

**SECTION 404(b)(1) EVALUATION REPORT FOR THE
RESTORATION OF DEER ISLAND, HARRISON COUNTY, MISSISSIPPI**
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**GRAND BAYOU MARSH, SOUTHERN SHORELINE RESTORATION, AND THE
WESTERN BREACH**
A RESTORATION PROJECT

I. PROJECT DESCRIPTION:

A. **Location.** The proposed restoration project sites would be located at Deer Island, Mississippi (Figure 1). The following three (3) restoration sites are evaluated in this Section 404(b)1 Evaluation

- (1) the western breach of Deer Island;
- (2) Grand Bayou Marsh restoration; and
- (3) the overall restoration of Deer Island back to its historic 1850s shoreline.



Figure 1: Deer Island Breach, Jackson & Harrison Counties, MS

The breach is located along the western side of Deer Island. The Grand Bayou Marsh restoration site is located in the center portion of the island on the southern shoreline. Finally, the overall restoration of the island focuses on restoring the remaining portion of the southern shoreline.

B. General Description. The purpose of this proposed action is to restore and prevent future erosion to Deer Island. The first site is a breached area located on the western end of Deer Island. Unfortunately, Deer Island was divided into two parts after Hurricane Camille in 1969 and that breached area was increased by Hurricane Elena on Labor Day in 1985. Additional storms throughout the years have greatly increased the breach's size. The last round of storms during 2005, i.e. Hurricanes Katrina and Rita, really exasperated the breach's size. The second area, Grand Bayou Marsh, consists of a small winding tidal creek moving through the island in a winding north-south direction. It is located towards the center-eastern portion of the island. The recent 2005 storm activity caused the creek to cut all the way through the island. The Mississippi Department of Marine Resources (MDMR), the non-Federal partner in this effort, has great concern that the small breached area may increase in size resulting in another large cut through in Deer Island. The final restoration effort at Deer Island is to restore the shoreline back to its historic 1850s footprint. Wave action and past storm activity have eroded the shoreline northward approximately 300 feet. Essentially, this effort would enhance the Grand Bayou Marsh restoration project.

This uninhabited island is one of the last natural islands along the Gulf Coast. It was designated as part of the Mississippi Coastal Preserve by the MDMR. Although commonly misidentified, Deer Island is *not* a barrier island. Despite first appearances, the island's geological character is inherited from multiple environments that have existed reaching back over 120,000 years. Accordingly, the shoreline is evolving uniquely at small spatial scales even though the physical processes, by and large, do not vary at these small scales. Deer Island provides the mainland, i.e. the City of Biloxi, with hurricane/storm protection. This uninhabited island absorbs a high amount of wave energy before it reaches the mainland. This feature was evident during Hurricane Katrina by those structures landward being somewhat more protected from storm forces compared to those without the island's protection. The Mississippi Coastal Preserve site provides various species, such as blue herons, osprey, and deer, with necessary habitat which is hard to find due to high development in the coastal Mississippi areas.

By restoring Deer Island, erosion along the island (i.e. southern, eastern, and western end) would be reduced and a vital link between the two island parts would be restored. Additionally, protecting these areas would also provide hurricane/storm protection to the City of Biloxi. The most recent number of hurricanes and tropical storms in 2005 has greatly accelerated the loss of Deer Island's shoreline. Thus, any protection to the island would benefit the City of Biloxi and the natural resources of the Mississippi Coastal Preserve site.

WESTERN BREACH AREA RESTORATION - The proposed western end breach restoration project at Deer Island consists of two revetment containment dikes, one on the south side of the island and one on the north side. Sandy fill material taken from within the breached area would be stacked and eventually covered in a geotextile material and then covered in rock (i.e. rip rap) to form the revetment containment dikes. The two dikes would serve as the containment structures for the fill material to be used to fill the breach in the western portion of Deer Island. The northern and southern containment dikes would encompass an area approximately 6.4 and 7.2 acres, respectively, while the interior of the revetments would be approximately 95 acres in total area to be filled with material from multiple private dredging projects in the Biloxi area [Commercial Docking Facility (~5,700 cys), Lighthouse Fishing Dock (~50,000 cys), Small Craft Harbor (~35,000 cys), Point Cadet Marina (~75,000 cys)] and also from

the offshore borrow area adjacent to the island used in the southern shoreline restoration project.

