Draft Sea Level Rise Guidance: 2024 Science and Policy Update

BCDC Commission Meeting

Justine Kimball, Senior Scientist, Ocean Protection Council (Alternate Commissioner)

February 1, 2023

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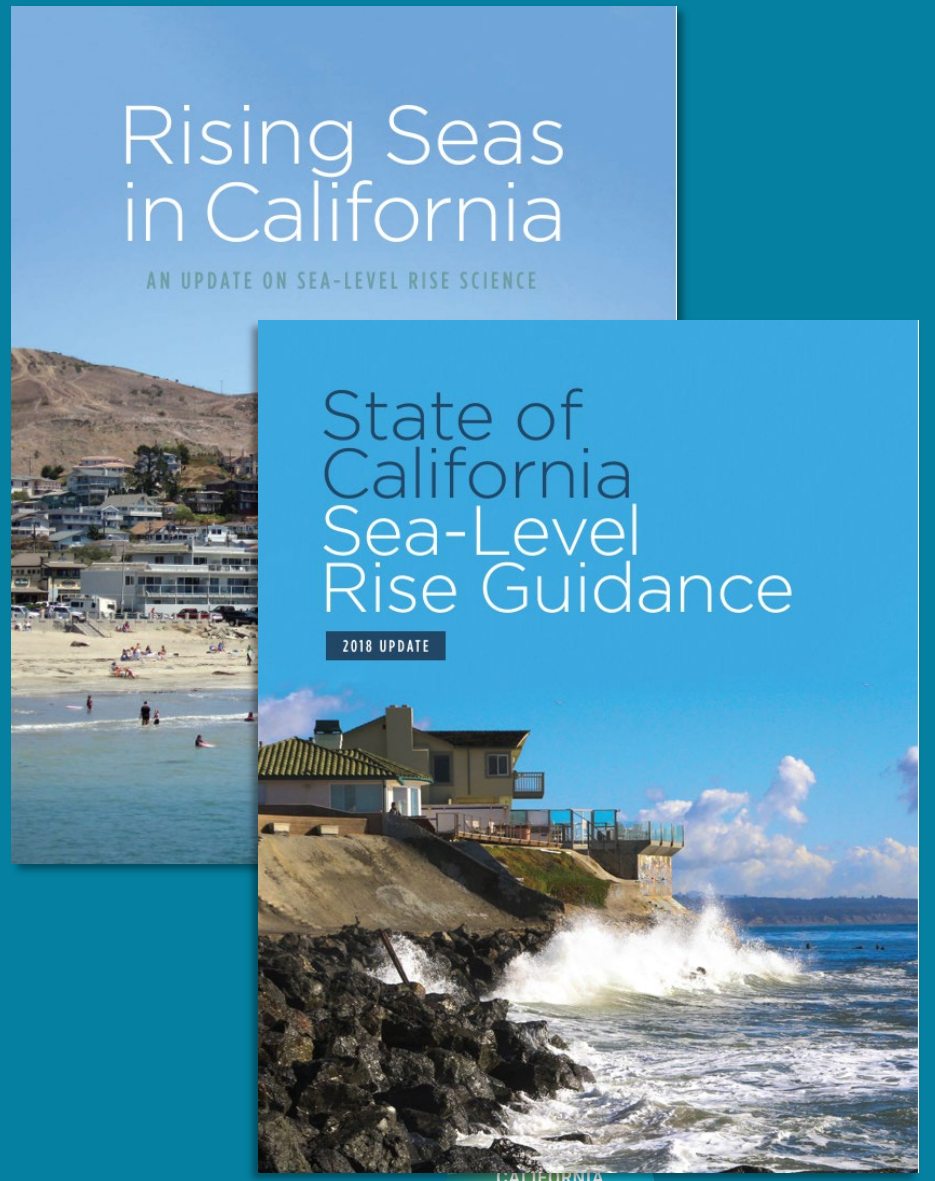
Update to the 2017/18 Science and Policy Guidance

