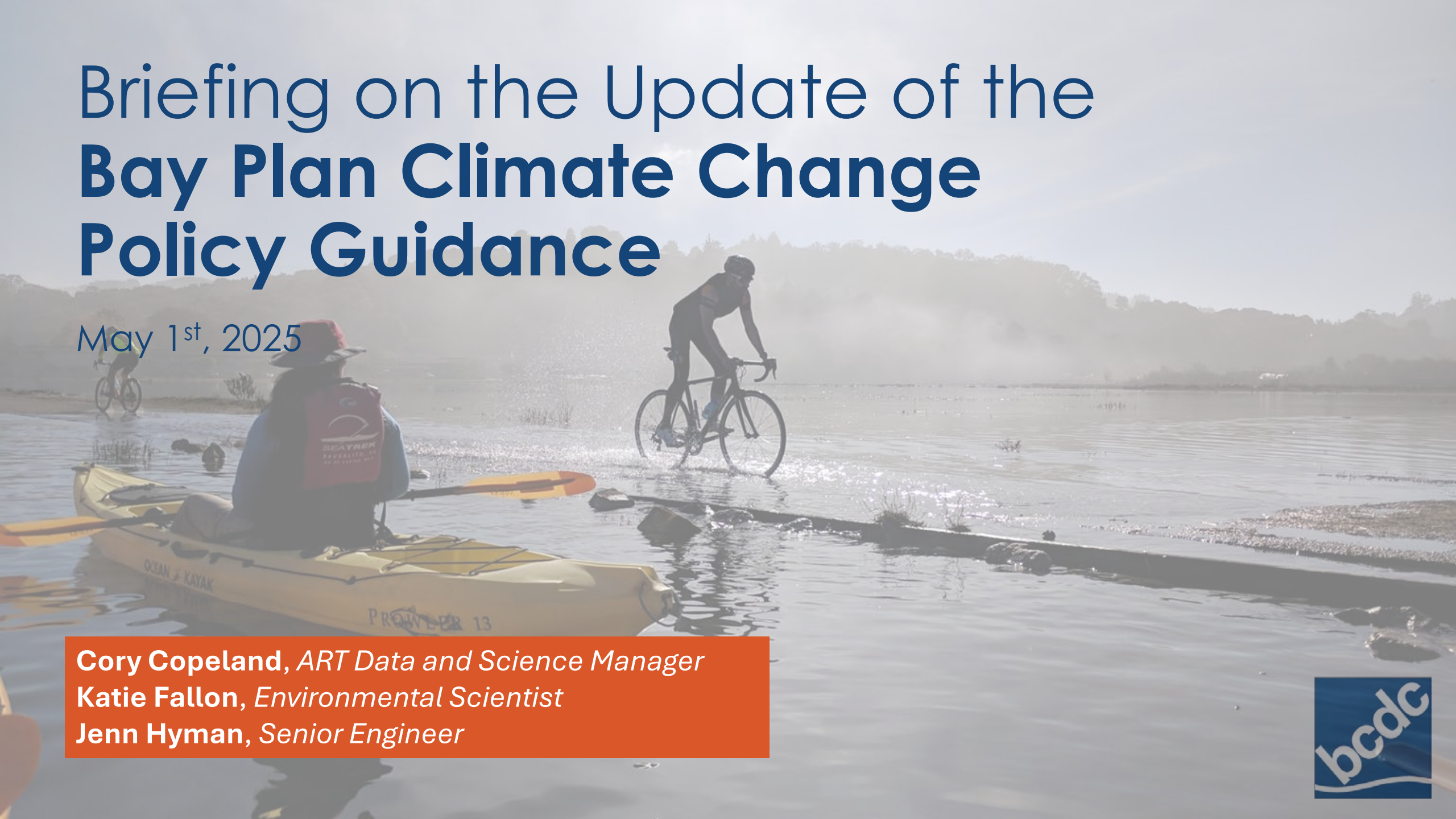
Briefing on the Update of the **Bay Plan Climate Change Policy Guidance**

May 1st, 2025



Cory Copeland, *ART Data and Science Manager*
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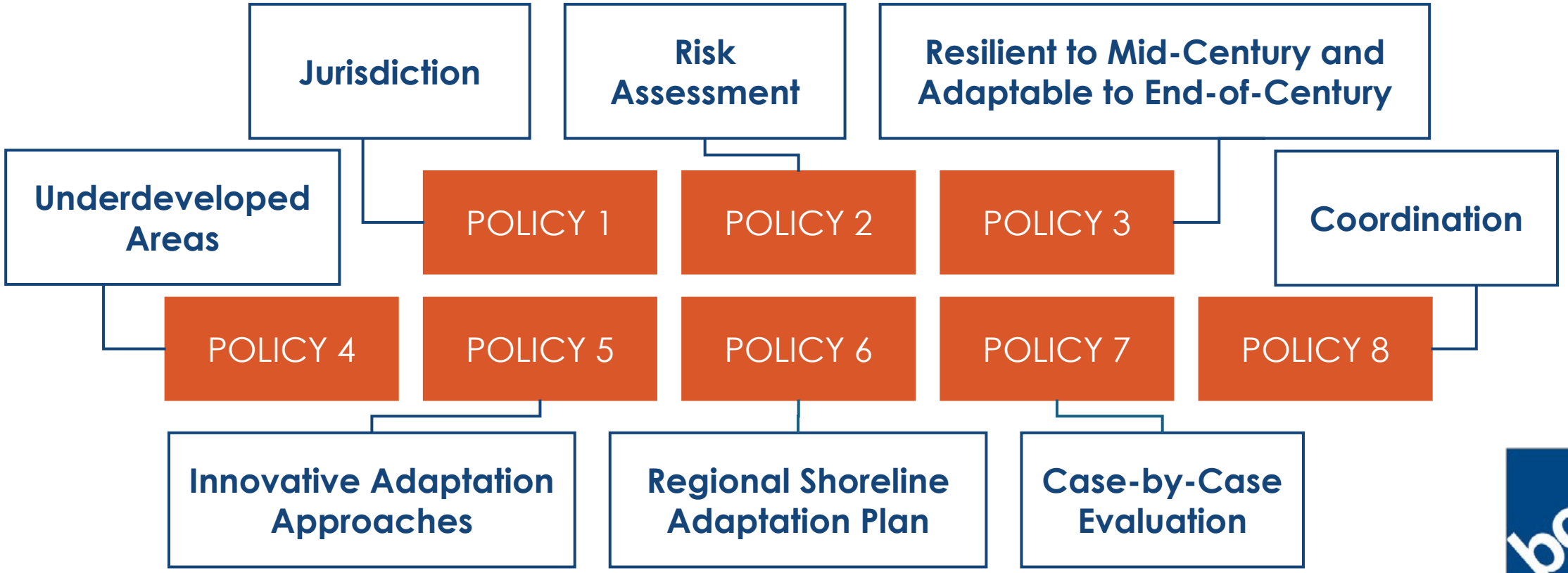
BACKGROUND:
Climate Change Policies