The revetment dikes would be filled to an elevation of +3 feet from the existing ground level (Figures 2 and 3). The current water depth at the breach ranges between -0.5-foot and -3 feet. Approximately 4,000 linear feet and 4,500 linear feet of revetment dikes would be required on the northern and southern side, respectively. Floatation channels would be constructed along the northern (4,000 feet) and southern (4,500 feet) dike interior portions in order to allow heavy equipment to access the site for operations. These channels would be approximately 6 feet deep by 50 feet wide. An interior channel would also be constructed in order to provide the required sandy material for the northern revetment containment dike. Approximately 55,000 and 50,000 cubic yards (cys) of sandy material from the southern access channel and the interior borrow area would be required to build the northern and southern dikes, respectively. Approximately 5,000 and 6,500 cys of rip rap material from commercial sources would be required to build the northern and southern dikes, respectively. The entire width of each dike, including the slopes and crest, would be between 60 and 70 feet. Rip rap would be placed along the exterior portions of the dikes covering the sandy and geotextile material for protection. The site would cover a total of approximately 110 acres (95 acres within the site and 14 acres for the revetment dike structure). The site would contain between approximately 675,000 and 700,000 cys of material consisting primarily of clays/ silts and sands. Appropriate maritime and dune species would be planted at the breached area.