- Separate science and policy reports
- SLR projections for 12 tide gauge locations
- Probabilistic projections for high and low emissions (2030 – 2150), and an extreme scenario (H++)
- Stepwise (5 steps) process on how to select SLR projections based on risk tolerance
- Recommendations for planning and adaption



Partnered with Ocean Science Trust - Task Force Approach

Executive Summary

Chapter 1: Introduction

Chapter 2*: California Sea Level Scenarios

Chapter 3: California Sea Level Rise Policy Guidance

Chapter 4*: Combined Impacts of Sea Level Rise and Other Coastal Hazards

Appendices

*Task Force authored

Dr. Susheel Adusumilli, University of California, San Diego
Dr. Patrick Barnard, United States Geological Survey (Co-Chair)
Dr. Daniel Cayan, University of California, San Diego
Laura Engeman, California Sea Grant & University of California, San Diego (Co-Chair)
Dr. Gary Griggs, University of California, Santa Cruz
Dr. Benjamin Hamlington, National Aeronautics and Space Administration (Co-Chair)
Dr. Kristina Hill, University of California, Berkeley
Dr. Felix Landerer, National Aeronautics and Space Administration
Dr. Phil Thompson, University of Hawaii at Manoa

+ Coordination with State Sea Level Rise Collaborative

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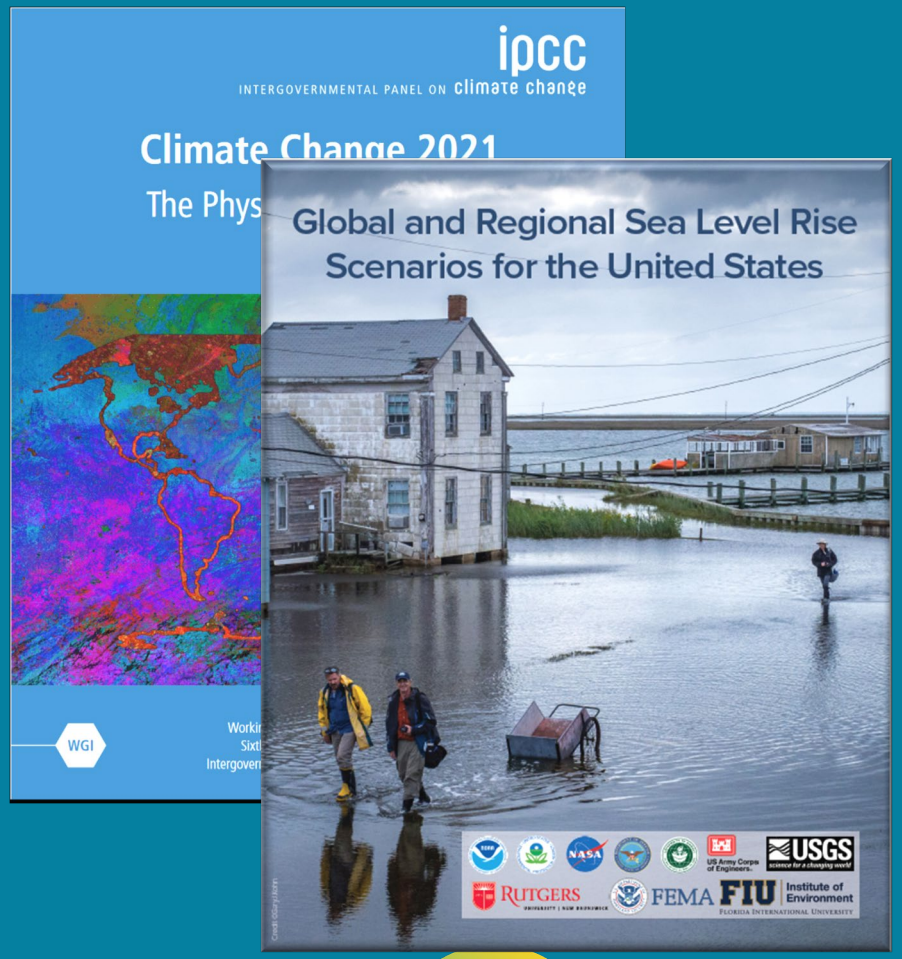
Chapter 2: California Sea Level Scenarios

