



City of Palo Alto

Sea Level Rise Adaptation Policy Recommendations

Palo Alto City Council Meeting, March 18, 2019

COUNCIL MEETING

03/18/2019

☒ Received Before Meeting

8



9' 7" King Tide on Palo Alto Baylands Trail, January 20, 2019. This approximates anticipated daily high tide levels in 2080.

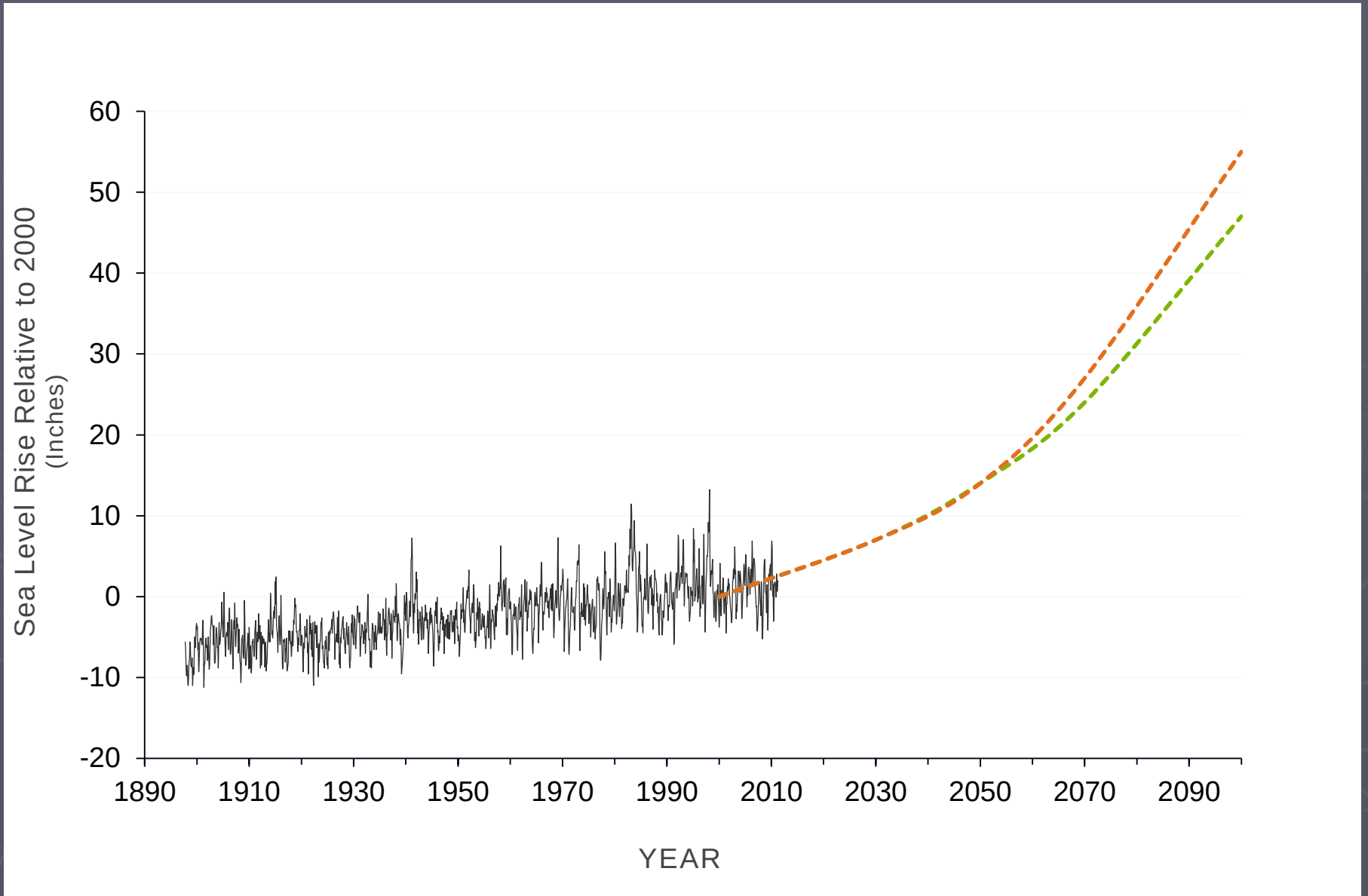


9' 7" King Tide on Palo Alto Baylands Trail, January 20, 2019. This approximates anticipated daily high tide levels in 2080.

