

# THIN-LAYER PLACEMENT PROJECT SHEET



## Bayou Lafourche, Louisiana

July 2017

Location: Leeville, Louisiana

Type: Marsh restoration

Area: 7.5 hectares

City: Leeville

Parish: Lafourche

Main Agencies: Louisiana State University, Louisiana Sea Grant College Program, US Department of Commerce, Louisiana Department of Natural Resources

State/Province: Louisiana

Country: United States

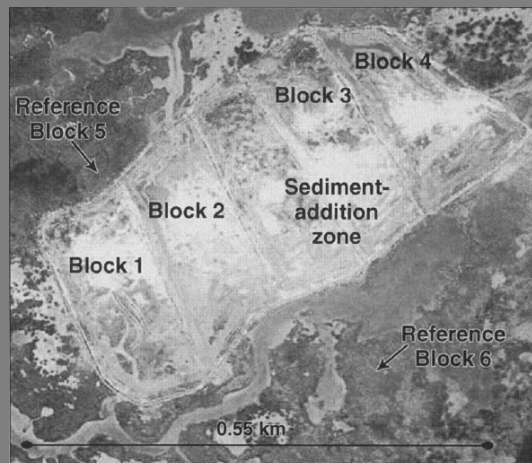
### Background

A marsh approximately 8 km south-southwest of Leeville, Louisiana on the west bank of Bayou Lafourche received dredged material that ranged between 13 and 36 cm in thickness. This area experiences high rates of relative sea level rise ( $1.11 \text{ cm yr}^{-1}$ ) and subsidence ( $7\text{-}11 \text{ mm yr}^{-1}$ ) in part due to the disconnection of the Mississippi River by levees.

In addition to sea level rise and anthropogenic disturbances, this marsh area experienced a large scale disturbance in 2000 as a result of a record drought. The drought caused the sudden dieback of *Spartina alterniflora*. Some disturbed salt marshes revegetated, while other disturbed salt marshes remained unvegetated and became mudflats. This marsh was located within a dieback marsh that contained both vegetated and unvegetated areas.

### Project Description

Sediment was hydraulically dredged from Bayou Lafourche and applied to the marsh surface. The sediment-water slurry consisted of 20-30% solids and 70-80% water. Sediment applications were completed in December 2002. Five treatments were monitored following sediment application. The treatments were: 1) unvegetated with 13-18 cm of sediment, 2) unvegetated with 20-25 cm of sediment, 3) unvegetated with 28-36 cm of sediment, 4) vegetated with 18-22 cm of sediment, 5) "pop-up" marsh where a portion of the marsh became buoyant and settled on top of the sediment application. Plant and soil physicochemical properties were measured one year following sediment placement. Plant variables included percent cover, stem density, and species richness. Soil physicochemical properties included soil physical properties (i.e.: bulk density, moisture content) and exchangeable nutrients (i.e.: phosphorus, ammonium, sulfide). Plant and soil properties were assessed five and seven years after sediment application.



Stagg and Mendelssohn, 2011

## Findings

---

Sediment application to a disturbed marsh improved the rate of plant recovery. The improved recovery was the result of reduced inundation with higher elevations and the addition of P with the dredged material. After seven years, total aboveground biomass, live biomass, stem density, and height of *Spartina alterniflora* were equivalent to the reference marsh. The addition of sediment to this marsh improved the resiliency and stability following an experimental vegetation disturbance by clipping and herbicide application. At the highest sediment application thickness, prolonged periods of drying lead to a decrease in marsh recovery.

## References

---

Schrift, A.M., I.A. Mendelssohn, M.D. Materne. 2008. Salt marsh restoration with sediment-slurry amendments following a drought-induced large scale disturbance. *Wetlands* 28:1071-1085.

Stagg, C.L. and I.A. Mendelssohn. 2011. Controls on resilience and stability in a sediment-subsidized salt marsh. *Ecological Applications* 21:1731-1744.

Tong, C., J.J. Baustian, S.A. Graham, I.A. Mendelssohn. 2013. Salt marsh restoration with sediment-slurry application: Effects on benthic macroinvertebrates and associated soil-plant variables. *Ecological Engineering* 51:151-160.

## Point of Contact

---

Irving A. Mendelssohn  
Emeritus Professor  
Department of Oceanography and Coastal Sciences  
Louisiana State University  
imendel@lsu.edu

### Main Agencies:

Funding for this project has been provided by:



US Army Corps  
of Engineers®

Engineer Research and Development Center  
Dredging Operations Technical Support Program

July 2017

**Louisiana Sea Grant – National Sea Grant Program by National Oceanic and Atmospheric Administration  
US Department of Commerce  
Louisiana Department of Natural Resources  
National Science Foundation of China (No. 50939003)**

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 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



US Army Corps  
of Engineers®