



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
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St. Petersburg, Florida 33701-5505
<https://www.fisheries.noaa.gov/region/southeast>

F/SER31:MT
SERO-2020-00103

Christy Fellas
DWH Environmental Compliance Coordinator
NOAA Restoration Center
263 13th Ave. South
St. Petersburg, FL 33701

Dear Ms. Fellas:

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action.

Project Name	Implementing Trustee	SERO Number	Project Type
DWH Lake Borgne & Golden Triangle Marsh Restoration Project	Louisiana Coastal Protection and Restoration Authority (CPRA)	SERO-2020-00103	Marsh Restoration

Consultation History

The proposed project is directly connected to 2 previous formal ESA Section 7 consultations which resulted in the issuance of biological opinions by NMFS.

The first related consultation is the Programmatic Biological Opinion on the Final Programmatic Damage Assessment and Restoration Plan for the Deepwater Horizon Oil Spill (DWH PDARP)¹. This Biological Opinion examined the DWH PDARP as a whole, and concluded that the implementation of the proposed Restoration Program is not likely to jeopardize the continued existence of any ESA-listed species under NMFS jurisdiction, and is not likely to destroy or adversely modify the designated critical habitat of those species. The proposed Lake Borgne and Golden Triangle Marsh Creation Project is part of a restoration plan developed under the DWH PDARP, by the Louisiana Trustee Implementation Group. Monitoring and adaptive management (MAM) is an integral element of the DWH PDARP, and MAM planning is a required component for large scale restoration projects such as the proposed project. The MAM Plan that was developed for the proposed project includes significant monitoring of the projects potential effects on ESA-listed species and designated critical habitat. These aspects of the proposed project's MAM Plan are detailed further in the Project Description section below.

¹ <https://www.fisheries.noaa.gov/webdam/download/91825976>



The second consultation that is directly connected to the proposed project is the Programmatic Biological Opinion on the Mississippi River-Gulf Outlet Ecosystem Restoration Plan (MRGO ERP)². The MRGO ERP is a large-scale ecosystem restoration plan that includes extensive marsh creation and shoreline protection in and around Lake Borgne and the Lower Pontchartrain Basin. Most of the restoration activities proposed under the MRGO ERP have not yet been implemented, and the proposed project is essentially implementing a small portion of the MRGO ERP. The marsh creation areas (MCAs) proposed under the current project overlap almost entirely with MCAs proposed under the MRGO ERP, and the dredge borrow areas (BAs) proposed under the current project also have significant overlap with those proposed under the MRGO ERP. Even though some of the dredging and marsh restoration locations do not entirely overlap with those proposed under the MRGO ERP, the dredging and construction methods and affected habitat types are virtually identical between the two sets of projects, and the expected effects to ESA listed species and designated critical habitat are also virtually identical (though the scale and magnitude of activities and effects of the MRGO ERP are much greater than those proposed under the Lake Borgne and Golden Triangle Marsh Restoration Project). We will therefore be borrowing many of the same analyses and conclusions included in the MRGO ERP Biological Opinion for our effects analysis of the current project below. The MRGO ERP Biological Opinion determined that implementation of the proposed ERP was not likely to adversely affect any ESA-listed species under NMFS' jurisdiction. This Opinion also determined that the dredging and marsh creation activities proposed under the ERP were not likely to adversely affect the essential features and primary constituent elements (PCEs) of critical habitat for Gulf sturgeon, which was designated within the action area (Gulf sturgeon critical habitat Unit 8). The MRGO ERP Biological Opinion did determine that the proposed permanent alteration of potential Gulf sturgeon foraging habitat, through the placement of extensive rock shoreline protection and other hardened structures, was likely to adversely affect the PCEs of Gulf sturgeon critical habitat, but would not destroy or adversely modify that critical habitat. There is no such placement of rock shoreline protection or other hardened structures proposed under the Lake Borgne and Golden Triangle Marsh Restoration Project.

NMFS' Protected Resources Division first became involved with the Lake Borgne Marsh Creation Project (LBMCP) on November 28, 2016, when we were requested to review and provide comments on the Louisiana (LA) TIG's Restoration Plan (RP) #1, which funded engineering and design of the LBMCP. This RP #1 was finalized in January 2017.

Once the engineering and design was complete, the LBMCP was proposed for implementation funding in the LA TIG's RP #1.2. A draft of RP 1.2 was released for public comment in October 2019. A long series of teleconferences and emails between the project proponents and NMFS regarding this project ensued, culminating in the submission of a final Biological Assessment

² NMFS. 2012. Biological Opinion on the Impacts Associated with the U.S. Army Corps of Engineers' proposed Mississippi River-Gulf Outlet Ecosystem Restoration Plan. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, Saint Petersburg, Florida.

and formal consultation requests by the NOAA Restoration Center (RC), on behalf of the Louisiana TIG, to NMFS on January 24, 2020. Several of the key interactions during the pre-consultation/technical assistance phase are listed below.