- Use IPCC Sixth Assessment Report (AR6) and observations to present best science
- From the probabilistic projections in AR6, develop a reduced set of sea level scenarios
- Localize these to California
- Scenarios available statewide and at 13 tide gauges



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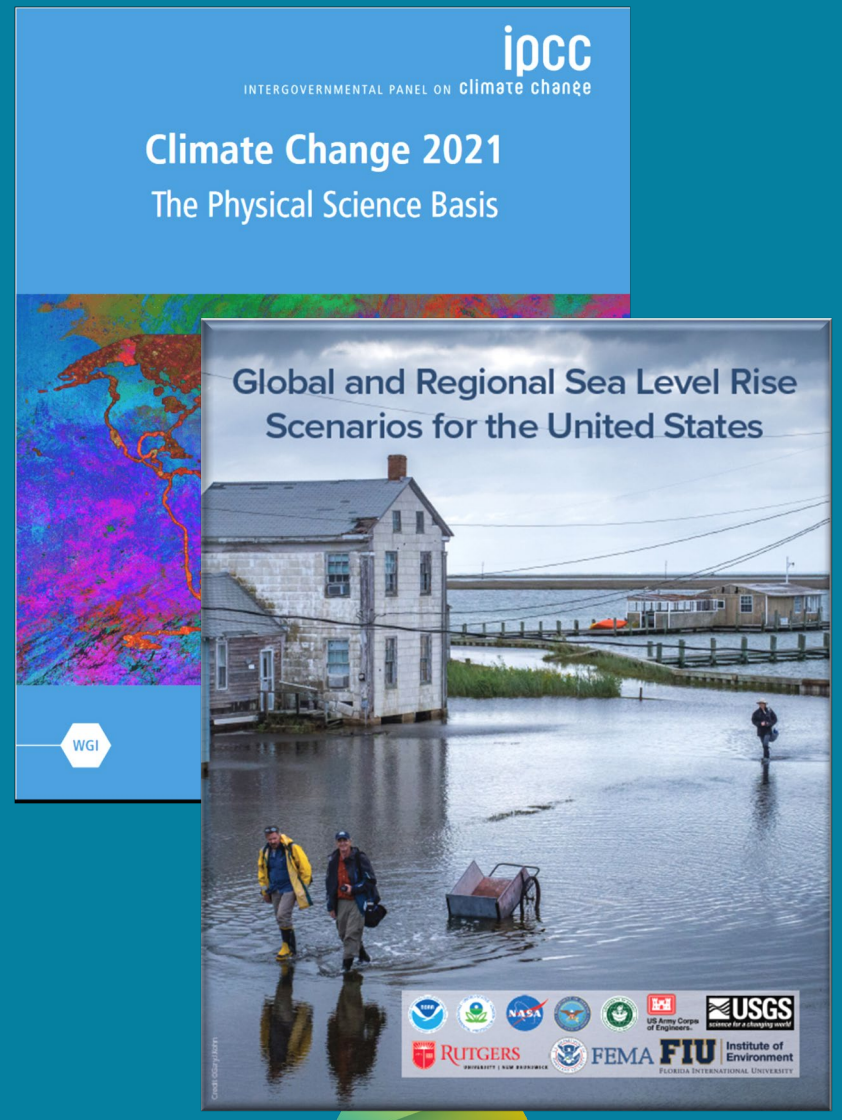
Scenarios Storylines

