(1) COUNCIL MEMBER APPLICANT AND PROPOSAL INFORMATION SUMMARY SHEET

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Project Identification

Project Title: Restoration of Deer Island with Beneficial Use of Dredged Material	Project
State(s): Mississippi	County/City/Region: Harrison County

General Location: *Projects must be located within the Gulf Coast Region as defined in RESTORE Act. (attach map or photos, if applicable)*
Within the coastal zone boundaries of the Mississippi Coastal Zone Management Program

Project Description

RESTORE Goals: *Identify all RESTORE Act goals this project supports. Place a **P** for Primary Goal, and **S** for secondary goals.*

P Restore and Conserve Habitat
~~S~~ Restore Water Quality
~~S~~ Restore and Revitalize the Gulf Economy
S Replenish and Protect Living Coastal and Marine Resources
~~S~~ Enhance Community Resilience

RESTORE Objectives: *Identify all RESTORE Act objectives this project supports. Place a **P** for Primary Objective, and **S** for secondary objectives.*

P Restore, Enhance, and Protect Habitats
~~S~~ Restore, Improve, and Protect Water Resources
P Protect and Restore Living Coastal and Marine Resources
P Restore and Enhance Natural Processes and Shorelines
S Promote Community Resilience
~~S~~ Promote Natural Resource Stewardship and Environmental Education
S Improve Science-Based Decision-Making Processes

RESTORE Priorities: *Identify all RESTORE Act priorities that this project supports.*

x Priority 1: Projects that are projected to make the greatest contribution
x Priority 2: Large-scale projects and programs that are projected to substantially contribute to restoring
x Priority 3: Projects contained in existing Gulf Coast State comprehensive plans for the restoration ….
x Priority 4: Projects that restore long-term resiliency of the natural resources, ecosystems, fisheries …

RESTORE Commitments: *Identify all RESTORE Comprehensive Plan commitments that this project supports.*

x Commitment to Science-based Decision Making
x Commitment to Regional Ecosystem-based Approach to Restoration
x Commitment to Engagement, Inclusion, and Transparency
x Commitment to Leverage Resources and Partnerships
x Commitment to Delivering Results and Measuring Impacts

RESTORE Proposal Type and Phases: *Please identify which type and phase best suits this proposal.*

Project x Planning Technical Assistance x Implementation X Program

Project Cost and Duration

Project Cost Estimate: **Total** :	**$ 3 Million**	**Project Timing Estimate**: Date Anticipated to Start: Within 3 months of Funding Time to Completion: 6 to 9 months / years Anticipated Project Lifespan: 50 years

(2) EXECUTIVE SUMMARY

Beneficial use for coastal Mississippi means keeping the sediments "in the littoral transport system." Historically, dredged material has been disposed in open-water disposal sites or in upland facilities. This essential philosophy now ensures dredged material removed from Mississippi Sound is beneficially reused within the system, as close to the dredged area as possible. To facilitate retaining these vital sediments, the State of Mississippi passed a law requiring dredging projects of over 2,500 cubic yards (cys) of sediment to be used beneficially if there is a designated beneficial use site.

The proposed habitat restoration project would consist of an earthen containment structure encompassing approximately 40 acres of open-water within Mississippi Sound, adjacent to Deer Island, Harrison County, Mississippi. Material dredged from navigation projects, such as the Federal Biloxi Harbor navigation project or smaller private channels, would be beneficially placed and managed within the site to create emergent wetlands. While the primary goal of the proposed project is emergent tidal marsh habitat restoration, it also provides a beneficial use site to support, leverage, and facilitate the Mississippi state law. Deer Island, located in Mississippi Sound near the mouth of Biloxi Bay and the City of Biloxi, Mississippi, is a State owned spindle-shaped 4.5-mile long island that has been a focus of ecosystem restoration since early 2000. In 2005 a 45 acre emergent wetland was created by the USACE in partnership with the Department of Marine Resources utilizing dredged material from the Federal channel and in 2010 – 2012 a 1-mile wide breach in the western end of the island and the entire 4.5 mile southern shoreline restored with funds provided following Hurricane Katrina. The island serves as the nesting habitat for endangered sea turtles as well as numerous shorebirds, bald eagles, and osprey while providing valued recreational benefit for the citizens of coastal Mississippi.

Comprehensive Plan Goals and Objectives. The primary goal of this project is to restore and conserve habitat by restoring an estimated 40 acres of estuarine tidal marsh by creating a containment structure into which readily available sediment material from the Biloxi Harbor navigation project and smaller private channels would be placed. This project is a significant step toward restoring the ecosystem diversity to regional tidal marsh and open water estuarine habitats and the continuation of an overall restoration of Deer Island to its pre-1900 footprint. The project will enhance utilization of navigation maintenance sediment and contribute to maximizing use of dredge material for effective and sustainable coastal restoration. The primary objective is to Restore, Enhance, and Protect Habitats by restoring the estuarine marsh through the construction of an earthen containment area and placement of dredge material at a cost of about $75,000 per acre. RESTORE funds will be utilized to create the containment feature, cost of placement and management of material will be leveraged from Federal and private interests. The project will enhance utilization of navigation maintenance sediment and contribute to maximizing use of dredge material for effective and sustainable coastal restoration.

Project Implementation. MDMR currently holds a Department of Army permit from USACE Mobile District, Regulatory Division to construct the original containment and emergent tidal marsh feature utilizing the beneficial use of dredged material concept. This permit expires in 2021 but could be renewed if necessary. All environmental clearances, such as cultural resources, submerged aquatic vegetation surveys, Essential Fish Habitat, and Section 7 of the Endangered Species Act concurrences, have been obtained and do not need to be re-coordinated. The dike design and footprint has been identified and sandy substrate now exists at the site to lay the coarser grain material beneficially utilized from the Black Warrior Tombigbee (BWT) upland borrow sites upon.

Between approximately 75,000 and 100,000 cys of the coarse grain sandy material from the BWT would be excavated and placed on barges for transit to the restoration site. The barges would transport the material down river 80 miles and then across Mobile Bay and Mississippi Sound 80 miles to Deer Island. The barges would then be offloaded hydraulically to avoid excessive access channel construction and reduce delays associated with common low water events. Additional equipment, such as marsh buggies and bulldozers would be used to achieve the required grades and tolerances.

The containment features include the construction of a 5 acre ridge (Chenier) along the southern boundary of the site (against the current island shoreline) and the rehabilitation/completion of a previously iniated northern containment berm. The southern Chenier will be constructed to an elevation of approximately +10 ft along the entire southern footprint using the hydraulically placed sand. This feature will resemble naturally occurring sandy ridges that offer protection of the site from larger storm events as well 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. The northern berm at elevation + 7 ft will initially act as containment for future fine grain dredge material placed over the next couple of years, but will eventually be degraded to allow for full tidal exchange and access for marine organisms once the new marsh is established. An open area will remain at the west end of the site to allow some tidal influence and draining until the site becomes a fully functional marsh. Once all work is completed under this proposal, the 40 acre site will be able to contain approximately 400,000 cys of locally dredged material.

(3) PROPOSAL NARRATIVE

1. Introduction and background

The proposed habitat restoration project would consist of an earthen containment structure encompassing approximately 40 acres of open-water within Mississippi Sound, adjacent to Deer Island, Harrison County, Mississippi. Material dredged from navigation projects, such as the Federal Biloxi Harbor navigation project or smaller private channels, would be beneficially placed within the site. While the primary goal of the proposed project is emergent tidal marsh habitat restoration, it also provides a beneficial use site to support, leverage, and facilitate the Mississippi state law (§49-27-61) passed to ensure material is beneficially used.

Beneficial use for coastal Mississippi means keeping the sediments "in the littoral transport system." Historically, dredged material has been disposed in open-water disposal sites or in upland facilities. This essential philosophy now ensures dredged material removed from Mississippi Sound is beneficially reused within the system, as close to the dredged area as possible. To facilitate retaining these vital sediments, the State of Mississippi passed §49-27-61, *Charges for Materials Removed under Permit; Alternative for Dredge Material Disposal*. In summary, the law ***requires*** dredging projects of over 2,500 cubic yards (cys) of sediment to be used beneficially if there is a designated beneficial use site. Therefore, to ensure material is used beneficially, MDMR must actively obtain permits and construct new beneficial use sites. The challenge is to identify sites within each county that can be permitted as beneficial use sites.

