

Achieving Groundwater Sustainability in California in an Era of Climate Uncertainty

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Background/Objectives. California has embarked on a comprehensive program to regulate groundwater use in more than 100 groundwater basins that have been over-drafted due to decades of unsustainable pumping. Excessive pumping has caused adverse impacts to infrastructure and the natural environment. The California Sustainable Groundwater Management Act (SGMA) program, enacted in 2014, requires local agencies to cooperate and implement long-term groundwater sustainability plans. Those plans explicitly require consideration of future climate conditions. While the state has provided general guidance for climate change adaptation, projections and datasets are limited regarding future precipitation, evapotranspiration, and sea-level rise, and do not include the possibility of extended severe droughts, extreme atmospheric-river driven precipitation events and associated flooding.

Approach/Activities. We present an overview of climate hazards identified in the different Groundwater Sustainability Plans across the state, and modeling performed to assess the vulnerability of existing domestic and agricultural water supply, water conveyance infrastructure, and the natural environment. We present results from a vulnerability analysis of three large seawater barriers in Southern California using a regional-scale groundwater model of the Los Angeles Coastal Plain, and provide estimates of the additional amount of water required to increase groundwater levels to prevent intrusion of salt water from the Pacific Ocean into inland freshwater aquifers.

Results/Lessons Learned. California is home to 40 million people and provides much of the fruit and vegetables consumed in the U.S and abroad. Having a reliable water supply is essential to the residents of the state and to the food security of the world. California's water managers are working hard to ensure that the state's groundwater reservoirs provide sustainable, high-quality water for decades to come. Particular attention must now be focused on incorporating climate uncertainty into California's groundwater sustainability planning. We highlight potential additional vulnerabilities due to emerging contaminants and discuss opportunities for a combined climate hazard analysis.