- Bay Plan Amendment 1-08, led to the creation of the Climate Change Policies in 2011



BACKGROUND:
2021 Bay Plan Climate Change Policy Guidance

WHY WAS THE GUIDANCE CREATED?

- Help BCDC permit applicants more easily **understand permit requirements** regarding climate change and flooding

- Create more **consistent application** of the Climate Change Policies based on past approved projects

Bay Plan Climate Change Policy Guidance

THE GUIDANCE DOES NOT…

- Constitute binding requirements
- Create new regulations or processes
- Recommend policy changes
- Replace pre-application consultation with BCDC

THE GUIDANCE DOES…

- Provide examples of past permits
- Offer background on climate science

HOW THIS GUIDANCE IS USED:

THE GUIDANCE SUPPORTS…

- Providing clear and comprehensive information on our Climate Change policies for applicants
- Onboarding new staff analysts
- Creating internal awareness of new high-quality science and data to support analysis
- Organizing information on past permits to improve efficiency and consistency

WHY UPDATE THE CLIMATE CHANGE POLICY GUIDANCE?

01

New State of California Sea Level Rise Guidance Released

02

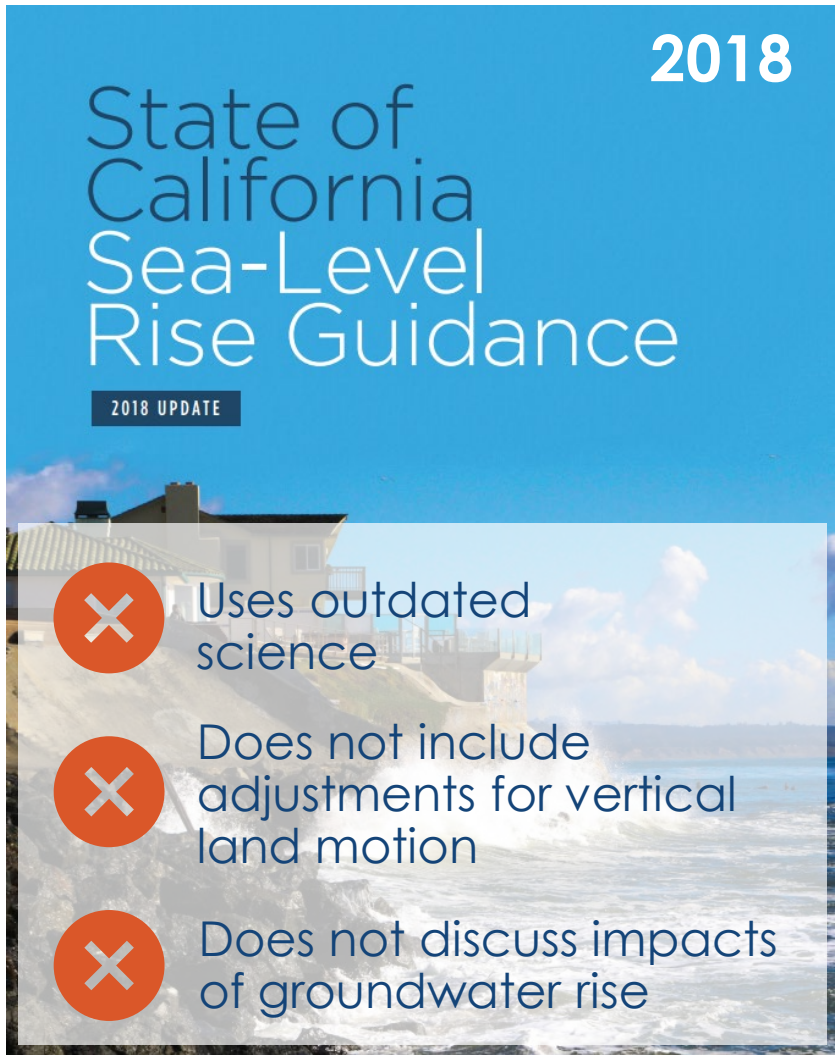
Information from New Permits

03

Climate Change Policies Amended (BPA 1-24)

