

# THIN-LAYER PLACEMENT PROJECT SHEET



## Paul J. Rainey Wildlife Sanctuary

July 2017

**Location:** Paul J. Rainey Wildlife Sanctuary

**Type:** Marsh restoration

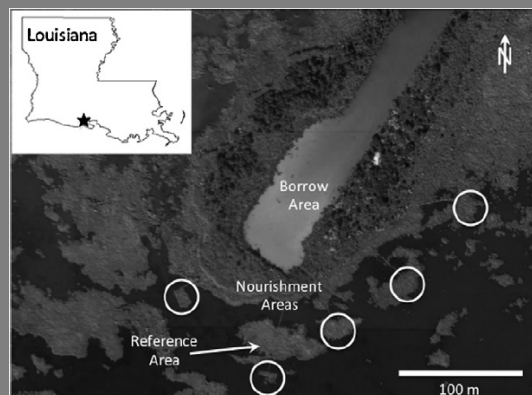
**Area:** 105 km<sup>2</sup>

**Parish:** Vermillion

**Main Agencies:** Louisiana State University, Cooperative Institute for Coastal and Estuarine Technology, Louisiana SeaGrant, National Atmospheric Administration, Louisiana Office of Coastal Protection and Restoration

**State/Province:** Louisiana

**Country:** United States



Graham and Mendelssohn, 2013

### Background

The Paul J. Rainey Wildlife Sanctuary is administered by the Audubon Society and contains 26,000 acres of wetlands within Vermillion Parish, Louisiana. The wildlife sanctuary was established in 1924 for the protection of wildlife that depend on marsh habitats. Due to changes in hydrology the sanctuary has shifted from freshwater wetlands to a brackish marsh.

A combination of hydrologic changes, including dams and levee construction, have disrupted freshwater and sediment inputs that sustained freshwater wetlands in Louisiana. Prolonged periods of limited flooding by rivers and canals resulted in long inundation periods, subsidence, and salinity increases that have degraded the marshes in the wildlife sanctuary. The objective of this restoration project was to mechanically place dredged material on the marsh surface to increase the elevation and decrease inundation.

### Project Description

Dredged material was mechanically pumped from a nearby oil canal into 20, 3m by 4m, contained areas within the marsh in July 2008. Four different sediment depths were achieved by using a slurry of water (70-80%) and sediment (20-30%). Sediment was applied to depths of either 0-10 cm, 10-15 cm, 15-20 cm, or no sediment (control). Physicochemical properties, elevation, and sulfur, iron, and manganese cycling were monitored over three years.

### Findings

The marsh surface elevation within plots averaged  $36.6 \pm 0.5$  cm NAVD88 prior to sediment additions. Three years post sediment augmentation elevation gains of 3 cm were seen in the highest deposition areas as a result of consolidation and

compression of the organic material below. Increased plant productivity was observed despite small elevation gain due to nutrient additions. In addition, the thicker the layer of dredged material placed on the marsh resulted in a decrease in sulfide concentration and an increase in sulfate concentration. The decrease in sulfide concentration with thicker dredged material applications may be the result of lower sulfate reduction rates with an increase in redox potential or interactions with iron and manganese that was present in the dredged material.

## References

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Graham, S. and I. Mendelssohn. 2013. Functional assessment of differential sediment slurry applications in a deteriorating brackish marsh. *Ecological Engineering* 51:264-274.

Maxwell, M. 2011. Effect of sediment slurry application on selected aspects of sulfur, iron, and manganese biogeochemistry in a coastal Louisiana marsh. Thesis for Louisiana State University.

Audubon Louisiana. Paul J. Rainey Wildlife Sanctuary. Audubon Society Website. Accessed February 27, 2017. <http://la.audubon.org/conversation/paul-j-rainey-wildlife-sanctuary>.

## Point of Contact

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Sean Graham  
Louisiana State University  
School of the Coast and Environment  
Energy, Coast and Environment  
Baton Rouge, Louisiana 70803

### Main Agencies:

Funding for this project has been provided by:



**Cooperative Institute for Coastal and Estuarine Technology  
Louisiana SeaGrant  
National Audubon Society**

**Louisiana Office of Coastal Protection and Restoration- Coastal Science Assistantship Program**

Information on thin layer placement (TLP) case studies has been compiled as part of a DOTS/EWN project to provide a source of information, knowledge, and experience on TLP of sediment or dredged material in aquatic



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environments. The Thin Layer Placement Website and Map-Portal are funded by the US Army Engineer Research and Development Center (ERDC). The POC for the Thin Layer Placement Website and Map-Portal is:

- Damarys Acevedo-Mackey, PE  
[Damarys.Acevedo-Mackey@usace.army.mil](mailto:Damarys.Acevedo-Mackey@usace.army.mil), 601-634-4845



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