

Activity: Deer Island Beneficial Use Site Implementation)

Unique Identifier: USACE_RESTORE_004_000_Cat1

Location: Mississippi

Type of Activity: Implementation

FPL Category: 1 – Funding Approved

Cost Estimate: \$3,000,000

Responsible Council Member: State of Mississippi

Partnering Council Member: Department of the Army (USACE)

Originally submitted by: Department of the Army (USACE), as the proposal “Restoration of Deer Island with Beneficial Use of Dredged Material”

Executive Summary: Material mechanically excavated onsite near Deer Island and dredged during maintenance of the Black Warrior – Tombigbee (BWT) Federal navigation project in Alabama will be used beneficially to construct linear berms that will create the containment components for an approximately 70-acre beneficial use site located on the northern side of Deer Island just offshore of Biloxi, MS. Subsequent future filling of the site with dredged material leveraged from local dredging projects would result in the creation of 70 acres of emergent tidal wetlands.

PROJECT DESCRIPTION:

Specific Actions/Activities: The containment berms are anticipated to be constructed from material on-site and dredged and placed mechanically. Additional coarse grain sandy material from the BWT, previously determined to be suitable for placement in the open waters of the Mississippi Sound, are anticipated to be excavated and placed upon barges for transit to the restoration site. The barges will transport the material down to Deer Island. The barges will then be offloaded hydraulically, and the sandy material will be used to reinforce the outside of the containment berms. Two access channels near Deer Island may be dredged to -9 feet mean lower low water (MLLW), if needed, to facilitate site construction and/or placement of dredged material into the beneficial use site. Additional equipment, such as marsh buggies and bulldozers may be used to achieve the required grades and tolerances.

The containment berm features include the construction of an inner shoreline Chenier (ridge) along the southern boundary of the site adjacent to the existing shoreline and the construction of an exterior outer coastal Chenier. The inner southern Chenier will be constructed to an initial elevation of approximately +4 feet mean lower low water (MLLW) and will resemble a naturally occurring sandy ridge that offers protection to the site from larger storm events and serves as a natural wind driven source of sand over the life of the project. The southern Chenier will also act as a containment feature during the filling process preventing dredged material from spilling onto the existing island habitat. The exterior Chenier berm is anticipated to be initially constructed to an elevation of approximately +6 feet MLLW and will initially act as containment for future fine grain dredge material placed over the next several years. The eastern end of the containment structure will remain open to provide for tidal flushing as well as continuation of the marsh adjacent to Grand Bayou. Once all work is completed under this activity, the 70-acre site will be able to contain approximately 470,000 to 575,000 cubic yards of local beneficial use dredge material.

Deliverables: Final plans and specifications, contract award and supervision/administration, and development/implementation of a monitoring and adaptive management plan. Construction of an interior Chenier (ridge) along the southern boundary of the site adjacent to the existing shoreline and an exterior northern containment berm.

Ecological Benefits/Outcomes and Metrics: Constructing this beneficial use containment site at Deer Island will allow for restoration, improvement, and protection of aquatic habitat on the Mississippi Coastal Preserves state lands and the adjacent Gulf sturgeon critical habitat within Mississippi Sound. Establishing the sandy earthen containment feature adjacent to Deer Island will encompass approximately 70 acres of open-water in Mississippi Sound and will allow for beneficial placement of suitable dredged material at an elevation to establish emergent tidal marsh habitat. These marshlands would protect the island from further erosive forces caused by routine wave energy. The marsh would provide areas for planting, if no natural colonization occurs, and spread of wetland vegetation, such as *Spartina alterniflora* and *Juncus roemerianus*, which serves to filter sediment from the water and increase dissolved oxygen levels. The created marshes will provide new feeding grounds supporting natural resources, ecosystems, fisheries, marine and wildlife habitats, and coastal wetlands of the Gulf Coast region. The site will be closely monitored to track the development of the marshes and make recommendations for modifying the sites, if needed, to increase viability and to ensure functional equivalency to surrounding marsh. All conditions established in the Department of the Army permit for this activity will be adhered to during construction.

Leveraging and Co-Funding:

- **Adjoining:** This project builds upon the Deer Island restoration efforts totaling over \$25M which began in 2000 with the creation of 45 acres of emergent wetlands under the USACE Section 204 Continuing Authority, additional creation of wetlands on the northern shore of the island by the Mississippi Department of Marine Resources and local interests, filling of the western breach and augmentation of the southern shoreline by the USACE following Katrina and the upcoming Mississippi Coastal Improvement Program element to restore 400 acres on the eastern end of the island. DIMR III, which was the original focus of the FPL project, is a 40-acre site that has been recently constructed and filled adjacent to DIMR IV.

