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Tidal Marsh Bird Population and Habitat Assessment for the San Francisco Estuary Under Future Climate Change Conditions

Over the past decade, a staggering commitment of resources has been directed toward the protection and restoration of San Francisco Estuary baylands. But sea-level rise, changing salinity, and other rapidly changing environmental conditions are expected to have substantial effects on the extent and quality of tidal marsh habitats and the birds and other wildlife dependent upon them.

To help conservation practitioners address these effects, we projected the spatial distribution of tidal marsh vegetation and the distribution and abundance of tidal marsh bird species for the period 2010 to 2110 under a range of projected changes in sea level and salinity with different sediment availability scenarios.

We project tidal marsh bird population declines from current levels due to the conversion of high and mid-marsh habitat to low-marsh and mudflats and changes in spring and summer salinity. All current marsh habitat in regions of low sediment availability are not likely to survive to 2110 in the absence of restoration activities. High sea-level rise scenarios had the biggest impact on bird populations, although the effects were muted under high sediment input scenarios.

The projected species distributions and changes in tidal marsh elevations are available in the form of interactive maps and downloadable GIS layers at: www.prbo.org/sfbayslr. This website can help managers plan effective conservation and restoration strategies to foster adaptation to the effects of future climate change.

Main Points

- According to some scenarios, 92% of current mid and high tidal marsh habitat in the Estuary could be lost by 2100.
- Many upland areas to which marshes will likely move are not protected, and this movement will be impeded by dikes and other barriers
- Black Rails, Common Yellowthroats, Marsh Wrens and Song Sparrows are likely to decline in abundance over the next 100 years due to flooding of their habitat.
- Population declines are reduced under high- sediment scenarios, meaning that restoration and watershed management activities that increase sediment concentrations should benefit bird populations.
- Although there is high uncertainty in the population effects of climate change on all species, considering multiple scenarios provides a robust estimate of the range of future possibilities.
- Areas we identified as having high habitat quality across scenarios should be prioritized for conservation.

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