- October 2, 2018 – Early compliance/project update call with NMFS, Department of Interior (DOI) and the Louisiana Coastal Protection and Restoration Authority (CPRA).
- December 17, 2018 – Call with NMFS, DOI and CPRA to discuss sand survey report results and implications of those findings for Gulf sturgeon.
- March 28, 2019 – Call with NMFS, DOI and CPRA to discuss the LBMCP draft Biological Evaluation (BE) form.
- June 24, 2019 – Biological Evaluation (BE) forms finalized via email with NMFS and DOI.
- July 8, 2019 – Meeting with NMFS and CPRA to discuss sturgeon monitoring in the draft MAM plan.
- August 15, 2019 – Follow up meeting with NOAA/NMFS and CPRA to continue discussion of Lake Borgne MAM requirements.
- August 20, 2019 - On a call between NMFS, CPRA, and the NOAA RC, NMFS suggested the LBMCP and the Golden Triangle Marsh Creation Project (GTMCP) should be batched under a single consultation, based on the close spatial proximity of the 2 projects and the similar proposed construction activities, techniques, and potential effects to ESA-listed species between the 2 projects. NMFS also expressed concern that the proposed dredging activities had the potential to adversely affect some of the PCEs of Gulf sturgeon critical habitat within Lake Borgne, and requested that a full Biological Assessment be completed to analyze these potential effects. Following review of the Final Biological Assessment, the MRGO ERP Biological Opinion and other dredging project consultations in the area, NMFS determined that the proposed activities were not likely to adversely affect designated critical habitat, as we have described in the effects analysis section below.
- October 8, 2019 – Call with NMFS, CPRA and US Fish and Wildlife Service (USFWS) to discuss the MAM Plan for the GTMCP and the potential to combine the Gulf sturgeon-related monitoring for the 2 projects (GTMCP and LBMCP).
- December 5, 2019 – NMFS provides comments on the draft Biological Assessment for the proposed project to NOAA RC and CPRA.
- December 10, 2019 – Call with NMFS, DOI and CPRA to discuss NMFS' comments on draft Biological Assessment.

NMFS' Protected Resources Division first became involved with the GTMCP on May 10, 2017, when the project was introduced as a pilot project at the RESTORE Gulf Coast Interagency Environmental Restoration Working Group (GCIERWG) meeting. The engineering and design phase of this project was funded through RESTORE.

- September 29, 2017 – Restore Council staff provide update on the GTMCP to the GCIERWG.
- October 25, 2018 – GCIERWG webinar dedicated entirely to presentation/discussion on the GTMCP.

Once the engineering and design was complete, the GTMCP was proposed for implementation funding in the LA TIG’s RP #6. A draft of RP #6 was released for public comment in December 2019 and then RP#6 was finalized in April 2020. A long series of teleconferences and emails between the project proponents and NMFS regarding this project ensued, culminating in the submission of a final Biological Assessment and request for consultation by the NOAA RC, on behalf of the Louisiana TIG, to NMFS on January 24, 2020. Several of the key interactions during the pre-consultation/technical assistance phase are listed below.

- October 8, 2019 – Call with NMFS, CPRA and US Fish and Wildlife Service (USFWS) to discuss MAM Plan for Golden Triangle and combining the Gulf sturgeon-related monitoring for the 2 projects (GTMCP and LBMCP).
- October 16, 2019 – NMFS received draft BE form for GTMCP for review and comment.
- October 28, 2019 – NMFS provides comments on draft BE form for Golden Triangle.
- December 2, 2019 – NMFS received draft Biological Assessment for combined Golden Triangle and Lake Borgne Marsh Creation Project, for review and comment.
- December 5, 2019 - NMFS provided comments on draft Biological Assessment for combined Golden Triangle and Lake Borgne Marsh Creation Project.

NMFS received the final Biological Assessment for the two combined projects on January 24, 2020, and initiated consultation on that day. This consultation has been assigned a tracking number in our NMFS Environmental Consultation Organizer (ECO), SERO-2020-00103. Please refer to this number in any future inquiries regarding this project.

Project Location

Location	Latitude/Longitude (North American Datum 1983)	Water body
LBMCP: Southeast of New Orleans, on the south shore of Lake Borgne, St. Bernard Parish, Louisiana	29.866389°N, 89.616944°W	Lake Borgne, Gulf of Mexico
GTMCP: Due east of New Orleans, on the northwestern shore of Lake Borgne, in both St. Bernard and Orleans Parishes, Louisiana	30.016622°N, 89.862363°W	Lake Borgne, Gulf of Mexico

Existing Site Conditions

The LBMCP includes 6 marsh creation areas (MCAs) on the southwestern shoreline of Lake Borgne; 3 borrow areas in Lake Borgne; and 3 pipeline conveyance corridors connecting the borrow areas to the MCAs (Figure 1). The MCAs are within brackish and salt marsh habitat with ground elevations ranging of 0.52 feet (ft) to 1.5 ft North American Vertical Datum of 1988 (NAVD88). During a site reconnaissance visit in April of 2018, water depths in the open water areas ranged from 1.2 ft to 3.0 ft, while water depths in the linear channel features ranged from 0.9 ft to 2.8 ft. The area is tidally flooded, and several ponded areas are located throughout the

marshes. Surface water drains into Lake Borgne. The borrow areas in Lake Borgne contain a mixture of soft to very soft clays, with fine sand and/or silts. Recent surveys confirmed that all proposed borrow areas contained less than 75% sand content. Water depths in the borrow areas range from -8 ft to -10 ft.

Sediment chemistry data for Lake Borgne was provided by the EPA, Gulf Ecology Division for analysis in the Final Environmental Impact Statement for the MRGO ERP³. The concentrations of detected contaminants were compared to a set of screening values developed by NOAA to identify substances which may potentially threaten resources of concern at the dredging and marsh creation sites. Based on comparison of the EPA sediment chemistry data to these screening values, it was determined that little or no adverse biological effects would be expected as a result of the proposed dredging and discharge of lake sediments into the MCAs.

More recently, the Phase I Environmental Site Assessment⁴ conducted within the LBMCP borrow areas revealed no evidence of the release of hazardous materials or petroleum products in the proposed borrow areas. Additionally, sediment and water quality sampling conducted for the GTMCP found no indications that dredging and marsh creation operations would pose a contamination problem⁵.

The dominant submerged aquatic vegetation (SAV) observed in the proposed MCAs during a 2018 site reconnaissance included: Eurasian watermilfoil (*Myriophyllum spicatum*) (invasive), horned pondweed (*Zanzechelia palustris*), and widgeon grass (*Ruppia maritima*). Other common species of estuarine sea grasses that may be present include wild celery (*Vallisneria spiralis*), southern naiad (*Najas guadalupensis*), and clasping-leaf pondweed (*Potamogeton pectinatus*). Mangroves were not observed during the site reconnaissance; however, black mangroves are common in the Mississippi Delta and may be present in the action area.