The State of Mississippi and the U.S. Army Corps of Engineers (USACE), Mobile District leveraged programs and staff expertise to form and co-chair the Mississippi Beneficial Use Group. Participating members include Federal, State and local entities. Focus centers upon actively identifying potential dredging projects, and identifying and coordinating future beneficial use sites that can retain this material to be in compliance with State law. Challenges routinely arise due to the fact of a very limited number of existing beneficial use sites in comparison to dredging volumes, extensive timeframes required to permit and construct future sites, and design consideration to account for projected sea level rise.

The Mississippi marshes have come under increasing pressure due to industrial and suburban developments, hurricane and storm damage, and man-made disasters. Marsh erosion has increased wave energy along Mississippi's shoreline. Erosion and disappearance of marsh habitat has resulted in increased exposure to wave energy and accelerated erosion of valuable wetlands along both the mainland of Mississippi and Deer Island, Harrison County (Figure 1). Deer Island, located in Mississippi Sound near the mouth of Biloxi Bay and the City of Biloxi, Mississippi (Figure 2), is a spindle-shaped 4.5-mile long island originating from late Pleistocene beach ridges (Schmid and Otvos, 2003). In fact, certain portions of Deer Island's shoreline are completely void of vegetation and typified a system lacking protection preferred by most marine organisms. Tidal marsh plays an integral role in the overall condition of nearshore coastal and estuarine waters. Typically, various types of particulates, such as excess nutrients and sediments, are assimilated by the marsh, which increases water quality in the surrounding areas. In addition, tidal marsh stabilizes sediments by promoting sedimentation of particles and inhibiting re-suspension of both organic and inorganic materials. This marsh habitat provides productive areas for numerous species of fish, crustaceans, and other invertebrates.

Restored marshes protect shoreline from wave energy while also performing environmental functions, such as increasing water quality, promoting settling of suspended particulates, and providing habitat to various species of birds, fish, crustaceans, and other invertebrates. Collaboration between the MDMR and USACE, Mobile District, along with other interested Federal, State and local parties, actively re-establishes emergent tidal marshes along Mississippi's coastline through this beneficial use program. The Mississippi Beneficial Use Group actively seeks proposed restoration areas along the coastline to accept material dredged from the water bottoms.

The USACE, Mobile District's recent involvement in several environmental activities on Deer Island include a Section 204 marsh restoration project on northeastern side of the island (Water Resources Development Act of 1992 - Beneficial Uses of Dredged Material (in connection with dredging of a federally authorized navigation project)) *and* restoration of the island's breach, emergent marsh, and southern shoreline [authorization originated from Section 528 of the Water Resources Development Act of 2000 (Coastal Mississippi Wetlands Restoration Projects) but received additional funding through several public laws in response to hurricane damages] (Figure 2). The USACE, Mobile District completed a restoration project on Deer Island in spring 2012. Deer Island was divided into two parts by Hurricane Camille in 1969 and the breach increased with additional storms. Hurricane Katrina greatly increased the size of the breach. The restoration project involved restoring the breach, planting emergent tidal marsh, and reconstructing sandy beaches along the southern shoreline including stabilizing the potential Graveline Bayou breach. The island was then densely planted with large trees, shrubs, and grasses. Prior to theses restoration efforts, Deer Island had lost an estimated one-third of its 1850 footprint.

MDMR expanded restoration efforts at Deer Island in 2012 while also serving its beneficial use of dredged material mission. MDMR constructed an earthen containment structure adding approximately 40 acres adjacent to the USACE, Mobile District's northeast Section 204 site (Figure 2). Material utilized for the exterior sandy berm was collected from within the site's interior and utilized to retain newly placed material dredged from the local area. Due to wave energy from tropical events and the sandy berm material's fine consistency, the site experienced accelerated erosion. Some silts and clays have since been placed within the site's interior excluding it from being identified as a potential borrow source.

The USACE, Mobile District's proposal identified the Black-Warrior and Tombigbee (BWT) upland disposal sites in Alabama as a beneficial use source to rebuild the earthen containment structures. This dredged material would re-establish the exterior sandy berm and serve as a more stable containment structure while incidentally adding capacity to limited upland storage site(s) in the river system. This site would provide the Mississippi Beneficial Use Group with a much needed designated and available site. Material dredged from the local area, such as the Federal Biloxi Harbor navigation project or other private projects, would be placed within the site. Should natural colonization of emergent tidal marsh vegetation not occur, then the site would be planted with appropriate tidal marsh species.

The Deer Island Preserve is comprised of 400 acres and follows the beach on Deer Island. Adjacent waters of Mississippi Sound are designated at Gulf sturgeon critical habitat. The majority of the lands within the preserve are owned, managed and monitored by the MDMR. Habitat within the preserve is comprised of: Mississippi Sound sand bottoms; barrier island pond/lagoon complex; polyhaline marsh; mesohaline marsh; slash pine maritime forest; and relic dune scrub. This habitat provides a feeding, resting and wintering area for migratory birds, including the brown pelican and cormorant. The preserve supports the great blue heron rookery and a number of rare and endangered species, including

piping plover, brown pelican, sharp-shinned hawk, American kestral, merlin, snowy plover, American oystercatcher, least tern, and southern red cedar. Other species known to utilize the island include nesting sea turtles, ospreys, and bald eagles. Although, Deer Island is not a true barrier island, it provides the City of Biloxi some refuge from hurricane and storm damage. Furthermore, the island has an extensive cultural history embedded with the City of Biloxi's citizens. This island's close proximity allows schools' utilization for educational purposes, and the recreational uses, such as motor and paddle vessels or those sunbathing on its white southern sandy beaches.

The proposed project would enhance natural resource stewardship with MDMR and continue to provide educational outreach. It would contribute to economic sustainability of the region and the Biloxi Harbor navigation project. The 40-acre site would provide a much needed location to place dredged materials consistent with Mississippi state law.

2 Implementation Methodology

MDMR obtained a Department of Army permit in 2011 from USACE, Regulatory Division to construct the original containment and emergent tidal marsh feature utilizing the beneficial use of dredged material concept. This DA permit is valid for 10 years; and, therefore is still in existence to pursue the proposed beneficial use of dredged material effort. All environmental clearances, such as cultural resources, submerged aquatic vegetation surveys, Essential Fish Habitat, and Section 7 of the Endangered Species Act concurrences, have been obtained and do not need to be re-coordinated (See Appendix A). Furthermore, the dike design and footprint has been identified. A sandy substrate now exists at the site to lay the coarser grain material beneficially utilized from the BWT upland borrow source upon.

Between approximately 75,000 and 100,000 cys of the coarse grain sandy material from the BWT would be excavated and placed upon barges for transit to the restoration site. The barges would transport the material down river 80 miles and then across Mobile Bay and Mississippi Sound 80 miles to Deer Island. The barges would then be offloaded hydraulically to avoid excessive access channel construction and reduce delays associated with common low water events. Additional equipment, such as marsh buggies and bulldozers would be used to achieve the required grades and tolerances.

The containment features include the construction of a 5 acre Chenier (ridge) along the southern boundary of the site adjacent to the existing shoreline and the rehabilitation/completion of the northern containment berm. The southern Chenier will be constructed to an elevation of approximately +10 ft along the entire southern footprint using the hydraulically placed sand. This feature will resemble naturally occurring sandy ridges that offer protection to the site from larger storm events as well 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 northern berm at elevation + 7 ft will initially act as containment for future fine grain dredge material placed over the next couple of years, but will eventually be degraded to allow for full tidal exchange and access for marine organisms once the new marsh is established. As the design dictates, an open area will remain at the west end of the site to allow some tidal influence and draining until the site becomes a fully functional marsh. Once all work is completed under this proposal, the 40 acre site will be able to contain approximately 400,000 cys of local beneficial use dredge material.

3. Monitoring and Adaptive Management of the Project or Program.

The proposed 40-acre restoration site would be monitored to ensure the project meets the goal of retaining dredged material according to the State of Mississippi law (§49-27-61) and providing for the creation of functional tidal wetlands. Prior to construction, an interagency monitoring team would be established to develop a monitoring protocol for this 40-acre restoration site. The protocol would include project goals, objectives, performance criteria, monitoring methods and schedule, and potential adaptive management measures. RESTORE funding would cover the cost of the monitoring program. Costs have been estimated based on the assumptions that: 1) the primary monitoring data for evaluating achievement of the ecological success criteria would be aerial photography; and 2) regular site visits would also be conducted to detect the progression of recruitment of salt marsh vegetation as well as occurrence of undesirable plant species and monitor marsh elevation and circulation. Should relative sea level rise be higher than projected, marsh elevation could be increased by thin-layer placement of dredged material from the Biloxi Harbor navigation project or other dredging projects. The cost of adding more material would likely be minimal because of the continuing need to maintain the navigation project(s), and the close proximity to the beneficial use site and would not be borne by RESTORE.