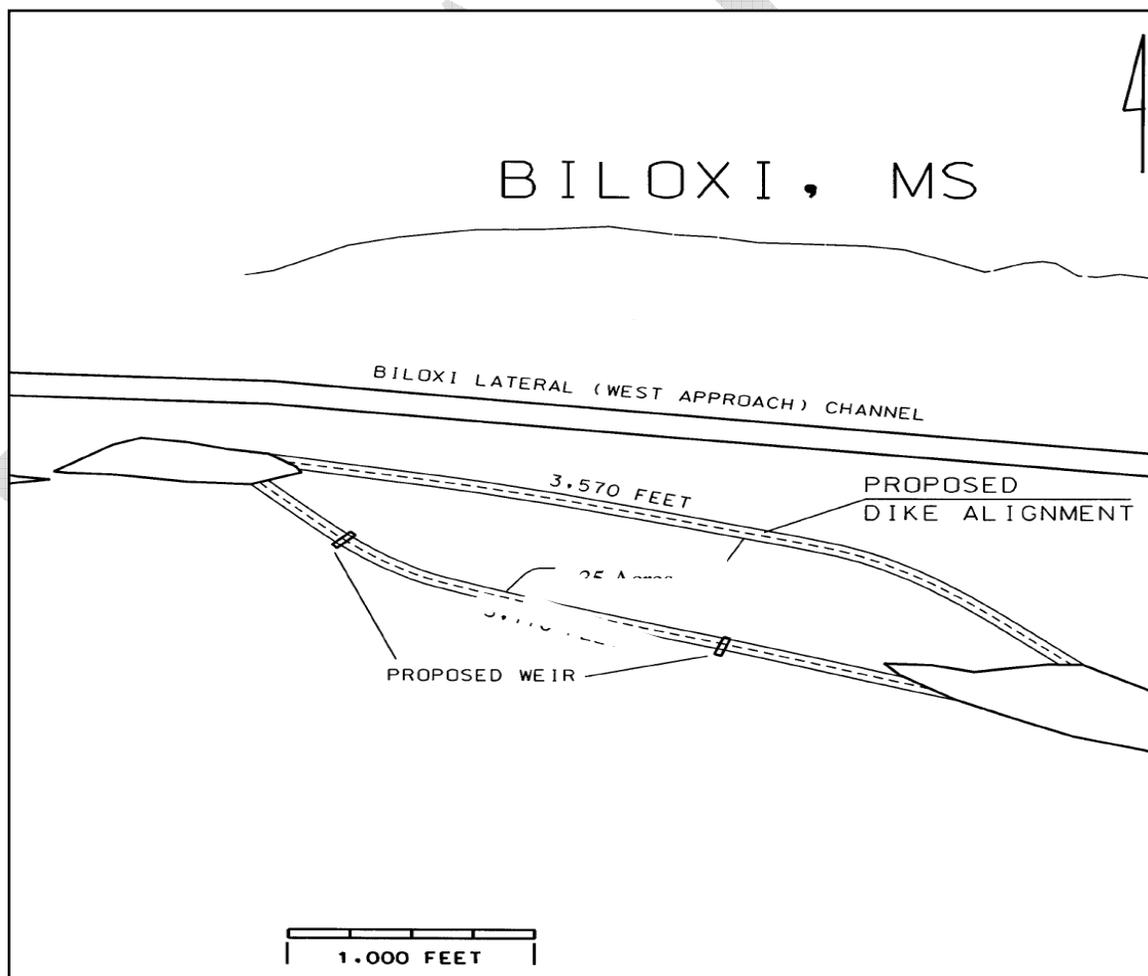
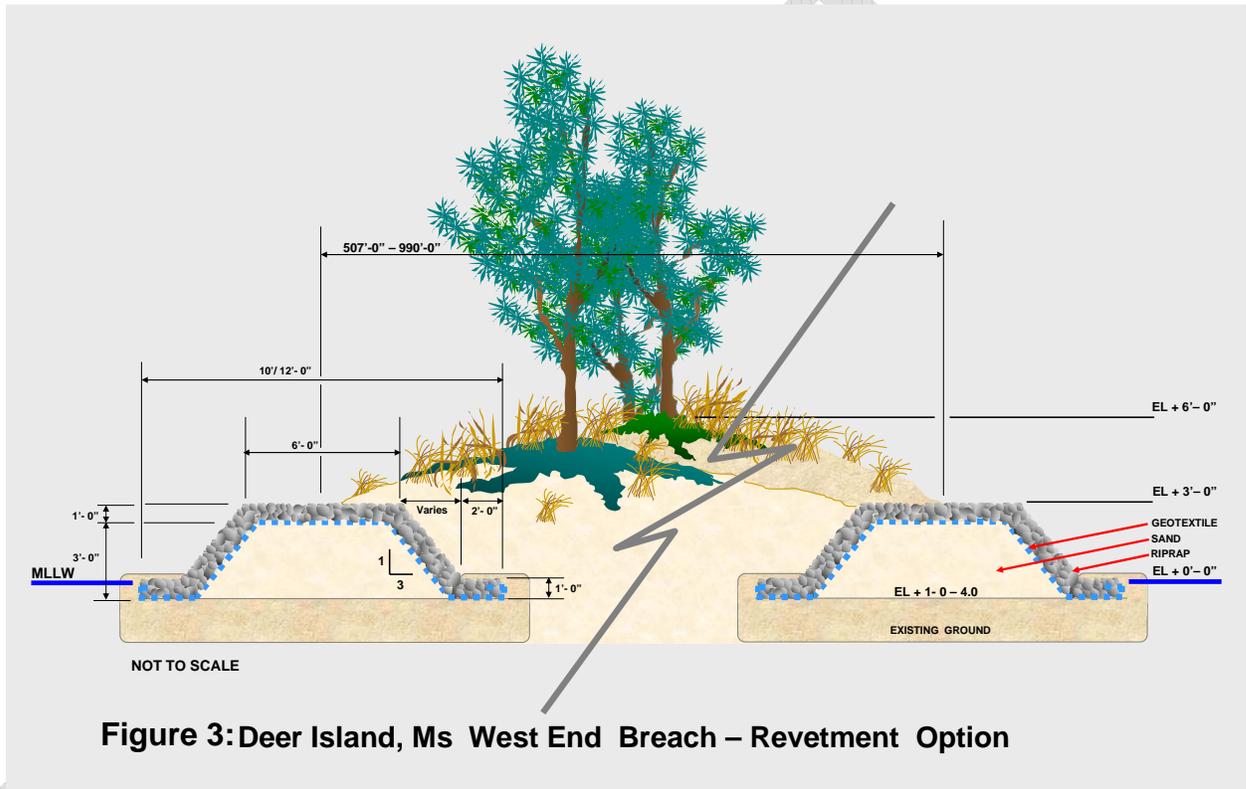


