

## **Effects of salinity and particle concentration on sediment hydrodynamics and critical bed-shear-stress for erosion of fine grained sediments used in wetland restoration projects**

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**Abstract** Sea-level rise, the increasing number and intensity of storms, oil and groundwater extraction, and coastal land subsidence are putting people and property at risk along Louisiana's coast, with major implications for human safety and economic health of coastal areas. A major goal towards re-establishing a healthy and sustainable coastal ecosystem has been to rebuild Louisiana's disappearing wetlands with fine grained sediments that are dredged or diverted from nearby rivers, channels and lakes to build land in open water areas. A thorough geo-hydrodynamic characterization of the deposited sediments is important in the correct design and a more realistic outcome assessment of the long-term performance measures for ongoing coastal restoration projects. This paper evaluates the effects of salinity and solid particle concentration on the re-suspension characteristics of fine-grained dredged sediments obtained from multiple geographic locations along the Gulf coast. The critical bed-shear-stress for erosion has been evaluated as a function of sedimentation time. The sediment hydrodynamic properties obtained from the laboratory testing were used in a numerical coastal sediment distribution model to aid in evaluating sediment diversions from the Mississippi River into Breton Sound and Barataria Bay.

**Key words** erosion; restoration; sediment; shear stress; salinity; grain size distribution; re-suspension, sedimentation.