Updating California's Sea-level Rise Guidance

Ocean Protection Council

CALIFORNIA OCEAN PROTECTION COUNCIL

Photo: Kris Hiemstra

State Sea-level Rise Guidance Document

- Incorporating sea-level rise projections into state and local decision-making.
- Updating guidance to reflect recent advances in ice loss science and projections of sea-level rise.
- Opportunities for engagement with state agencies, local governments, consultants, non-governmental organizations, tribes, vulnerable communities, and other constituents.

Process & Opportunities for Engagement

December 2016 - April 2017: State agency, local government and constituent engagement: interviews and five listening sessions; CO-CAT meetings

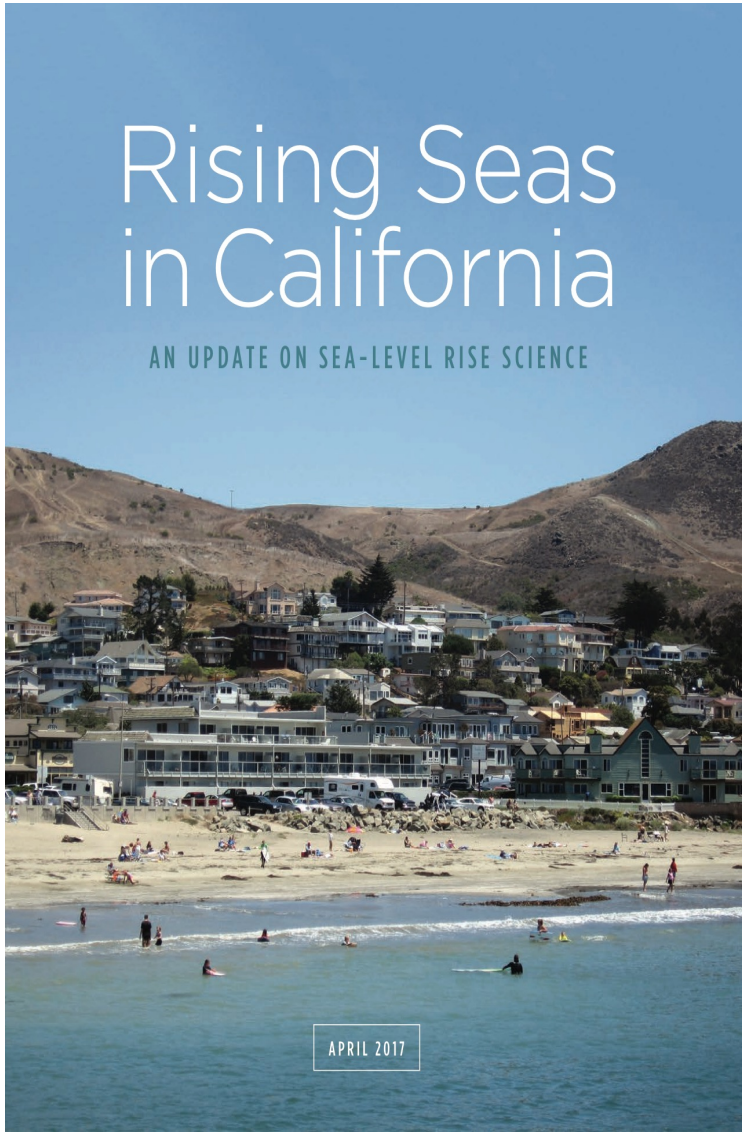
April 26 2017: OPC Meeting: Science summary presented to the OPC; OPC Resolution adopted

May - June 2017: Series of public workshops to solicit feedback on a draft framework for the *State Sea-level Rise Guidance Document*

October - November 2017: 30-day public comment period on a draft update to the *State Sea-level Rise Guidance Document*

January 2018: OPC Meeting: Potential approval by the OPC of the updated *State Sea-level Rise Guidance Document*