Figure 2: Deer Island Breached Restoration Site

The U.S Army Corps of Engineers (Corps), Mobile District and the Mississippi Department of Marine Resources (MDMR) are committed to beneficially using dredged material wherever possible. The site would contain between approximately 675,000 and 700,000 cubic yards (cys) of material consisting primarily of clays/silts and sands.



GRAND BAYOU MARSH RESTORATION - The purpose of this project is to restore, opposite of the Grand Bayou area, a portion of the seaward shoreline that has been lost through erosion over time to the point that a small breach has formed in to the Grand Bayou and is allowing tidal flow through the island. Without intervention, the small breach that has formed will continue to enlarge through erosion and sensitive marsh/wetland areas will be destroyed in the process. Restoration of the shoreline would permit the establishment of beach and dune, maritime forest, and emergent marsh areas within the project area as well as eliminate the small breach and protect interior marsh and wetland areas.

1850s SHORELINE RESTORATION - The purpose of this project is to restore the entire length of the southern (seaward) shoreline of Deer Island to closely match its historic limits. The shoreline has been reduced over time through erosion and restoration of the shoreline will permit the establishment of beach and dune, maritime forest, and emergent marsh areas within the project area and protect interior marsh, wetland, and maritime forest areas.

The proposed 1850s southern shoreline restoration project would extend the entire Deer Island length, including the Grand Bayou Marsh and western end breached area, from Station 44+84.39 to Station 243+00. The restoration project would require approximately 1.3 million cys of material obtained from a local borrow source near to the island and upland disposal sites, Bonivesta and Sunflower, located in Alabama on the Black Warrior and Tombigbee Waterway. The restored features would include approximately 100 feet of flat beach, approximately 75 feet of dunes and maritime forest, and a tidal marsh that would naturally tie into the existing marsh on the island. The area adjacent to the island that would provide the fill material is located approximately 500 feet off the southern shoreline of Deer Island. This offshore borrow area would be approximately 50 feet wide, 6 feet deep, and run the entire length of the island. This material would be cast on the existing shoreline for beach nourishment via a hydraulic dredge. Land equipment, such as a bulldozer and marsh buggy, would then shape the material on the island to form the maritime, beach, tidal marsh, and dune systems. Appropriate flora species would be planted in each specified area. The proposed restoration of the entire southern shoreline, including the Grand Bayou Marsh area, would facilitate the placement of approximately 1.3 million cys of material over a total of 273 acres. At its widest point, the restored beach would be approximately 650 feet wide, and at its narrowest only 200 feet wide. The proposed project would restore approximately 273 acres at Deer Island. Approximately 126 acres would be new beach that would be placed south of the current shoreline, while approximately 147 acres would be on the existing land mass of Deer Island.

C. Authority and Purpose. The Corps, Mobile District is conducting this study and its construction under Section 528 of the Water Resources Development Act (WRDA) of 2000. Section 528 provides the following guidance:

SEC. 528. COASTAL MISSISSIPPI WETLANDS RESTORATION PROJECTS.

