

Marsh Survival in the Subsiding Mississippi Delta Plain: A Ten-Year Record of Marsh Surface Elevation Change

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Abstract

Studies of marsh sedimentary dynamics in the early 1990's demonstrated differences among marshes that were influenced to varying degrees by the Mississippi or Atchafalaya Rivers. Marshes close to the Atchafalaya were gradually increasing elevation while those remote from the rivers did not show substantial gains in marsh surface elevation, even though storms and cold fronts were providing sediments.

Sediment-erosion table measurement sites established in 1990 during that study were revisited in 2000, using the same equipment, to provide a longer-term assessment of marsh surface elevation change. At both Carencro Bayou and Old Oyster Bayou, close to the Atchafalaya, there was minor increase in elevation since the earlier measurements, while at Bayou Chitigue up to 5 cm of elevation increase had occurred since the previous measurements in 1993.

The opportunity to examine longer term changes in marsh surface elevation change indicated the processes controlling marsh surface elevation change, both physical and biotic, can vary not only on the seasonal and inter-annual time scales as suggested by the previous study, but also along time scales of decades. Importantly, some marshes which appeared degraded and where measurements of elevation change over several years indicated a trend towards submergence, survived and regained elevation "capital" to sustain them. In addition, the apparent stability of marshes directly influenced by the Atchafalaya River suggests that these marshes have attained an equilibrium elevation where a balance between vertical accretion and subsidence is maintained.