Eighth National Summit on Coastal and Estuarine Restoration – December 10-15, 2016

https://www.estuaries.org/2016-summit-prospectus

Assessing Historic Change and Relative Vulnerability of Southern California Coastal Wetlands to Sea Level Rise

Eric D. Stein

Southern California Coastal Water Research Project Authority, Costa Mesa, CA, USA

Abstract

Development of regional objectives for wetland recovery requires an understanding of both historical wetland losses and expected future changes due to sea level rise. Knowledge of historical wetland extent and distribution is a key element of the Regional Strategy because it provides a baseline to understand past losses that can be used to guide regional planning. Understanding historical conditions provides valuable context for the relationship between landscape-scale process and wetland composition, and can inform decisions about appropriate restoration targets at different positions along the coastline. To support the regional strategy development, we compared contemporary wetland maps based on the National Wetlands Inventory to a set of over 40 historical Topographic sheets (T-sheets) that provide mapping of the California coastline ca. 1870.

We combined the analysis of historical losses with expected changes due to sea level rise using a rule-based model. The model uses region-wide and site-specific data to analyze the vulnerability of Southern California wetlands to sea level rise. Data inputs included relative sea level rise, vertical land motion, sediment accretion, watershed characteristics, and estuary mouth dynamics. Initial vulnerability results demonstrated that, without management action, coastal estuaries in Southern California will generally experience shifts in habitat composition trending towards increases in subtidal and intertidal mudflats; however, effects are expected to vary across the region. Preliminary findings indicate that certain estuary "archetypes" that are small in extent and have minimal fluvial inputs are more vulnerable to increases in sea level. These results provide important considerations for prioritization of management strategies that mitigate the effects of sea level rise, leading to more successful adaptation and restoration projects in the future. The results of this analysis allow us to develop alternative future scenarios that can be used to support development of regional objectives for wetland recovery.