(a) *IN GENERAL.*—In order to further the purposes of Section 204 of the WRDA of 1992 (33 U.S.C. 2326) and section 206 of the WRDA of 1996 (33 U.S.C. 2330), the Secretary shall participate in restoration projects for critical coastal wetlands and coastal barrier islands in the State of Mississippi that will produce, consistent with existing Federal programs, projects, and activities, immediate and substantial restoration, preservation, and ecosystem protection benefits, including the beneficial use of dredged material if such use is a cost-effective means of disposal of such material.

(b) *PROJECT SELECTION.*—The Secretary, in coordination with other Federal, tribal, State, and local agencies, may identify and implement projects described in subsection (a) after entering into an agreement with an appropriate non-Federal interest in accordance with this section.

(c) *COST SHARING.*—Before implementing any project under this section, the Secretary shall enter into a binding agreement with the non-Federal interests. The agreement shall provide that the non-Federal responsibility for the project shall be as follows:

- (1) To acquire any lands, easements, rights-of-way, relocations, and dredged material disposal areas necessary for implementation of the project.
- (2) To hold and save harmless the United States free from claims or damages due to implementation of the project, except for the negligence of the Federal Government or its contractors.
- (3) To pay 35 percent of project costs.

(d) *NONPROFIT ENTITY.* — For any project undertaken under this

section, a non-Federal interest may include a nonprofit entity with the consent of the affected local government.

(e) *AUTHORIZATION OF APPROPRIATIONS*.—There is authorized to be appropriated to carry out this section \$10,000,000.

D. General Description of Fill Material.

(1) **General Characteristics of Material.** The material proposed for placement on Deer Island consists of rip rap, geotextile fabric, sands, silts, and clays materials.

(2) **Quantity of Material.** Approximately 1.3 million cys of sandy material would be placed along the southern shoreline, including the area in front of Grand Bayou Marsh. Approximately 5,000 cys and 6,500 cys of rip rap would be placed on the sandy revetment dikes which would consist of approximately, 55,000 cys and 50,000 cys of sandy material on the northern and southern dikes, respectively. Within the western breached area, between 675,000 and 700,000 cys of material would be placed within the site. This material includes the material from the Biloxi dredging project as described above.

(3) **Source of Material.** The material used to restore Deer Island will be dredged from the Biloxi dredging projects as described above, an offshore borrow site immediately adjacent to the island, and upland sites, Buena Vista and Sunflower, in Alabama on the Black Warrior and Tombigbee Waterway. The rip rap and geotextile fabric will be from a commercial site.

E. Description of the Proposed Discharge Site.

(1) **Location.** The diked containment site will be in open-water along the western end of Deer Island. The dike will be mechanically constructed from borrow areas within the site. Material, including dredged material from the Biloxi dredging projects, will be placed within the contained diked area adjacent to Deer Island. The other restoration project would be located on the southern side of the island. This project runs the entire length of the island, including in front of the Grand Bayou Marsh area. A borrow area will be used approximately 500 feet south of the island that runs the entire length of the island. Other borrow areas, Buena Vista and Sunflower, will be used that are located in Alabama on the Black Warrior and Tombigbee. Another borrow area will be from multiple private dredging projects in the Biloxi area [Commercial Docking Facility (~5,700 cys), Lighthouse Fishing Dock (~50,000 cys), Small Craft Harbor (~35,000 cys), Point Cadet Marina (~75,000 cys)].

(2) **Size.** The contained diked site adjacent to Deer Island consists of about a 95-acre area while the southern shoreline project consists of approximately 273 acres. The borrow area is 50 feet wide and runs approximately 6.5 miles long. The other borrow areas in Alabama are within contained dikes and are approximately 50 acres in size.

(3) **Type of Site.** The western breached site type is a newly constructed, diked, placement site located in open-water adjacent to Deer Island. The southern shoreline is a high energy environment that is open to the environmental forces. In addition, the southern shoreline also has upland habitat on the island. The borrow area immediately south of the island is open-water while the borrow areas in Alabama consists of upland diked containment sites.