SCIENCE

UPDATE: **2024 STATE OF CALIFORNIA SEA LEVEL RISE GUIDANCE (OPC)**



SCIENCE

UPDATE: 2024 STATE GUIDANCE
SEA LEVEL RISE SCENARIOS

2018

1.9 ft

		Probabilistic Projections (in feet) (based on Kopp et al. 2014)					H++ scenario (Sweet et al. 2017) *Single scenario
		MEDIAN	LIKELY RANGE		1-IN-20 CHANCE	1-IN-200 CHANCE	
		50% probability sea-level rise meets or exceeds...	66% probability sea-level rise is between...		5% probability sea-level rise meets or exceeds...	0.5% probability sea-level rise meets or exceeds...	
				Low Risk Aversion		Medium - High Risk Aversion	Extreme Risk Aversion
High emissions	2030	0.4	0.3 -	0.5	0.6	0.8	1.0
	2040	0.6	0.5 -	0.8	1.0	1.3	1.8
	2050	0.9	0.6 -	1.1	1.4	1.9	2.7
Low emissions	2060	1.0	0.6 -	1.3	1.6	2.4	
High emissions	2060	1.1	0.8 -	1.5	1.8	2.6	3.9
Low emissions	2070	1.1	0.8 -	1.5	1.9	3.1	
High emissions	2070	1.4	1.0 -	1.9	2.4	3.5	5.2
Low emissions	2080	1.3	0.9 -	1.8	2.3	3.9	
High emissions	2080	1.7	1.2 -	2.4	3.0	4.5	6.6
Low emissions	2090	1.4	1.0 -	2.1	2.8	4.7	
High emissions	2090	2.1	1.4 -	2.9	3.6	5.6	8.3
Low emissions	2100	1.6	1.0 -	2.4	3.2	5.7	
High emissions	2100	2.5	1.6 -	3.4	4.4	6.9	10.2
Low emissions	2110*	1.7	1.2 -	2.5	3.4	6.3	
High emissions	2110*	2.6	1.9 -	3.5	4.5	7.3	11.9
Low emissions	2120	1.9	1.2 -	2.8	3.9	7.4	
High emissions	2120	3	2.2 -	4.1	5.2	8.6	14.2
Low emissions	2130	2.1	1.3 -	3.1	4.4	8.5	
High emissions	2130	3.3	2.4 -	4.6	6.0	10.0	16.6
Low emissions	2140	2.2	1.3 -	3.4	4.9	9.7	
High emissions	2140	3.7	2.6 -	5.2	6.8	11.4	19.1
Low emissions	2150	2.4	1.3 -	3.8	5.5	11.0	
High emissions	2150	4.1	2.8 -	5.8	5.7	13.0	21.9

2024

0.8 ft

Statewide Averages for Five California Sea Level Scenarios

Median values for California Sea Level Scenarios, in feet, relative to a 2000 baseline. These statewide values all incorporate an average value of vertical land motion corresponding to a negligible rate of 0.1 mm (0.0003 ft) per year uplift. The California Sea Level Scenarios track closely with global mean sea level (GMSL), with differences of only 2 to 3 inches between GMSL and the California Sea Level Scenarios in 2100. Evaluation of the Intermediate, Intermediate-High, and High scenarios (outlined in red below) is recommended to inform appropriate sea level rise planning and project decisions.

YEAR	LOW	INT-LOW	INTERMEDIATE	INT-HIGH	HIGH
2020	0.2	0.2	0.2	0.2	0.3
2030	0.3	0.4	0.4	0.4	0.4
2040	0.4	0.5	0.6	0.7	0.8
2050	0.5	0.6	0.8	1.0	1.2
2060	0.6	0.8	1.1	1.5	2.0
2070	0.7	1.0	1.4	2.2	3.0
2080	0.8	1.2	1.8	3.0	4.1
2090	0.9	1.4	2.4	3.9	5.4
2100	1.0	1.6	3.1	4.9	6.6
2110	1.1	1.8	3.8	5.7	8.0
2120	1.1	2.0	4.5	6.4	9.1
2130	1.2	2.2	5.0	7.1	10.0
2140	1.3	2.4	5.6	7.7	11.0
2150	1.3	2.6	6.1	8.3	11.9

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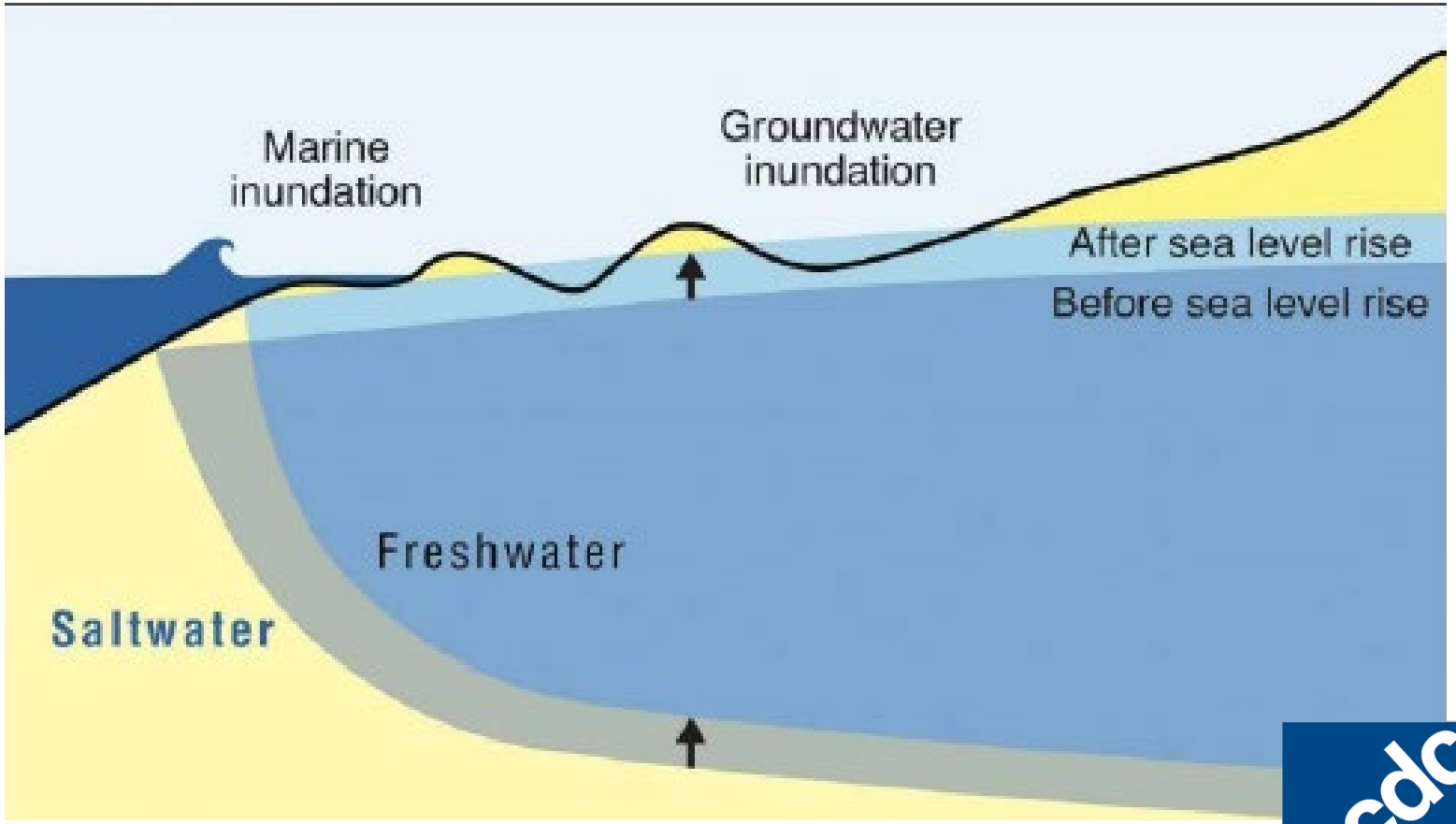
UPDATE: 2024 STATE GUIDANCE **GROUNDWATER**

