

Probabilistic Projections of Absolute SLR in WA: The Devil is in the Deep Tail

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THE WASHINGTON COASTAL RESILIENCE PROJECT



Key Components: Global Sea Level Rise (SLR)

Changes in global sea level are driven by four main components (1) thermal expansion, (2) melting of glaciers and ice caps, (3) melting of the Greenland and Antarctic Ice Sheets, (4) and to a lesser degree, shifts in the amount of water that is stored on-land in reservoirs.



Thermal Expansion

As the ocean warms the water becomes less dense and the volume increases.



Glaciers & Ice Caps

Loss of land-based glacier and ice cap mass causes sea levels to rise as land-based water stored in snow and ice is lost.



Ice Sheets

Melt of land-based ice sheets is the largest potential contributor of future SLR.

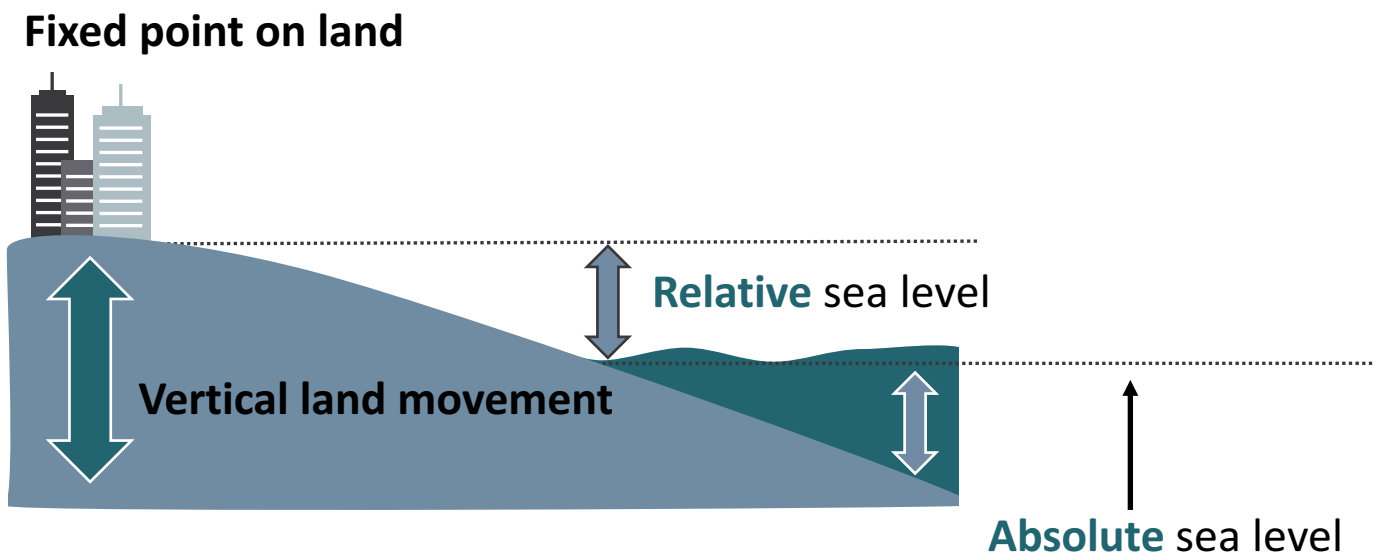


Land Water Storage

Dams and ground water extraction

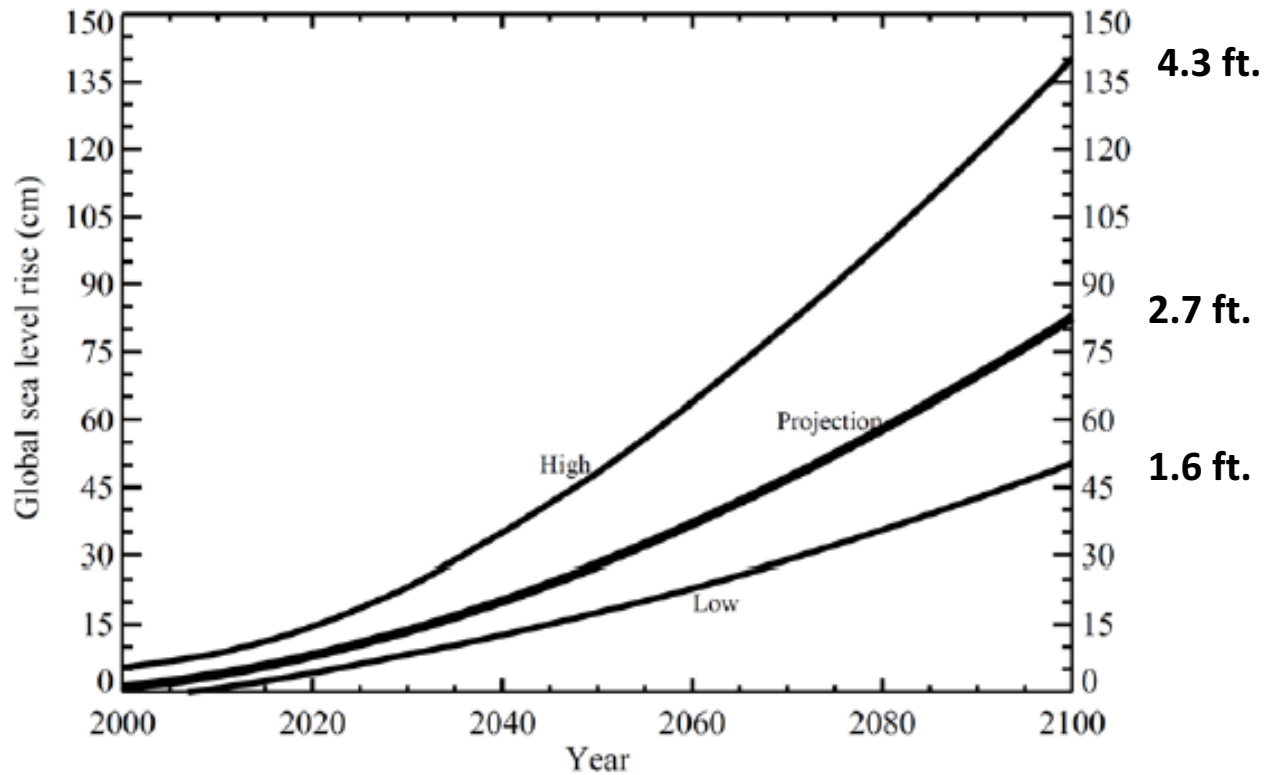


Absolute vs. Relative Sea Level Rise





Options for Projecting SLR: Approaches Abound



National Research Council. Sea-Level Rise for the Coasts of California, Oregon, and Washington. Washington, D.C.: National Academies Press. 2012.



Options for Projecting SLR: Approaches Abound (ctd.)

