



How salt marshes and seagrasses impact the sediment budget in shallow bays

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The influence of salt marshes and seagrasses on the sediment storage capability of shallow lagoon-type estuaries is investigated. Hydrodynamics, sediment transport, and vegetation dynamics are simulated using the numerical framework COAWST in the Barnegat Bay-Little Egg Harbor system, USA. We show that the salt marsh loss influences the delivery of sediments to marsh platforms, which further contributes to marsh decline. Indeed, the sediment storage capability of salt marshes exponentially decreases with their morphological degradation. For instance, up to 50% of the sediment mass trapped by vegetation is lost once a quarter of the marsh area is eroded. Finally, using six historical maps of seagrass distribution, we demonstrate that a decline in the extent of seagrass meadows also influences the sediment mass potentially stored within bay systems, as well as suspended sediment concentrations. Our findings highlight the relevance of salt marshes and seagrasses for the long term survival of coastal ecosystems, and the complex dynamics regulating the interaction between subtidal landscapes and upper intertidal zones.