4. Measures of Success for the Proposed Project or Program.

- Meets intent of the Mississippi state law – retain dredged material within the system.
- Earthen Containment Feature constructed to DA permit and/or plans and specifications.
- Earthen containment dikes constructed would be rehabilitated prior to use as needed.
- Success of marsh creation in beneficial use site would be measured against performance criteria

5. Risks and Uncertainties of the Proposed Activities.

Relative Sea Level Rise

Current USACE guidance on assessing the impacts of sea level rise on project construction and operation has been utilized in the preparation of this proposal (USACE EC 1165-2-212, October 2011). The USACE guidance specifies the use of "low", "intermediate", and "high" rates of future sea-level change based upon the local historic rate of mean sea level (low) and curves established by the National Research Council (1987) for the intermediate and high rates. USACE guidance requires consideration of projected future sea-level changes and impacts in project planning, design, and O&M. Because future sea level rise rates are uncertain, planning and design should consider project performance for a range of sea level change rates. Historic rates are used as the lower bound sea level change rate. Predictions of future sea level due to intermediate and high rates of sea level change are to be developed in accordance with USACE guidance by extension of rate Curve 1 and Curve 3 respectively from the National Research Council's 1987 report *Responding to Changes in Sea Level: Engineering Implications.*

Historic rates of sea level change are determined from tide gage records. Long-term tide gage records on the order of 40 years are preferred over shorter term records because the sea level change rate estimate error decreases as the period of record increases. There are three long-term tide gages in the vicinity of Deer Island: Dauphin Island, Pascagoula, and Biloxi. The Pascagoula gage is owned and operated by the USACE, Mobile District. However, because the gage is located within the Pascagoula River channel, the water surface elevation there is influenced by riverine discharge and would not be expected to be as representative of open water conditions in Mississippi Sound as Mobile District's Biloxi gage number 02480351 or the U.S. Geologic Survey Dauphin Island gage number 8735180.

Sea level rise rates for these locations are shown in Table 1. The rate of rise shown for Biloxi was fitted to annual mean tide level data by the method of least squares. The rate of rise shown for Dauphin Island was fitted by a slightly different method and obtained from NOAA technical report. The difference in fitting methods is immaterial for present purposes.

Table 1

Historic Sea Level Rise Rates

Location	**Rise in mm/yr**	**Std. Error of Rise**
Dauphin Island, AL	2.89	0.87
Period of Record	1966-2006	
Biloxi, MS	2.26	0.26
Period of Record	1928-'76, '79-98	

Source: USACE.

USACE, Mobile District's Biloxi gage number 02480351 is located near Point Cadet and is about two miles closer to the project reach than the USGS Dauphin Island gage number 8735180. It is otherwise unclear which gage would best represent perspective conditions at Deer Island, owing to the following differences:

- The Biloxi gage is located on the mainland fringe and may be more geotechnically stable than the Dauphin Island gage, which is on a barrier island with resource extraction platforms in the near vicinity.
- Biloxi has a longer period of record (68 years versus 41 for Dauphin Island), though it is intermittent.

Predicted rise scenarios for the Biloxi and Dauphin Island sites were computed in accordance with current USACE guidance and are shown in Figure 3 and Figure 4. Predicted rise varies between about 0.8 feet and 1-foot. Use of Dauphin Island relative sea level rise rates in the predictive equations results in about 0.25 feet (three inches) greater rise over the 100 year period 2000-2100 than predictions using rates determined from the Biloxi gage data.

Analysis of historical data suggests a relative sea level rise of approximately nine inches along the Mississippi coast during the 20th century. Relative sea level rise is what an observer standing on the shoreline over a long period would observe, which includes the combined effects of land subsidence (or uplift) and the rise of sea level in and of itself. For the last twenty-five years, the climate change community has also been arguing that sea level rise will accelerate in the 21st century, though to date, there is no clear confirmation that acceleration is actually taking place.

It is important to recognize that sea level has been rising, and it's prudent (and required by USACE regulations) to recognize the uncertainties inherent in sea-level rise projections. Given the long-term nature of this phenomenon, future sea level rise was projected over a 100-year period. However, the period of analysis specified by ER 1105-2-100 for USACE water resources projects of this type is 50-years. Based on extension of the Biloxi, MS tide gage data, predicted 21st century sea level rise is about 0.8 feet, about 0.4 feet over a period of 50 years. This assumes that sea level rise proceeds in the 21st century at a rate corresponding to the 20th century rate at this location. Assuming a high rate of

rise in accordance with USACE guidance gives an estimate on the order of five feet of rise over the 21st century. This level of sea level rise can be easily adapted to in the proposed project.

Construction

Soft sediments in some areas may create foundation concerns for containment dikes. If not designed properly for these areas, dikes could fail. However, that initial dike construction does provide a sandy foundation to lay the coarser grain material upon which greatly minimizes that risk. Storm surge associated with hurricanes and tropical storms poses a threat to containment dikes and marsh during and after project construction. Estimates of the quantity of dredged material available for marsh fill have been based on the Biloxi Harbor Federal navigation channel and other private smaller dredging events. The MDMR manages the beneficial use site for placement of dredged material. The containment dikes at Deer Island would be greatly susceptible to accelerated erosion without the placement of material within the site. To avoid this the USACE, Mobile District would work with MDMR to prioritize placement of dredged material into the Deer Island site in order to quickly stabilize the containment structure.

Environmental

Although no environmental construction windows are proposed, all construction and marsh filling activities would be completed to minimize any environmental impacts to sea turtles, shorebirds, or other species to the maximum extent practical.

Hazardous, Toxic, and Radioactive Waste (HTRW)

The project area including both the BWT upland sites and the Deer Island lie primarily areas in where there are no known sources of contamination. The Corps knows of no sources of hazardous, toxic and radioactive waste (HTRW) in the project area. However, on April 20, 2010, the floating semi-submersible mobile offshore drilling unit Deepwater Horizon experienced an explosion and fire. The rig began leaking into the Gulf of Mexico. The total amount of oil and natural gas that has escaped into the Gulf of Mexico is unknown, but is currently believed to be approximate 4.9 million barrels. The spill has been known to cause damage to marine and wildlife habitats as well as the Gulf's fishing and tourism industries. Should oil be encountered during project construction, the U.S. Coast Guard will be notified.

6. Outreach and Education Opportunities

The USACE, Mobile District Public Affairs Office would announce the start and completion of construction with News Releases. The Deer Island beneficial use site is located on Mississippi Coastal Preserves lands, which are visited annually by thousands of visitors from the local area and U.S. Pamphlets and posters would be provided to the MDMR and other Federal and State agencies that describes the overall project and its RESTORE funding source.

The USACE, Mobile District would create a Mobile District webpage showcasing the project, its funding from RESTORE, and partnerships with MDMR, MDEQ, USFWS, NOAA, and other resources agencies.

The USACE, Mobile District and MDMR would provide personnel to assist with field trips for high school and college students interested in Engineering and Sciences to learn about project construction

and observe the functionality of the completed beneficial use of dredged material (i.e. a viable natural resource) through the USACE STEM Program.

7. Leveraging of Resources and Partnerships

Completion of the Deer Island beneficial use site would leverage RESTORE funding with USACE O&M program (Federal) and private funding to complete filling, site contouring and planting of the marsh cells, if necessary. Partnerships between USACE and MDMR to restore historically eroded Mississippi coastline have been in existence since the Department's conception in early 1980s. Collaboration with the Mississippi Beneficial Use Group which has other Federal, State and local entities' participation has only strengthened this beneficial use of dredged material effort. Dredged material used in the fill of the containment area and wetland creation would be funded via USACE, State, and private interests.

