Agenda Item #10

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CALIFORNIA natural resources AGENCY

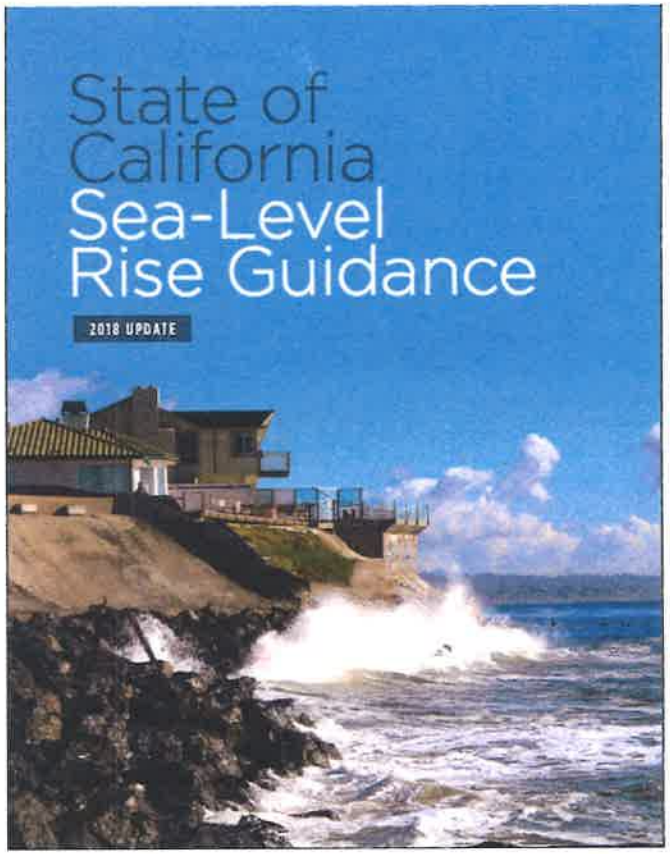
State of California
Sea-Level Rise Guidance

Deborah Halberstadt, Executive Director

July 19, 2018

Content of Updated Guidance

- Updated projections based on best available science
- Stepwise approach for evaluating projections, associated risk, and adaptation pathways
- Recommended adaptation strategies



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What Triggered this Update?

- Advances in sea-level rise science
- Need for guidance to help state *and* local governments plan for sea-level rise
  - Executive order B:30-15
  - SB 379 (Jackson)
  - SB 264 (Wieckowski)

Flooding of East Cliff Drive, Moran Lake, Santa Cruz County, January 20, 2010 King Tide (Photo credit: Dave Revell)

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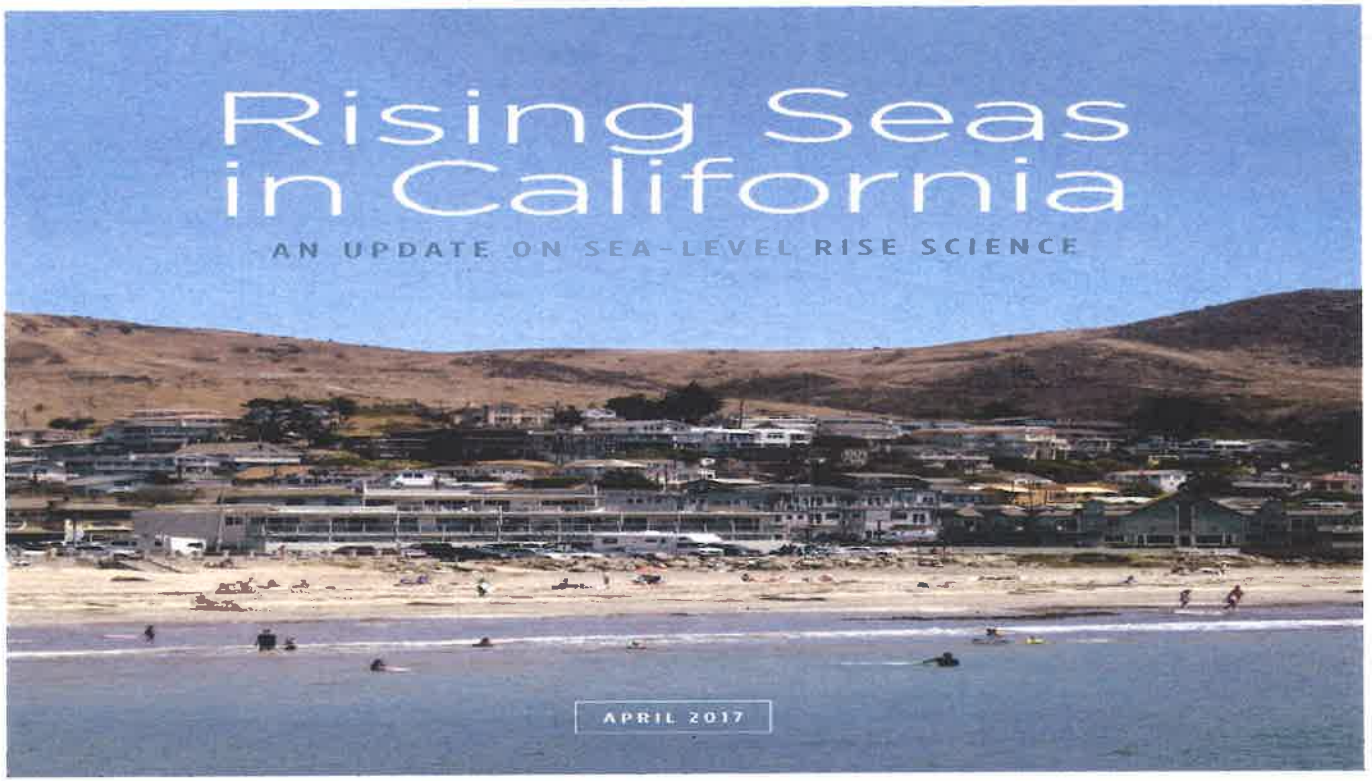
Rising Seas in California: An Update on Sea-level Rise Science



