

A SEDIMENT BUDGET FOR THE WINYAH BAY ESTUARY, SOUTH CAROLINA, USA

1PATCHINEELAM, S.M., 2KJERFVE, B. and 2GARDNER, L.R. 1Universidade Santa Úrsula, Rio de Janeiro, Brazil, 2 University of South Carolina, South Carolina, USA

Winyah Bay, a 65 km² coastal plain estuary in South Carolina, has an average freshwater input of 557 m³ s⁻¹ and presently receives 0.43 x 10⁶ t yr⁻¹ of suspended sediments from its watershed, corresponding to a yield of 12.7 t km⁻² yr⁻¹. However, twenty dams have been constructed on the upper rivers, primarily on the Yadkin and Pee Dee rivers, which serve to capture an additional 0.40 x 10⁶ t yr⁻¹ of sediment, implying a gross sediment yield of 24.5 t km² yr⁻¹ for the watershed although almost 50% never reaches the coast. Continuous dredging in the estuarine channels removes 0.107 x 10⁶ t yr⁻¹ of silt and clay from the estuary. Sediment coring and ²¹⁰Pb analysis indicate that the sedimentation rate in Mud Bay, a high accretion area in the lower estuary, is 5.5 mm yr⁻¹, which together with previous estimates of marsh sedimentation rates of 2.7 mm yr⁻¹ in the tidal marshes surrounding the estuary leads to a total estuarine mud sedimentation estimate of 0.24 x 10⁶ t yr⁻¹. Thus, 80% of the fine-grained sediment reaching Winyah Bay is either accumulating in adjacent marshes or on estuarine mud flats or is being dredged and deposited offshore. Therefore, Winyah Bay apparently delivers only a minimal amount of suspended fine-grained sediments to the coastal ocean.