Characterization of Sedimentology and Infill Rates for Sediment Borrow Areas in Coastal Louisiana

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ABSTRACT

Over the past century, Louisiana has experienced some of the highest rates of coastal land loss within the United States. More recently, the State of Louisiana has addressed this issue by relocating sand from offshore borrow areas to replenish coastal barrier islands. Introducing relocated sand from borrow areas helps to slow coastal wetland loss. However, little is known on how sediment dredging impacts water quality and biogeochemistry within borrow areas. Furthermore, changes to seafloor topography near to and within borrow areas has the potential to affect oil and gas infrastructure in close proximity. Our research is focused on comparing effects of sediment excavation in sandy versus muddy environments in coastal Louisiana. Previous work within the area shows silty sediments (finer than ~30 µm) are filling in the borrow area at higher (~0.1–0.3 cm/day) rates of deposition occurring during winter months and at lower rates (0.01–0.02 cm/day) during summer months. Although many studies have been conducted within borrow areas, there is a lack of data that could possibly link sediment infill in borrow areas to duration and intensity of hypoxic events in the northern Gulf of Mexico. As of September 2018, 5 multicores were taken at Caminada borrow area, a sandy energetic site approximately 25 km off the coast of central Louisiana. Of the cores taken, half were prepared for x-ray analysis to understand the sedimentary characteristics within the pit. The other half were extruded in 2 cm intervals for analysis of water saturation, grain size, radionuclide (^{7}Be), and organic matter accumulation. The latter will be important to discern if muddy, organic-rich sediment is increasing the length and duration of hypoxia within borrow areas by absorbing oxygen during decomposition. Preliminary results of x-ray core images show a lack of bioturbation within recently deposited sediment (top ~4 cm) which is indicative of hypoxic environments.

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