³<https://www.mvn.usace.army.mil/Portals/56/docs/environmental/MRGO/MRGOEcosystemRestorationFinalEnvironmentalImpactStatementJune2012compressed.pdf>

⁴ Chenier Environmental Consulting, LLC and Providence Engineering and Environmental Group, LLC. 2018. Lake Borgne Marsh Creation Project, Phase I, Environmental Site Assessment. Prepared for Coastal Protection and Restoration Authority of Louisiana and Duplantis Design Group, PC. May 29, 2018.

⁵ Chenier Environmental Consulting, LLC and Providence Engineering and Environmental Group, LLC. 2019. Lake Borgne and Golden Triangle Marsh Creation Projects Final Biological Assessment. October, 2019

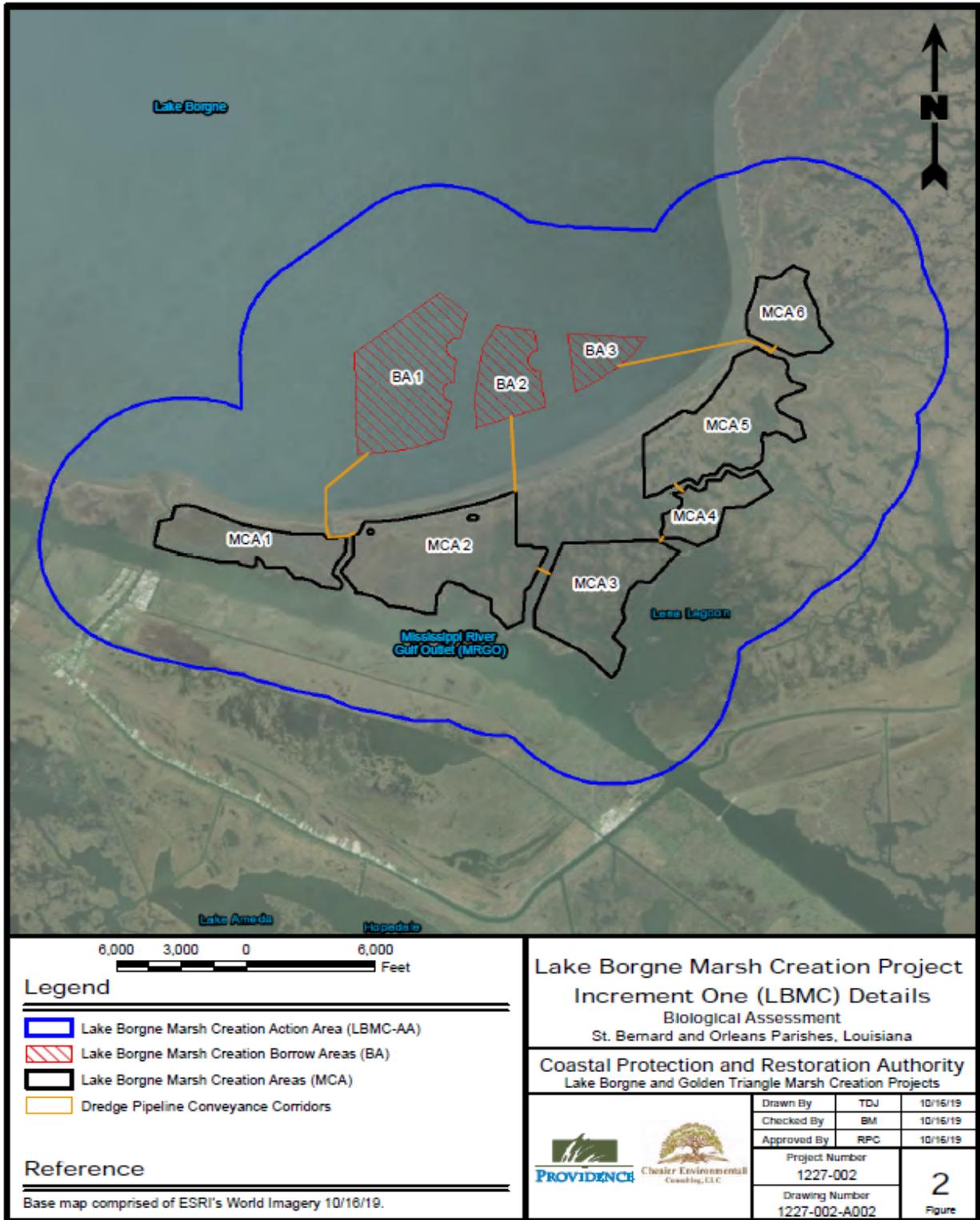


Figure 1. Overview of the Lake Borgne Marsh Creation Project location and surrounding area (Figure 2 in the Final Biological Assessment for the Lake Borgne and Golden Triangle Marsh Creation Project, 1/24/20)

The GTMCP is proposed to be constructed along a narrow band of brackish marsh directly east of New Orleans between Lake Borgne and the confluence of the MRGO and the GIWW, on the shore of Lake Borgne in Orleans Parish. The borrow area, pipeline corridor, and navigation channel are in Lake Borgne in St. Bernard Parish. The action area for this project is shown with a one-mile buffer extending out from the borrow area, pipeline corridor, navigation channel, and marsh creation areas (Figure 2).