(4) **Type of Habitat.** The western breached area and offshore borrow areas are currently open-water habitat. The southern shoreline is open-water and upland habitat while the upland borrow areas consist of upland habitat. Another borrow area will be from multiple private dredging projects in the Biloxi area [Commercial Docking Facility (~5,700 cys), Lighthouse Fishing Dock (~50,000 cys), Small Craft Harbor (~35,000 cys), Point Cadet Marina (~75,000 cys)]. This consists of heavily used marinas.

(5) **Timing and Duration of Discharge.** The initial action is currently expected to begin this spring and require several months to complete.

F. **Description of Disposal Method.** The Corps, Mobile District will place material into the site by a hydraulic pipeline dredge and rework the material via heavy equipment on land.

II. Factual Determinations (Section 230.11):

A. **Physical Substrate Determinations.**

(1) **Substrate Elevation and Slope.** A containment dike would be mechanically constructed from borrow areas within the site at the western breached area. The predominate sediment type associated with the Deer Island site is primarily composed of slightly silty fine sands. The revetment dikes would be filled to an elevation of +3 feet from the existing ground level. The current water depth at the breach ranges between -0.5-foot and -3 feet. Approximately 4,000 linear feet and 4,500 linear feet of revetment dikes would be required on the northern and southern side, respectively. Floation channels would be constructed along the northern (4,000 feet) and southern (4,500 feet) dike interior portions in order to allow heavy equipment to access the site for operations. These channels would be approximately 6 feet deep by 50 feet wide. An interior channel would also be constructed in order to provide the required sandy material for the northern revetment containment dike. Approximately 55,000 and 50,000 cys of sandy material from the southern access channel and the interior borrow area would be required to build the northern and southern dikes, respectively. Approximately 5,000 and 6,500 cys of rip rap material from commercial sources would be required to build the northern and southern dikes, respectively. The entire width of each dike, including the slopes and crest, would be between 60 and 70 feet. Rip rap would be placed along the exterior portions of the dikes covering the sandy and geotextile material for protection.

No dikes would be constructed along the southern shoreline. Material would be cast on the existing shoreline for beach nourishment via a hydraulic dredge. Land equipment, such as a bulldozer and marsh buggy, would then shape the material on the island to form the maritime, beach, tidal marsh, and dune systems. Appropriate flora species would be planted in each specified area. The proposed restoration of the entire southern shoreline, including the Grand Bayou Marsh area, would facilitate the placement of approximately 1.3 million cys of material over a total of 273 acres. At its widest point, the restored beach would be approximately 650 feet wide, and at its narrowest only 200 feet wide. The proposed project would restore approximately 273 acres at Deer Island. Approximately 126 acres would be new beach that would be placed south of the current shoreline, while approximately 147 acres would be on the existing land mass of Deer Island.

(2) **Sediment Type.** The material proposed for placement is composed primarily of sands. There is also clays and silts with some traces of oyster shells/sands material that will be placed at the western breached area.

(3) **Dredged/Fill Material Movement.** Placement of the material would be confined to the limits of the diked area and 1850s shoreline footprint.