8. Project Benefits

Mississippi Sound is a naturally shallow coastal lagoon that extends from Mobile Bay, Alabama, to Lake Borgne, Louisiana. The average non-dredged depth is approximately 13 feet. The average tidal exchange is modest, averaging only 1 to 2 feet. The three of Mississippi's major drainage basins (Pascagoula, Pearl, and Coastal Streams) discharge into Mississippi Sound. Combined, they account for approximately 1,800 square miles of drainage area and over 11,000 million gallons per day of discharge into Mississippi Sound.

Aerial photographs show many canals throughout the wetlands of Mississippi's coast, which have altered the flow through the system. Dredging activities have been carried out in Mississippi Sound and the Pearl and Pascagoula Rivers since at least 1908 (Nautical Chart 1901-1908). Currently, four major Federal navigation channels are maintained in the Mississippi Sound: Gulfport Harbor, in Harrison County; Biloxi Bay, in Harrison County; Pascagoula Harbor, in Jackson County; and the Gulf Intracoastal Waterway. Hurricane Katrina changed how Mississippi manages its coastline and how dredged material is used. The storm decimated the barrier island system, particularly Ship and Islands.

Constructing this beneficial use containment site at Deer Island would restore, improve, and protect aquatic habitat in and near 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 would encompass approximately 40 acres of open-water in Mississippi Sound. Placement of dredged material beneficially at an elevation to establish emergent tidal marsh habitat would ultimately improve water quality by reducing erosion and sedimentation in the water column. These marsh lands 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. These created marshes would also provide nursery grounds for coastal resources including finfish and shellfish. Many fishery species prefer marsh edge, so creation of these free-standing *Spartina alterniflora* and *Juncus Roemerianus* marshes with interior circulation should enhance its habitat value and cause a substantial increase in its use by these species.

While the creation of these marsh lands would result in an overall loss of shallow, unvegetated subtidal habitat, the area replaced by marsh would be very small compared to the total area of open water habitat in the vicinity. Furthermore, in a 1997 study by NMFS that compared natural and

created wetlands, it was found that natural and created marshes did not differ in species richness of nekton (Minello and Webb 1997). The created marshes would provide new feeding grounds supporting natural resources, ecosystems, fisheries, marine and wildlife habitats, and coastal wetlands of the Gulf Coast region. The construction of the Deer Island beneficial use site would improve science-based processes and recognize the ongoing collaborative and interagency coordination and partnerships necessary for planning and implementation by increasing participation from project sponsors; improve data collection, sharing, and archival, technical tools; and improve understanding of regional processes thereby providing improved management decisions.

The site would 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.

9. Focus and Emphasis Areas

a. Focus Area. The main focus of this project is to accomplish habitat restoration. Through the beneficial placement of readily available dredged material to create an earthen containment structure encompassing approximately 40 acres of open-water within Mississippi Sound, adjacent to Deer Island, Harrison County, Mississippi. Material dredged from navigation projects, such as the Federal Biloxi Harbor navigation project or smaller private channels, would be beneficially placed within the site. While the primary goal of the proposed project is emergent tidal marsh habitat restoration, it also provides a beneficial use site to support, leverage, and facilitate the Mississippi state law (§49-27-61) passed to ensure material is beneficially used. The project will create and restore emergent estuarine tidal marsh that has transitioned into shallow open water habitat. A secondary focus is improving water quality by creating and restoring high density marsh vegetation that acts as a natural sink for nutrients and promotes sedimentation. This natural process improves the overall water quality resulting in enhanced quality of water entering the Gulf of Mexico.

b. Emphasis Area. By restoring estuarine marshes, the proposed project addresses a significant ecosystem issue in that marshes in the Mississippi Sound have come under increasing pressure due to industrial and suburban developments, hurricane and storm damage, and man-made disasters. Marsh erosion has increased wave energy along Mississippi's shoreline. Erosion and disappearance of marsh habitat has resulted in increased exposure to wave energy and accelerated erosion of valuable wetlands along both the mainland of Mississippi and Deer Island, Harrison County. Restoring these resources provide a degree of storm protection and as well providing valuable ecosystem services to the Sound. These resources improve water quality and provide habitat for variety of marine wildlife associated with estuarine areas. Creating and restoring the marsh benefit humans supporting local fisheries, oyster production, and enhancing ecotourism. All of these services provide a significant boon to the local economy. Overall, the project restores brackish estuarine marshes that are among the most highly productive ecosystems and have historically been important to fisheries, migratory birds, and various protected species.

Once the containment area is constructed, the area will be used for placement of dredged material from the nearby Federal navigation channel as well as from private channels. Having this placement option provides greater cost efficiency rather than disposing of the material in the open water and upland disposal areas providing a high probability that the project will succeed and be sustainable over the life of the project.

Creating and restoring the tidal marsh takes advantage of opportunities for mitigating the loss of resources and shorelines by keeping sediment into the system. Doing so builds upon the USACE's strategies emphasizing the connection between maintenance dredging requirements of the navigation channel, beneficial uses for purposes of ecological restoration, and RSM philosophies.

The project offers substantial opportunities to document and build on these collaborative efforts with different missions and purposes. Opportunities that could be applied in other areas of the southeast and the nation include: collaboration and support; sediment transport modeling; information exchange and dissemination; knowledge management; training; and integration of the regulatory, planning, engineering, and operational processes. The RSM approach for beneficially using dredged material in conducting restoration practices provides the ability to coordinate and collaborate; integrate numerous tools, technology, and data; leverage funding; and enhance partnerships. A regional approach to restoration more effectively leverages the resources of the Gulf Coast and promotes holistic Gulf Coast recovery.

B. Specific Requirements

1. Comprehensive Plan Goals

a. Restore and Conserve Habitat. The primary goal of this project is to restore and conserve habitat by restoring an estimated 40 acres of estuarine tidal marsh through the placement of readily available sediment material from the Biloxi Harbor navigation project and smaller private channels, into the containment structure. This project is a significant step toward restoring the ecosystem diversity to regional tidal marsh and open water estuarine habitats. The project will enhance utilization of navigation maintenance sediment and contribute to maximizing use of dredge material for effective and sustainable coastal restoration.

b. Restore Water Quality. Improving water quality would be a secondary goal by improving water in providing high density marsh vegetation. Tidal marsh plays an integral role in the overall condition of nearshore coastal and estuarine waters. Typically, various types of particulates, such as excess nutrients and sediments, are assimilated by the marsh, which increases water quality in the surrounding areas. In addition, tidal marsh stabilizes sediments by promoting sedimentation of particles and inhibiting re-suspension of both organic and inorganic materials.

c. Replenish and Protect Living Coastal and Marine Resources. The BU of dredged material in existing shallow water will be converted to emergent tidal marsh. The project will provide a transition into productive higher quality fish habitat by protecting healthy, diverse, and sustainable living coastal resources. The emergent marsh and associated vegetation is vital to juvenile fish species that depend on such areas for nursery habitat. Intertidal marshes supports plant species that provide nursery and foraging grounds for a variety of economically important marine species including red drum, black drum, sand trout, spotted seatrout, southern flounder, Atlantic croaker, striped mullet, menhaden, white shrimp, brown shrimp, and blue crab. The project would also be beneficial a variety of other wildlife species in that would utilize the project area.

d. Enhance Community Resilience. An extensive and healthy tidal marsh will provide a degree of storm protection. Enhancing and maintaining the supply of sediment to the restoration area and restoring a function marsh will provide hurricane and storm damage protection by reducing the damaging effects of hurricanes and severe storms to properties and environmental resources along the coastal region and help to stabilize adjacent shorelines and protecting against long-term erosion.

e. Restore and Revitalize the Gulf Economy. The proposed project will serve to restore and revitalize the Gulf economy by providing the habitat necessary for growing and sustaining fish species critical to recreational and commercial fishing industries. Recreational and commercial fishing is a

prominent industry vital to the local and regional economies. Estuarine marsh habitats provide food sources and natural protection from predators (U.S. DOI FWS 1983). Restoring coastal estuarine habitats for fish and wildlife species dependent upon such habitat for nursery, shelter, food, nesting, cover, and other life requirements will benefit the Gulf economy. In addition, creation of the BU site provides for long-term cost effective placement of dredged material for the economically vital navigation industry base of the area.