Drivers of Sea Level Rise

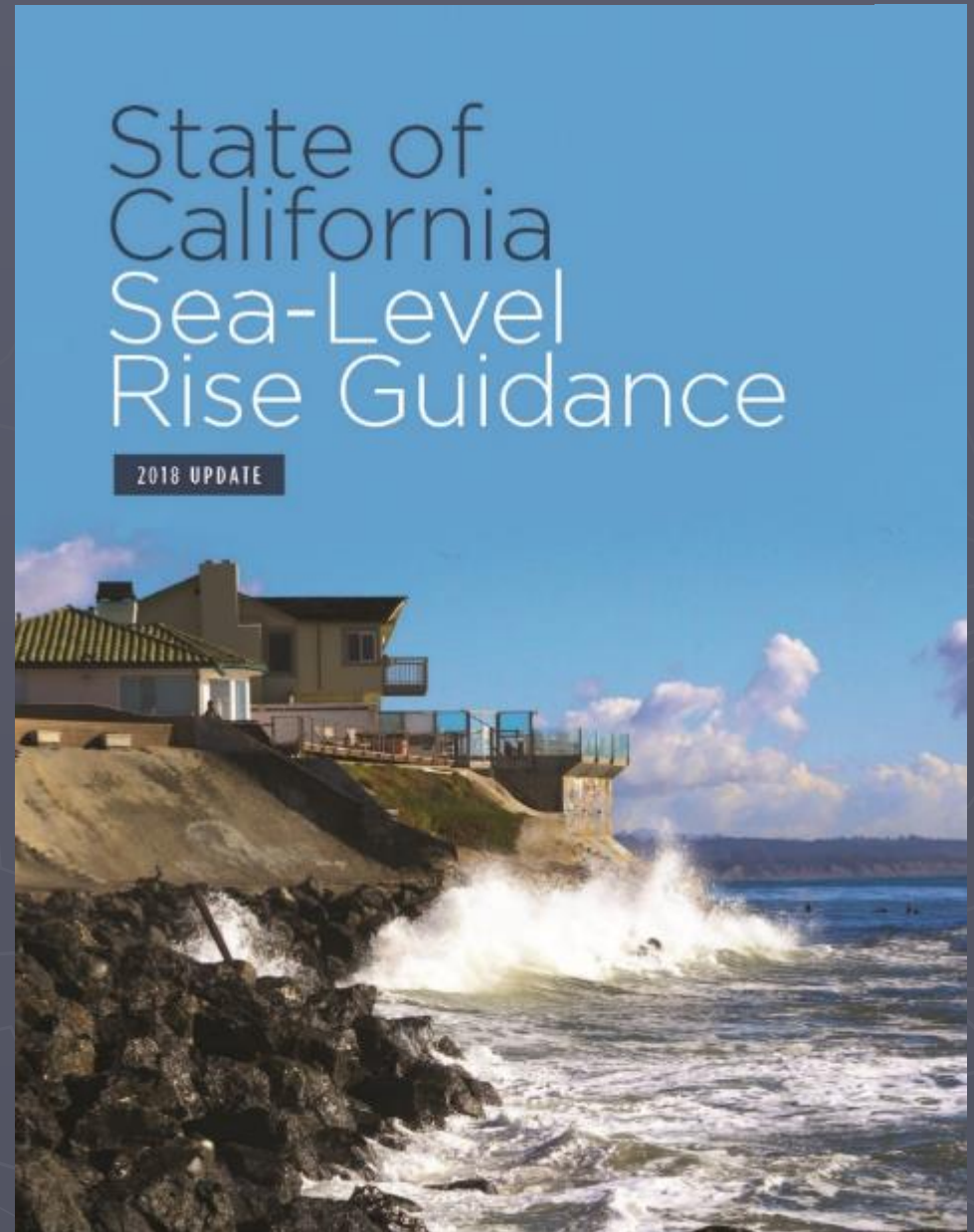


Sea Level: Today and Tomorrow



Information on Sea-Level Rise

opc.ca.gov



California's Fourth Climate Change Assessment

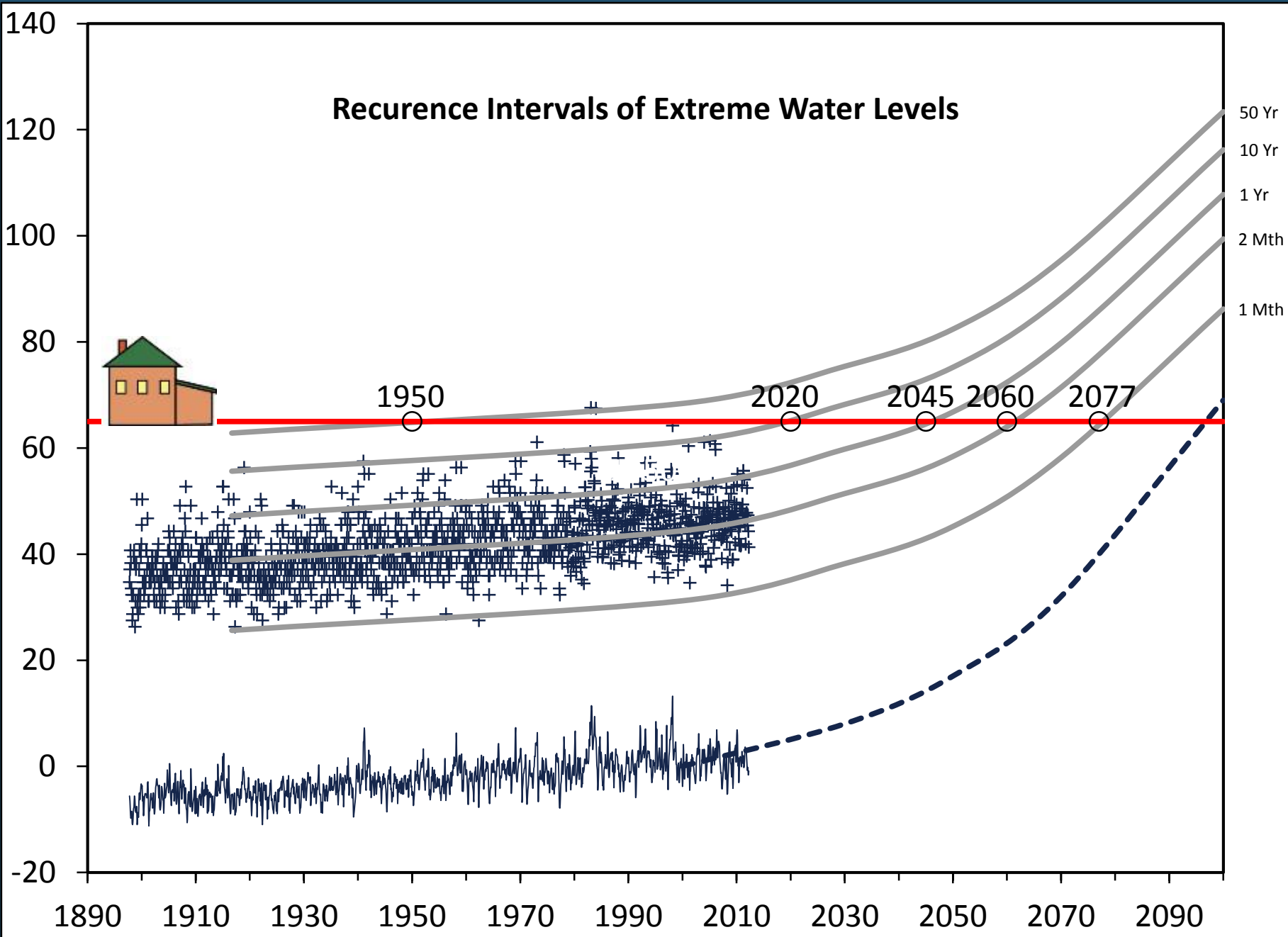
- Sea level in the Bay Area has risen over 0.6 feet in the last 100 years.
- Projection of sea level rise up to 1.9 feet by 2050, and between 5.7 and 6.9 feet by 2100.
- Extremely high sea level rise by 2100 (as high as 10.2 feet at San Francisco) is plausible but with very low probability.
- At least 6 feet of sea level rise is inevitable over the next several centuries.