The waters around the Golden Triangle MCAs and the western terminus of the conveyance corridor would include the estuarine portion of the Bayou Bienvenue from the MRGO to Bayou Villere. Water levels in the MCAs vary, with water depth typically being less than 1 ft. The conveyance corridor, borrow area, and the southern portion of the access corridor are in Lake Borgne, with depths in these areas ranging from 6 to 10 ft. The northern portion of the access corridor is in the Bayou Sauvage, which is an estuary that includes a hurricane protection levee to Chef Menteur Pass.

The Golden Triangle MCAs contain brackish marsh habitat consisting of mixed stands of smooth cordgrass (*Spartina alterniflora*) and marsh hay cordgrass (*Spartina patens*) and scattered discontinuous patches of Black mangroves (*Avicennia germinans*).

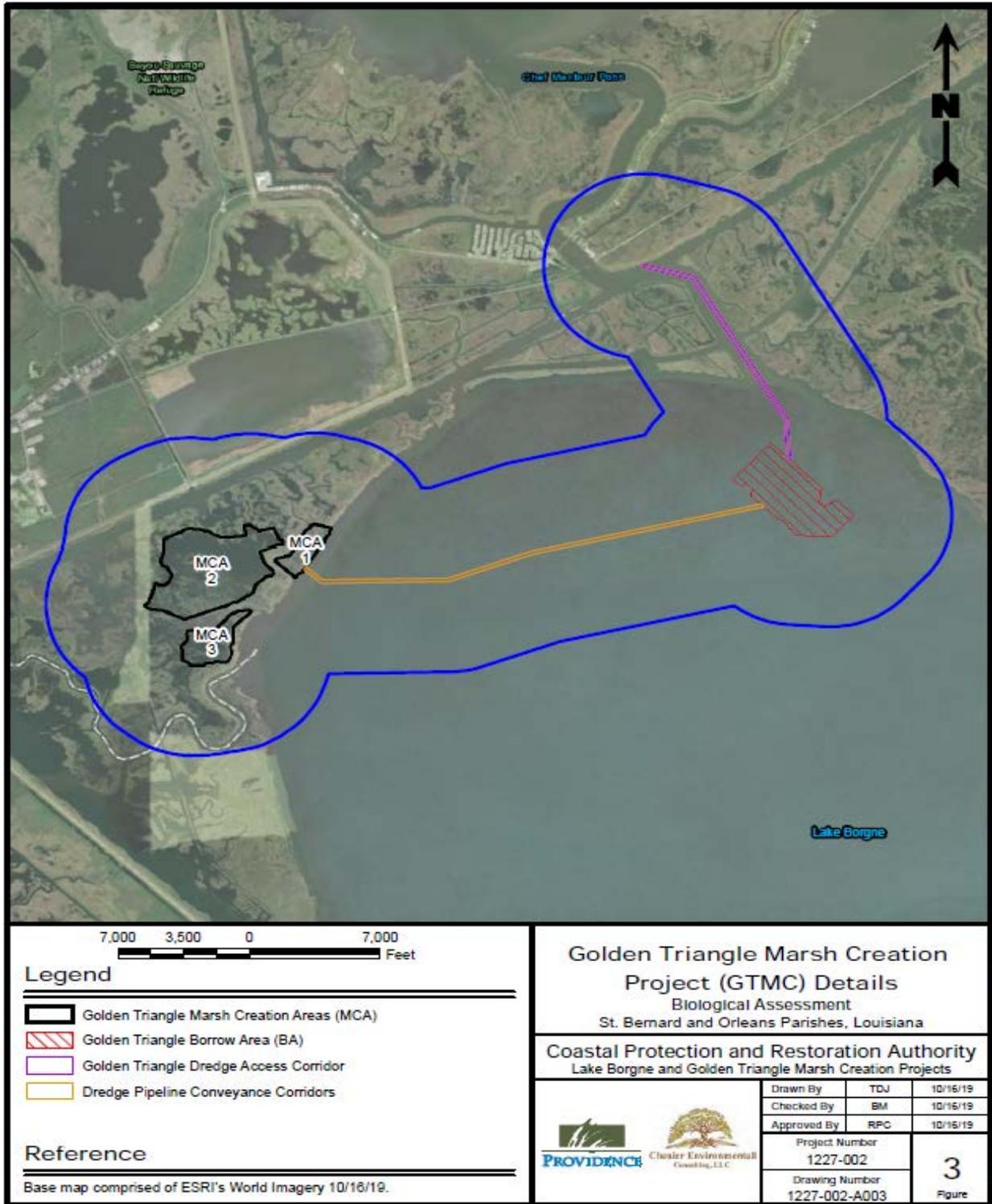


Figure 2. Overview of the Golden Triangle Marsh Creation Project location and surrounding area (Figure 3 in the Final Biological Assessment for the Lake Borgne and Golden Triangle Marsh Creation Project, 1/24/20)

Project Description

Lake Borgne Marsh Creation Project

The applicant proposes to create and nourish an estimated 2,935 acres of marsh on the southwestern shoreline of Lake Borgne using approximately 13.01 million cubic yards (MCY) of material dredged from Lake Borgne. The primary components of the project include six MCAs on the southwestern shoreline of Lake Borgne; three borrow areas in Lake Borgne; and pipeline conveyance corridors connecting the borrow areas to the MCAs (Figure 1).

A cutterhead dredge would be used to dredge approximately 13.01 MCY of gray silty clays from Lake Borgne, covering roughly 1,063 acres in the southwest corner of the lake. The borrow areas (BA) would consist of three different maximum depths of cut: 10, 15, and 20 feet below the current lake bottom. The dredged material will be transported via submerged pipeline from the borrow areas to the MCAs. The project would use three, 100-foot-wide access routes that were sited to avoid all historical, cultural, and oyster resources.