- Better scientific understanding of how sea level rise will affect groundwater
- Encourages inclusion of other types of flooding (not just tidal inundation)

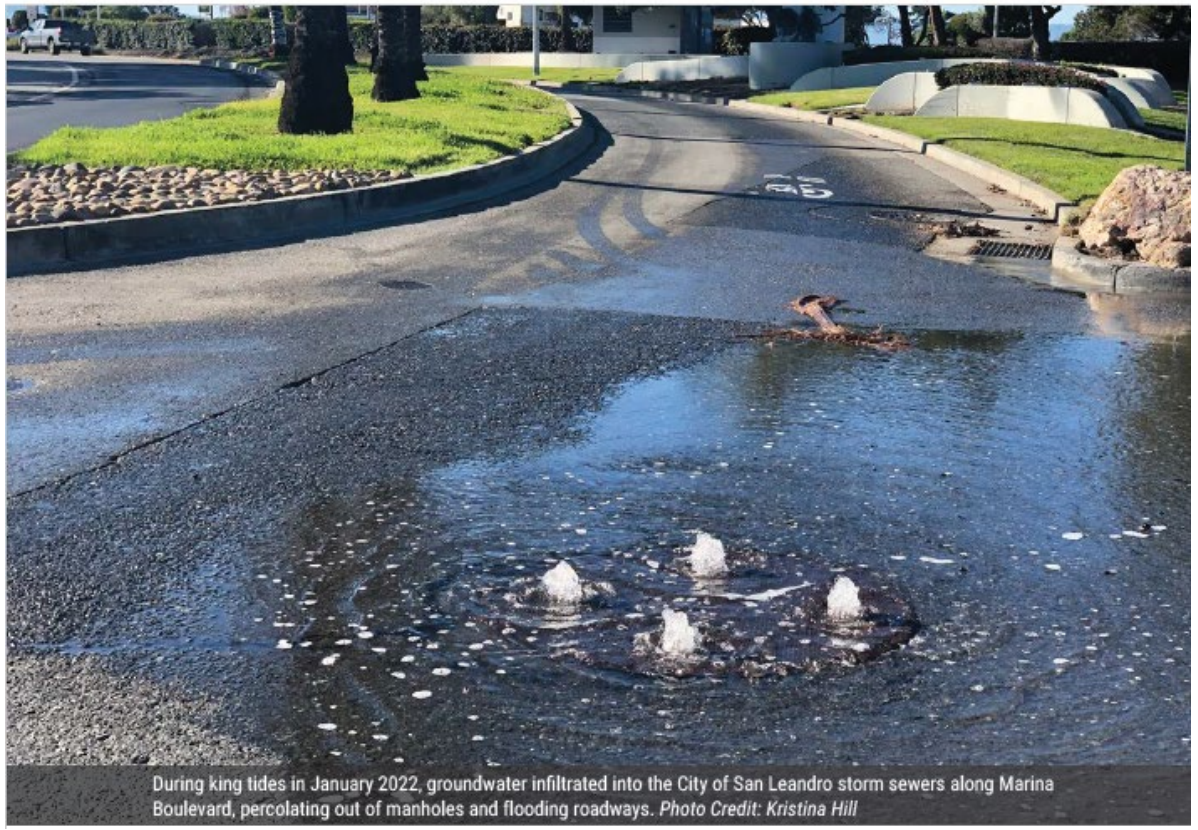


Source: UHM Coastal Geology Group

SCIENCE

Impacts of **GROUNDWATER RISE** are predicted to come before those from coastal flooding

