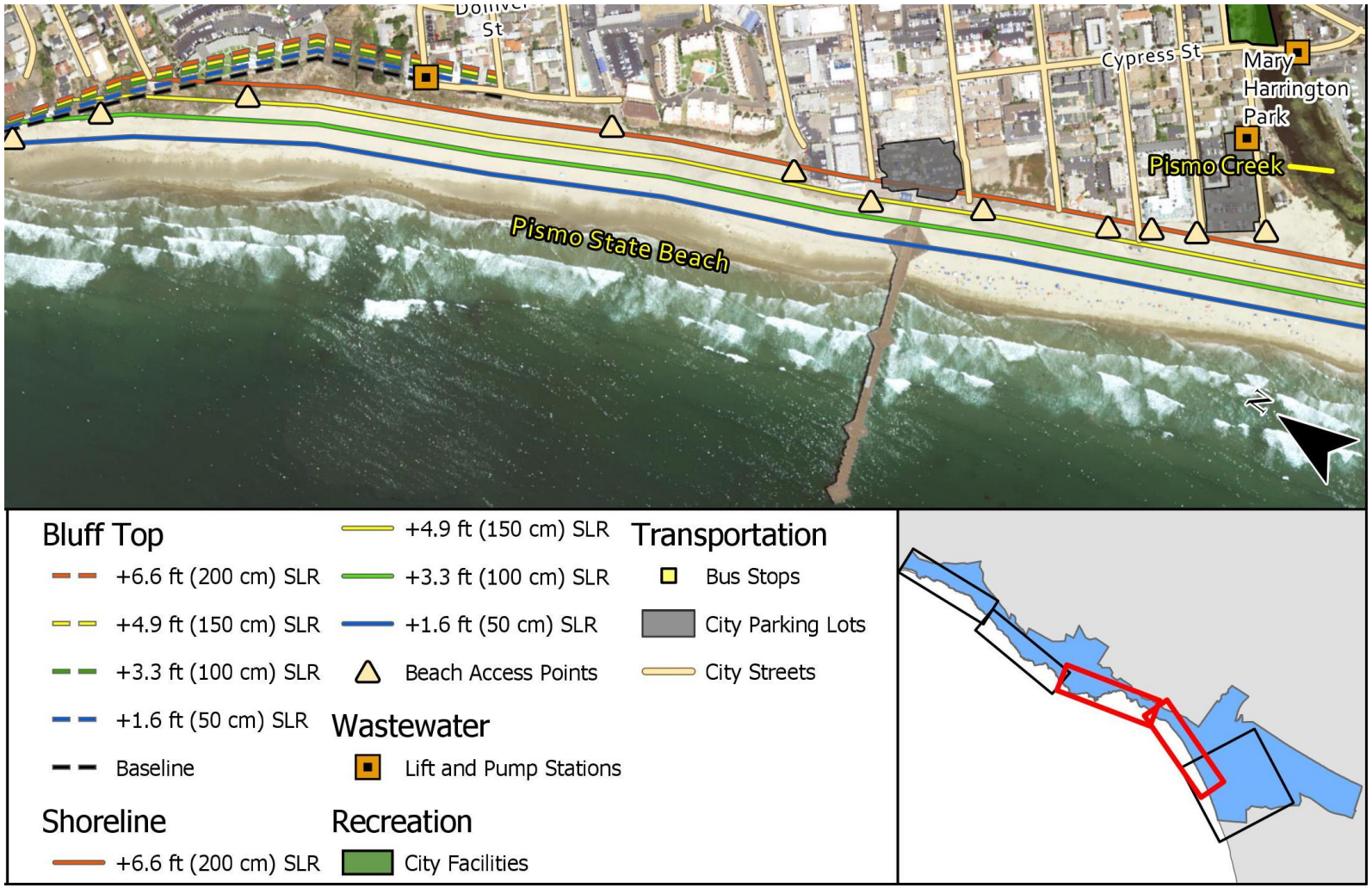
What magnitudes of SLR matter over the long-term?

SLR Scenario	Location	Key Impact Thresholds
3.3 ft	Bluffs	Loss of pocket beaches & associated resources Increased wave attack along toe of bluffs threatens development & infrastructure
3.3 ft	Downtown	Roughly half of Pismo State Beach lost Pier deck exposed to wave impacts during extreme event
3.3 ft	Low-lying Areas	Beach profile migration impacts dunes and Pismo Creek estuary Flooding of RV resort & campground during extreme coastal event
6.6 ft +	Downtown Low-lying Areas	Daily shoreline against unprotected bluffs & development along Downtown Widespread non-storm "high tide" flooding along Pismo Creek