Borrow Areas

Three BA cells, BA1, BA2, and BA3, each were designed with different depths of cut. BA1 is approximately 654 acres and will provide up to 10.54 MCY of material based on a 10-foot cut. BA2 is approximately 272 acres and will provide up to 6.59 MCY of material based on a 15-foot cut. BA3 is approximately 137 acres and will provide up to 4.42 MCY of material based on a 20-foot cut. All BAs will be constructed with gently sloping sides of 1V to 3H to gradually transition from the adjacent water bottoms. The total permitted borrow is 21.6 MCY which exceeds the 13.1 MCY expected to be required to complete the project. The borrow material quantity is “over permitted” to ensure that adequate fill is available, based on projected settling of sediments in the MCAs, and to allow for the possibility that portions of the borrow area are not usable. The BAs were designed to limit impacts to existing oyster leases, avoid previously abandoned oil and gas wells, areas of high magnetic anomaly density, and areas with a surficial sand content greater than 75%.

Dredge Pipeline Conveyance Corridors

A series of 3, 50-ft wide dredge pipeline corridors would provide access from the BAs within Lake Borgne to the MCAs. The dredge pipelines must cross over the existing rock dikes along the Lake Borgne shoreline. Wooden mats would be installed over the existing rock dike to minimize impacts. The dredge pipeline would be placed on the water bottom and no dredging would be required for this placement.

Marsh Creation Areas

The MCAs are comprised of low, deteriorating marsh on the west side (MCA 1 and MCA 2) and eroding canals and open water, along with areas of relatively robust marsh, on the east side (MCAs 3 through 6). Overall, the MCAs have significant amounts of open water area intermixed with broken marsh and are divided into the following individual cells (Figure 1):

- MCA 1 includes 416 acres from Bayou Yscloskey to Doullut’s Canal.
- MCA 2 includes 841 acres from Doullut’s Canal to Bayou Guyago.
- MCA 3 includes 551 acres from Bayou Guyago to Lena Lagoon.
- MCA 4 includes 212 acres from north of Lena Lagoon to Bayou Guyago.

- MCA 5 includes 642 acres from Bayou Guyago to Bayou St. Malo.
- MCA 6 includes 260 acres from Bayou St. Malo east approximately 3,000 feet.

Marsh creation activities, including construction of containment dikes, movement and shaping of fill material, and manipulation of the dredge pipe will require marsh buggies, bulldozers, and front-end loaders. Each of the MCAs would be constructed to a final elevation of +2.5 ft NAVD88, based on detailed modeling of expected sediment settling rates during and following construction. This elevation is designed to maximize the number of years that the marsh elevation will be in the intertidal range (where intertidal is referring to the water level between local mean high water and mean low water elevations) based on documented land subsidence rates and modeled sea-level rise for the project area.

The applicant proposes to conduct limited planting of marsh vegetation immediately following fill placement activities in strategic areas (containment dikes and inflow/outflow points), to help prevent erosion and turbid runoff. The remainder of the restoration areas will be allowed to revegetate naturally, unless monitoring indicates that revegetation goals are not being met, at which point, additional plantings may be implemented. Vegetation surveys will be conducted in year 1, after the first growing season (if sediment consolidation allows access), and in years 3 and 5 post-construction. Sampling will occur between mid-August and mid-November with the target being September/October.

Prior to construction, pollution prevention plans would be prepared, as necessary, in conjunction with the National Pollutant Discharge Elimination System (NPDES) permitting process. These plans would require implementation of all specifications and Best Management Practices (BMPs) necessary for control of erosion and sedimentation due to construction-related activities. Due to the installation of containment dikes, most of the dredge material is expected to remain contained within the MCAs, which would limit sediment runoff. The planting and natural establishment of vegetation would serve to further stabilize soils and reduce soil loss.

Golden Triangle Marsh Creation Project

The applicant proposes to restore and nourish an estimated 774 acres of broken marsh and open water using material dredged from the northeast corner of Lake Borgne. The primary components of the project include three MCAs on the northwestern shoreline of Lake Borgne; one BA in Lake Borgne; and one pipeline conveyance corridor connecting the BA to the MCAs (Figure 2).

Borrow Area

Approximately 6.7 MCY of sediments would be hydraulically dredged from a 78-acre borrow area approximately 5.3 miles east-northeast of the MCAs. The borrow area contains a mixture of soft to very soft clays, with fine sand and/or silts, which is compatible material for marsh creation. The BA design consists of one dredge cut to -24.0 feet NAVD88 (approximately 12 ft below the current lake bottom), with approximately 10 MCY of available marsh compatible fill material. The BA will be constructed with gently sloping sides of 1V to 3H to gradually transition from the adjacent water bottoms.

Dredge Access Corridor

A 100 ft wide access corridor from Chef Menteur Pass into Lake Borgne would be designated as the dredge access corridor to the Golden Triangle BA. Equipment would enter the access area via the Gulf Intracoastal Waterway and into Lake Borgne via Chef Menteur Pass. Bathymetric surveys indicate that this access corridor may be deep/wide enough to allow for navigation of equipment barges to access the borrow area without the need for additional dredging; however, some sections may require dredging to accommodate equipment access.

Dredge Pipeline Conveyance Corridor

A 100 ft wide pipeline corridor would be used to transport fill from the BA to the MCAs through a submerged pipeline. The pipeline corridor runs from east to west from the Golden Triangle BA to MCA 1 (Figure 2).

The average pipeline distance would be 31,933 linear ft (lf), with the longest pumping distance being from the BA to the central fill area (32,600 lf). All dredge pipe/subline installed within the corridor would be submerged, and navigation lights would be affixed to buoys every 500 ft, or per U.S. Coast Guard regulations, to notify marine traffic of the submerged pipeline. Bathymetry within Lake Borgne varies from approximately -6.0 ft to -12.0 ft NAVD88. It is assumed that these depths would be sufficient for floating equipment to install the pipeline.