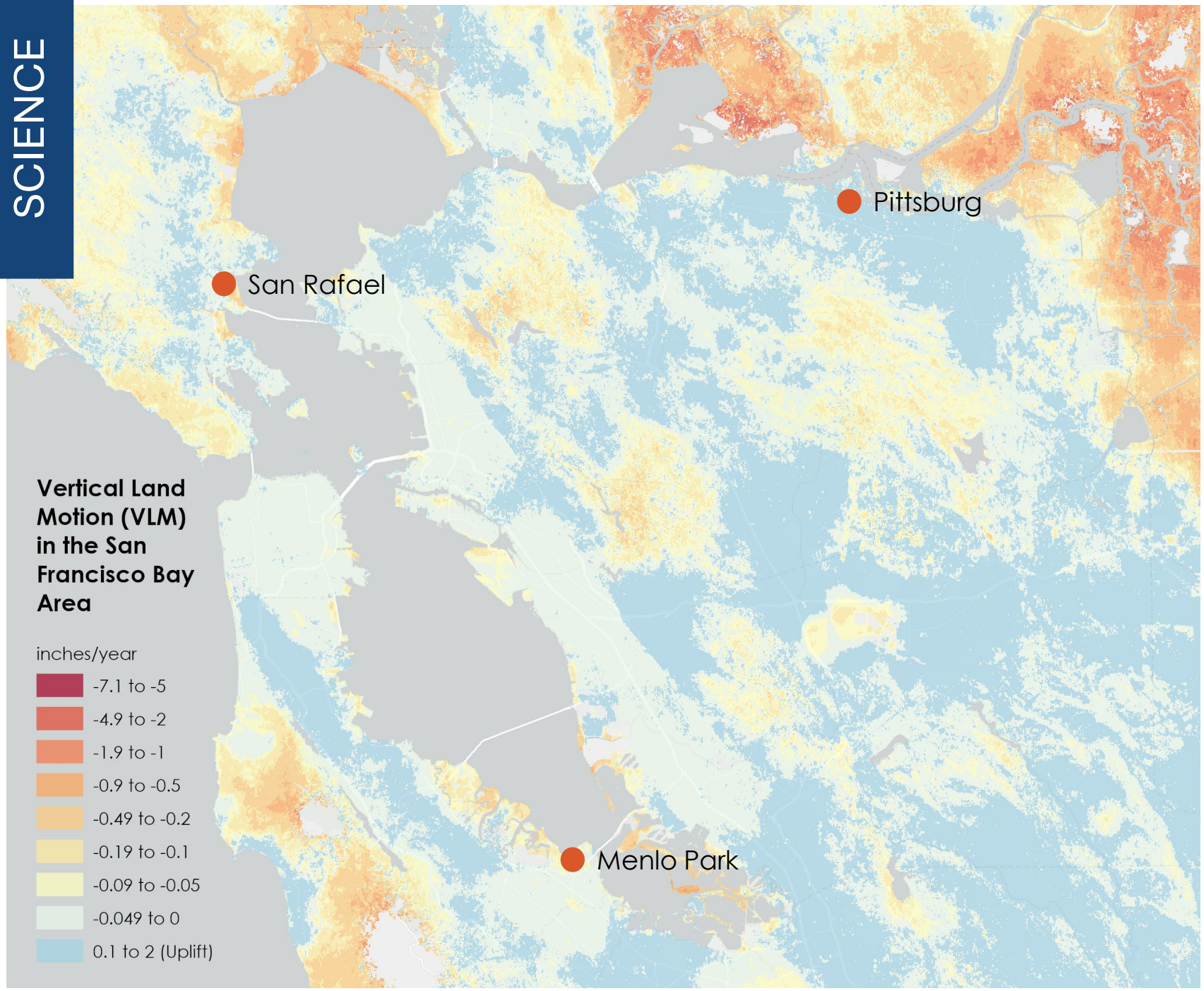
Veterans Court in the City of Alameda during King Tides. Groundwater intrusion into the sewer system provides a pathway for inland flooding when Bay tides are high. A high groundwater table and emergent groundwater flooding have caused pavement failures.



During king tides in January 2022, groundwater infiltrated into the City of San Leandro storm sewers along Marina Boulevard, percolating out of manholes and flooding roadways. *Photo Credit: Kristina Hill*

Photos from: May CL, Mohan A, Plane E, Ramirez-Lopez D, Mak M, Luchinsky L, Hale T, Hill K. 2022. Shallow Groundwater Response to Sea-Level Rise: Alameda, Marin, San Francisco, and San Mateo Counties. Prepared by Pathways Climate Institute and San Francisco Estuary Institute.

SCIENCE



VERTICAL LAND MOTION causes coastal flooding to be worse where land is subsiding

- Orange = -1 inch/year **OR** -4 feet over 50 years
- New data set

Map Created by BCDC.
Source: Govorcin et al., 2025.
VLM data from 2016-2023

SCIENCE

UPDATE: 2024 STATE GUIDANCE
VERTICAL LAND MOTION

- Rate of and direction (subsidence/uplift) of vertical land motion **varies greatly** throughout the Bay
- Can have a **significant impact on** how quickly an area will experience the effects of sea level rise

Effects of VLM on **San Rafael**

-.2 in/ year	Negative rate of VLM over time frame (2000 baseline)	Sea Level Rise Projection (Int-High)	SLR + VLM
2050	0.8 ft	0.8 ft	**1.6 ft**
2070	1.2 ft	2.2 ft	**3.4 ft**
2100	1.7 ft	4.9 ft	**6.6 ft**

▲ Significant increase in relative sea level rise

Effects of VLM on **Menlo Park**

-.08 in/ year	Negative rate of VLM over time frame (2000 baseline)	Sea Level Rise Projection (Int-High)	SLR + VLM
2050	0.3 ft	0.8 ft	**1.1 ft**
2070	0.5 ft	2.2 ft	**2.7 ft**
2100	0.7 ft	4.9 ft	**5.6 ft**

▲ Increase in relative sea level rise

Effects of VLM on **Pittsburg**

+.03 in/ year	Negative rate of VLM over time frame (2000 baseline)	Sea Level Rise Projection (Int-High)	SLR + VLM
2050	- 0.1 ft	0.8 ft	**.7 ft**
2070	- 0.2 ft	2.2 ft	**2.0 ft**
2100	- 0.3 ft	4.9 ft	**4.6 ft**

▼ Slight decrease in relative sea level rise

bcdc

PERMITS

BCDC STEPWISE PROCESS

STEP 1: Identify the nearest tidal datums and local groundwater levels

- Ensure that permittees are using appropriate data by providing sources for tidal datums, local groundwater monitoring, and regionwide future groundwater modeling

STEP 2: Evaluate Project Time Horizons

- Determine the lifespan of the project

STEP 3: Choose sea level rise scenarios and evaluate project risk tolerance

- Select the appropriate level of risk aversion and determine the local rate of vertical land motion

