



State of California Sea-Level Rise Guidance Document

The State of California Sea-Level Rise Guidance Document was developed by the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) to provide guidance for incorporating sea-level rise (SLR) projections into planning and decision-making in California. The guidance provides ranges of SLR for all California agencies, including the Department of Transportation (Caltrans), to be used for risk-based scenario planning and assessments, such as long term transportation planning and vulnerability assessments.

California Executive Order S-13-08 required all state agencies planning construction projects in areas vulnerable to future sea-level rise to "consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise." The State of California Sea-Level Rise Guidance for project planning and decision making was developed in 2010 to support this directive. It was updated in 2013 to incorporate the findings of the National Academy of Sciences (NAS) report on Sea-Level Rise for the Coasts of California, Oregon, and Washington, released in June 2012. Caltrans developed its own Guidance on Incorporating Sea Level Rise in 2011, based on the 2010 State of California Interim Guidance Document.

The updated guidance makes eight key recommendations for state agencies:

- Use the SLR projections presented in the June 2012 NAS report as a starting place to select SLR values, incorporating specific considerations of risk tolerance and adaptive

capacity based on the agency and context. The guidance offers separate projections for two regions of California – north and south of Cape Mendocino. The regional differences are due to geologic forces that can cause sudden vertical land movements in the northern part of the state. Using 2000 as a baseline, SLR ranges are projected over three time periods. The 2030 and 2050 projections are similar to but have a wider range than those presented in the 2010 Interim Guidance Document, while the 2100 projections here are lower than those in the Interim Guidance Document because of different modeling approaches and regional considerations.

Time Period	Sea Level Rise Projections for Regions North of Cape Mendocino	Sea Level Rise Projections for Regions South of Cape Mendocino
2000-2030	-4 to 23 cm (-0.13 to 0.75 ft)	4 to 30 cm (0.13 to 0.98 ft)
2000-2050	-3 to 48 cm (-0.1 to 1.57 ft)	12 to 61 cm (0.39 to 2.0 ft)
2000-2100	10 to 143 cm (0.3 to 4.69 ft)	42 to 167 cm (1.38 to 5.48 ft)

- Consider project timeframes, risk tolerance, and adaptive capacity in selecting SLR estimates. Uncertainty regarding SLR estimates rises considerably after 2050, making these considerations even more important for selecting the appropriate SLR estimate for projects with long timeframes.
- Consider storms and extreme weather events in their analyses. Tides, storm





surges, and El Niño-Southern Oscillation are all relevant consideration for infrastructure planning decisions. It recommends that the agencies use future sea level as a starting point, but also combine those projections with extreme oceanographic conditions to design projects that can withstand the impacts from extreme events.

- Coordinate with each other in selecting SLR estimates, seeking consistency and efficiency whenever feasible and appropriate.
- Not base SLR projections on linear extrapolation of past sea level patterns. Because of non-linear increases in global temperature and the unpredictability of complex natural system, linear extrapolation is inadequate and likely to underestimate SLR for projections beyond one or two decades. Instead, agencies should use the NAS projections in their planning.
- Consider changing shorelines, as California's coastline is dynamic and will evolve due to SLR and erosion. Areas of high sediment supply, for instance, could undergo less coastal change due to SLR, whereas the coast may recede more rapidly in low-sediment areas. For reference, it points to a U.S. Geological Survey report on

shoreline changes for California's beach habitat and report on shoreline changes for California's bluff habitat.

- Consider tectonic activity predictions. As highlighted in the 2012 NAS report, the region north of Cape Mendocino is at significant risk of a large earthquake, which could cause significant land subsidence and instantaneous relative sea-level rise. More specific recommendations concerning changes in SLR due to tectonic activity are beyond the scope of this guidance.
- Consider trends in relative local mean sea level in making predictions of future sea levels at specific locations. As coastal land elevation in California changes due to tectonic activity and subsidence, sea level relative to the elevation of the land will also change, affecting projected SLR impacts. The guidance suggests that agencies use relative sea level trend data from the National Oceanic and Atmospheric Administration to incorporate relative sea level into their analyses.

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For More Information:

<http://www.opc.ca.gov/2013/04/update-to-the-sea-level-rise-guidance-document/>





Resources:

State of California Sea-Level Rise Interim Guidance Document:

http://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20110311/12.SLR_Resolution/SLR-Guidance-Document.pdf

National Academy of Sciences Sea-Level Rise for the Coasts of California, Oregon, and Washington

http://www.nap.edu/catalog.php?record_id=13389

U.S. Geological Survey shoreline changes for California's beach habitat:

<http://pubs.usgs.gov/of/2006/1219/>

U.S. Geological Survey shoreline changes for California's bluff habitat:

<http://pubs.usgs.gov/of/2007/1133/>

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