One booster pump would be installed within the corridor. A maximum area of 200 ft by 50 ft would be excavated to a maximum elevation of -10.0 feet NAV88 to accommodate the booster pump. All excavated material would be sidecast adjacent to the booster pump footprint within the pipeline corridor.

Marsh Creation Areas

The MCAs consist of low, deteriorating brackish marsh and open water. There are three MCAs proposed under the GTMCP (Figure 2). These MCAs include the following:

- MCA 1 includes 80 acres of broken marsh and open water.
- MCA 2 includes 560 acres of broken marsh and open water.
- MCA 3 includes 134 acres of broken marsh adjacent to Lake Borgne.

Marsh creation activities, including construction of containment dikes, movement and shaping of fill material, and manipulation of the dredge pipe will require marsh buggies, bulldozers, and front-end loaders. Each of the MCAs would be constructed to a final elevation of +2.5 ft NAVD88, based on detailed modeling of expected sediment settling rates during and following construction. An estimated 6.7 MCYs of marsh compatible sediments would be required to meet the elevation goals in the three MCAs. The targeted final elevation is designed to maximize the number of years that the marsh elevation will be in the intertidal range (where intertidal is referring to the water level between local mean high water and mean low water elevations) based on documented land subsidence rates and modeled sea-level rise for the project area.

The applicant proposes to conduct limited planting of marsh vegetation immediately following fill placement activities in strategic areas (containment dikes and inflow/outflow points), to help prevent erosion and turbid runoff. The remainder of the restoration areas will be allowed to

revegetate naturally, unless monitoring indicates that revegetation goals are not being met, at which point, additional plantings may be implemented. Vegetation surveys will be conducted in year 1, after the first growing season (if sediment consolidation allows access), and in years 3 and 5 post-construction. Sampling will occur between mid-August and mid-November with the target being September/October.

Prior to construction, pollution prevention plans would be prepared, as necessary, in conjunction with the NPDES permitting process. These plans would require implementation of all specifications and BMPs necessary for control of erosion and sedimentation during and following construction-related activities. Due to the installation of containment dikes, most of the dredge material is expected to remain contained within the MCAs, which would limit sediment runoff. The planting and natural establishment of vegetation would serve to further stabilize soils and reduce soil loss.

Monitoring and Adaptive Management Plan

The MAM Plan was developed to evaluate project performance, key uncertainties, and potential corrective actions, if needed, during the project's construction, and for the first 5 years following the completion of construction. The data collected during this period will also be used to predict the project's performance during the remaining years of the project's design life (20 years total). Those elements of the MAM Plan directly related to potential project effects on ESA-listed species and designated critical habitat are described below. All scientific collection permits and other environmental permitting related to the implementation of this MAM Plan have already been secured so there is no further analysis of potential effects of MAM implementation necessary at this time.

Gulf Sturgeon Telemetry

- a) Purpose: To determine whether acoustically tagged gulf sturgeon use the portions of Lake Borgne where the LBMCP and GTMCP borrow areas are located.
- b) Method: Telemetry surveillance will include twenty (20) continuously recording receiver stations throughout the southern portion of Lake Borgne, including within and around the footprints of the Lake Borgne and Golden Triangle borrow locations. This sturgeon telemetry monitoring will be executed in conjunction with planned research efforts (i.e., Open Ocean sturgeon project) to leverage resources across multiple projects to complete a robust telemetry surveillance throughout Lake Borgne. These data collection efforts will be combined with information gathered through the monitoring parameters described below, in order to develop a broad understanding of Gulf sturgeon occupancy in the Lake Borgne area.
- c) Timing, Frequency, and Duration: Continuously recording acoustic receivers will be deployed to provide passive monitoring of the project areas. The telemetry array would be deployed prior to the initiation of dredging operations, and would be maintained for approximately two years. The two-year period of analysis will include pre-construction conditions and a period of time during initial dredging activity.

Receivers would be routinely downloaded and serviced every six to eight weeks, with water quality parameters concurrently recorded.

- d) **Sample Size:** Twenty acoustic receivers will be strategically deployed throughout the southern portion of Lake Borgne.
- e) **Sites:** The acoustic receivers would be deployed in a coarse-scale array covering the lower portion of Lake Borgne including the proposed borrow areas. This effort will be coordinated with the Open Ocean TIG sturgeon acoustic tagging research project (which places receivers in upper Lake Borgne), thereby integrating telemetry monitoring efforts to cover the entire Lake Borgne area.

Water Quality

- a) **Purpose:** To measure water quality at various depths within and surrounding the Lake Borgne and Golden Triangle borrow areas to capture a before and after dataset of water quality parameters.
- b) **Method:** Water quality multi-probe sonder will be deployed from a boat to measure turbidity, temperature, pH, specific conductance, salinity, and dissolved oxygen at multiple depths and locations.
- c) **Timing, Frequency, and Duration:** Discrete samples will be collected in conjunction with other sampling efforts described below, in addition to routine monthly sampling to be conducted within and around each borrow area for at least one year following dredging completion. Sampling duration may be extended up to 5 years, and frequency may increase to every other week during summer if stratification or hypoxia is detected.
- d) **Sample Size:** Approximately 20 locations with 3-4 depths measured at each location.
- e) **Sites:** Collocated with benthic sampling and telemetry monitoring sites, as well as specifically within and adjacent to the four dredge borrow areas.

Benthic Invertebrate Recolonization

- a) **Purpose:** To evaluate pre- and post-dredging macroinvertebrate density and community composition to estimate the rate of post-dredging recolonization of the benthic community in relation to water quality and substrate composition.
- b) **Method:** Collect surficial benthic grab samples for biologic and substrate compositional analysis.
 - Quantify component grain size classes of substrate samples.
 - Calculate organic content (loss on ignition).
 - Conduct taxonomic identification and enumeration of benthic macroinvertebrates.
 - Collect water quality data (dissolved oxygen, salinity, turbidity, temperature) associated with each benthic sample location.