What is Protecting Us?



Photo: ESA

Same Levee – New Year's Eve 2005

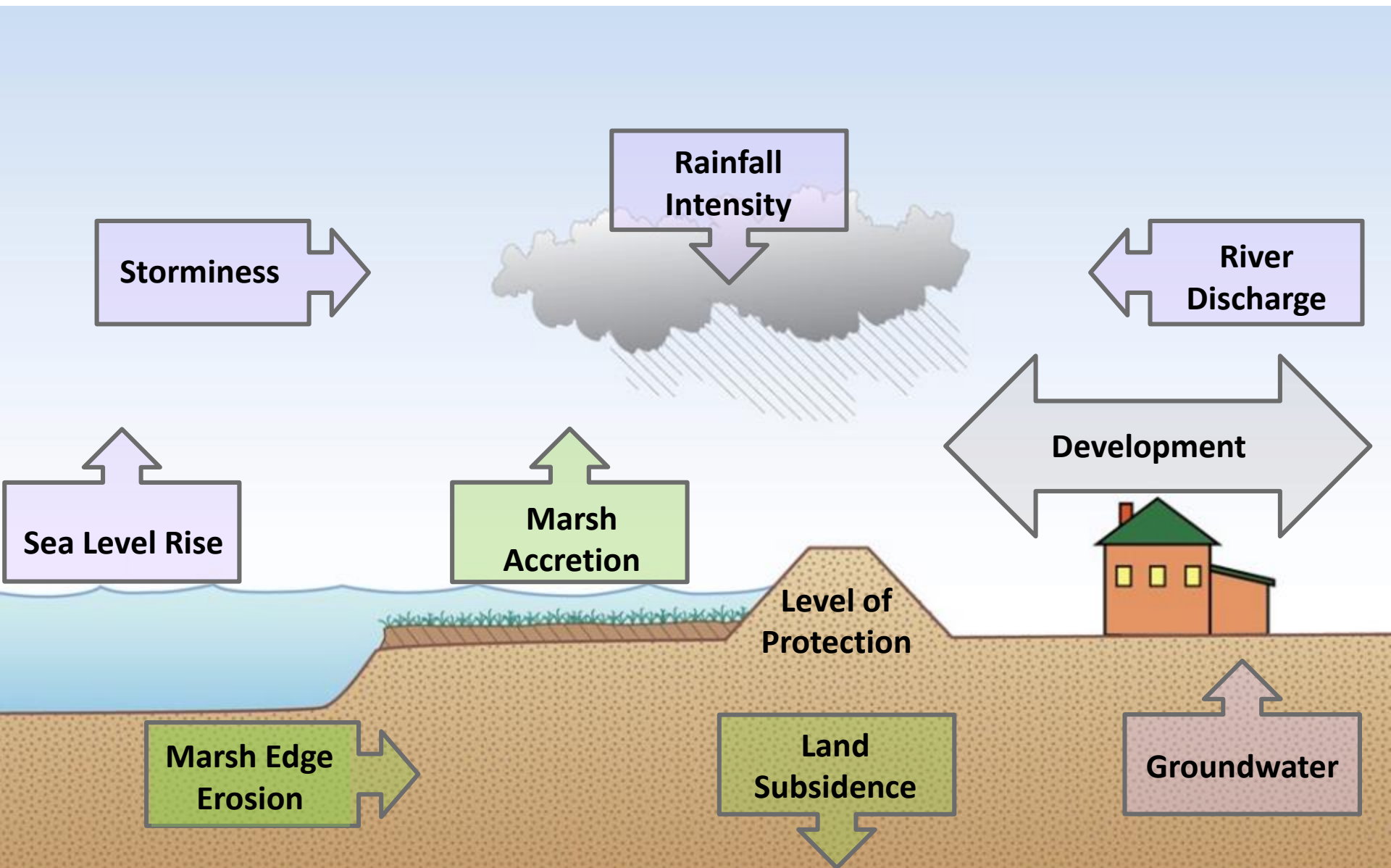


Creeks Backup due to High Bay Levels



Photo: Mike Lowery

Drivers for Future Flood Risks



Horizontal Levee



Tidal salt

Levee

r Baye

ary District

SAFER Levee Project



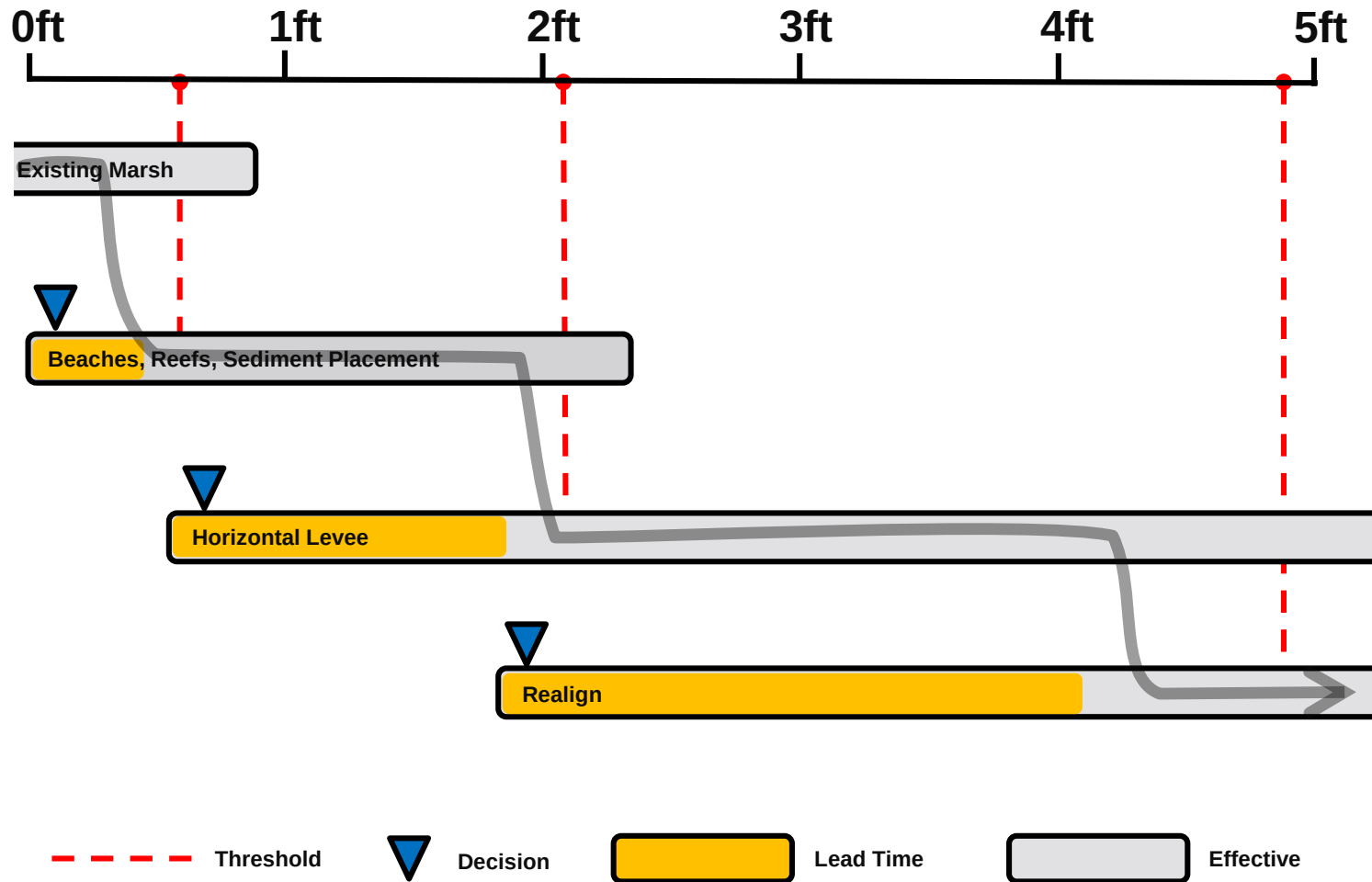
Oyster Reefs



South Bay Salt Ponds Project



Adaptation Pathways



Why We Need a Policy and Plan

- Climate Protection is one of Council's top four priorities. Previous Council directed staff to provide a sea level rise policy and plan in our Sustainability and Climate Action Plan
- A policy bridges the City's high-level SLR planning goals with an eventual nuts-and-bolts SLR Sustainability Implementation Plan
- Protect our neighborhoods, economy and Baylands habitat
- Plan and adapt to varying sea level rise predictions
- Provide clear SLR planning goals and technical guidance across City departments
- Align with (and not hinder) efforts with neighboring cities and regional planning
- Communicate with the public