- **Low Scenario**: the assumption of the current rate of sea level rise continuing on into the future
- **Intermediate-Low**: range of warming levels and emissions pathways; a reasonable lower bound of the most likely in 2100
- **Intermediate:** A range of future emissions pathways; could include contribution from low confidence processes; a reasonable estimate of the upper bound of most likely sea level rise in 2100
- **Intermediate-High:** Intermediate-to-high future emissions and high warming; this scenario is heavily reflective of a world where rapid ice sheet loss processes are contributing to sea level rise
- **High:** High future emissions and high warming with large potential contributions from rapid ice-sheet loss processes



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California Sea Level Scenarios

	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

Global Mean Surface Air Temperature 2081-2100	1.5°C	2.0°C	3.0°C	4.0°C	5.0°C	Low Confidence Processes, Low Warming	Low Confidence Processes, High Warming
Low Scenario	92%	98%	>99%	>99%	>99%	90%	>99%
Intermediate-Low Scenario	37%	50%	82%	97%	>99%	49%	96%
Intermediate Scenario	<1%	2%	5%	10%	23%	7%	49%
Intermediate-High Scenario	<1%	<1%	<1%	1%	2%	1%	20%
High Scenario	<1%	<1%	<1%	<1%	<1%	<1%	8%

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Science: Key Takeaways

- There is greater certainty and a narrowing range of the amount of sea level rise in the next 30 years. Statewide, sea levels are most likely to rise 0.8 ft (Intermediate Scenario) by 2050
- By 2100, statewide sea levels are most likely to rise between 1.6 ft and 3.1 ft (Int-Low to Intermediate Scenarios), and even higher amounts cannot be ruled out
- Beyond 2100, the range of sea level rise becomes increasingly large due to uncertainties associated with physical processes, such as earlier-than-expected ice sheet loss. By 2150, statewide sea levels may rise from 2.6 ft to 11.9 ft (Int-Low to High Scenarios), although even higher amounts are possible
- The extreme sea level rise scenario (i.e. H++) from Rising Seas 2017 is much higher than best available science suggests
- Vertical land motion (uplift or subsidence) is the primary driver of local variations in sea level rise across the state

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Science: Comparison Takeaways

- Does not include episodic events (i.e., storms, king tides, ENSO, etc.)
- Direct comparison between 2018 and 2023 impossible
- Rough comparison from the policy perspective:
  - No comparable for Low Scenario
  - Low end of likely range vs Int-Low
  - High end of likely range vs Intermediate
  - 1-in-20 vs Int-High
  - 1-in-200 vs High
  - No comparable for H++

2050	Low end of likely range (vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	0.6	1.1	1.4	1.9	2.7
2023	0.6	0.8	1	1.2	-----

2100	Low end of likely range vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	1- 1.6	2.4- 3.4	3.2- 4.4	5.7- 6.9	10.2
2023	1.6	3.1	4.9	6.6	-----

2150	Low end of likely range vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	1.3- 2.8	3.8- 5.8	5.5- 7.7	11- 13	21.9
2023	2.6	6.1	8.3	11.9	-----

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Chapter 3: California Sea Level Rise Policy Guidance

- For most planning and projects, it is recommended to evaluate **Intermediate, Intermediate-High, and High scenarios** to assess a spectrum of potential impacts, consequences, and responses. Consideration of storm conditions (for most applications 100-year storm) in combination with Sea Level Scenarios is also recommended to evaluate extreme water levels, as appropriate
- Existing vulnerability assessments can skip to Step 5, as appropriate
- Step 5: Explore adaptation options and feasibility – new Step!
- Selection of SLR should be guided by risk tolerance and is often a multi-factor process

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Chapter 4: Combined Impacts of SLR and Other Coastal Hazards

- Increased Coastal Flood Frequency
- Groundwater Rise and Seawater Intrusion
- Coastal and Shoreline Erosion
  - Loss or Migration of Beaches
  - Cliff and Bluff Retreat
  - Loss or Migration of Coastal Ecosystems and Species
  - Threats to Coastal Access and Recreation
- Preparing for Extreme Coastal Storms