2. Comprehensive Plan Objectives

a. Restore, Enhance, and Protect Habitats. The primary objective of the proposed project is to Restore, Enhance, and Protect Habitats by restoring approximately 40 acres of coastal wetland habitat through the construction of an earthen containment structure and sediment placement area and placement of dredge material at a cost of about $75,000 per acre. In addition to the primary objective of restoring habitats, the project will support most of the remaining Comprehensive Plan Objectives. The project will enhance utilization of navigation maintenance sediment and contribute to maximizing use of dredge material for effective and sustainable coastal restoration.

b. Restore, Improve, and Protect Water Resources. A secondary objective of restoring water resources will be accomplished by providing a transition of open bay bottom habitat to open shallow estuarine tidal marsh. The project would provide numerous benefits to a variety of other wildlife species that would utilize the project area.

c. Protect and Restore Living Coastal and Marine Resources. As outlined in the discussion on Comprehensive Plan Goals, restoration of emergent tidal marsh will protect healthy, diverse, and sustainable living coastal habitat essential for benthic invertebrates, fish, and various avian wildlife species.

d. Restore and Enhance Natural Processes and Shorelines. In addition to maintaining and protecting adjacent shorelines, the project would support the protection of existing estuarine configuration through the BU of dredged material. In doing so, the project will restore and enhance ecosystem resilience, sustainability, and natural defenses through the restoration of natural processes and shorelines. In addition, tidal marshes and their associated vegetation stabilize the shoreline by holding sediments in place and buffering wave energy.

e. Promote Community Resilience. An extensive and healthy tidal marsh will provide a degree of storm protection. Enhancing and maintaining the supply of sediment to the project area will provide hurricane and storm damage protection by reducing the damaging effects of hurricanes and severe storms to properties and environmental resources along the coastal region and help to stabilize adjacent shorelines and protecting against long-term erosion.

f. Improve Science-based Decision-making Processes. The science associated with dredge material placement is well established, as demonstrated by the USACE, Mobile District's ongoing sediment management efforts in Mississippi. The project offers substantial opportunities to document and build on collaborative efforts with different missions and purposes. The RSM approach for beneficially using dredged material for conducting restoration practices provides the ability to coordinate and collaborate; integrate numerous tools, technology, and data; leverage funding; and enhance partnerships. Activities associated with this effort will leverage existing tools from ongoing research while providing capabilities to evaluate probable consequences of natural change and specific project actions to make informed decisions associated with similar restoration practices. Scientific and engineering efforts associated with this proposal are include elsewhere in the document.

3. RESTORE Act and Comprehensive Plan Priority Criteria

The proposed project demonstrates a contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, shorelines, and coastal wetlands of the

Gulf Coast region, without regard to geographic location within the Gulf Coast region by beneficially utilizing dredged material (refer to Section 9 below). Information and lessons learned from this action can be applied to similar projects along the coastal areas throughout the Gulf of Mexico. Creating and restoring a large scale tidal marsh contributes substantially to restoring and protecting the natural resources of Gulf Coast ecosystem. The Mississippi Coastal Plan recognizes the need for wise use of natural resources including sediments. The Coastal Zone Agency of the State initiated and directs the work of the BUG. Emergent wetlands throughout the Gulf were heavily impacted by the Deepwater Horizon Oil spill.

4. **Comprehensive Plan Commitments**

The proposed project demonstrates how the creation and restoration of a large scale tidal marsh will achieve the commitments in the Comprehensive Plan, which includes:

a. Commitment to Science-Based Decision-Making. - The decisions made pursuant to the project will be based on the best available science, and this project will evolve over time to incorporate new science, information, and changing conditions. Commitment to best available science is evidenced in the previously conducted activities for Deer Island.

b. Commitment to a Regional Ecosystem-based Approach to Restoration. – While the project promotes ecosystem-based restoration within a specific geographic area it is a foundational project that could be expanded or combined with other projects to elicit Gulf wide benefit (Refer Section 9).

c. Commitment to Engagement, Inclusion, and Transparency – The proposed project includes the support and participation from the diverse stakeholders who live, work, and play in the Gulf Coast region through the establishment of the BUG.

d. Commitment to Leveraging Resources and Partnerships. - The proposed project has the continued involvement of the Mississippi BUG established to evaluate and provide guidance pertaining to alternative sediment management practices in along coastal Mississippi. The BUG consists of local, State and Federal agencies as well as academia and other non-governmental entities. The project offers substantial opportunities to document and build on these collaborative efforts with different missions and purposes. The approach taken to beneficially use dredged material in conducting restoration practices provides the ability to coordinate and collaborate; integrate numerous tools, technology, and data; leverage funding; and enhance partnerships. A large portion of the project i.e. long-term creation of wetlands, are leveraged against funds provided through a number of interests including USACE, DMR, and local navigation industry.

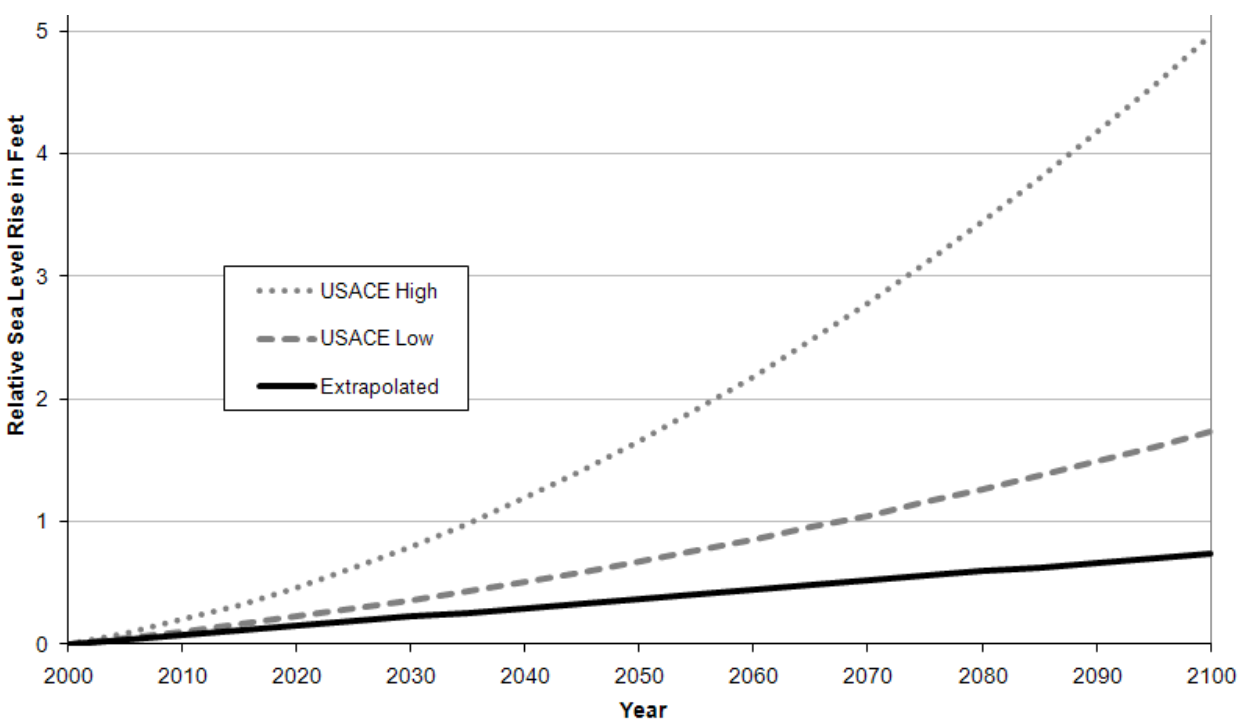
e. Commitment to Delivering Results and Measuring Impacts. - The proposed project which includes monitoring and adaptive management shows the importance of achieving tangible results over a specified time frame and ensuring that funds are invested in a way to benefit the ecosystem of the Gulf of Mexico.