(4) **Physical Effects on Benthos.** No impacts would occur to benthos, motile invertebrates, and fishes as a result of material being removed from the upland borrow area sites along the Black Warrior and Tombigbee Waterway. Nor would any impacts occur to these species as a result of the heavy equipment moving the borrow material on land at Deer Island to shape the natural topography of the island (i.e. beach and dune system, maritime forest, and emergent tidal marsh habitat). There would be temporary disruption of the aquatic community at the offshore borrow area located 500 feet south of the island in open-water. In addition, the seaward area of Deer Island's southern shoreline to be filled with sandy material or dredged material and at the western breached area would be impacted. Non-motile benthic fauna within the area may be destroyed by the proposed operations, but should repopulate within several months. Those areas along the southern shoreline and western breach that would be restored to a beach/dune, maritime forest, and emergent marsh habitat would repopulate with a somewhat different species of fauna, such as crabs, due to it not being submerged and/or emergent. Some of the motile benthic and pelagic fauna, such as crabs, shrimp, and fishes, are able to avoid the disturbed area and should return shortly to the vicinity after the activity is completed. Larval and juvenile stages of these forms may not be able to avoid the activity due to limited mobility. The overall impact to these organisms is expected to be minimal. In addition, in light of these adverse impacts, the re-establishment of Deer Island's historic footprint and the filling of the breached areas would benefit various motile and non-motile benthic fauna by providing additional upland and aquatic habitat. Deer Island's environmental habitat following the proposed activities would provide suitable conditions for benthic fauna, motile invertebrates, and fishes within the emergent tidal marsh habitat.

(4) **Other effects.** No other effects are anticipated.

(5) **Actions Taken to Minimize Impacts (Subpart H).** No other actions to minimize impacts to the physical substrate are deemed appropriate for this project.

B. Water Column Determinations.

(1) **Salinity.** No effect.

(2) **Water Chemistry (pH, etc.).** No effect.

(3) **Clarity.** Minor increases in turbidity may be experienced in the immediate vicinity of the restoration project operations. However, these increases will be temporary and would return to pre-project conditions shortly after completion.

(4) **Color.** No effect.

(5) **Odor.** No effect.

(6) **Taste.** No effect.

(7) **Dissolved Gas Levels.** Temporary decreases in dissolved oxygen will likely result from the operations, but this will only be of a short duration. No significant effect to the water column is

anticipated.

(8) **Nutrients.** Slight increases in nutrient concentrations may occur; however, these would rapidly disperse. These described increases would have no significant effect to the water column.

(9) **Eutrophication.** No effect.

C. **Water Circulation, Fluctuation, and Salinity Gradient Determinations:**

(1) **Current Patterns and Circulation.**

(a) **Current Patterns and Flow.** Placement of material into the diked placement site and at the southern shoreline would have no effect on current patterns and flow in the vicinity of the project area.

(b) **Velocity.** No significant effects.

(2) **Stratification.** No effect.

(3) **Hydrologic Regime.** No effect.

(4) **Normal Water Level Fluctuations.** No effects.

(5) **Salinity Gradient.** The salinities in Mississippi Sound are highly variable due to the inflow of freshwater and the tidal influence from surrounding rivers and the Gulf of Mexico.

D. **Suspended Particulate/Turbidity Determination:**

(1) **Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Placement Site.** Material consists primarily of sands and clays and silts with some traces of oyster shells. Turbidity during restoration operations is not expected to violate the State of Mississippi's water quality certification conditions.

(2) **Effects on Chemical and Physical Properties of the Water Column.**

(a) **Light Penetration.** No significant effects.

(b) **Dissolved Oxygen.** No significant effects.

(c) **Toxic Metals and Organics.** No effects.

(d) **Pathogens.** No effect.

(e) **Esthetics.** No effect.

(3) **Effects on Biota.**

(a) **Primary Production Photosynthesis.** No significant effects.

(b) **Suspension/Filter Feeders.** No significant effects.

(c) **Sight Feeders.** Shorebirds tend to be attracted to construction sites in open-water and associated placement activities due to the presence of food items in the sediment.

(4) **Actions Taken to Minimize Impacts (Subpart H).** No further actions are deemed appropriate.

E. **Contaminant Determinations.** The materials proposed for placement are naturally occurring materials. There is no reason to believe that the materials are unsuitable for placement. Therefore, the materials are excluded from testing under Section 404(b)(1)(d).

F. **Aquatic Ecosystem and Organism Determinations.** No effect.

(1) **Effects on Plankton.** No significant effects.

(2) **Effects on Benthos.** No significant effects would occur to the benthos.

(3) **Effects on Nekton.** No significant effects.