SFCJPA.ORG

SAFER Bay Project

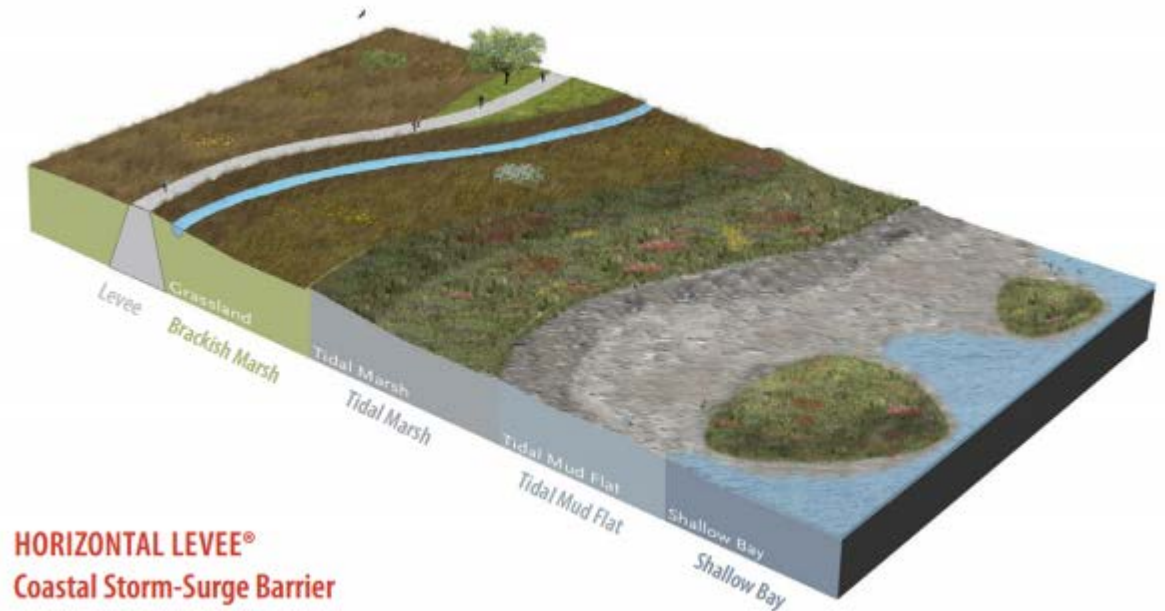
Protect 5,000 properties & major infrastructure,
restore marshes, connect communities through trails

Two counties and three cities.

11 miles of shoreline with 11 reaches that include 24 options.

Each alternative includes all reaches and only one option per reach.

the first of these is the fact that the majority of the population is still living in rural areas, and the majority of the population is still living in rural areas.



HORIZONTAL LEEVE®
Coastal Storm-Surge Barrier

Palo Alto Baylands

Climate Change and Sea Level Rise at the Baylands

Prepared for:

City of Palo Alto

November 2018



Key takeaways:

- 12" SLR may flood unprotected areas of marsh
- 36" SLR is tipping point where portions of levees and berms may be overtopped, impacting critical infrastructure
- Byxbee Park won't be affected under current SLR scenarios because of its higher elevation

San Francisquito Creek Project

Protects 1,000 homes from a 100 year flood event and 3' Sea Level Rise

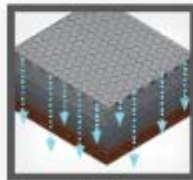


December, 2019.

CITY OF PALO ALTO

GREEN STORMWATER INFRASTRUCTURE PLAN

Scheduled for Council Review on May 13, 2019



Permeable Pavement



Stormwater Planter



Bioretention Area



Tree Well Filter

Greenhouse Gas Emissions Accelerate Like a 'Speeding Freight Train' in 2018

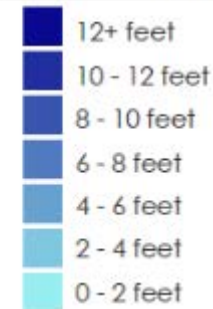


Daytime traffic amid smog in Beijing on Sunday. China produces 27 percent of global carbon emissions, the most of any country. Wu Hong/EPA, via Shutterstock

2050 projection (Likely Range ~ 1.1 ft)

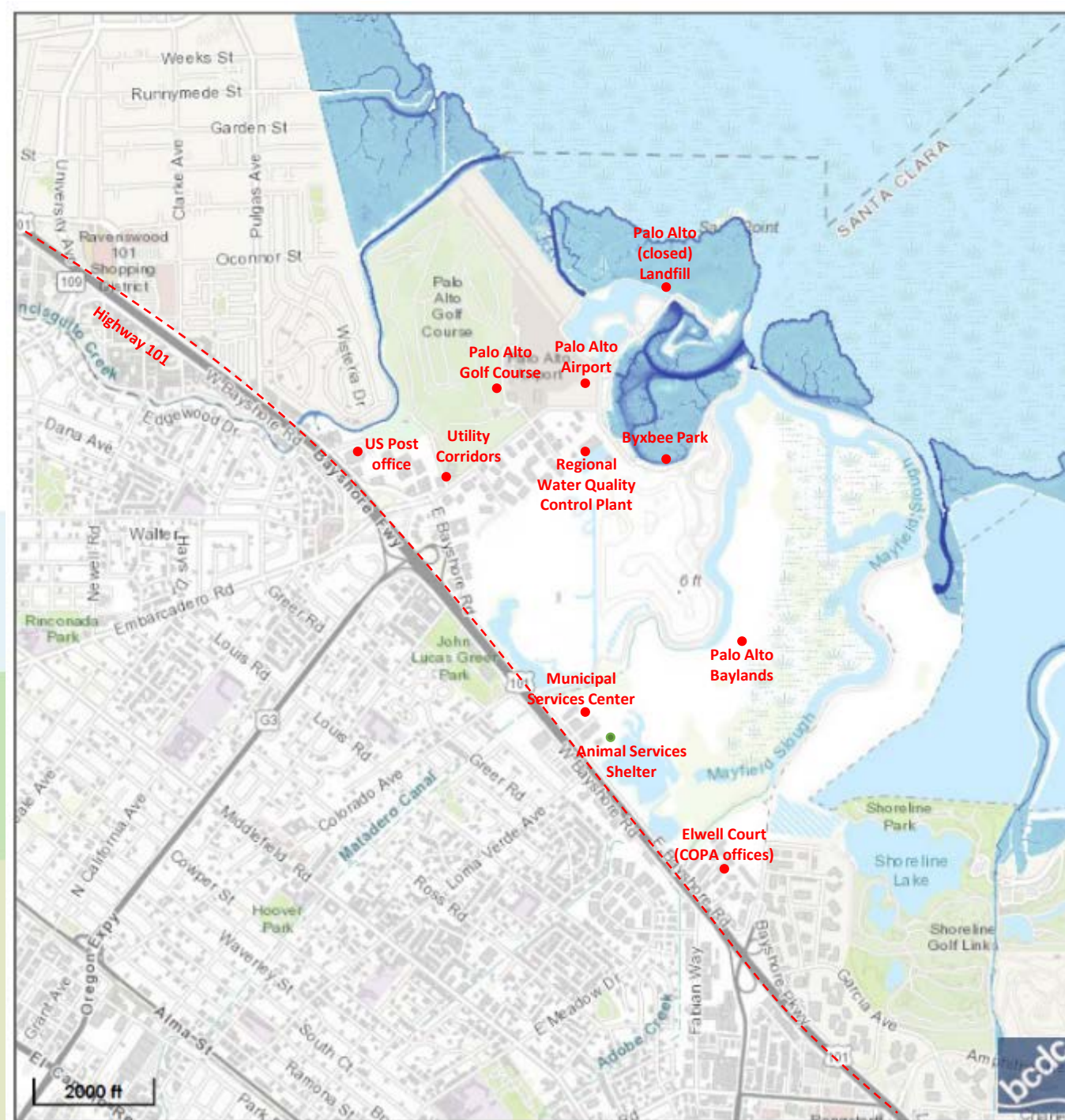
Sea Level Rise	+	Storm Surge
0"		5-year
6"		2-year
12"		King Tide
24"		No Storm Surge