(4) LOCATION INFORMATION

Figure 1: Deer Island Shoreline Erosion

Figure 2: Aerial of Deer Island

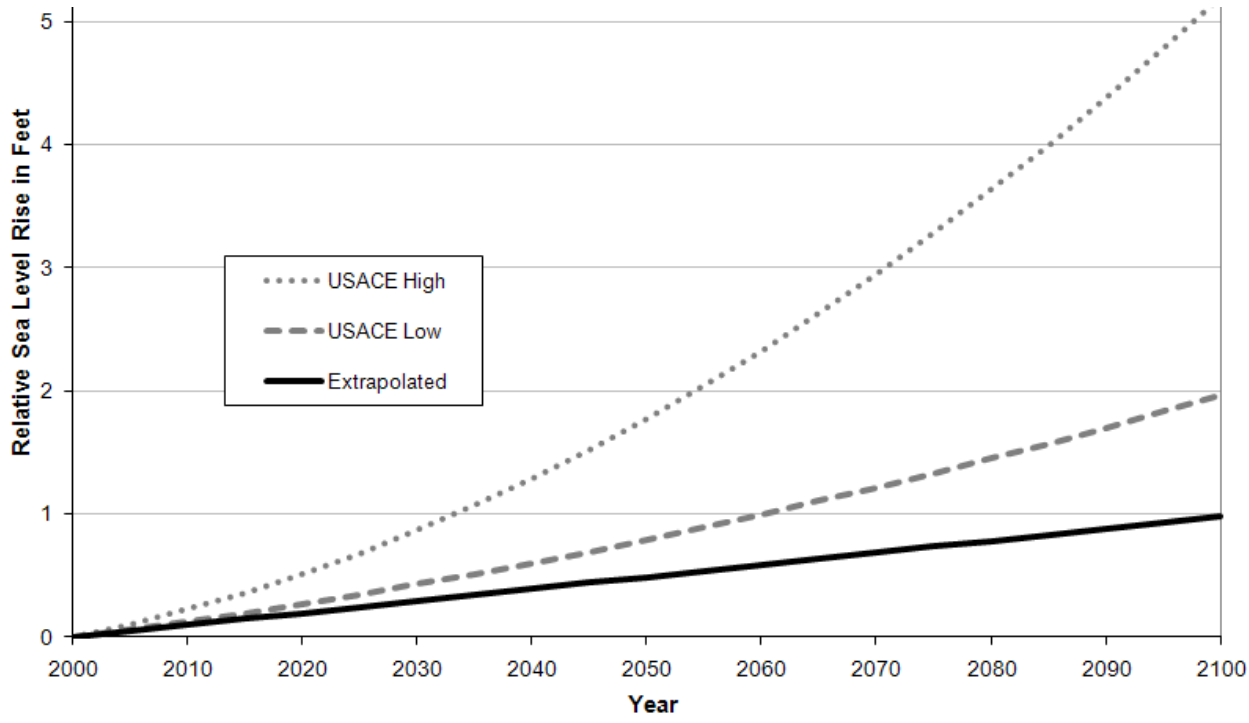
Figure 3



Sea Level Rise

Predictions, USACE gage 02480351 Biloxi, MS

Figure 4



Sea Level Rise

Predictions, 8735180 Dauphin Island, AL

(5) BUDGET NARRATIVE

Costs include obtaining the BWT material, transiting via barge from the upland site(s) down river, and hydraulically offloading material and reworking material at the site to establish the earthen containment feature. The total construction cost for the 40-acre marsh restoration site is $3 million. This includes all required water and land equipment. Additional details are in Section 2 - IMPLEMENTATION METHODOLOGY.

(6) ENVIRONMENTAL COMPLIANCE

This information is included under – Appendix A Environmental Compliance Checklist.

(7) DATA INFORMATION SHARING PLAN

The project offers substantial opportunities to document and build on Federal, state, local, non-profit, and academia collaborative efforts with different missions and purposes. Opportunities that could be applied in other areas of the southeast and the nation include: collaboration and support; watershed technology; information exchange and dissemination; knowledge management; training; and integration of the regulatory, planning, engineering, and operational processes. The approach taken will provide the opportunity to coordinate, collaborate and share tools, technology and data; leverage funding; and enhance partnerships. Information, data, and tools generated through the implementation of the project will be made available to state and Federal agencies, academia, and other stakeholders interested in conducting similar projects towards improving the use of sediment resources. The data can provide managers with information and tools necessary to make more informed decisions concerning beneficial use opportunities associated with dredged material. A web site, building on ongoing efforts in Mississippi as part of the MsCIP program, will be established to facilitate sharing of information.

(8) REFERENCES

Brock,,J.C., J.A. Barras, and S.J.Williams. 2013. Introduction to the Special Issue on Understanding and Predicting Change in the Coastal Ecosystems of the Northern Gulf of Mexico. Journal of Coastal Research, SI 63, pp. 1-5.

Gerhardt-Smith, J., J. MacDonald, S. Rees, and N. Lovelace. 2014. Deer Island Aquatic Ecosystem Restoration Project. ERDC-TN-EWN-TBD. Engineering Research Development Center, Vicksburg, MS

Gulf Coast Ecosystem Restoration Task Force (GCERTF). 2011. Gulf of Mexico Regional Ecosystem Restoration Strategy. www.epa.gov/gcertf/pdfs/GulfCoastRespor_Full_12-04_508-1.pdf.

Laws, 1973, ch. 385, § 11; Laws, 1988, ch. 408, § 3; Laws, 1994, ch. 578, § 46; Laws, 2005, ch. 371, § 2; Laws, 2010, ch. 412, § 1, eff from and after July 1, 2010.

Mabus, R. 2010. America's Gulf Coast: A long term recovery plan after the Deepwater Horizon Oil Spill. http://www.epa.gov/indian/pdf/mabus-report.pdf

Minello, T.J., and J.W. Webb, Jr. 1997. Use of natural and created *Spartina alterniflora* salt marshes by fishery species and other aquatic fauna in Galveston Bay, Texas, USA. Mar. Ecol. Prog. Ser. 151:165-179.

Schmid, K., and E.O. Otvos, 2003, Deer Island, Coastal Mississippi - a geological and historical story [abs]: Mississippi Academy of Sciences, v. 48, 1, p. 45.

USACE. 2009. Water Resource Policies and Authorities: Incorporating Sea-Level Change Considerations in Civil Works Programs. Engineering Circular. EC 1165-2-211, July 1 2009.

USACE. 2009. Mississippi Coastal Improvements Program (MsCIP) Hancock, Harrison, Jackson Counties, Mississippi. June 2009.

USACE, CECW-CE Washington, DC 20314-1000. Circular No. 1165-2-212 1 October 2011

U.S. Fish and Wildlife Service. 1983. *Habitat Suitability Index Models: Northern Gulf of Mexico Brown Shrimp and White Shrimp.* Report FWS/OBS-82/10.54. September 1983.

Gulf Coast Ecosystem Restoration Council
Environmental Compliance Checklist

Please check all federal and state environmental compliance and permit requirements as appropriate to the proposed project/program

Environmental Compliance Type	**Yes**	**No**	**Applied For**	**N/A**
Federal				
National Marine Sanctuaries Act (NMSA)				X
Coastal Zone Management Act (CZMA)	X			
Fish and Wildlife Coordination Act				X
Farmland Protection Policy Act (FPPA)				X
NEPA – Categorical Exclusion				X
NEPA – Environmental Assessment	X			
NEPA – Environmental Impact Statement				X
Clean Water Act – 404 – Individual Permit (USACOE)	X			
Clean Water Act – 404 – General Permit(USACOE)				X
Clean Water Act – 404 – Letters of Permission(USACOE)				X
Clean Water Act – 401 – WQ certification	X			
Clean Water Act – 402 – NPDES				X
Rivers and Harbors Act – Section 10 (USACOE)	X			
Endangered Species Act – Section 7 – Informal and Formal Consultation (NMFS, USFWS)	X			
Endangered Species Act – Section 7 - Biological Assessment (BOEM,USACOE)				X
Endangered Species Act – Section 7 – Biological Opinion (NMFS,	X			
Endangered Species Act – Section 7 – Permit for Take (NMFS, USFWS)				X
Magnuson-Stevens Fishery Conservation and Management Act Essential Fish	X			
Marine Mammal Protection Act – Incidental Take Permit (106) (NMFS, USFWS)				X
Migratory Bird Treaty Act (USFWS)	X			
Bald and Golden Eagle Protection Act – Consultation and Planning	X			
Marine Protection, Research and Sanctuaries Act – Section 103 permit (NMFS)				X
BOEM Outer Continental Shelf Lands Act – Section 8 OCS Lands Sand permit				X
NHPA Section 106 – Consultation and Planning ACHP, SHPO(s), and/or THPO(s)	X			
NHPA Section 106 – Memorandum of Agreement/Programmatic				X
Tribal Consultation (Government to Government)	X			
Coastal Barriers Resource Act – CBRS (Consultation)				X
State				
As Applicable per State	X			

(9) OTHER

1. Gulfwide Beneficial Use Of Dredged Material

Overview

During the last three decades of the 20th century, the standard perception was that dredged material was "spoil" or waste material that had no value or needed to be handled as a pollutant. However, as we move into the beginning of the 21st century, issues such as sea level rise, subsidence, loss of habitat, development, and pervasive storm damage in coastal areas has changed that perception. Most coastal managers now recognize that dredged material is frequently uncontaminated, and should be used as a resource to compensate for coastal erosion, to nourish beaches, to build habitat, and to return areas that have subsided below sea level back to an elevation within the tidal range. Even with this change in the way dredged material is valued, challenges remain. For example:

- Dredged material comes in various types from rock to fine grained silts and clays to 'fluff' or 'fluid mud'. Beneficial use of each requires different engineering approaches resulting in wide differences in cost;
- The location of the dredging or dredged material stockpile may not be in a location where there is a need for beneficial use;
- The timing of the dredging requirement is out of sync with the availability of a beneficial use site; or
- Project specific funding and/or overall funding may limit the range and/or extent of beneficial use.