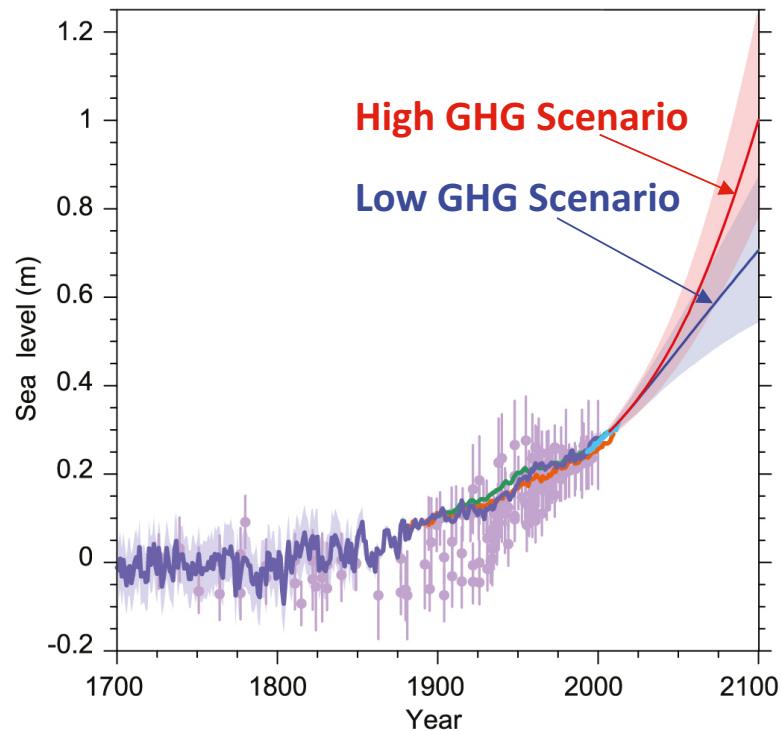
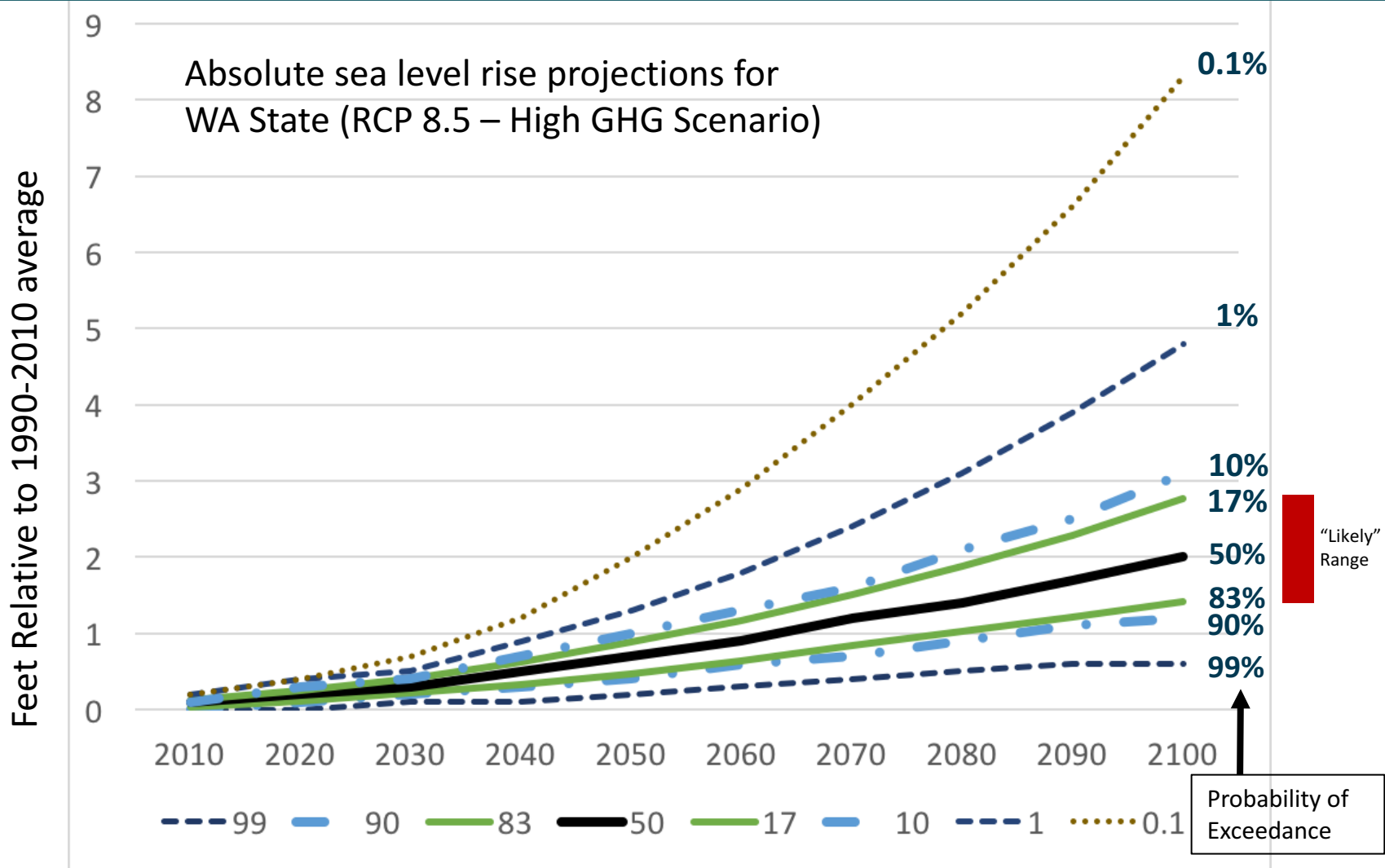


Fig 13-27. IPCC's Fifth Assessment Report.

Church J. A. et al. 2013a. Sea level change Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change ed. T F Stocker, D Qin, G-K Plattner, M Tignor, S K Allen, J Boschung, A Nauels, Y Xia, V Bex and P M Midgley (Cambridge: Cambridge University Press).



Options for Projecting SLR: Approaches Abound (ctd.)