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

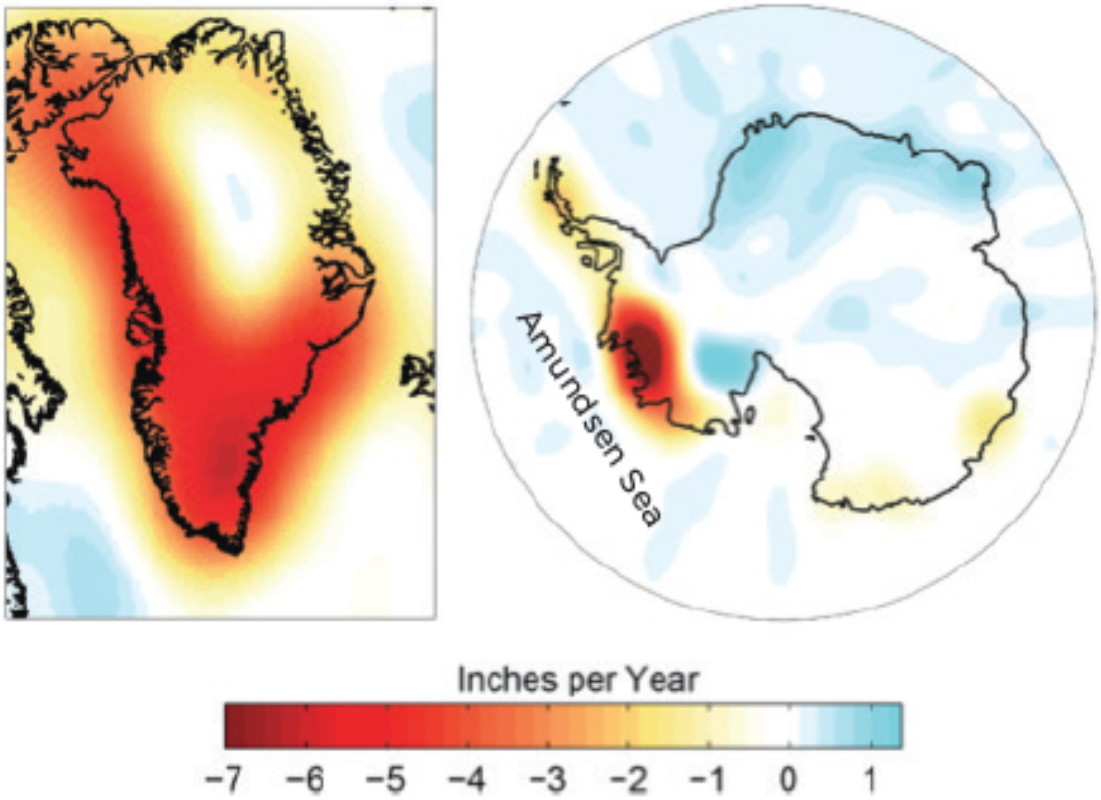


Ocean Protection Council Science Advisory Team (OPC-SAT) Working Group Members:

- Gary Griggs, *University of California Santa Cruz, OPC-SAT Working Group Chair)*
- Dan Cayan, *Scripps Institution of Oceanography, OPC-SAT*
- Claudia Tebaldi, *National Center for Atmospheric Research & Climate Central*
- Helen Amanda Fricker, *Scripps Institution of Oceanography*
- Joseph Arvai, *University of Michigan*
- Robert DeConto, *University of Massachusetts*
- Robert E. Kopp, *Rutgers University*

Greenland and Antarctic Ice Sheets

Greenland Ice Sheet **Antarctic Ice Sheet**



Ice mass loss (inches of water equivalent lost per year between 2003 and 2012) over Greenland and Antarctica from GFACE satellite.

- Loss of ice from the Greenland and Antarctic ice sheets will become the dominant source of sea-level rise, surpassing contributions from mountain glaciers and ocean thermal expansion
- Greenland Ice Sheet (GIS) is currently losing mass at a faster rate than the Antarctic Ice Sheet (AIS), but, *emerging science suggests that ice loss from the Antarctic Ice Sheet poses the greatest potential risk to California coastlines over the next 100 years.*