(4) **Effects on Aquatic Food Web.** No significant effects.

(5) **Effects on Special Aquatic Sites.** No effect.

(a) **Sanctuaries and Refuges.** Not applicable.

(b) **Wetlands.** Not applicable.

(c) **Mud Flats.** Not applicable.

(d) **Vegetated Shallows.** Not applicable.

(e) **Coral Reefs.** Not applicable.

(f) **Riffle and Pool Complexes.** Not applicable.

(6) **Effects on Threatened and Endangered Species.** No federally-protected species or is associated critical habitat would be adversely impacted the proposed restoration projects.

(7) **Effects on Other Wildlife.** No significant effects.

(8) **Actions to Minimize Impacts.** No other actions to minimize impacts on the aquatic ecosystem are deemed appropriate.

G. **Proposed Disposal Site Determinations:**

(1) **Mixing Zone Determination.** The State of Mississippi will specify a mixing zone for turbidity compliance. The Corps, Mobile District will adhere to that turbidity requirement.

(a) **Depth of water at the disposal site.** Depths of water at the site vary from 0 to 3 feet.

(b) **Current velocity, direction, and variability at the disposal site.** Not significant.

(c) **Degree of turbulence.** Not significant.

(d) **Stratification attributable to causes such as obstructions, salinity or density profiles at the disposal site.** No effect.

(e) **Discharge vessel speed and direction, if appropriate.** No effect.

(f) **Rate of discharge.** Rate of discharge will vary according to the particular type of dredge disposing of the material.

(g) **Ambient concentrations of constituents of interest.** Not applicable.

(h) **Dredged material characteristics, particularly concentrations of constituents, amount of material, type of material (sand, silt, clay, etc.) and settling velocities.** Approximately 1.3 million cys of material will be placed on the southern shoreline of Deer Island by a hydraulic pipeline dredge. At the western breach, between approximately 675,000 and 700,000 cys of material will be placed within the site. Material will consist primarily of sands with only some clays and silts with some traces of oyster shells. Settling of particles is anticipated due to the material size.

(i) **Number of discharge actions per unit of time.** The number of discharge actions per unit of time will vary depending upon particular disposal activity.

(2) **Determination of Compliance with Applicable Water Quality Standards.** The proposed activity is expected to be in compliance with all applicable water quality standards.

(3) **Potential Effects on Human Use Characteristics.**

(a) **Municipal and Private Water Supply.** No effect.

(b) **Recreational and Commercial Fisheries.** Recreational and commercial fishing would be temporarily impacted primarily as a result of the physical presence of heavy equipment during operation activities.

(c) **Water Related Recreation.** No significant effects.

(d) **Esthetics.** No significant effects.

(e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.** No effect.

(f) **Other Effects.** No effect.

H. **Determination of Cumulative Effects on the Aquatic Ecosystem.** The proposed action is not expected to have significant cumulative adverse impacts.

I. **Determination of Secondary Effects of the Aquatic Ecosystem.** The proposed action is not expected to have any significant secondary adverse effects on the aquatic ecosystem.

III. **Finding of Compliance With the Restrictions on Discharge.**

A. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.

B. The proposed discharge represents the least environmentally damaging practicable alternative.

C. The planned placement of materials associated the restoration of Deer Island would not violate any applicable State water quality standards; nor will it violate the Toxic Effluent Standard of Section 307 of the Clean Water Act (CWA).

D. Restoring Deer Island will not jeopardize the continued existence of any federally-listed endangered or threatened species or their critical habitat.

E. The proposed placement of fill material will not contribute to significant degradation of waters of the United States. Nor will it result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing; life stages of organisms dependent upon the aquatic ecosystem; ecosystem diversity, productivity and stability; or recreational, aesthetic or economic values.

F. Appropriate and practicable steps will be taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

DATE _____

Pete F. Taylor, Jr.
Colonel, Corps of Engineers
District Commander