

## Conflicts and Opportunities In Coastal Wetlands Under Sea-Level Rise and Infrastructure Pressures

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Under natural conditions, the sustainability and resilience of coastal wetlands to sea-level rise depends on the slope of the landscape and a balance between the rates of soil accretion and the sea-level rise. However, local man-made flow disturbances can have comparable effects. Coastal infrastructure affecting flow in the wetlands can pose an additional constraint on the adaptive capacity of these ecosystems, but can also present opportunities for targeted flow management to increase their resilience. Coastal wetlands in SE Australia are heavily managed and typically present infrastructure including flow control devices. How these flow control structures are operated respond to different ecological conservation objectives (i.e. bird, frog or fish habitat) that can sometimes be mutually exclusive. For example, promoting mangrove establishment to enhance fish habitat results in saltmarsh decline thus affecting bird habitat. Moreover, sea-level rise will change hydraulic conditions in wetlands and may result in some flow control structures and strategies becoming obsolete or even counterproductive. In order to address these problems and in support of future management of flows in coastal wetlands, we have developed a predictive tool for long-term wetland evolution that incorporates the effects of infrastructure and other perturbations to the tidal flow within the wetland (i.e. vegetation resistance) and determines how these flow conditions affect vegetation establishment and survival. We use the model to support management and analyse different scenarios of sea-level rise and flow control measures aimed at preserving bird habitat. Our results show that sea-level rise affects the efficiency of management measures and in some cases may completely override their effect. It also shows the potential of targeted flow management to compensate for the effects of sea-level rise.