STEP 4: Conduct risk assessment

- Asses flood risk by analyzing gathered information

STEP 5: Explore adaptation options and prepare an adaptive management plan

PERMITS

HOW WILL PERMIT ANALYSTS USE THE UPDATED GUIDANCE?
MULTIPLE FLOODING SOURCES

- Coastal flooding from extreme tides and sea level rise
- Wave runup
- Groundwater effects on stormwater systems (pluvial flooding)
- Overflow from flooded creeks and rivers (fluvial flooding)

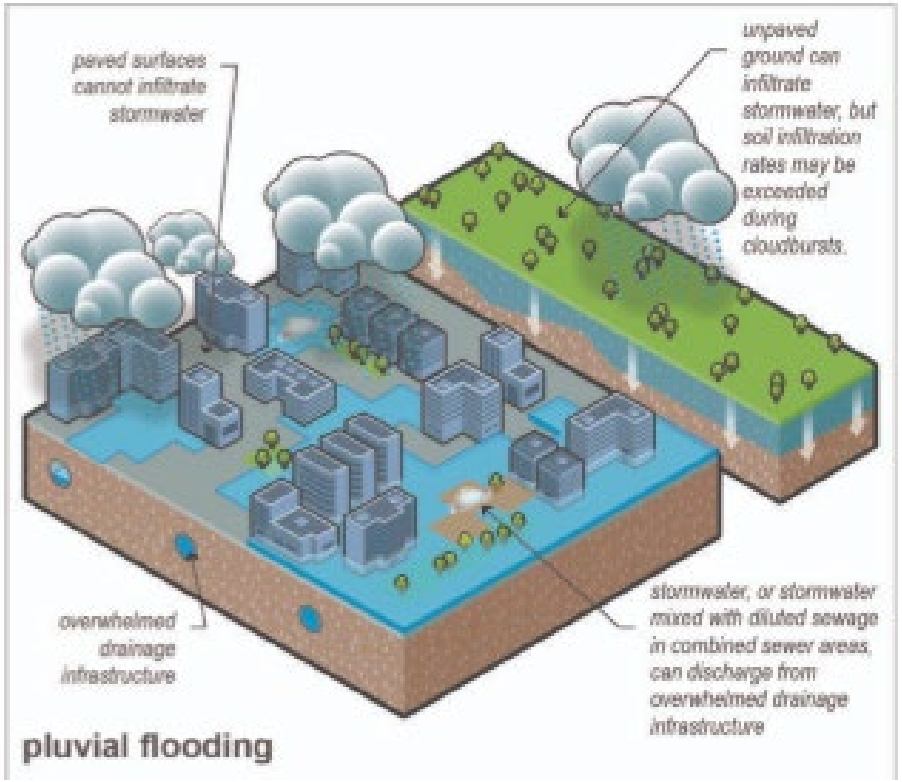


Figure from: New York City Panel on Climate Change web site: https://climateassessment.nyc/assessment/overview/, 2025

PERMITS

PUTTING THE UPDATED GUIDANCE INTO PRACTICE **NEW TOOLS**

- Sea Level Rise Spreadsheet for permit analysts
- Vertical land motion mapping tool for screening of land subsidence for project permit applications
- RSAP Atlas - maps of shallow groundwater rise hazards and wave height