- c) Timing, Frequency, and Duration: Samples would be collected prior to dredging as a representative baseline, immediately after dredging is completed (year 0), and one year post-construction. If benthic recolonization is not observed in year 1, additional sampling may occur 3 and/or 5 years post-construction.
- d) Sample Size: Initial sampling locations would be collocated with the twenty telemetry receiver deployment sites throughout lower Lake Borgne, including within the planned borrow areas. Post dredging samples will be collected in quadruplicate for each of the borrow areas, and at non-disturbed control sites, during each sampling period to characterize benthic substrate and macroinvertebrate fauna (approximately 20 samples per period).
- e) Sites: Baseline benthic sampling will be located at the 20 acoustic receiver locations throughout lower Lake Borgne, including within dredge borrow areas. During each post-dredging sampling periods, quadruplicate samples will be collected from within each of the four dredge borrow footprints, as well as from adjacent control sites that will remain undisturbed by the project.

Borrow Area – Infilling Rate

- a) Purpose: To determine the rate of sediment infilling of the borrow area after dredging.
- b) Method: Single beam bathymetry survey.
- c) Timing, Frequency, and Duration: YRs 1, 3, and 5 post-construction.
- d) Sample Size: The survey will be completed on a 500 foot by 1,000 foot grid.
- e) Sites: The borrow area plus transects extended beyond the borrow area for reference.

Modeling

- a) Purpose: Numerical environmental models will be developed for the entire basin surrounding the project area including Lake Pontchartrain, Lake Borgne, the Biloxi Marsh area, out to Chandeleur Sound. In the first phase of development the models will use existing data for river stage, discharge, wind and ocean currents, precipitation, and physical landscape features to estimate environmental conditions in coastal estuaries that are important in providing suitable habitat for Gulf sturgeon. Once developed, the models will provide capacity to hind-cast aquatic environmental conditions based on historic information and to project future aquatic conditions based on various contemplated scenarios. The modelled output will be combined with existing USFWS and LDWF telemetry data to develop habitat suitability maps that will provide managers with important quantitative information about Gulf sturgeon habitat in the area to inform current and future restoration projects. In the third phase, modeled output for Lake Borgne will be combine with telemetry information collected as part of the cooperative telemetry array to develop similar habitat suitability maps. Once complete, managers will have a quantitative

assessment of the probability of Gulf sturgeon occupancy for the entire footprint of Gulf sturgeon critical habitat in Louisiana. The numerical models will continue to provide the capacity to derive environmental parameters like salinity, temperature, and dissolved oxygen on a daily timescale to evaluate potential biological response for many other species to various environmental changes.

- b) **Method:** Three additive phases of modeling will be conducted, culminating with the incorporation of the telemetry dataset collected via Parameter #1 above. Phase 1 of the modeling efforts will include the development of model conditions, and production of components that influence habitat suitability (environmental and physical conditions) at a basin-wide scale with a specific focus on the Lake Borgne area. Phase 2 will overlay past sturgeon telemetry information into the numerical habitat model developed in the first phase, and hindcast sturgeon movement patterns based on three years of previous collected USFWS telemetry data. Phase 3 of modeling will update the model and re-run outputs with the incorporation of new sturgeon telemetry data collection efforts (described above) to forecast sturgeon habitat utilization and guide the development of future projects through adaptive management.
- c) **Timing, Frequency, and Duration:** The three phases of modeling will be conducted sequentially, and will take approximately one year per phase.
- d) **Sample Size:** Modeling efforts will combine all available data (e.g., benthic sampling, water quality monitoring, sturgeon telemetry) to best inform outputs.
- e) **Sites:** The model will be conducted at a basin-wide scale using information from numerous sites/data throughout Lake Borgne; however, the focus of the outputs would be directed at the area covered by the large-scale cooperative telemetry array.

Construction Conditions

To minimize any potential effects to ESA-listed species, the construction contractors will implement the following conditions during all in-water construction activities:

- All construction related vessels will adhere to NMFS's Vessel Strike Avoidance Measures and Reporting for Mariners.⁶
- Construction contractors will implement the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions.⁷
- Construction contractors will implement the NMFS Measures for Reducing the Entrapment Risk to Protected Species.⁸

⁶ <http://www.fisheries.noaa.gov/webdam/download/92937962>

⁷ <https://www.fisheries.noaa.gov/webdam/download/92937961>

⁸ <https://www.fisheries.noaa.gov/webdam/download/92937957>

Effects Determination(s) for Species the Action Agency or NMFS Believes May Be Affected by the Proposed Action

Species	ESA Listing Status ⁹	Action Agency Effect Determination	NMFS Effect Determination
Sea Turtles			
Green (North Atlantic [NA] distinct population segment [DPS])	T	NLAA	NLAA
Green (South Atlantic [SA] DPS)	T	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Loggerhead (Northwest Atlantic [NWA] DPS)	T	NLAA	NLAA
Fish			
Gulf sturgeon (Atlantic sturgeon, Gulf subspecies)	T	NLAA	NLAA

Critical Habitat

The project is located in Gulf sturgeon critical habitat Unit 8 (Lake Pontchartrain/Mississippi Sound). The following essential features/primary constituent elements (PCEs) are present in Unit 8: (1) abundant prey items within estuarine and marine habitats and substrates for juvenile, subadult, and adult life stages; (2) water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; (3) sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and (4) safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats. We believe PCEs 1, 2, and 3 may be affected by the proposed action.

Analysis of Potential Routes of Effects to Species

Sea turtles and Gulf sturgeon could be physically injured if struck by construction equipment or materials. We believe the potential for physical injury is highly unlikely and therefore discountable because these species are highly mobile and are expected to move away from the noise and disturbance associated with in-water construction activities. The applicants' implementation of the above-listed construction conditions will further reduce the risk by requiring operation of any mechanical equipment to cease immediately if an ESA-listed species is detected within a 50-ft radius of the equipment.