Sea-level Fingerprint of West Antarctic Ice Sheet Mass Loss

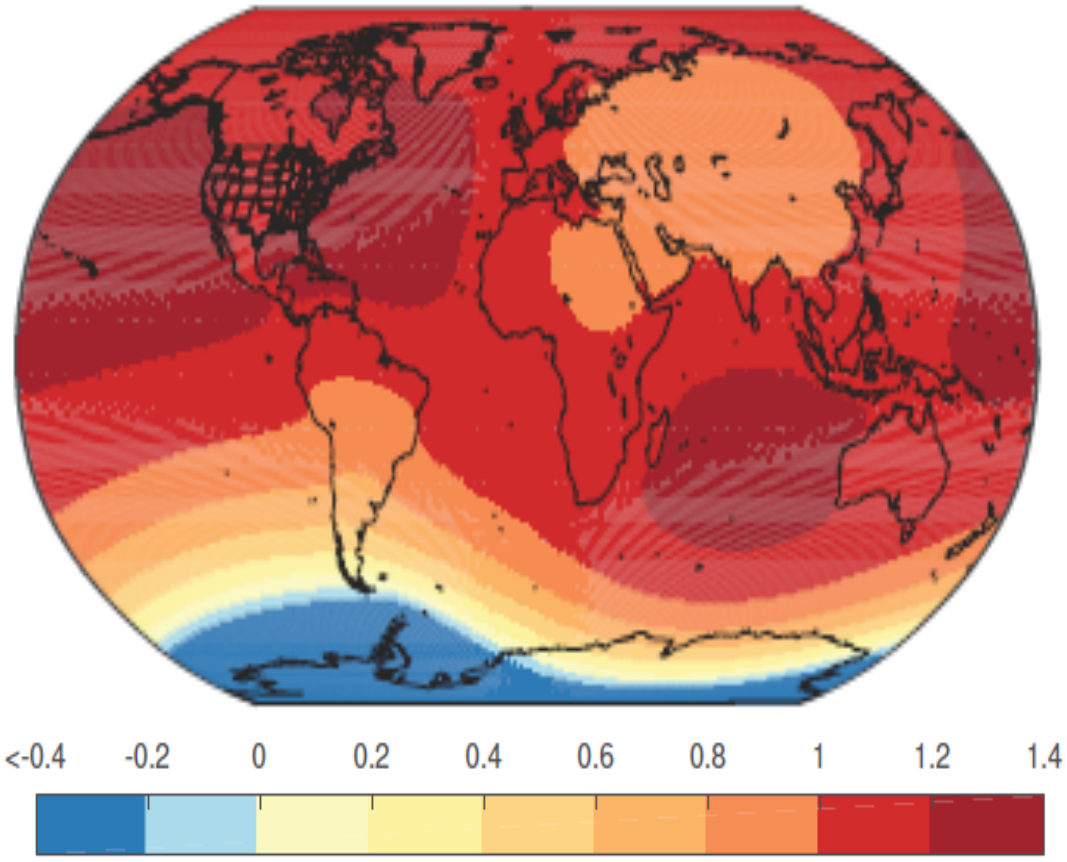
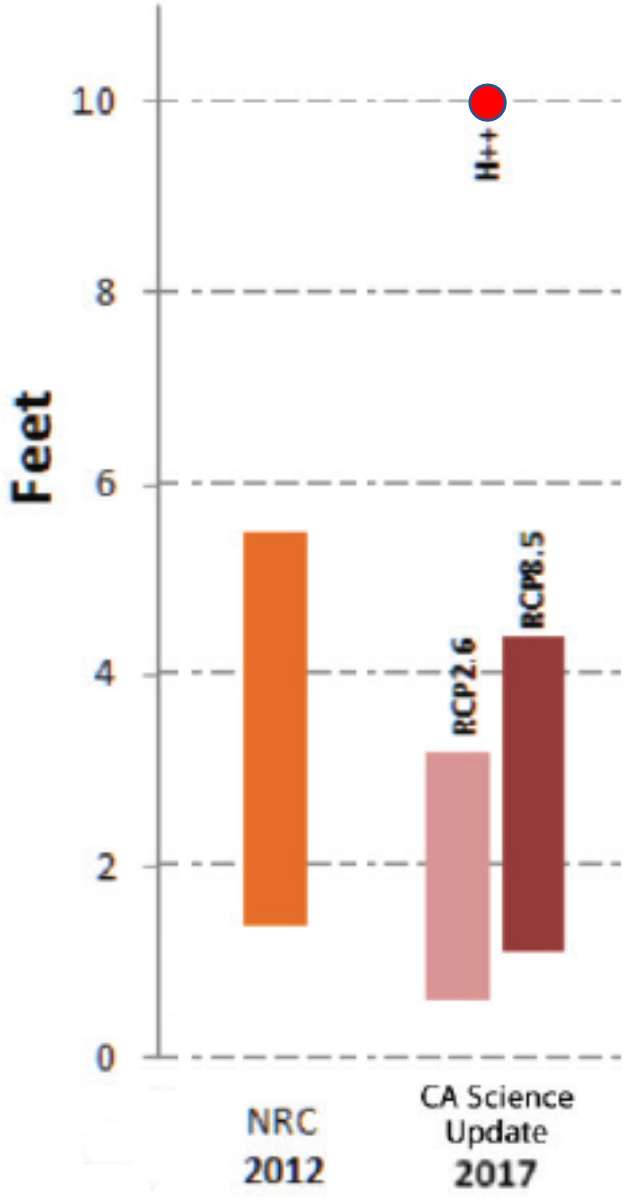


Figure 1. Sea-level 'fingerprints' resulting from the distribution of ice and water around the Earth and ensuing gravitational and rotational effects.