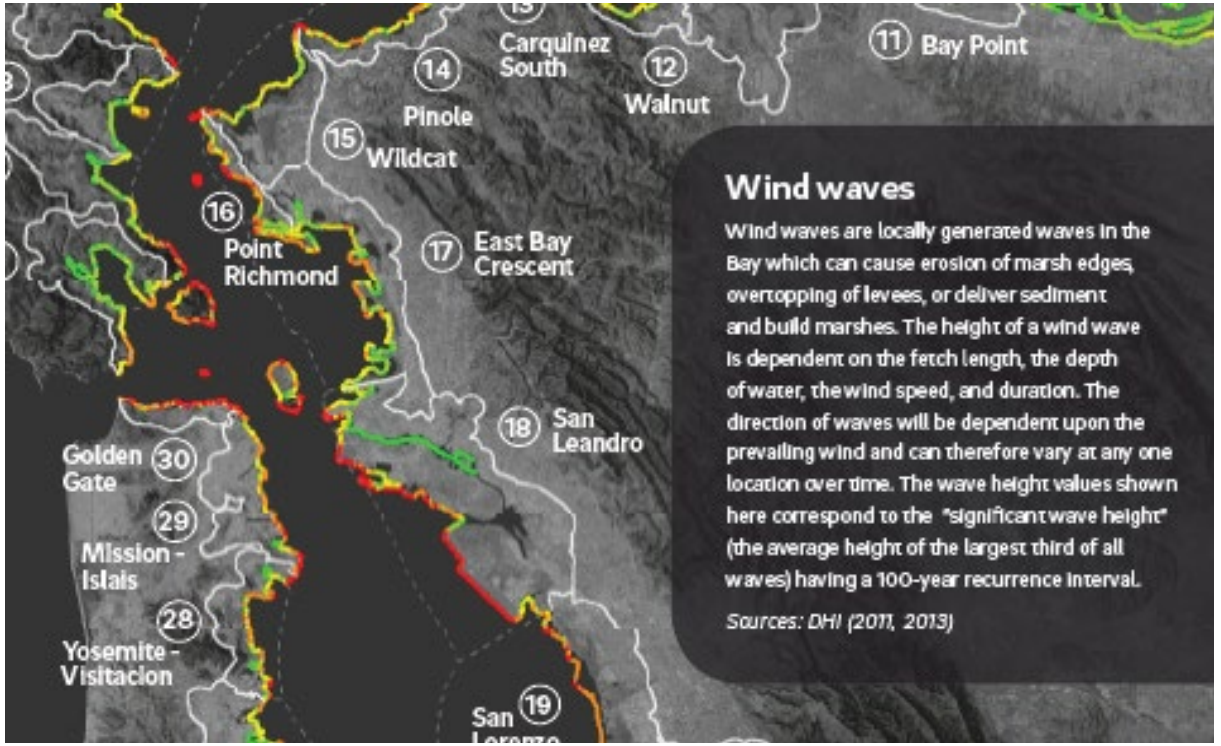
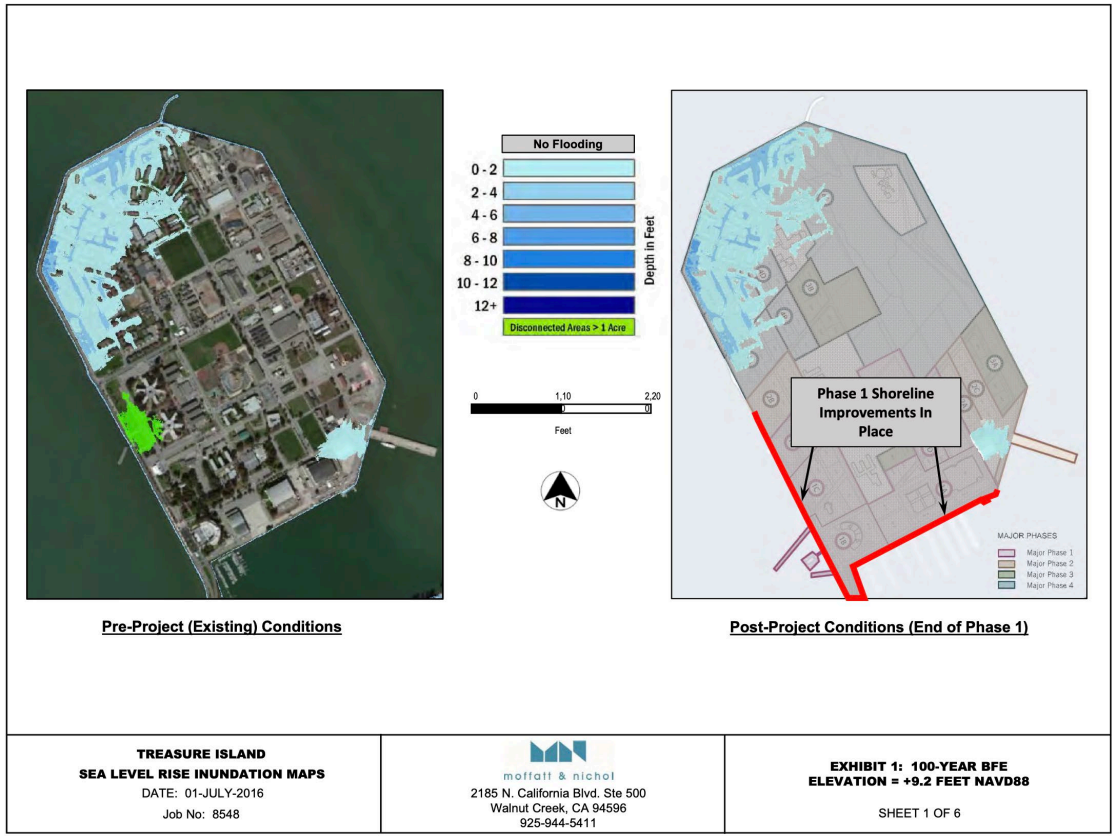


Figure from: SFEI, SF Bay Shoreline Adaptation Atlas, 2018

PERMITS

PERMIT EXAMPLE:
TREASURE ISLAND DEVELOPMENT
(BCDC PERMIT NO. 2016.005.00)

Development plan for Treasure Island



Portion of the project's risk assessment

PERMIT EXAMPLE:
TREASURE ISLAND DEVELOPMENT
(BCDC PERMIT NO. 2016.005.00)

- First 5-Year Sea level Rise Risk Assessment considers the best available science on sea level rise
- Examines impacts to the storm drain system from groundwater rise
- Updated timeline for future sea level rise adaptations like raising the shoreline and storm drain improvements
- Land subsidence monitoring