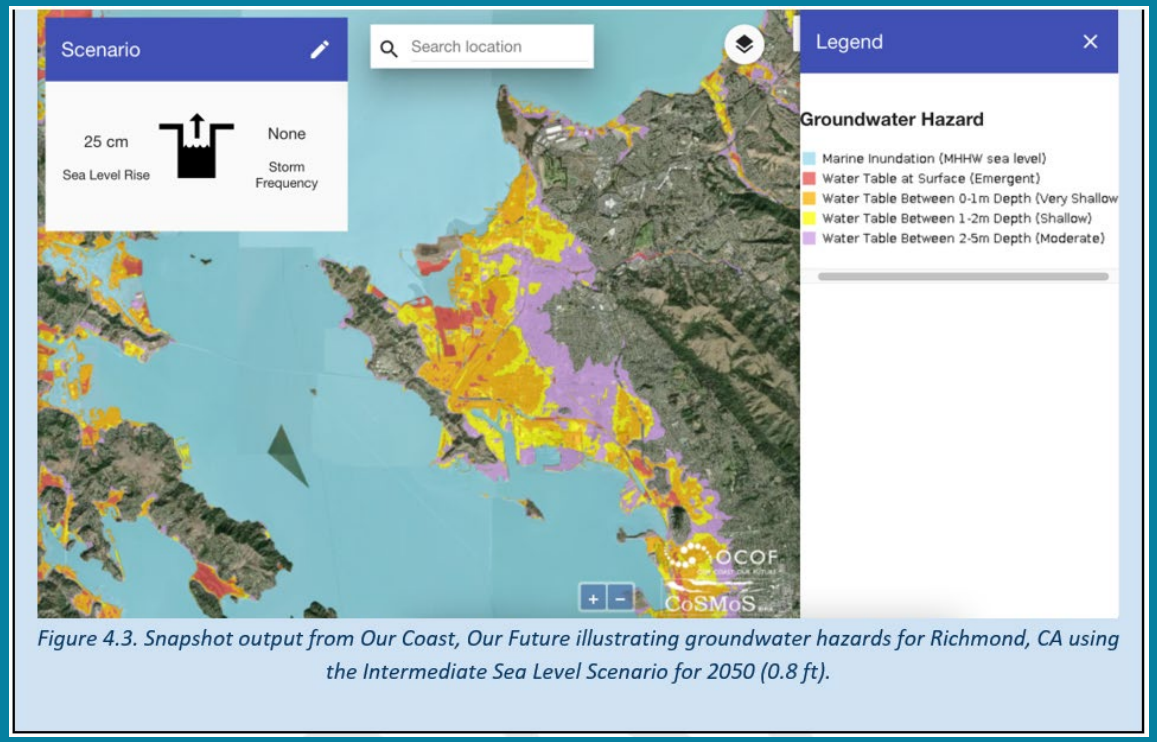

Figure 4.3. Snapshot output from Our Coast, Our Future illustrating groundwater hazards for Richmond, CA using the Intermediate Sea Level Scenario for 2050 (0.8 ft).

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State Efforts to Prepare California for Sea Level Rise

- Senate Bill 1 Sea Level Rise Adaptation Grant Program (Track 1 recently launched! $71.4 available)
- $660 million maintained in the Governor's FY 24/25 Budget for critical coastal resilience programs and projects
- Ongoing coordination and efforts through the State Sea Level Rise Collaborative

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Public Comment and Outreach Plans

Website: https://opc.ca.gov/2024/01/draft-slr-guidance-2024/

45-day public comment period – Closes March 4, 2024

Webinar: Monday, February 5th 1:00 – 2:00 pm

Regional Workshops:

- Central Coast: February 13 from 2:00 pm to 3:30 pm
- North Coast: February 14 from 10:00 am to 11:30 pm
- South Coast: February 15 from 10:00 am to 11:30 am
- **San Francisco Bay Area: February 16 from 10:30 am to 12:00 pm**

Questions? Justine Kimball, Justine.Kimball@resources.ca.gov
Public Comment? Ben Dorfman, Ben.Dorfman@resources.ca.gov

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Thank you!

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