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TITLE: A multidisciplinary coastal vulnerability assessment for local government focused on ecosystems, Santa Barbara area, California

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ABSTRACT:

Incorporating coastal ecosystems in climate adaptation planning is needed to maintain the well-being of both natural and human systems. Our vulnerability study uses a multidisciplinary approach to evaluate climate change vulnerability of an urbanized coastal community that could serve as a model approach for communities worldwide, particularly in similar Mediterranean climates. We synthesize projected changes in climate, coastal erosion and flooding, watershed runoff and impacts to two important coastal ecosystems, sandy beaches and coastal salt marshes. Using downscaled climate models along with other regional models, we find that temperature, extreme heat events, and sea level are expected to increase in the future, along with more intense rainfall events, despite a negligible change in annual rainfall. Consequently, more droughts are expected but the magnitude of larger flood events will increase. Associated with the continuing rise of mean sea level, extreme coastal water levels will occur with increasingly greater magnitudes and frequency. Severe flooding will occur for both natural (wetlands, beaches) and built environments (airport, harbor, freeway, and residential areas). Adaptation actions can reduce the impact of rising sea level, which will cause losses of sandy beach zones and salt marsh habitats that support the highest biodiversity in these ecosystems, including regionally rare and endangered species, with substantial impacts occurring by 2050. Providing for inland transgression of coastal habitats, effective sediment management, reduced beach grooming and removal of shoreline armoring are adaptations that would help maintain coastal ecosystems and the beneficial services they provide.

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