Duration of Activity: Construction could be implemented within 9 months of receiving funds and be completed within 6 to 9 months of construction initiation.

Life of Activity: Life span is expected to be a minimum of 10 years.

RESPONSE TO SCIENCE REVIEWS:

Comment: The overarching comments from the science reviews of the original proposal indicated that additional information would strengthen the proposal, this included providing more peer-reviewed studies associated with beneficial use, the chosen method, and similar projects; as well as additional information on ecological benefits, uncertainties, and measures of success.

Response: Additional Information related to the overarching comments is as follows.

General Takeaways: This project has been planned by Mississippi Beneficial Use Group beginning in 2012 as part of an overall effort concerning beneficial use of dredged material from Mississippi waters in compliance with Mississippi State Law (§49-27-61). The MDMR has the leverage to assess placement fees for private entity use of a designated beneficial use site that would be applied towards site maintenance and marsh creation.

Other Related Projects: The project builds on the experience and successes of similar projects that have been implemented by the Mobile District using dredged material from navigation maintenance. An additional project that has beneficially utilized dredged material is Macky Island in Florida. The information provided below, in how Macky Island was implemented, serves as a model for the Deer Island project.

Macky Island, associated with the Escambia River navigation project, was created to provide a disposal facility for the navigation channel in the lower Escambia River and mouth of Escambia Bay near Pensacola, Florida. A sound approach to accomplishing the long-term project needs provided numerous environmental and public benefits. Providing the long-term capability to maintain the Escambia River navigation project is essential towards sustaining vital commercial activities that are critical components of the local and regional economy. Construction activities consisted of the removal by pipeline dredge of material from within the footprint of the disposal area (see attached). An aquatic berm consisting of a geotube placed on a sandy base was constructed from the eastern end of the island extending around the south side forming an enclosed embayment for the purpose of wetland restoration. The area inside the aquatic berm is being used for advanced mitigation and creation of salt marsh habitat. Advanced mitigation is being conducted to compensate for impacts to wetland vegetation on the fringes of the upland portion of the island. Construction of Macky Island disposal area was conducted in three phases. The first phase consisted of the aquatic berm area on the south side of the island and was constructed prior to any initial maintenance dredging operations so that advanced mitigation actions could be initiated using on-site material from within the footprint of the aquatic berm. Smaller berms inside the perimeter of the aquatic berm area were also constructed for diversion of water flow and formation of wetland features.

The second phase, construction of the upland dike, during subsequent maintenance dredging of the navigation channel utilized the existing sand contained in the old disposal mounds on the island itself and sandy material from the channel dredging operations. The upland dike is being used to contain the fine-grained materials from subsequent dredging activities, allowing water to escape through strategically placed weirs. When the fine-grained material has become dewatered, it can be redistributed inside the aquatic berm area to form additional wetland features.

Phase three would be accomplished after many subsequent dredging activities. Future dredging activities would consist of using sandy material for the formation of desired wetland features inside the aquatic berm to encourage full wetland expansion inside the berm. Any additional sandy material not needed inside the berm, as well as the fine-grained materials, would be placed inside the upland containment area. Material can be redistributed and water

flow redirected to achieve the desired wetland and to maintain water quality requirements.

An adaptive management approach has been implemented to fine tune disposal site activities so that the desired wetland would be achieved. The non-federal sponsor, Escambia County, has agreed to monitor the wetland restoration and mitigation throughout the phased implementation. A coordination team consisting of representatives from the County and the Corps has been established to continually reassess the monitoring plan to determine if the desired wetland creation objectives are being achieved and adapting the monitoring plan to resolve any new issues that may arise. The purpose of the monitoring is to manage the Macky Island disposal site in an environmentally sustainable manner and assess expansion of the wetland vegetation growth towards the mitigation criteria. The Escambia County Department of Marine Resources is responsible for collecting and compiling a monitoring database for use on this effort. A similar adaptive management approach would be implemented at Deer Island to aid in the success of the project and address uncertainties.