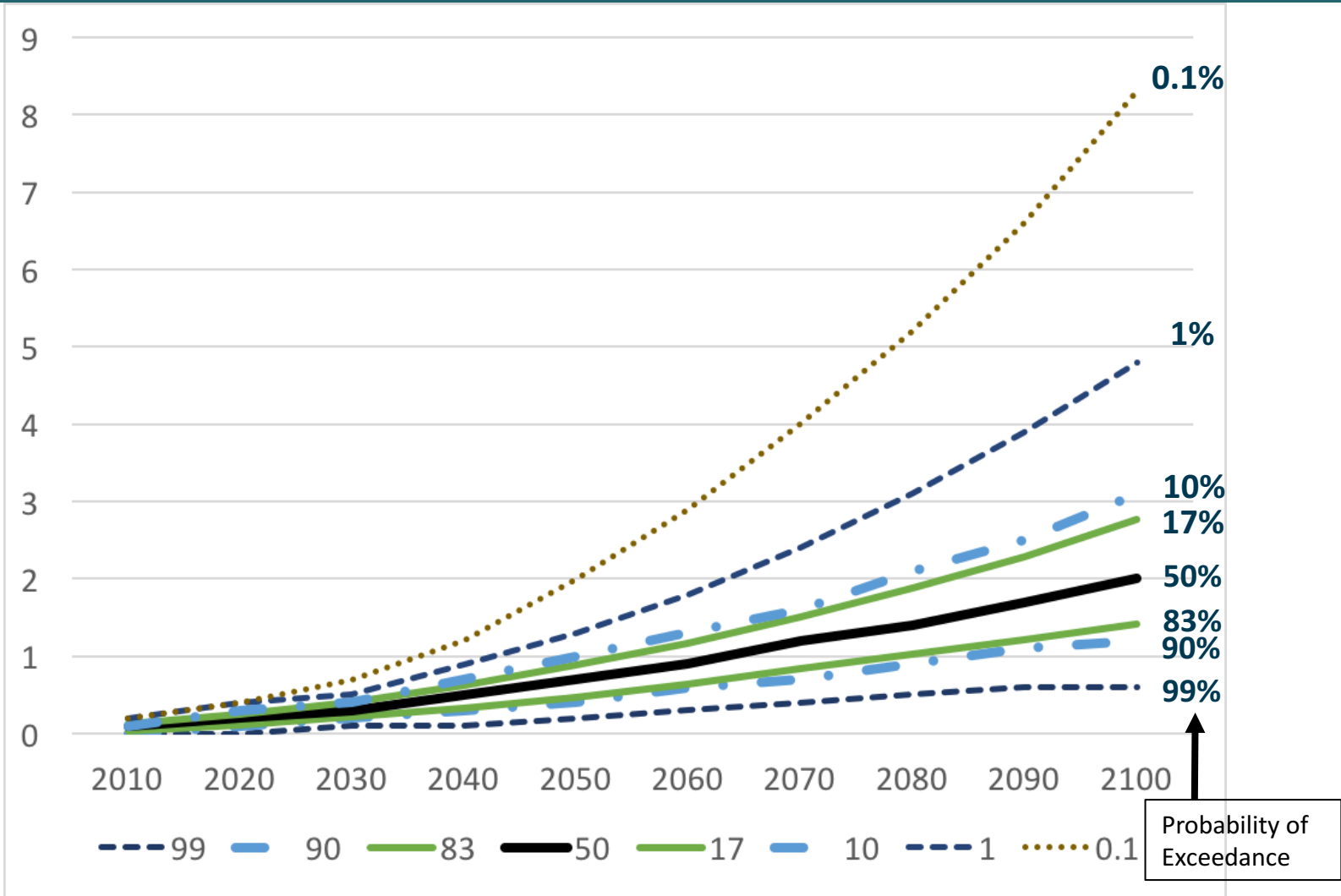




How are probabilistic projections generated?