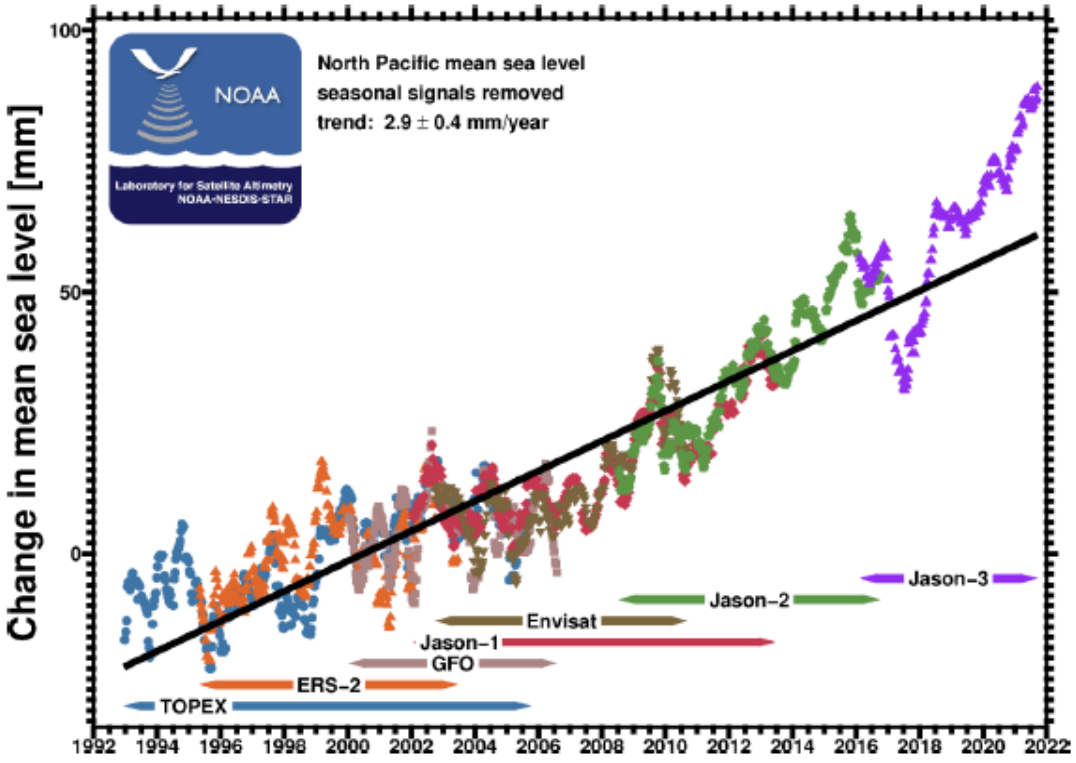
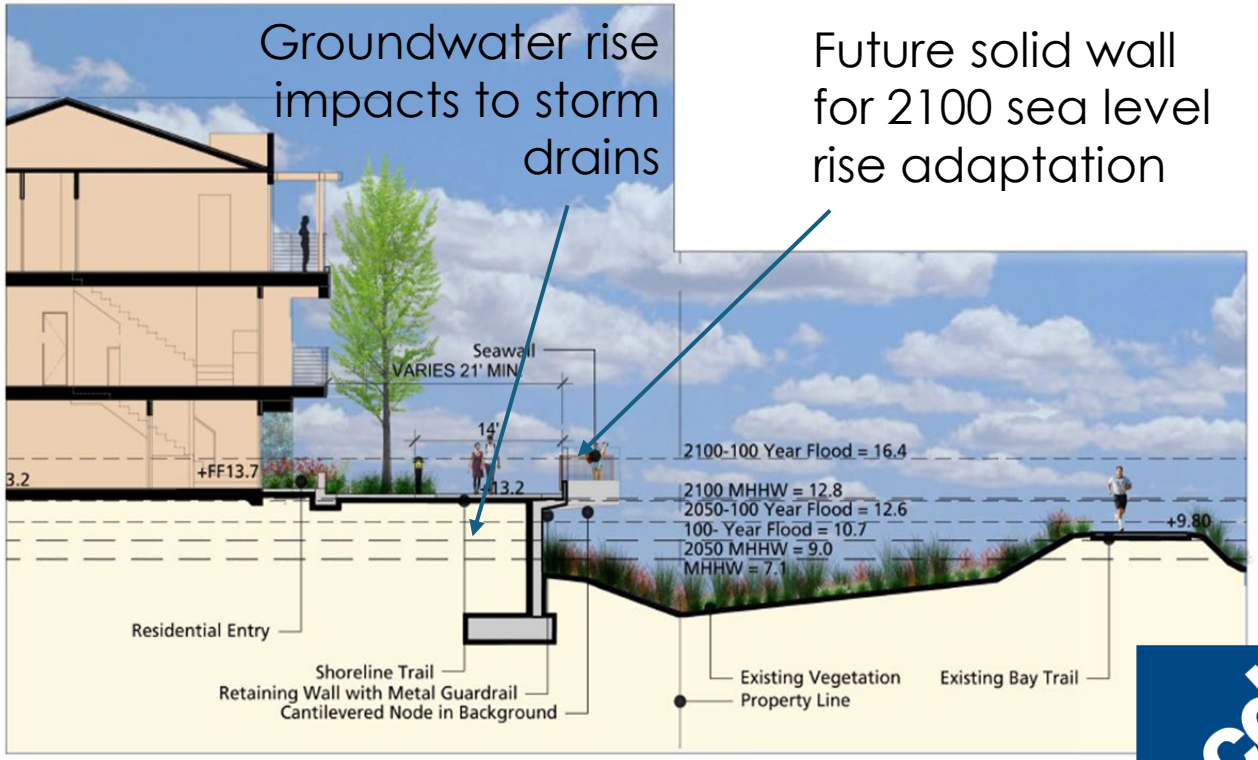


Figure 2-1: North Pacific Mean Sea Level Trend Based on Satellite Altimetry (NOAA, 2020).

Figure from: Moffat & Nichol Treasure Island Development Project 5-Year Sea Level Rise Monitoring Report, September 20, 2023

PERMIT EXAMPLE:
505 EAST BAYSHORE TOWNHOMES, REDWOOD CITY
(BCDC PERMIT NO. 2023.005.00)

- Sea level Rise Adaptation Plan included:
- Future storm drain improvements for groundwater rise inundation of buried storm drain piping
- Future sea wall for coastal flooding



BAY PLAN

UPDATE:
RSAP BAY PLAN AMENDMENT (1-24)

Directed commission to develop **"Regional Shoreline adaptation strategy"**

1. **Establishes the RSAP** and includes the requirement for local governments **to prepare plans consistent with SB 272**.
2. Directs Commission to **provide ongoing technical and policy assistance** to help local governments develop plans as provided in the RSAP.
3. Creates some goals for the ongoing evolution of the agency
4. Does **NOT** change BCDC permitting authority or the application of the Climate Change policies.

IN CONCLUSION

BCDC STAFF HAVE DEVELOPED A PROPOSED UPDATE TO OUR CLIMATE CHANGE POLICY GUIDANCE

THIS UPDATE INCLUDES WHAT SAFF CONSIDERS THE NEW BEST AVAILABLE SCIENCE

- New Sea Level Rise Scenarios which are generally lower than in the previous guidelines
- New information on groundwater rise to consider under the policies
- Information on vertical land motion and how to incorporate it

BCDC HAS NEW TOOLS TO HELP ANALYZE FLOODING AND CONDUCT RISK ASSESSMENTS

THE GUIDANCE HAS NEW INFORMATION FROM PERMITS AND UPDATED CLIMATE CHANGE POLICIES

STAFF RECOMMENDATION

Staff recommends that the Commission adopt the updates to the San Francisco Bay Plan Climate Change Policy Guidance for use and distribution supporting internal and external sea level rise adaptation efforts.


Source: California King Tides Project

THANK YOU!

Questions?

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