Measures of Success: Prior to construction an interagency team will be established under the guidance of the existing Mississippi BUG to develop a specific protocol for monitoring the considered activity. The protocol will include project goals, objectives, performance criteria, monitoring methods and schedule, and potential adaptive management measures. In addition to the monitoring protocol for this specific activity the monitoring standards developed under the “Muck to Marshes” program under the State’s Department of Marine Resources and Mississippi Habitat Stewards will be evaluated to provide at a minimum the monitoring required for the subsequent filling of the site and establishment of wetland. These monitoring standards include photographs, vegetation, macrofauna, and bird surveys at restoration locations including both beneficial use sites and reference (natural) sites. Conditions established in the Department of the Army Permit for this project will be followed in determining success of the activity.

Sediment Management Studies:

Much information was gleaned from a summary of case studies along the Gulf coast prepared by Byrnes and Berlinghoff (2011)¹² for a variety of restoration projects that were implemented consisting of a variety of habitat types, restoration goals, and project sizes. The projects highlighted in this compilation exhibited their own unique characteristics that required specific approaches to restoration and conservation considering beneficial use of sediment including dredged material. A common approach was shared by each project in that they demonstrated effective use of sediment. Examples cited in this study varied from use of dredged material for bird habitat for avoidance of SAV impacts to similarly using material for containment dikes and marsh restoration. In all cases, sediment was used for habitat restoration rather than disposal outside the sediment system.

¹² Byrnes, M.R. and Berlinghoff, J.L., 2012. Gulf Regional Sediment Management Master Plan: Case Study Compilation. In: Khalil, S.M, Parson, L.E., and Waters, J.P. (eds) *Technical Framework for the Gulf Regional Sediment Management Master Plan (GRSMMP)*, Journal of Coastal Research, Special Issue No. 60, 72-124.

Another study by Parson and Swafford (2012)¹³ recognizing dredged material as a potential source of sediment to be considered in any conservation and restoration planning process was also considered in the course of preparing this proposal. The study recognized that wise use of sediment resources from dredging is integral to accomplishing the conservation and restoration initiatives and objectives being recommended under the Gulf of Mexico Alliance (GOMA). Keeping dredged sediments within the natural system or using it in the construction of restoration projects can improve environmental conditions, provide storm damage protection, and contribute to habitat creation and restoration goals. Hundreds of millions of cubic yards of sediments are dredged each year from Gulf ports, harbors, and waterways, much of which could be used beneficially.

A paper prepared by Reed et al. (2012)¹⁴ provides insight pertaining to water and sediment resource planning as an important component of natural resource management. Their study emphasizes that there may be ecologically disruptive consequences from conventional resource management plans and explores how sediment management methods may affect sediment dynamics in relation to the ecology of the habitats throughout the Gulf. Ideas are presented that should be considered to prevent future disruptions of natural processes when implementing sediment management strategies. The implications of these different management techniques can lead to extensive changes in coastal habitats.

ENVIRONMENTAL COMPLIANCE:

To comply with the National Environmental Policy Act (NEPA), the Council is proposing to adopt the 2021 Department of the Army Environmental Assessment (EA) prepared by the USACE in association with permit SAM-2018-00434-KMN. The Council has reviewed this EA and associated documents, including a USACE memorandum for the record dated April 1, 2021, documenting compliance with NEPA, the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the National Historic Preservation Act (NHPA), and other relevant environmental laws. The Council has determined that the subject EA and associated compliance documents address the environmental effects of the activity to be funded. To ensure compliance with ESA, MSA, NHPA, and other relevant laws, the Council will require that the sponsor of the project adhere to all applicable permit conditions listed in USACE permit SAM-2018-00434-KMN and the associated environmental compliance documents. The aforementioned environmental compliance documents can be found [here](#).

¹³Parson, L., and R. Swafford. 2012. Beneficial use of sediments from dredging activities in the Gulf of Mexico. In: S.M. Khalil, L.E. Parson and J.P. Waters (eds.), Technical Framework for the Gulf Regional Sediment Management Master Plan (GRSMMP). Journal of Coastal Research Special Issue No. 60, 45-50.

¹⁴Reed, D.J., A.C. Hijuelos and S.M. Fearnley. 2012. Ecological aspects of coastal sediment management in the Gulf of Mexico. In: S.M. Khalil, L.E. Parson and J.P. Waters (eds.), Technical Framework for the Gulf Regional Sediment Management Master Plan (GRSMMP). Journal of Coastal Research Special Issue No. 60, 51-65.