WHAT IS THE EFFECT OF INCREASED STORM ACTIVITY ON THE RESPONSE OF COASTAL WETLANDS TO SEA-LEVEL RISE?

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Statement of Project Objective. The components of climate change do not occur in isolation, but rather interact in complex and often unpredictable ways. This research will address two potentially interacting components of climate change: sea-level rise and storm-induced sedimentation. This research will answer the question: *Does storm-induced sedimentation influence the capacity of marshes to accommodate sea-level rise and promote marsh sustainability?*

Scientific Questions to be Addressed. (1) Does storm-induced sedimentation modify the effects of sea-level rise on wetland resilience and stability, and in-turn, wetland sustainability? If so, by what mechanisms is this effect elicited? (2) How does this effect differ with marsh type, e.g., brackish versus salt? If so, why? (3) Is there a specific threshold sediment level that influences sea-level rise impacts and does this threshold level vary with marsh type?

Location of Research Activities. Louisiana's deltaic environment, which is subject to high rates of relative sea-level rise as well as frequent and intense hurricanes, provides a unique natural laboratory in which to investigate the importance of hurricane-induced sedimentation as a means of reducing the ecological impacts of excessive submergence due to sea-level rise.

Approach. Greenhouse and field studies will investigate the effects of storm-induced sedimentation on the response of coastal marsh habitats to different sea-level endpoints and salinities. In the greenhouse, marsh mesocosms containing intact soil and vegetation from both brackish and saline marshes will be exposed to three sea-level endpoints, two final salinities, and three sedimentation levels. Changes in structural (e.g., species composition, cover, dominance and biomass) and functional (e..g., aboveground primary productivity, root production, and organic matter decomposition) attributes will be assessed. The field research will use 34 pre-established permanent marsh stations that received from 0 to 12 cm of sedimentation from Hurricanes Katrina/Rita. Pre- and post hurricane marsh condition as a function of sedimentation as well as the effects of sedimentation on marsh resilience (rate of recovery) and stability (extent of recovery) will be evaluated at these stations.

Expected Accomplishments. This research will reduce the scientific uncertainty associated with the impact of two potentially interacting components of climate change, sea-level rise and storm/hurricane activity, on wetland ecological condition, resilience and stability. The output from this research will include peer-reviewed papers, fact sheets explaining research implications to the public, and a web site that archives data, metadata, presentations, progress reports, and publications resulting from the project.