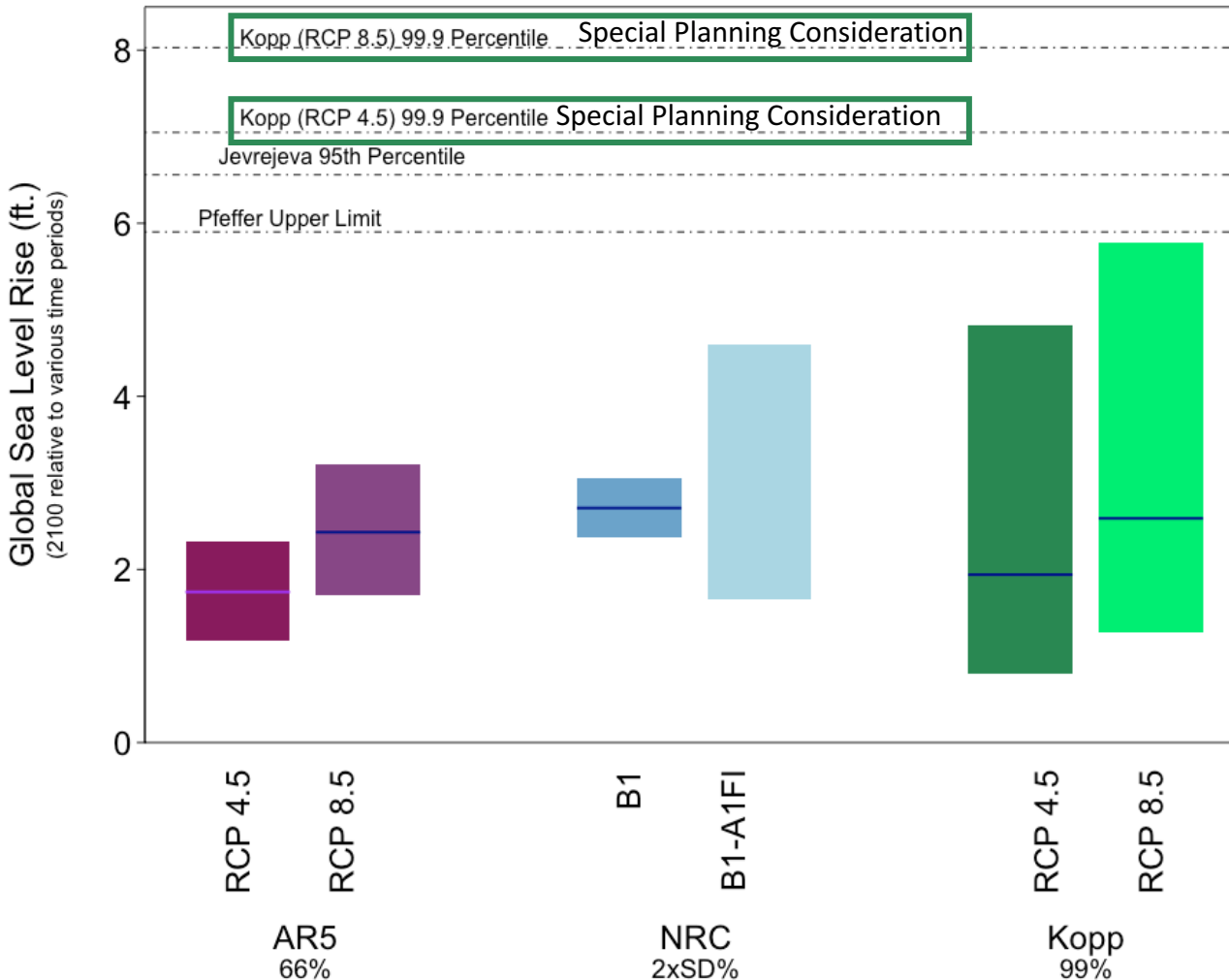


Feet Relative to 1990-2010 average





Comparing Projections & Upper Limits





Probabilistic Projections: Absolute SLR in WA State

20-year period centered on:	Green House Gas Scenario	More likely than not (50%)	Likely Range (83-17%)	Very Unlikely (10%)	Exceptionally Unlikely (1%)	Special Planning Consideration (0.1%)
2050	RCP 2.6	0.6	0.4 - 0.8	0.9	1.2	1.8
	RCP 4.5	0.6	0.4 - 0.8	0.9	1.2	1.8
	RCP 6.0	0.6	0.4 - 0.8	0.8	1.1	1.8
	RCP 8.5	0.7	0.5 - 0.9	1.0	1.3	2.0
2100	RCP 2.6	1.4	0.8 - 2.0	2.2	4.0	7.2
	RCP 4.5	1.6	1.0 - 2.2	2.5	4.1	7.2
	RCP 6.0	1.6	1.1 - 2.2	2.5	4.2	7.4
	RCP 8.5	2.0	1.4 - 2.8	3.1	4.8	8.3
2150	RCP 2.6	1.9	1.0 - 3.1	3.7	8.1	16.1
	RCP 4.5	2.5	1.5 - 3.8	4.4	8.5	16.2
	RCP 6.0	*	*	*	*	*
	RCP 8.5	3.4	2.3 - 4.9	5.6	10.0	18.3

Projections are expressed in **ft.** and are relative to 1990-2010 avg. sea level.

Questions?

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