

Potential sea-level rise impacts on tidal wetlands in the Pacific Northwest: Declines in productivity and diversity?

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Global climate change could alter sea-level and salinity dynamics in Pacific Northwest estuaries. We combined survey and experimental approaches to better understand potential climate change effects on the future of tidal wetland primary producers in the region. Surveys conducted in wetlands across four Oregon estuaries with different hydrologic regimes suggested that patterns of composition and diversity are in part structured by tidal inundation and salinity. Correlations between plant and algal metrics and tidal elevation suggest that relative sea-level rise is likely to increase the abundance of wetland macroalgae and benthic chlorophyll a, change vascular plant composition, and lower plant richness. We conducted lab and field manipulations to address salinity and inundation effects on plant germination and growth. Germination of many common species was negatively affected by higher salinity (≥ 10), but species varied in their salinity tolerances. In a transplant experiment where we placed seedlings at different elevations in three wetlands, growth declined with simulated sea-level rise in all seven species investigated. Our findings suggest that relative sea-level rise and elevated salinity are likely to reduce plant diversity and biomass, but could favor algae. These structural changes have potential consequences for coastal food webs and other wetland functions.