Depth of Flooding

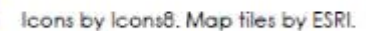


At the regional scale, these scenarios present average water levels that are representative of what could occur along the entire Bay shoreline. The mapped scenarios are based on binning the water levels with a tolerance of ± 3 inches.

Icons by Icons8. Map files by ESRI.

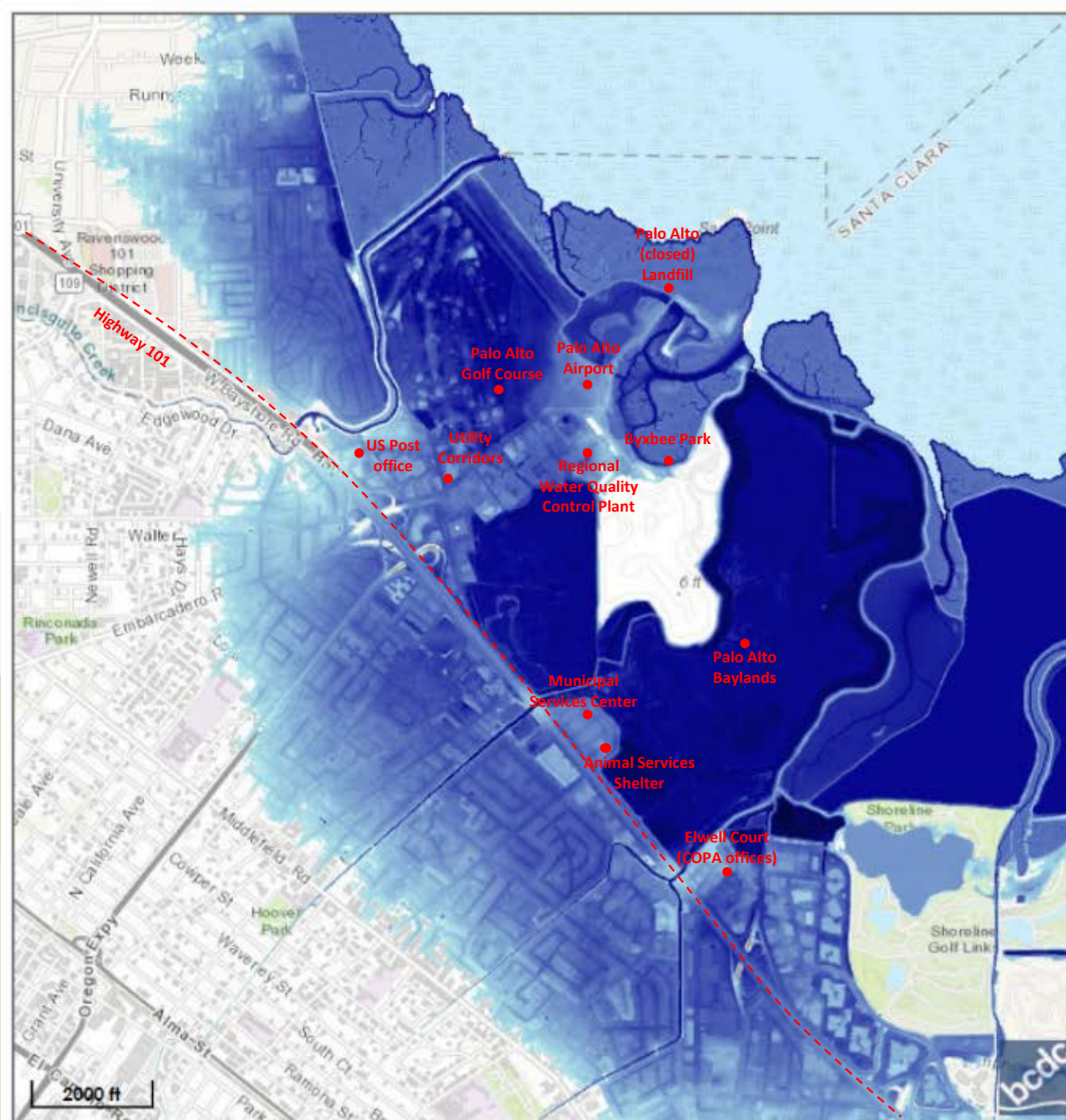


~ 3.4 ft SLR + King Tide
= 4 ft Total Water Level

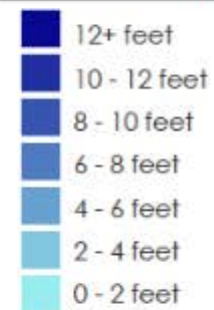


2100 projection (Med-High Risk ~ 6.9 ft)