- There is no worse place for California for land ice to be lost than from the West Antarctic Ice Sheet, because of globally-uneven gravitational and rotational effects.
- For every foot of global sea-level rise caused by the loss of ice on West Antarctica, sea-level will rise about 1.25 feet along the California coast.

Working Group Sea-level Rise Projections

Sea-level Rise Projections from Current Guidance & Rising Seas Science Report for 2100



Projected Sea-level Rise (measured in feet)

(Table 1b from the report)

San Francisco, RCP 8.5 in 2100

Feet above 1991-2009 mean	MEDIAN	LIKELY RANGE	1-IN-20 CHANCE	1-IN-200 CHANCE
Year / Percentile	*50% probability SLR meets or exceeds...*	*67% probability SLR is between...*	*5% probability SLR meets or exceeds...*	*0.5% probability SLR meets or exceeds...*
2030	0.4	0.3 – 0.5	0.6	0.8
2050	0.9	0.6 – 1.1	1.4	1.9
2100 (RCP 2.6)	1.6	1.0 – 2.4	3.2	5.7
2100 (RCP 4.5)	1.9	1.2 – 2.7	3.5	5.9
2100 (RCP 8.5)	2.5	1.6 – 3.4	4.4	6.9
2100 (H++)	10			
2150 (RCP 2.6)	2.4	1.3 – 3.8	5.5	11.0
2150 (RCP 4.5)	3.0	1.7 – 4.6	6.4	11.7
2150 (RCP 8.5)	4.1	2.8 – 5.8	7.7	13.0
2150 (H++)	22			

Please note that projections are also provided for Crescent City and La Jolla

Probability that sea-level rise at San Francisco will meet or exceed a particular height (feet) in a given year

(Table 4a from the report; does not include H++ extreme scenario)

	1 FT.	2 FT.	3 FT.	4 FT.	5 FT.	6 FT.	7 FT.	8 FT.	9 FT.	10 FT.
2020										
2030	0.1%									
2040	3.3%									
2050	31%	0.4%								
2060	65%	3%	0.2%	0.1%						
2070	84%	13%	1.2%	0.2%	0.1%					
2080	93%	34%	5%	0.9%	0.3%	0.1%	0.1%			
2090	96%	55%	14%	3%	0.9%	0.3%	0.2%	0.1%	0.1%	
2100	96%	70%	28%	8%	3%	1%	0.5%	0.3%	0.2%	0.1%
2150	100%	96%	79%	52%	28%	15%	8%	4%	3%	2%
2200	100%	97%	91%	80%	65%	50%	36%	25%	18%	13%

San Francisco, RCP 8.5 in 2100

Key Findings

1. **Scientific understanding of sea-level rise is advancing at a rapid pace.**
   Periodic updates of Sea-level Rise Guidance will be necessary.

2. **The direction of sea level change is clear; sea-level is rising.**

3. **The rate of ice loss from the Greenland and Antarctic Ice Sheets is increasing.**

4. **New scientific evidence has highlighted the potential for extreme sea-level rise.**

5. **Probabilities of specific sea-level increases can inform decisions.**

6. **Current policy decisions are shaping our coastal future.**

7. **Waiting for scientific certainty is neither a safe nor prudent option.**

Public Workshops

South Coast · Tuesday, May 16 · 1 pm - 4 pm
Environmental Learning Center at Hyperion
12000 Vista Del Mar, Playa Del Rey

Bay Area · Monday, May 22 · 1:30 pm – 5 pm*
455 Golden Gate Ave, San Francisco

North Coast · Thursday, June 8 · 9 am - 12 pm
Sequoia Conference Center
901 Myrtle Avenue, Eureka, CA

San Diego · Monday, June 12 - 1:30 - 5 pm*
University of San Diego Auditorium, San Diego, CA

**a Safeguarding California Workshop will take place here earlier in the day at 9:30am - 12:30 pm*

For more information, visit:
http://www.opc.ca.gov/climate-change/updating-californias-sea-level-rise-guidance/


Photo: Margaret Lindgren


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Photo: Linda Dron