



MEMORANDUM

Re: Record-breaking Sea Levels in California
From: Abe Doherty, Climate Change Policy Advisor, California Ocean Protection Council
Date: December 3, 2015

California broke a record late last month: [Sea levels at several tide stations in Southern California](#) reached higher elevations than [ever measured before](#), including during major storms. Water levels were higher than the “[King Tides](#)” that were predicted by the National Oceanic and Atmospheric Administration (NOAA), due to the ongoing El Niño, warm ocean temperatures and a minor storm. NOAA observations for San Diego, La Jolla and Santa Barbara show sea levels for November 25, 2015 higher than the maximum water levels ever recorded at these tide stations. The San Diego tide station has been recording sea levels since 1906, La Jolla since 1924 and Santa Barbara since 1974. San Diego experienced street flooding [several miles inland](#) when ocean water surged into the storm drain system.

During the past two years along the West Coast, surface waters have been [unusually warm](#), which has contributed to higher coastal water levels. For example, the temperatures at the Santa Cruz wharf were as much as 9 degrees Fahrenheit warmer than normal, which is greater than the 1997-1998 El Niño. These warm ocean waters and other regional processes have caused an [increase in water levels](#) of an additional few inches of higher water levels beyond what was experienced during past strong El Niños. Sea levels recently have been up to a foot higher than expected. These elevated water levels are on top of the long term sea level rise trends that have occurred due to climate change, such as the [eight inches of sea level rise](#) that has been documented over the last century at the San Francisco tide station.

The current El Niño also has [broken a record](#) for one indicator of strength of El Niño conditions based on sea surface temperatures near the equator. Past strong El Niños in 1982-83 and 1997-98 produced 6 to 10 inches of elevated sea levels that persisted from fall until late spring and then became elevated again the following summer through fall. Winter storms during these past strong El Niños caused peak water levels of 1.5 to 3 feet above predicted levels, with high waves, storm surges and heavy precipitation resulting in disaster declarations for flooding in coastal counties. It is only prudent to assume that the current strong El Niño conditions could bring similar trouble.

Climate disruption is amplifying extreme events that threaten the health and safety of families and communities in California and around the world.

Scientists from the [Intergovernmental Panel on Climate Change, the world’s leading body on climate change assessment](#), tell us that climate change increases the intensity of drought,

wildfire, and flooding. California recently earned an “A” grade in a [national assessment](#) of state efforts to prepare for climate change, and there is a lot of great work and collaboration happening at all levels in California to address sea-level rise. But the amount of sea-level rise will make a big difference in the success of our efforts to adapt. The [State of California Sea-level Rise Guidance Document](#) projects up to five and a half feet of sea-level rise by 2100. However, carbon dioxide levels in our atmosphere have surpassed 400 parts per million. [Scientists](#) report that the last time the Earth had such levels of atmospheric carbon dioxide, several million years ago, sea levels were more than twenty feet higher than current levels. The potential for sea-level rise greater than we now project is one of many reasons Californians take strong action to combat climate change.

Beyond adapting governance to an epoch of changing shoreline conditions, we also must be ready for floods, mudslides and coastal erosion during the current strong El Niño conditions. California state agencies have been working with emergency responders and local governments to prepare.

See www.climatechange.ca.gov for more information on California’s actions on climate. See www.storms.ca.gov for information on preparedness for storm impacts. See the [California Ocean Protection Council website on El Niño](#) for more information on elevated sea levels.