~ 6.9 ft SLR + King Tide
= 7 ft Total Water Level



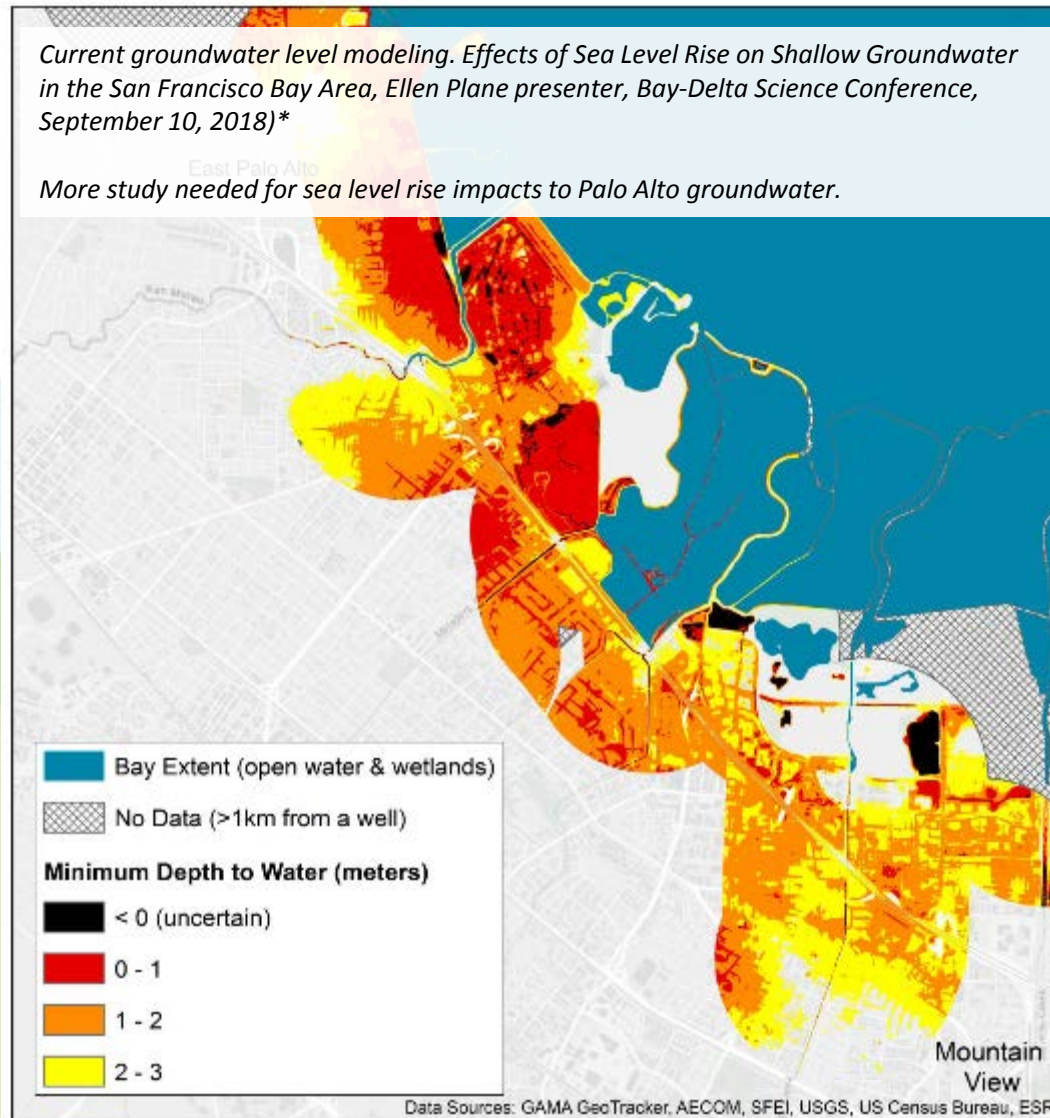
Depth of Flooding



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Icons by Icons8. Map files by ESRI.

How Will Sea Level Rise Impact Ground Water?



*Ellen Plane and Kristina Hill
College of Environmental Design, University
of California, Berkeley

Kris May, Silvestrum Climate Associates
This dataset shows estimated values for
minimum depth to groundwater in the
coastal Bay Area. The estimation is based
on an interpolation that uses ground
elevation data and minimum depth to water
values measured at monitoring wells in the
nine Bay Area counties over the past 20
years.

More information at
<https://dash.berkeley.edu/stash/dataset/doi:10.6078/D1W01Q>

SLR Plan Actions Could Include:

Governance

- Incorporate sea level rise and groundwater intrusion into design standards
- Incorporate SLR into emergency planning
- Perform an economic analysis of critical assets to protect, relocate or surrender.

Physical

- Prioritized CIP projects with SLR triggers for action
- Use restoration plantings with a wider climate tolerance zone.
- Establish regular monitoring for SLR impacts and groundwater elevation.