Very slight chance (0.5%) SLR exceeds 3.3 feet by 2070 and 6.6 feet by 2100

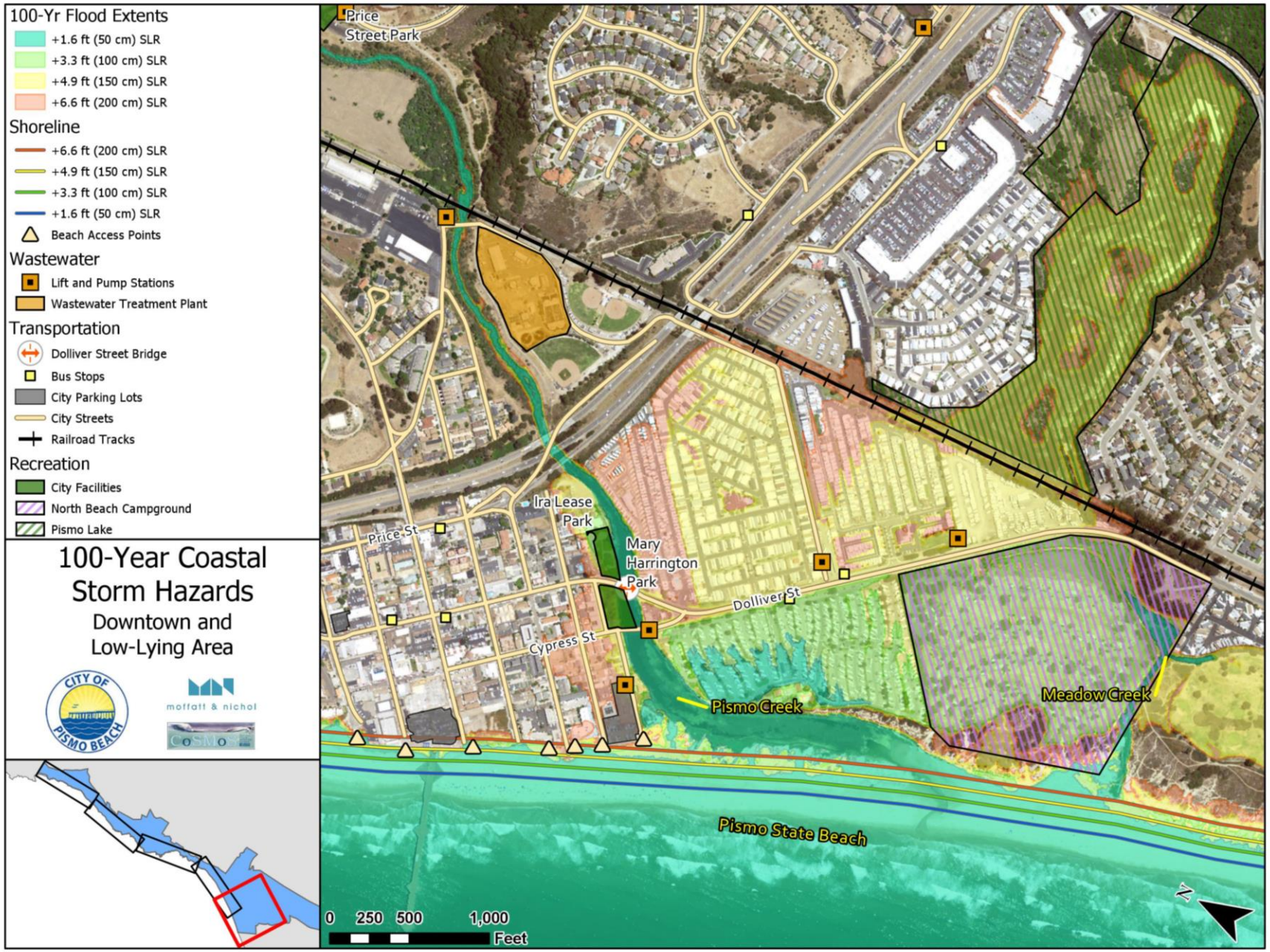
What coastal resources are at risk in the long-term?

- 3.3 ft SLR
  - Coastal squeeze impacts beaches & access points
  - Pier exposure to extreme waves
- 6.6 ft SLR
  - Bluff-top/back beach development
  - Pier & Plaza



Low-lying Areas

- 3.3 ft SLR
  - Flooding of RV resort & campground
  - Beach profile/estuarine impacts
- 6.6 ft SLR
  - Widespread flooding
  - Development & Infrastructure



Long-term – Adaptation Strategies

- 1.6 feet of SLR - trigger for long-term adaptation strategies
- Evaluate effectiveness of near-term strategies & adjust as appropriate
- Bluffs: adjust near-term strategies based on bluff & beach monitoring data
  - Mitigate adverse impacts to beach access, habitat or other resources
- Downtown: develop shoreline management program
  - Specify adaptation strategies (nourishment/living shoreline) to apply along Downtown waterfront
- Low-lying Areas: flood hazard mitigation along Pismo & Meadow Creeks
  - Coordinate with Caltrans & State Parks
  - Develop long-term plan for reconfiguration of RV resorts & other resources to accommodate 3.3 -6.6 feet SLR

Next Steps

- Update draft Adaptation Plan – City & CCC comments
- Stakeholder/community outreach
  - King Tides Event – January 11th at 9:00am (Addie St)
- Final Adaptation Plan
- Develop policies for GP/LCP Safety Element

GP/LCP Policy Approach (Safety Element)

- Broad policies for development in a coastal hazard areas
  - Applies to properties within Vulnerability Assessment hazard maps
  - Based on Chapter 3 of the Coastal Act
    - New development and redevelopment must avoid hazards
    - Protection is permitted for existing structures, coastal-dependent uses, and public beaches
  - Includes application requirements (e.g., SLR scenarios, anticipated lifespan of development/risk aversion, site-specific hazard assessment) and shoreline protection device requirements (e.g., alternatives analysis, mitigation, monitoring, repair and maintenance)
- Threshold-based policies for adaptation utilizing the Adaptation Plan recommendations
  - Triggered by SLR monitoring
  - Commitment to pursue long-term adaptive management strategies and programs, specific to location and hazard (e.g., beach nourishment, habitat restoration, flood hazard mitigation and retrofits)