SCCWRP #1105

Establishing Targets for Regional Coastal Wetland Restoration Planning Using Historical Ecology and Future Scenario Analysis: The Past, Present, Future Approach

Eric D. Stein[1], Cheryl L. Doughty[2], Jeremy Lowe[3], Megan Cooper[4], Evyan Borgnis Sloane[4], Danielle Liza Bram[5]

1 Southern California Coastal Water Research Project, 3535 Harbor Blvd., Suite 110, Costa Mesa, CA
2 Department of Geography, University of California, Los Angeles, CA
3 San Francisco Estuary Institute, Richmond, CA, USA
4 California Coastal Conservancy, Oakland, CA, USA
5 Center for Geospatial Science and Technology, California State University, Northridge, CA

ABSTRACT

Regional approaches to coastal wetland restoration are one of the best ways to ensure that these threatened habitats persist in the face of sea level rise. Regional approaches provide a mechanism for prioritizing restoration actions in areas where future conditions will promote maximum resiliency while still providing for an appropriate composition of plant and animal habitats across the region as a whole. Developing a regional restoration strategy requires understanding historical losses relative to contemporary habitat distributions, predicting future changes due to sea level rise (and other stressors), and evaluating management actions with the potential to offset expected future losses. In this study, we present an approach to assess historical losses and future management options for more than 100 individual wetlands along the Southern California (USA) coast ranging in size from a few tenths of a hectare to over 250 ha. This analysis was conducted to support development of a regional wetland strategy that will guide restoration in Southern California for the next several decades. The approach consisted of reconstructing historical wetland distribution using US Coast and Geodetic Survey T-sheets, mapping current wetlands and classifying them into archetypes that represent different settings and processes, and predicting future distributions based on a hypsometric model of elevation changes under various sea level rise and management scenarios. Historical analysis revealed that two-thirds of the 331 wetlands present in ca. 1850 and 75% of vegetated estuarine habitat area has been lost, with most losses occurring in small to medium size wetlands. Up to 69% of the remaining marshes and flats could be lost with 1.7 m of sea level rise, with an associated increase in subtidal habitat. However, potential future losses could be largely offset, and total area could increase under scenarios of facilitated wetland migration and sediment augmentation. Although the future distribution of wetlands would likely be different from current conditions, sufficient habitat would be provided region-wide. This analysis demonstrates how regional analysis of historic, present, and likely future conditions can support a strategy that