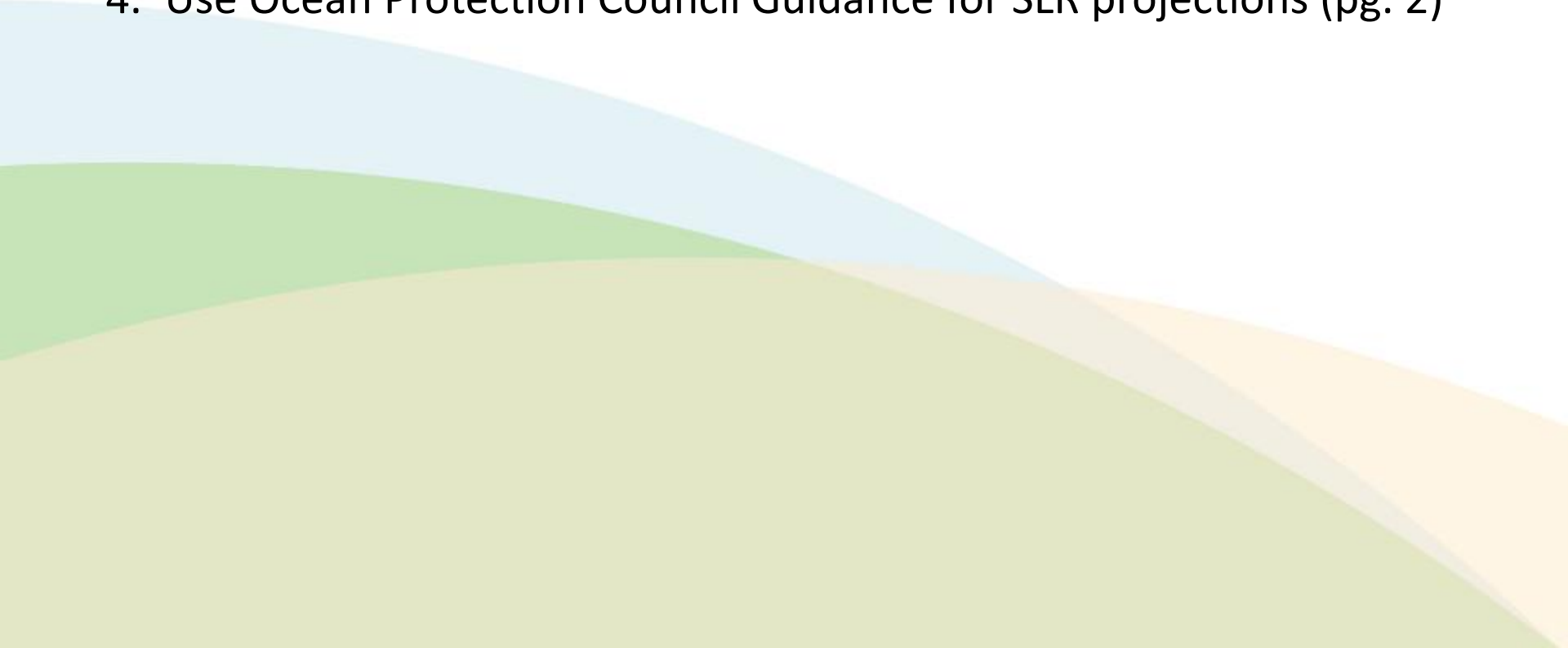
Informational

- SLR projection zone map versus solely a flood zone map.
- Public education about sea level rise and response planning (events, website, public meetings, Development Center outreach, interpretive signage around Baylands).

What Informed Palo Alto's Draft Policy:

- Commitments in Sustainability Climate Action Plan, Comprehensive Plan, Local Hazard Mitigation Plan and Threat and Hazard Identification Risk Assessment
- Reviewed by:
 - UC Berkeley Climate Readiness Institute
 - San Francisco Estuary Institute
 - Peer Review (San Mateo County, Santa Clara County, Santa Clara Valley Water District, SFPUC)
 - Neighboring Cities
 - Interdepartmental staff
 - Palo Alto Community

Policy Summary

1. Purpose is to plan for rising tides, integrate SLR into City planning, provide a framework for a SLR plan. (pg. 1)
 2. Continue focusing on GHG reductions (pg. 1)
 3. Lead by example and work with neighboring communities (pg. 1)
 4. Use Ocean Protection Council Guidance for SLR projections (pg. 2)
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Policy Procedures

Develop a Sea Level Rise vulnerability assessment and adaptation plan which would: (pg. 3)

- i. Align with SLR requirements in existing planning documents (Comp Plan, S/CAP, Local Hazard Mitigation Plan) (pg. 3.b.i.)
- ii. Include prioritized actions to manage risks, identify sea level thresholds that initiate action, and that factor in the long lead time to plan, fund, review and build response strategies (pg. 3.b.ii)
- iii. Include development planning for areas to be impacted by sea level rise (public, infrastructure, and private) (pg. 3.b.iii)
- iv. Address budget funding considerations (pg. 3.b.iv)
- v. Provide guidance on managing and enhancing the Baylands, creek and open space ecosystems which can reduce SLR impacts (pg. 3.b.v)
- vi. Provide education for staff and developers (pg. 3.b.v)

Next steps

Spring- Winter 2019	• Vulnerability assessment and menu of possible adaptation strategies (requires consultant RFP) • Staff education, establish regular interdepartmental meetings • Expand regular meetings with surrounding public agencies • Create a SLR Community Task Force • Public outreach and communication
Winter 2020- Fall 2020	• Sea Level Rise Plan Development • Public input/revisions • CEQA review (part of Sustainability Climate Action Plan CEQA)
December 2020	• Bring draft SLR SIP plan to Council • Goals that can be accomplished within two years will serve as the sea level rise chapter of the S/CAP
2021 and after	• Implement plan and provide annual Council updates with S/CAP • Fine tune long-term SLR Plan as needed and with five-year <i>Ocean Protection Council Sea Level Rise Guidance</i> revisions

Work is contingent on FY2020 budget approval for Plan Development.

Recommended motion:

1. Accept the Se Level Rise Adpatation Policy
2. Direct Staff to return to Council with a Sea Level Rise Adaptation Plan in December 2020.