While the function or value of individual beneficial use projects may be only local in scope, for instance, a new wetland area may help protect a particular stretch of levee around a small community, restore a section of critically eroded beach, or provide habitat for a specific population of estuarine organisms, cumulatively, multiple beneficial use projects across a wide geographic area could significantly offset coastal wetland loss, provide nursery areas or other habitats for important commercial species or species of concern such as sea turtles and neotropical migrants and minimize salt water intrusion by reestablishing estuarine boundaries through construction of spits and barrier islands.

The northern coast of the Gulf of Mexico is an ideal location to augment existing beneficial use efforts that are based only on individual projects and elevate them to a programmatic effort. The need and feasibility of a programmatic beneficial use program in the northern Gulf is due to the natural and man-made stresses on the coastal environment experienced in the recent decade, resulting in considerable habitat and wetland loss with subsequent impact on marine and coastal resources, and increase in water quality issues, which may be offset by the proximity of many authorized Federal navigation channels that are dredged on a regular basis as well as local or privately maintained channels, thus providing substantial quantities of materials for use.

Current Conditions in the Gulf of Mexico

The coastal region of the northern Gulf of Mexico owes its current landscape structure to an array of tectonic, erosional and depositional, climatic, geochemical, hydrological, ecological, and human processes that have resulted in some of the world's most complex, dynamic, productive, and threatened ecosystems (Brock et al. 2013). These ecosystems and the resources they support are

vulnerable to man-made and natural events such as development, catastrophic hurricane landfalls, ongoing subsidence and erosion exacerbated by sea-level rise, disintegration of barrier island chains, and high rates of wetland loss. Improving the resiliency of these ecosystems is a critical component of restoring the Gulf of Mexico as a whole.

Following the Deepwater Horizon oil spill, an assessment of the most pressing challenges facing the Gulf of Mexico ecosystem described the following (Mabus 2010):

- *Loss of wetland habitats, including coastal marshes, forested wetlands, barrier islands, and coastal shorelines that form the Mississippi River Delta and Chenier Plains.* While an issue in every Gulf state, the loss of coastal habitat has been most dramatically illustrated in Louisiana and highlights the need to maintain freshwater and sediment flows to the Gulf of Mexico. Since the 1930s, the coast of Louisiana has lost nearly 2,000 square miles (approximately 25 square miles per year) of wetlands. Causes of this loss include a combination of erosion, storm damage, land subsidence, alterations to natural freshwater and sediment flow from the Mississippi River, dredging of canals for oil and gas exploration and pipeline installation activity. Climate change (including the impacts of inundation and sea-level rise) threatens to accelerate the loss of these habitats.
- *Erosion of barrier islands and shorelines throughout the Gulf Coast.* From Florida to Texas, continued erosion of the coastal barrier island system undermines storm protection for coastal communities, threatens the beaches that support the local tourism economy, and affects numerous species that rely on these barrier islands for habitat (e.g., Kemp's Ridley and loggerhead sea turtles, numerous shorebirds and the Alabama beach mouse).
- *Loss and degradation of coastal estuarine habitat.* The estuaries and coastal systems of the Gulf Coast—such as Mobile Bay, Apalachicola Bay, Galveston Bay, Tampa Bay, Florida Bay, the Mississippi Sound, Barataria Bay and others—provide the nursery habitat for most of the fishery resources in the Gulf and support a nationally important oyster industry. These estuaries are impacted by a variety of stressors, including pollution, coastal development, energy development, erosion, hydrological alteration, changes in freshwater inflow, structural marsh management and overfishing.
- *Imperiled fisheries.* Several of the major commercially and recreationally important finfish species are currently experiencing pressures from overfishing or have been overfished. In some cases, these conditions have persisted for many years. Additionally, contaminants such as methyl-mercury in fishes, and red tide organisms and human pathogens in shellfish, reduce fishery values and endanger human health.
- *Hypoxia (low oxygen) in the Gulf of Mexico.* Hypoxia occurs where the concentration of dissolved oxygen in the water column decreases to a level that reduces the quality of habitat, resulting in death or migration away from the hypoxic zone. The northern Gulf of Mexico adjacent to the Mississippi River is the site of the largest hypoxic zone in the United States and the second largest hypoxic zone worldwide. This Gulf of Mexico "Dead Zone" is caused by input of excess nutrient pollution to the Gulf most of which comes from upstream through Mississippi River drainage.

- *Climate change*. Our changing climate is already altering, perhaps irreversibly, the physical, chemical and biological characteristics of our oceans, coasts and adjacent watersheds. Increasing air and water temperatures, changing precipitation patterns, rising sea level, and ocean acidification will increasingly confound efforts to restore or sustain system states.

Sediment, delivered by the Gulf river systems, built much of the Gulf Coast and continues to be essential to the health of the Gulf ecosystem. The utilization of dredged materials can offset some of the challenges listed in the Mabus report above, specifically those associated with erosion of barrier islands, loss of habitat and relative sea level rise mitigation. Accordingly, the Gulf Coast Ecosystem Restoration Task Force proposed a sediment management approach to address land loss through sustainable resource management and land building and restoration. The 2011 Gulf of Mexico Regional Ecosystem Restoration Strategy (GCERTF 2011) recommended 3 actions, two of which are related to dredged material:

- Maximize beneficial use of navigational dredged material, where practicable and ecologically acceptable, for effective and sustainable habitat restoration.
- Increase dedicated dredging of river and other sediment sources, such as permitted offshore sediment shoals, for use in habitat restoration projects.

Beneficial Use

Beneficial use is defined as the productive use of material produced during the authorized maintenance dredging of navigation channels. Dedicated dredging on the other hand while having the same purpose does not have the same required link with authorized navigation dredging. Selection of a beneficial use methodology is governed by the Federal Standard which is defined as the disposal alternative(s) identified by the USACE and its partners which represents the least costly alternative consistent with and meeting the environmental standards established by the 404(b)(1) evaluation process or ocean dumping criteria. Many states believe that the Federal Standard impede the beneficial use of dredged material, however, opportunity exists for a non-federal sponsor to pay the incremental cost between the Federal Standard established for the project and the actual cost of the beneficial use project.

Estimating cubic yards required to create BU acreage depends, among other things, on the placement site conditions (i.e., substrate, water depth, etc.), dredged material characteristics, and the use/non-use of containment. Applying one site's results to another site for predictive purposes is difficult and not entirely reliable. However, a reasonable estimate in a location such as coastal Louisiana is that 1 million cubic yards of material can create approximately 100 acres of wetland when using unconfined placement and between 150 and 200 acres for confined placement.

USACE activities in the Gulf of Mexico

Combined, the four Corps Districts covering the Gulf of Mexico (Galveston, New Orleans, Mobile, and Jacksonville) dredge approximately 123 million cubic yards from coastal Federal navigation projects on an annual basis[1]. Approximately 22 million cubic yards of this material is used beneficially as the least cost placement option or when a local sponsor is able to contribute funds to cover the incremental of the more costly beneficial use option. Details of the Corps dredging program are provided in the table below.