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Risk Analysis Decision Framework

>> **STEP 1:** *Identify the nearest tide gauge.*

>> **STEP 2:** *Evaluate project lifespan.*

>> **STEP 3:** *For the nearest tide gauge and project lifespan, identify range of sea-level rise projections.*

>> **STEP 4:** *Evaluate potential impacts and adaptive capacity across a range of sea-level rise projections and emissions scenarios.*

>> **STEP 5:** *Select sea-level rise projections based on risk tolerance and, if necessary, develop adapation pathways that increase resiliency to sea-level rise and include contingency plans if projections are exceeded.*

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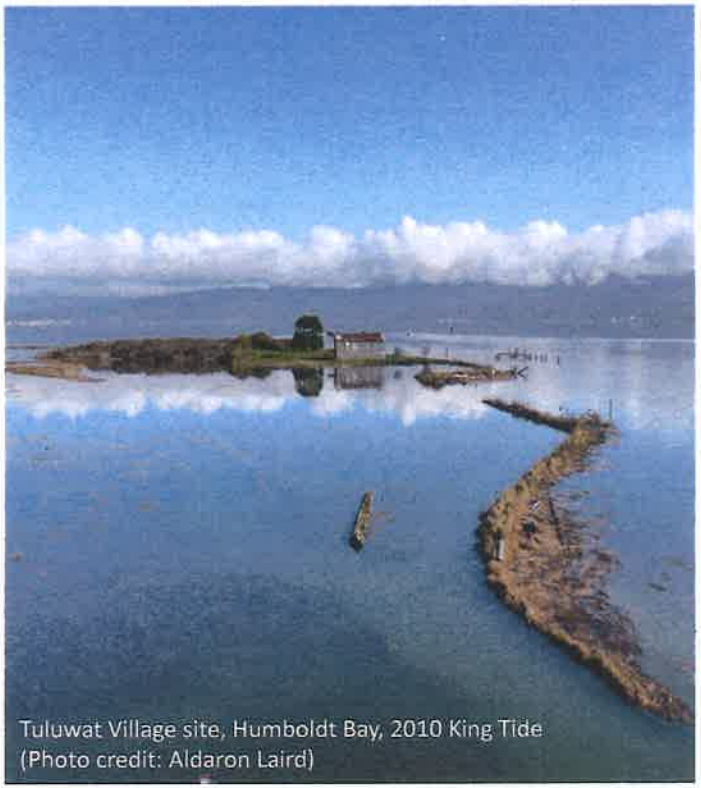
TABLE 1: Projected Sea-Level Rise (in feet) for San Francisco

Probabilistic projections for the height of sea-level rise shown below, along with the H++ scenario (depicted in blue on the right-hand side), as seen in the Rising Seas Report. The H++ projection is a single scenario and does not have an associated likelihood of occurrence as do the probabilistic projections. Probabilistic projections are with respect to a baseline of the year 2000, or more specifically the average relative sea level over 1991 - 2009. High emissions represents RCP 8.5; low emissions represents RCP 2.6.
Recommended projections for use in low, medium-high and extreme risk aversion decisions are outlined in red boxes below.

		Probabilistic Projections (in feet) (based on Kopp et al. 2014)				H++ scenario (Sweet et al. 2017) *Single scenario
		Median *50% probability sea-level rise meets or exceeds...*	Likely range *67% probability sea-level rise is between...*	1-in-20 chance *5% probability sea-level rise meets or exceeds...*	1-in-200 chance *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	7.7	13.0	21.9

Evaluate Impacts and Adaptive Capacity Across Range of Projections and Emissions Scenarios



Tuluwat Village site, Humboldt Bay, 2010 King Tide
(Photo credit: Aldaron Laird)

- *Consequence of potential impacts*
- *What is at stake*
- *Adaptive capacity/triggers*
- *Economic impacts*

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Planning & Adaptation Strategies

- Social equity
- Coastal habitats and public access
- Water-dependent infrastructure
- Acute increases in sea-level rise
- Community and regional planning
- Local conditions
- Adaptive capacity

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Visualization Tools and Resources

NOAA

Surging Seas
Risk Finder

cal-adapt

State Adaptation
Clearinghouse

The Nature Conservancy

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Implementing the Guidance

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Outreach Efforts

State Partnerships

- Interagency SLR Team
- AB 691 Working Group
- State Adaptation Clearinghouse
- CO-CAT

Local and Regional Partnerships

- 3rd Climate Adaptation Forum
  (August 27-29, 2018)
- Regional Workshops (Fall 2018)

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GLOBAL CLIMATE ACTION SUMMIT

WWW.GLOBALCLIMATEACTIONSUMMIT.ORG

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In science-guided, collective action, we will maintain and enhance California's coastal habitats in the face of sea level rise, other climate change-induced challenges, and development, ensuring a protected coast for future generations to enjoy, replete with as much or more habitat and wildlife, as well as social, economic, and recreational benefits, as we have today.

OPC Funding Opportunities

Competitive and Discretionary Grant Programs

- Prop. 1
- Prop. 68
- Prop. 84
- General Fund

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