Sea turtles and Gulf sturgeon could be physically injured if struck by construction related vessels or barges. We believe the potential for a vessel strike is highly unlikely and therefore discountable due to the species' mobility and the requirement for all construction related vessels to adhere to NMFS's *Vessel Strike Avoidance Measures and Reporting for Mariners*.

Sea turtles and Gulf sturgeon may be physically injured if struck or entrained during dredging activities. We believe the potential for any dredging-related injuries is highly unlikely and

⁹ E = endangered; T = threatened; NLAA = may affect, not likely to adversely affect.

therefore discountable. Because these species are highly mobile, we expect them to move away from the noise and disturbance created by the dredging activities. Additionally, NMFS has previously determined in dredging Biological Opinions that, while ocean-going hopper-type dredges may lethally entrain ESA-listed species, non-hopper type dredging methods, such as the hydraulic cutterhead methods proposed in this project, are slower and extremely unlikely to adversely affect these species.¹⁰

Sea turtles and Gulf sturgeon may avoid the in-water construction areas due to turbidity and noise resulting from dredging and placement activities. We believe any potential effects on sea turtles and Gulf sturgeon from temporary avoidance of the dredging areas would be insignificant, as these are open water areas surrounded by large expanses of similar habitats that would remain accessible to these species throughout the construction process. With regard to activities within the MCAs, all of these areas located outside of the main body of Lake Borgne. Most of the MCAs are separated from the lake by rock shoreline protection structures, and all are in extremely shallow water (less than 3 ft). For these reasons, we do not expect sea turtles or Gulf sturgeon to be present in any of the proposed MCAs and the potential for adverse effects to these species from activities occurring in the MCAs is extremely unlikely, and therefore discountable.

Analysis of Potential Routes of Effect to Critical Habitat

Dredging may remove substrates containing Gulf sturgeon prey items. We believe the effect to the Gulf sturgeon critical habitat PCE for abundant prey species (PCE 1) from dredging will be insignificant since the estimated impact is relatively small compared to the surrounding area available for foraging, any impacts will be temporary, and prey items will still be present in the areas outside the dredging footprint. The maximum area that may be dredged under the 2 projects is 1,141 acres (1,063 for LBMCP + 78 for GTMCP = 1,141 acres). This equals just 0.64% of the total available foraging area in Lake Borgne (1,141 acres / 177,280 total acres in Lake Borgne = 0.0064 = 0.64%), and just 0.13% of the area of critical habitat in Unit 8 (1,141 acres / 881,280 total acres in Unit 8 = 0.0013 = 0.13%). Any reduction in prey species within the borrow areas is also expected to be temporary. Observed rates of benthic community recovery, after removal of dredged material, range from 3-24 months.¹¹

Dredging and the placement of material to create marsh habitat may generate turbidity that could cause localized and temporary reductions in water quality. We believe the effect to the Gulf sturgeon critical habitat PCE for water quality (PCE 2) from increased turbidity will be insignificant. Sturgeon are adapted to foraging in highly turbid environments, and the action area contains naturally turbid water due to the shallow depths, fine sediment substrates, and high wave energy common in Lake Borgne. Any temporary increases in turbidity are not expected to notably decrease the water quality in the area.

¹⁰ NMFS. 2007b. Revision 2 to the National Marine Fisheries Service (NMFS) November 19, 2003, Gulf of Mexico regional biological opinion (GRBO) to the U.S. Army Corps of Engineers (COE) on hopper dredging of navigation channels and borrow areas in the U.S. Gulf of Mexico. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida.

¹¹ Saloman, C. H., S. P. Naughton, and J. L. Taylor. 1982. Benthic Community Response to Dredging Borrow Pits, Panama City Beach, Florida. Pages 141 in. National Marine Fisheries Service, Panama City Beach, Southeast Fisheries Center.

Increased turbidity and sediment laden runoff may continue to flow from the MCAs, into Lake Borgne following construction activities, particularly during large storm events with heavy precipitation. We believe the effect to the Gulf sturgeon critical habitat PCE for water quality (PCE 2) from any increases in turbidity will be insignificant. The proposed strategic planting of vegetation along with natural revegetation, as well as the proposed erosion prevention BMPs, are expected to minimize any post-construction erosion/turbidity into Lake Borgne and ensure that any temporary increases in turbidity will not significantly impact the water quality in the lake.

The creation of deep, poorly circulating borrow pits can cause hypoxic conditions (reduced dissolved oxygen) at the bottoms of the pits that may persist over time. We believe that any effects to the PCE for water quality (PCE 2) from reduced dissolved oxygen in the borrow pits will be insignificant. Lake Borgne is a broad, well-mixed water body due to significant wave energy and the large hydrological connection with Mississippi Sound. The proposed borrow pits have been designed with gentle slopes and modest depths to protect against hypoxia formation. Because of borrow pit designs and the hydrological nature of Lake Borgne (well mixed), NMFS does not anticipate any significant changes in oxygen content, or other chemical characteristics as a result of the proposed dredging.

The removal of dredged material from Lake Borgne may affect sediment quality in the dredged areas. We believe any effect to the PCE for sediment quality (PCE 3) from sediment removal will be insignificant. The composition of substrate materials that will remain in the dredge footprint after dredging is complete are expected to be very similar to those that are removed from the project area; therefore, no significant alteration of sediment composition is expected.

Conclusion

Because all potential project effects to listed species were found to be discountable, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species under NMFS's purview. This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Michael Tucker, Consultation Biologist, at (727) 209-5981 or by email at Michael.Tucker@noaa.gov.

Sincerely,

David Bernhart
Assistant Regional Administrator
for Protected Resources

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