

California's Fourth Climate Change Assessment – Technical Reports

TITLE

ASSESSING AND COMMUNICATING THE IMPACTS OF CLIMATE CHANGE ON THE SOUTHERN CALIFORNIA COAST

CITATION

Erikson, Li, H., Patrick L. Barnard, Andrea O'Neill, Patrick Limber, Sean Vitousek, Juliette Finzi Hart, Maya Hayden, Jeanne Jones, Nathan Wood, Michael Fitzgibbon, Amy Foxgrover, Jessica Lovering. (U.S. Geological Survey and Point Blue Conservation Science). 2018. Assessing and Communicating the Impacts of Climate Change on the Southern California Coast. California's Fourth Climate Change Assessment, California Natural Resources Agency. Publication number: CCA4-CNRA-2018-013.

ABSTRACT

Over the course of this and the next century, the combination of rising sea levels, severe storms, and coastal erosion will threaten the sustainability of coastal communities, development, and ecosystems as we currently know them. To clearly identify coastal vulnerabilities and develop appropriate adaptation strategies for projected increased levels of coastal flooding and erosion, coastal managers need user-friendly planning tools based on the best available climate and coastal science. In anticipation of these climate change impacts, many communities are in the early stages of climate change adaptation planning but lack the scientific information and tools to adequately address the potential impacts. In collaboration with leading scientists worldwide, the USGS designed the Coastal Storm Modeling System (CoSMoS) to assess the coastal impacts of climate change for the California coast, including the combination of sea level rise, storms, and coastal change. In this project, we directly address the needs of coastal resource managers in Southern California by integrating a vast range of global climate change projections and translate that information using sophisticated physical process models into planning-scale physical, ecological, and economic exposure, shoreline change, and impact assessments, all delivered in two simple, user-friendly, online tools. Our results show that by the end of the 21st century, over 250,000 residents and nearly \$40 billion in building value across Southern California could be exposed to coastal flooding from storms, sea level rise, and coastal change. Results for the other major population center in California (the greater San Francisco Bay Area) are also available but not explicitly discussed in this report. Together, CoSMoS has now assessed the exposure of 95% of the 26 million coastal residents of the State (17 million in Southern California)

HIGHLIGHTS

- CoSMoS provides coastal hazard vulnerability projections due to climate change for the 17 million coastal residents of Southern California. The results are being extensively used in local adaptation and resilience planning.

- Over 250,000 people, >2,300 km of road, and \$38 billion worth of constructed buildings (present-day value, not accounting for inflation) are prone to coastal flooding across the region for the 200 cm SLR in combination with anticipated 100-year coastal storm events.
- Including storms increases population and property exposure from 10% (annual storm) to 350% (100-year) compared to the no-storm, SLR only scenarios.
- Of the five Southern California coastal counties, San Diego, Orange, and Los Angeles are most vulnerable to residential and infrastructure exposure. Ventura County is most prone to flooding of agricultural land whereas San Diego County hosts the majority of wetlands that are prone to permanent inundation (assuming no wetland accretion).
- Long-term average beach loss is projected to range from ~10 to 70 m for the 25 and 200 cm SLRs, potentially eliminating 2/3 of Southern California's beaches if sediment supply is limited.
- Average cliff retreat (including armored sections) is projected to range from 5 to 30 m for the 25 and 200 cm SLRs, representing an increase of ~20% to 150% compared to historical rates.

ACCESS

For access to the full report, please email Susan.wilhelm@energy.ca.gov

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