District	State	Annual Quantity	% Sand	% Fines	Current BU
Galveston	Texas	20 – 30 mcy	2.8%	97.2%	15 – 20% (3-4.5 mcy
New Orleans	Louisiana	41 mcy*			39% (16 mcy)
Mobile	Mississippi	8.5 mcy	2.9%	97.1%	3.2%[2] (270 kcy)
Mobile	Alabama	6.5 mcy	3.8%	96.2%	19%[2] (1.25 mcy)
Mobile	Florida panhandle	700,000 cy	70%	30%	50% (350 kcy)
Jacksonville	Florida	875,000 cy	28.1%	62.9%	37%[2] (325 kcy)

[1]Louisiana dredging totals approximately 78 mcy annually, however 37mcy is determined unsuitable for coastal restoration because it is fluff or the dredging location is remote from the coast.

[2]All sandy material is beneficially used

In addition, several Federal inland river navigation systems dredge sediments that could be suitable material for coastal restoration and place this material on 'upland' disposal areas. For example, approximately 18 million cubic yards is present in existing disposal areas along the Black Warrior – Tombigbee Waterway below the first dam. This material is predominately coarse grained sand and some of the areas have a high percentage of gravel which would make excellent containment features or be suitable to establish substrate suitable for oyster reef establishment.

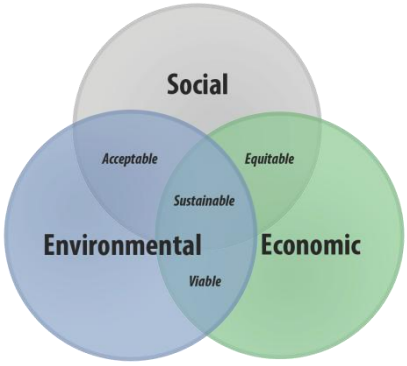
The USACE has an established track record in the area of beneficial use. For instance, the New Orleans District is responsible for the largest Federal channel maintenance dredging program in the nation. On average, the New Orleans District annually dredges approximately 78 million cubic yards (mcy) of material during routine maintenance of federally authorized navigation channels, of which approximately 41 mcy is currently suitable for beneficial use. The remainder of material is either dredged from remote locations that are too distant from beneficial placement sites to be economically used, or the material is physically unsuitable for beneficial use.

Of the 41 mcy of material available for beneficial placement, approximately 16 mcy, or nearly 40 percent, is used beneficially by existing MVN programs. Since 1976, the New Orleans District has beneficially used dredged material to create over 48 square miles (31,693 acres) of coastal habitat, including nearly 15,600 acres using material from the LMR. These beneficial use projects not only benefit the ecosystem by restoring habitat diversity to its historical marsh-ridge-open water configuration, which benefits commercial and recreational significant finfish, wildlife and water fowl species, but also abates saltwater intrusion into historically freshwater and brackish wetlands. Beneficial use projects may also promote community resilience by preventing further coastal retreat, dampen storm surges, and reduce storm damages providing economic and social benefits to the region.

Within the boundaries of the Mobile District, use of dredged material as a resource began in 1979 with the creation of Gaillard Island in Mobile Bay. Today this 1300 acre island serves as an active disposal area while at the same time serving as a nesting haven for shore and seabirds. In 1983 four brown pelicans were noted nesting on the island which was the first sighting in Alabama since their decline due to hunting and use of DDR. Recent surveys have estimated over 80,000 nesting pairs of birds utilizing the island. More recently dredge material was used beneficially in the restoration of Deer Island off the coast of Biloxi, MS and will be used over the next 20 years to establish a 400 acre wetland adjacent to Singing River Island in Pascagoula, MS.

Beneficial use of dredged material builds on the foundation of Working with Nature and Engineering with Nature principles as discussed in the Deer Island Aquatic Ecosystem Restoration Project report (Gerhardt-Smith, et al. 2014).

- Use science and engineering to produce operational efficiencies supporting sustainable infrastructure.
- Use natural processes to maximum benefit, thereby reducing demands on limited resources and enhancing the quality of project benefits.
- Broaden and extend the base of benefits provided by projects to include substantiated economic, social, and environmental benefits ("triple-win" benefits).
- Use science-based collaborative processes to organize and focus interests, stakeholders, and partners to reduce social friction, resistance, and project delays while producing more broadly acceptable projects.



Navigation in the Gulf Coast region will continue to require dredging, and the implementation of projects that use dredge material to restore coastal habitats will provide a cornerstone for coastal ecosystem restoration in the Gulf region. Sediment delivered by the many rivers draining into the Gulf is essential to the health of the Gulf Coast ecosystem. One component of a strategic approach to sediment management is maximizing the beneficial use of dredge material, where ecologically acceptable, for effective and sustainable habitat restoration. While not all dredge material may be the right consistency or composition to be used beneficially for ecosystem restoration, some sediment that is available is currently being underutilized for effective beneficial use in ecosystem restoration. By beneficially utilizing dredge material to create coastal wetlands, the project will restore habitat.

As mentioned earlier in this Introductory Summary, The northern coast of the Gulf of Mexico is an ideal location to augment existing beneficial use efforts that are based only on individual projects and elevate them to a programmatic effort. The project described below, along with others submitted separately for inclusion in the RESTORE Funded Priority List is intended as a first step and a foundational element toward restoring the value of the Gulf of Mexico to the Nation and the World.

Jacobson, Jennifer L SAM

From: George Ramseur [George.Ramseur@dmr.ms.gov]
Sent: Tuesday, October 14, 2014 2:51 PM
To: Jacobson, Jennifer L SAM
Subject: [EXTERNAL] Re: Email of Support (UNCLASSIFIED)

Jenny,
The Mississippi Department of Marine Resources is highly supportive of the USACE Mobile Districts proposals to help restore key features of Deer Island. This specifically includes augmentation of sand dike structures critical to maintaining a balance of habitats as well as managing beneficial use marsh restoration areas.

Sent from my iPhone

> On Oct 14, 2014, at 2:01 PM, "Jacobson, Jennifer L SAM" <Jennifer.L.Jacobson@usace.army.mil> wrote:
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
> George,
> With these Restore submittals, could you send me an email stating MDMR would support the Mississippi Deer Island projects?
>
> Sincerely,
>
> Jenny Jacobson
> Chief, Coastal Environment Team
> Planning & Environmental Division
> 109 St. Joseph Street
> Mobile, Alabama 36602
> Email - Jennifer.L.Jacobson@usace.army.mil
> Office Phone - 251/690-2724
> Fax Line - 251/690-2727
> Cellular - 251/472-7589
>
>
>
> Classification: UNCLASSIFIED
> Caveats: NONE
>
>

ELIGIBILITY REVIEW

Bucket 2 – Council Selected Restoration Component

PROPOSAL TITLE

Restoration of Deer Island with Beneficial Use of Dredged Material

PROPOSAL NUMBER

ACOE-4

LOCATION

Within the coastal zone boundaries of the Mississippi Coastal Zone Management Program

SPONSOR(S)

Department of the Army

TYPE OF FUNDING REQUESTED (Planning, Technical Assistance, Implementation)

Planning/Implementation

REVIEWED BY:

Bethany Carl Kraft/ Ben Scaggs

DATE:

11-18-14

1. Does the project aim to restore and/or protect natural resources, ecosystems, fisheries, marine and wildlife habitat, beaches, coastal wetlands and economy of the Gulf Coast Region?

(●) YES ( ) NO

Notes:

This proposal seeks to restore and conserve habitat by restoring an estimated 40 acres of estuarine tidal marsh.

2. Is the proposal a project?

( ) YES (●) NO

If yes, is the proposed activity a discrete project or group of projects where the full scope of the restoration or protection activity has been defined?

( ) YES ( ) NO

Notes:

3. Is the proposal a program?

(●) YES ( ) NO

If yes, does the proposed activity establish a program where the program manager will solicit, evaluate, select, and carry out discrete projects that best meet the program's restoration objectives and evaluation criteria?

(●) YES ( ) NO

Notes:

4. Is the project within the Gulf Coast Region of the respective Gulf States?

(●) YES ( ) NO

If no, do project benefits accrue in the Gulf Coast Region?

( ) YES ( ) NO

Notes:

Eligibility Determination

ELIGIBLE

Additional Information

Proposal Submission Requirements

1. Is the project submission overall layout complete? ***Check if included and formatted correctly.***

A. Summary sheet	☑	F. Environmental compliance checklist	☑
B. Executive summary	☑	G. Data/Information sharing plan	☑
C. Proposal narrative	☑	H. Reference list	☑
D. Location information	☑	I. Other	☑
E. High level budget narrative	☑		

If any items are NOT included - please list and provide details

2. Are all proposal components presented within the specified page limits (if applicable)?

◉ YES ○ NO

Notes: