United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

May 22, 2014

Mr. Robert Barham
Secretary
Louisiana Department of Wildlife and Fisheries
Post Office Box 98000
Baton Rouge, Louisiana 70898-9000

Dear Mr. Barham:

Please reference Programmatic Individual Environmental Report (PIER #36) addressing compensatory mitigation for improvements made to the Lake Pontchartrain and Vicinity project. Attached is the Final Fish and Wildlife Coordination Act Report on the Tiered Individual Environmental Report # 1 (TIER #1) titled "Milton Island Marsh Restoration Project, St. Tammany Parish, Louisiana" (PIER 36, TIER 1, Milton Island). This Tiered IER is being prepared under the approval of the Council on Environmental Quality (CEQ) and it will partially fulfill the U.S. Army Corps of Engineers' (Corps) compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). Work proposed under this Tiered IER would mitigate impacts to intermediate and fresh marsh habitats resulting from the improved hurricane protection measures of the Lake Pontchartrain and Vicinity hurricane protection project and would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4).

This report constitutes the 2(b) report of the Fish and Wildlife Service (Service). Should your staff have any questions regarding this report, please have them contact David Walther (337/291-3122) of this office.

Sincerely,

Jeffrey D. Weller
Field Supervisor
Louisiana Ecological Services Office

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

May 22, 2014

Mr. Richard Hartman
Branch Chief
Habitat Conservation Division
National Marine Fisheries Service
c/o Louisiana State University
Baton Rouge, Louisiana 70803-7535

Dear Mr. Hartman:

Please reference Programmatic Individual Environmental Report (PIER #36) addressing compensatory mitigation for improvements made to the Lake Pontchartrain and Vicinity project. Attached is the Final Fish and Wildlife Coordination Act Report on the Tiered Individual Environmental Report # 1 (TIER #1) titled "Milton Island Marsh Restoration Project, St. Tammany Parish, Louisiana" (PIER 36, TIER 1, Milton Island). This Tiered IER is being prepared under the approval of the Council on Environmental Quality (CEQ) and it will partially fulfill the U.S. Army Corps of Engineers' (Corps) compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). Work proposed under this Tiered IER would mitigate impacts to intermediate and fresh marsh habitats resulting from the improved hurricane protection measures of the Lake Pontchartrain and Vicinity hurricane protection project and would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4).

This report constitutes the 2(b) report of the Fish and Wildlife Service (Service). The Service has incorporated your agency's comments into the final report prior to its submission to the Corps. Should your staff have any questions regarding this report, please have them contact David Walther (337/291-3122) of this office.

Sincerely,

Jeffrey D. Weller
Field Supervisor
Louisiana Ecological Services Office

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FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
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Lafayette, Louisiana 70506

May 22, 2014

Colonel Richard L. Hansen
District Commander
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Hansen:

Please reference Programmatic Individual Environmental Report (PIER #36) addressing the final array of mitigation alternatives and the Draft Tiered Individual Environmental Report #1 (TIER 1) for the Milton Island Marsh Restoration Project feature. Those reports are prepared under the approval of the Council on Environmental Quality (CEQ) and will partially fulfill the U.S. Army Corps of Engineers' (Corps) compliance with the National Environmental Policy Act of 1969 (NEPA) (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). Individual Environmental Reports are CEQ-approved alternative arrangements for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures in Louisiana. Work proposed under this TIER would mitigate impacts to fresh and intermediate marsh habitats resulting from the improved hurricane protection measures to the Lake Pontchartrain and Vicinity (LPV) project and would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana.

The Fish and Wildlife Service (Service) provides this report to assist your staff in fulfilling mitigation needs associated with those efforts in accordance with the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This report constitutes the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. Copies of this report were provided to the National Marine Fisheries Service (NMFS) and the Louisiana Department of Wildlife and Fisheries. NMFS provided comments, and their comments on the draft FWCA report and the draft TIER have been incorporated into this final report (Appendix D). Their comments include a cursory review of the Draft Mitigation Guidelines; please refer to their comments for those specific comments.

Through the Corps' alternative evaluation process (AEP) the Milton Island Intermediate Marsh Restoration (non-refuge impacts) project was selected as a Tentatively Selected Plan (TSP) to mitigate impacts to fresh and intermediate marsh. This report is provided to assist in fulfilling those mitigation needs. This report incorporates and supplements our October 28, 2013, FWCA Report provided during the development of the PIER#36, as well as our November 26, 2007, Draft FWCA Report that provided twenty-six programmatic recommendations for the Hurricane and Storm Damage Risk Reduction System (HSDRRS) authorized work to help avoid and minimize impacts to fisheries, wetlands, forested habitats, migratory birds, and public lands. This report also incorporates, and supplements the numerous FWCA Reports provided for the work authorized under 4th and 5th Supplemental for the LPV Hurricane Protection Project only (i.e., IERS 1-11, including supplemental documents). Those reports contain a thorough discussion of the significant fish and wildlife resources (including those habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following information is provided to update the previously mentioned reports and provide specific information and recommendations.

Project Impacts & Mitigation

As a result of HSDRRS impacts to approximately 100 acres and 45.7 average annual habitat units (AAHUs, based on 95-100% design of levee impacts) of intermediate and fresh marsh, mitigation plans are jointly being developed by the Corps, the Service and the NMFS. The current plan consists of acquisition and management of a 152-acre area near Madisonville in St. Tammany Parish, Louisiana. The site is located within an area that was converted from a marsh and swamp complex into a mechanically-dependent agricultural area surrounded by dikes. The area is no longer used for agriculture but is managed to attract wintering waterfowl. Recent shoreline loss has resulting in breaching of the Lake Pontchartrain shoreline allowing tidal influence into the immediate project area. The project area is bounded on the north by similar open water habitat, on the west by a cypress-tupelo swamp and on the east by a borrow canal that supports a residential development along the Milton's Island ridge.

HSDRRS project activities are located in the Mississippi River Deltaic Plain. Habitats (bottomland hardwoods, swamp, and estuarine marshes) within this area have decreased because of urbanization, especially adjacent to the New Orleans metropolitan area, and conversion to agriculture along the adjacent natural river levees. Other factors contributing to the loss of those habitats include hydrologic alterations associated with navigation channels, isolation from historic riverine overbank flows by flood-control levees, oil and gas exploration, extraction and transportation activities, sea-level rise, and subsidence. Due to their value and scarcity, in-kind compensation for project-induced losses to estuarine marsh habitats would be implemented. Avoidance and minimization of impacts to wetlands and incorporation of environmental features, when feasible, into levee designs were Corps' planning objectives. A more detailed description of the habitats and their value to fish and wildlife resources was presented in our October 28, 2013, FWCA Report and herein incorporated by reference.

The Service quantified unavoidable project impacts on wildlife resources and calculated mitigation needs and benefits through the use of Wetland Value Assessment (WVA). Habitat units fluctuate in response to changes in habitat quality, represented by the Habitat Suitability Index (HSI), and/or quantity (acres); those changes are predicted for various target years over the period-of-analysis (i.e., 50 years), for future without-project and future with-project scenarios. Target years (TY) were selected for this analysis to capture the effects of important biological events. Values for model variables were obtained from site visits to the area, previous wetland assessments in similar habitats, communication with personnel knowledgeable about the study area and similar habitats, and review of aerial photographs and reports documenting fish and wildlife habitat conditions in the study area and similar habitats. For all the habitat assessments, the products of the resulting HSI values and acreage estimates were then summed and annualized for each habitat type to determine the AAHUs available. The net change (increase or decrease) in AAHUs under future with-project conditions, compared to future without-project conditions, provides a quantitative comparison of anticipated project impact/benefits in AAHUs. By dividing the AAHU by the proposed mitigation project acreage a mitigation potential per acre was determined. Using an iterative analysis, that mitigation potential was used to refine the project size to meet the mitigation needs. Further explanation of how impacts/benefits are assessed with the WVA and an explanation of the assumptions affecting HSI values are available for review at the Service's Louisiana Ecological Services Office. Impact assessments and mitigation benefit assessments considered sea-level rise, subsidence, accretion, and historic marsh loss trends and were coordinated with other State and Federal agencies.

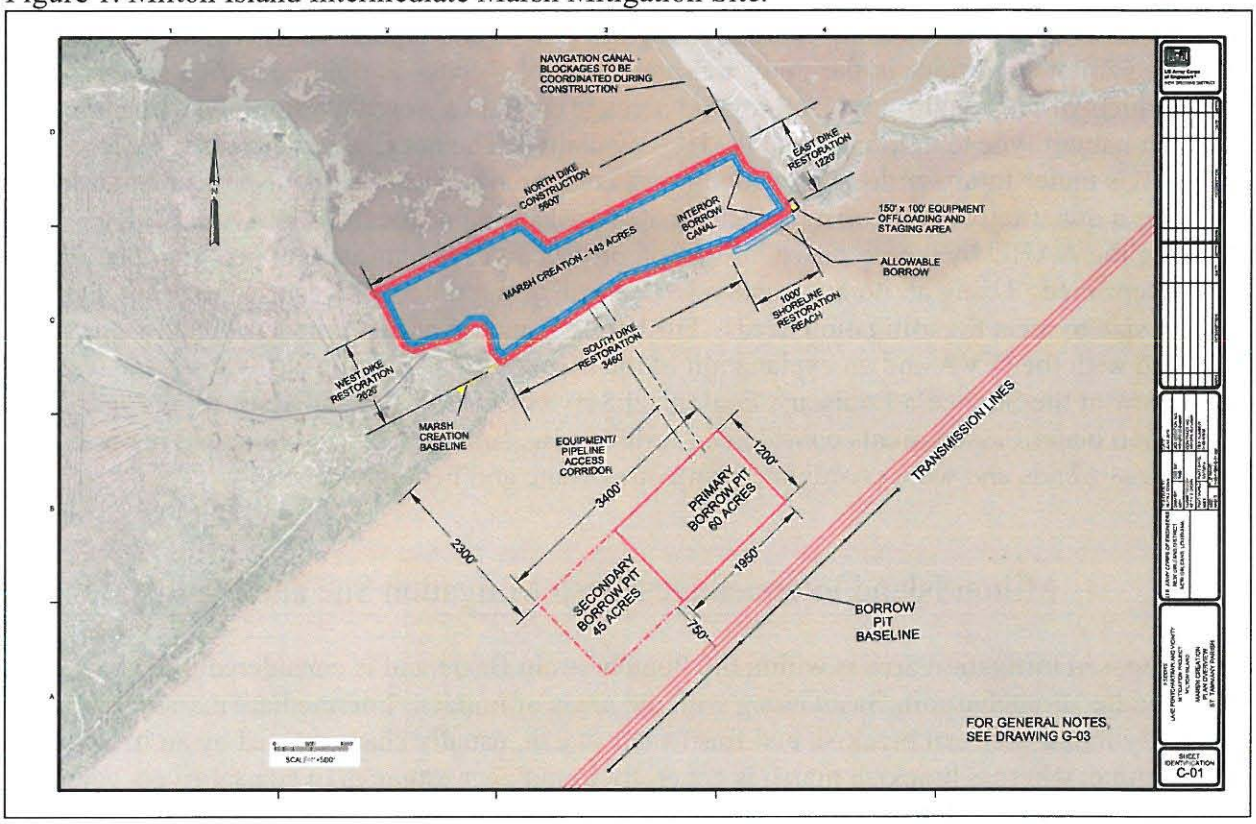
Milton Island Intermediate Marsh Mitigation Site and Plan

The proposed mitigation area is within the Pontchartrain Basin and is considered to be located in the "middle" Pontchartrain Basin along with the areas of impact. Intermediate marsh is generally found between brackish and freshwater marsh, usually characterized by an irregular tidal regime, whereas brackish marsh is generally found near estuaries of coastal rivers where an influx of freshwater dilutes seawater to a brackish level of salinity. Chabreck (1972) classified fresh and intermediate marshes as having an average salinity range of 0.1 parts per thousand (ppt) to 9.9 ppt with a mean of < 3.0 ppt for fresh and 3.3 ppt for intermediate marshes, whereas brackish marsh average salinities can range from 0.4 ppt to 28.1 ppt (average 8.0 ppt). Implementation of the mitigation plans would maintain and/or increase fish and wildlife resource values via the improvement and re-establishment of estuarine marsh. The proposed mitigation plan is being developed to offset losses to fresh/intermediate marshes and includes the purchase of protective easements (or fee-title) and the construction of a marsh restoration project (containment dike construction, dedicated dredging, and filling of open water areas) on 152 acres along the Lake Pontchartrain shoreline (Figure 1). Mitigation lands are to be purchased by the Corps and managed by the Non-Federal Sponsor, the Coastal Protection and Restoration Authority Board.

The Milton Island Flood Side Intermediate Marsh Restoration project will consist of a 152-acre project area, of which includes 7 acres of existing dikes and 2 acres of shoreline restoration. The remaining 143 acres is open water that would be filled to create marsh. Approximately 15 acres of borrow ditches will be dredged within the marsh creation area for containment. Of those 15

acres, 4.5 acres are expected to be back filled to target marsh elevations, leaving 10.5 acres of shallow open water. Based on these calculations, approximately 132.5 acres of floodside intermediate marsh and 10.5 acres of associated open water (143 acres total) will provide the necessary benefits to offset levee construction impacts. The WVA evaluated the 145-acre project area to account for the conversion of 2 acres of open water to non-wetland habitat for shoreline restoration.

Figure 1. Milton Island Intermediate Marsh Mitigation Site.



The project consists of dredging material from Lake Pontchartrain about 2,000 feet from the shoreline using a hydraulic cutterhead dredge. Initial elevation for dredge fill would be to an approximate elevation of +2.25 feet North American Vertical Datum 1988 (NAVD88), to ultimately result in a target marsh elevation of between +1.5 and +1.0 feet NAVD88 within the project life. Total perimeter retention would be required to retain dredged material and to allow for vertical accretion. Existing retention features exist along the east, west, and south perimeters of the project footprint, except for a 1,000-foot reach of shoreline along the lake which would require shoreline restoration efforts. Rehabilitation of these existing dikes would be accomplished as necessary to retain the dredge material slurry. Over 5,500 linear feet of new retention dike would be required along the northern limit of the project footprint. The dike would be built to an elevation +4.5 feet NAVD88 with borrow material obtained within the marsh creation footprint and would have a 5-foot crown width to provide two feet of freeboard during the dredged material pumping operation. Interior weirs or baffle dikes may be constructed to assist in vertical stacking of dredged material. Dikes surrounding the project will be either gapped or degraded approximately one year after project construction, upon settlement

and dewatering of the created marsh platform. Gaps would require a 25-foot bottom width at approximately elevation +0.0 NAVD88 (lower limit of existing marsh platform) to assure water interchange with the existing marsh and would be spaced with care being taken to locate gaps at existing natural bayous, canals, and other openings. Gap locations should also be considered at low areas within the mitigation site. The southern dike would remain to provide protection from Lake Pontchartrain waves and water intrusion.

With regards to the lake shoreline, a design element of the project will be to restore 1,000-foot reach of that shoreline which has breached, allowing lake waters to freely enter the project footprint. An earthen berm, with a 25-foot crown width, 1:4 foot (rise to run) side slope, at elevation +5.0 feet NAVD88 is proposed. An earthen-filled bag system, which will accommodate planting of shoreline vegetation, is being considered as a viable shoreline protection alternative. It is estimated that the footprint of the shoreline restoration would result in 2 acres of impacted water bottoms. Additionally, approximately 2-3 acres of water bottom lake side of the shoreline restoration feature will be dredged to obtain material for the shoreline restoration.

The marsh footprint will be planted upon satisfactory settlement and dewatering of the dredged material, approximately one year after initial construction. Plugs of appropriate marsh vegetation will be planted over 100% of the marsh restoration acreage on seven (7) foot centers. To ensure adequate species diversity, the planting will include at least two (2) of the following different species: California Bulrush, Black Needle Rush, Giant Cutgrass, Marshhay Cordgrass, Maidencane, and/or Seashore Paspalum.

Land Use

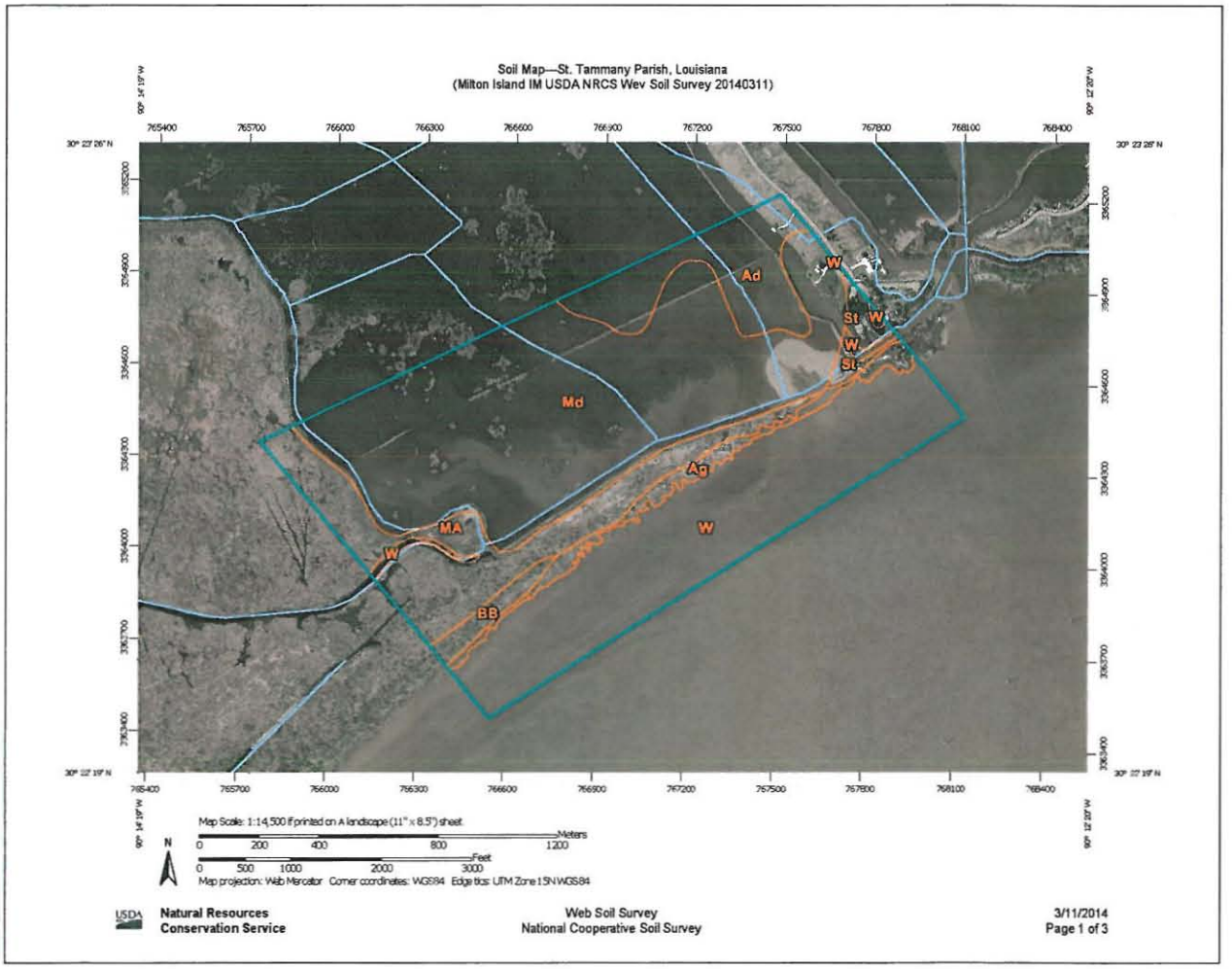
The proposed mitigation project was part of a larger parcel that was considered by the Interagency Review Team as a Section 404 of the Clean Water Act mitigation bank proposal. Of the larger parcel considered as a private mitigation bank, only Unit 6 was pursued as a Phase 1 mitigation proposal. That unit is not the same unit being considered for HSDRRS mitigation (Unit 8). Currently the mitigation bank proposal has been withdrawn. According to information presented during the project evaluation process, the site underwent a massive land conversion from swamp and marsh to a pumped agricultural area during the 1950's. Construction was completed in the 1960's, and has since been used for agriculture and hunting. The impounded area historically underwent spring and summer drawdowns and winter filling to attract waterfowl. A recent breach in the Lake Pontchartrain shoreline connects the project area to the lake. Except for the remnant dikes most of the site is currently open water, and until recently was cut off from tidal fluctuations. A portion of the Milton Island ridge, just east of the project area, has been developed into a residential area.

Soils

Soils found within and near the proposed mitigation area include Maurepas muck, drained (Md); Maurepas muck (MA); Allemands muck (drained) (Ad); and Aquents, dredged (Ag) (Figure 2).

The site is predominantly Maurepas muck which consists of very poorly drained organic soils formed in woody plant remains characteristic of soils found in very large swamps. According to the *Soil Survey of St, Tammany Parish, Louisiana*, (1990), Maurepas soils are flooded and ponded most of the time by freshwater, and have a low capacity to support loads. Allemands muck soils make up a significant portion of the project area and are organic soils that are in former freshwater marshes that have been drained. They are similar to the Maurepas soils with an organic layer on top of a clay layer; however the organic layer in the Allemands soils is shallower (18 inches thick). Both series are best used as habitat for wetland fish and wildlife. The natural vegetation for the Allemands series includes bulltongue, maidencane, alligator weed, cattail, common rush, pickerel weed, and giant cutgrass. Bald cypress has been known to occur occasionally throughout the area.

Figure 2. Soil Classifications within the Milton Island Intermediate Marsh Project



The shoreline of Lake Pontchartrain is characterized as Aquents (dredged) soils. Aquents soils are created by the placement of dredged material either through the creation of dikes for the agricultural impoundments or dredged material disposal from Lake Pontchartrain. These soils are variable in texture and, according to the *Soil Survey of St. Tammany Parish, Louisiana* (1990)

range from muck and clay to sand. The material was stacked and allowed to dry, then leveled and spread throughout the diked area. Also occurring along the Lake Pontchartrain shoreline near the project area is the Barbary muck clay soils. Typical vegetation supported by this soil includes water tupelo, bald cypress, water oak, white oak, red ample, elm, and water hickory for the overstory, and lizard's tail, spiderlily and buttonbush as the undertstory.

A small portion of the project area near the shoreline breach and along the borrow canal is classified as Stough find sandy loam. This is a somewhat poorly drained soil that formed in loamy marine and fluvial sediments, and is found on terraces of the late Pleistocene age. This soil is well suited for woodland and openland habitat, and moderately suited for crop production and recreational use.

Hydrology

Until recently the project area was part of a larger non-operational agricultural impoundment that was cut off from tidal influences. The area was diked and pumped to support the agricultural activities and dependent on rain water for freshwater input. The 1,000-foot breach that has recently developed allows some tidal flow into the area.

The mitigation plan includes gapping and degrading dikes after initial settlement to restore the tidal regime to the project area. This will also offer hydrologic benefits to adjacent areas that have reduced hydrologic connections near existing dikes.

The Corps' Draft 100% Design Document Report for the Milton Island Intermediate Marsh project used data from the Mandeville tide gage. Using 14,253 usable records taken between January 1, 1959 and May 14, 2011, the minimum stage is estimated at -1.64 feet, the average stage is +1.33 feet, and the maximum stage is +5.00 feet. Tidal data to be used for Milton Island was calculated from the Corps #85575 Mandeville hourly adjusted gage readings, located in the Mandeville Harbor just east of the Causeway Bridge. Since this is about the same distance from the mouth of the Tchefuncte River as the project is, but on opposite sides of this river outlet, this gage is a suitable gage for this project. Using tidal data terminology from National Oceanic and Atmospheric Administration, the results of the Mandeville gage are as follows:

- MHW & MHHW = 1.00 feet NAVD88 (which occurs at 71% above all other lower elevations)
- MSL & MTL = 0.70 feet NAVD88 (which occurs at 53% above all other lower elevations)
- MLW & MLLW = 0.40 feet NAVD88 (which occurs at 32% above all other lower elevations)

  **MHW = Mean High Water, MHHW = Mean High High Water, MLW = Mean Low Water, MLLW = Mean Low Low Water

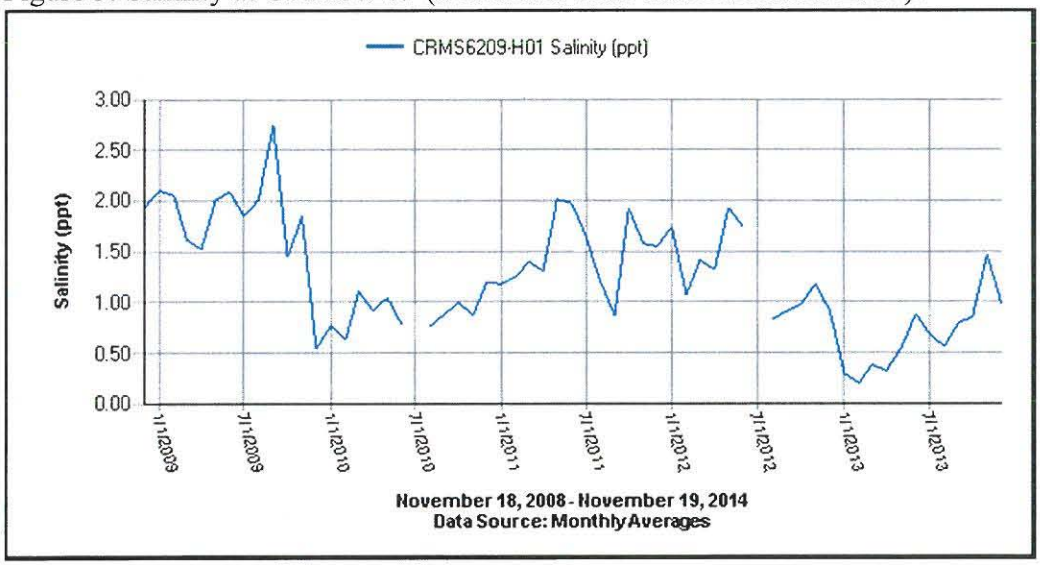
Since Lake Pontchartrain is not subject to diurnal tides, MLLW is the same as MLW and MHHW is the same as MHW. Due to Relative Sea Level Rise (RSLR), water surface elevations in the project area could increase by up to the following amounts by the end of the project's 50

year period of analysis: 1.23 feet for the Low estimate, 1.66 feet for the Intermediate estimate, and 3.06 feet for the High estimate.

Salinities

Two Coastwide Reference Monitoring System (CRMS) stations are located near the project area but further inland likely resulting in fresher conditions observed at those stations compared to the project area. CRMS4094 is located in a fresh marsh area east of the Tchefuncte River. Average salinity between November 2011 and December 2013 was measured at 1.26 ppt. CRMS6209 is located in a swamp also inland from the lake shoreline and has a recorded average salinity of 1.07 ppt between December 2009 and December 2013. The WVA references the proposed Guste Island Mitigation Bank habitat assessment which indicates that the area salinity averages 3.0 ppt during the growing season.

Figure 3. Salinity at CRMS6209 (December 2009 and December 2013).



Future-without Mitigation

Under future without-management conditions, the proposed wetland mitigation area is predicted to remain in private ownership. Without management it is likely that the remnant dikes will further deteriorate and the project area will become an extension of Lake Pontchartrain. Areas further inland will experience increased turbidity and salinities as the site will be exposed to greater wind fetch and tidal conditions. Submerged aquatic vegetation will likely respond negatively to this increase in turbidity and salinity. Aquatic organism ingress and egress will likely increase as the shoreline breaches into the project area.

Future-with Mitigation

General

The goal of the mitigation plan is to provide for equal replacement of the habitat units lost due to re-construction of the hurricane/flood protection projects. The equal replacement compensation goal specifies that the gain of one habitat unit can be used to offset the loss of one habitat unit. Achieving this goal would re-establish, maintain and protect emergent wetland habitats as a species diverse, sustainable habitat by restoring/maintaining unique functions, values, and services. The objectives of the mitigation measures would be to establish and maintain an intermediate marsh habitat at an elevation that would support emergent vegetation for the longest period of time within the project life.

The mitigation plan consists of acquisition (easement or fee-title) and management of approximately 152 acres of intermediate marsh; approximately 7 acres of the 152 acres consist primarily of levees surrounding the proposed mitigation site which will be incorporated into proposed containment dike design. The mitigation plan addresses marsh loss due to induced subsidence as a result of the area being leveed and placed under a pump system. Marsh elevations and natural tidal regimes will need to be restored to support a diversity of native marsh vegetation and intertidal marsh functions for a time period no less than that of a natural marsh.

Success Criteria, Monitoring, and Adaptive Management

"General Mitigation Guidelines" for monitoring, success criteria, and reporting requirements were developed by the Corps in coordination with the Interagency Team, including the Non-Federal Sponsor. According to the "General Mitigation Guidelines", the proposed mitigation actions will include construction with the Non-Federal Sponsor responsible for operation and maintenance of functional portions of work as they are completed. The Corps will monitor completed mitigation to determine whether additional actions are required to achieve mitigation success and will implement those actions in accordance with cost sharing responsibilities applicable to the project and subject to the availability of funds. Once the Corps determines that the mitigation has achieved initial success criteria, monitoring will be performed by the Non-Federal Sponsor. If the mitigation fails to meet the intermediate and/or long term ecological success criteria the Non-Federal Sponsor is responsible for performing the corrective actions and additional monitoring, at their expense, to ensure success criteria are meet.

General mitigation guidelines for Milton Island have also been drafted (Appendix A); however those draft detailed mitigation plans will need to be reviewed and agreed upon by the Interagency Team including the Non-Federal Sponsor. While, it is anticipated that final mitigation plans would not deviate substantially in regards to the general guidelines provided in the PIER, project specific details need to coincide with design parameters (e.g., settlement curves) evaluated in the WVA.

Newly developed mitigation guidelines are being reviewed by the Corps' Regulatory Division and the Interagency Review Team. Mitigation guidelines for this project as well as future HSDRRS mitigation features should coincide with Regulatory guidelines as much as possible and should continue to be conducted in coordination with the Interagency team. Further, future changes to the mitigation plan should be evaluated against the accrued and anticipated benefits and the effect of implementing the proposal on achievement of the mitigation plan goal. Any changes that would prevent the mitigation goal from being achieved would not be recommended for implementation. Furthermore, the following actives are not permitted within the mitigation area:

1. Placing, filling, storing, or dumping of refuse, trash, vehicle bodies or parts, rubbish, debris, junk, waste, or other such items on the property.
2. Mechanized land clearing or deposition of soil, shell, rock or other fill on the property without prior request for approval, excluding the existing right-of-ways.
3. Cutting, removal or destruction of vegetation on the property except in accordance with the restoration plan.
4. Grazing of cattle or other livestock on the property that has been restored or enhanced.
5. Commercial, industrial, agricultural, or residential uses of the property.
6. No other human activities that result in the material degradation of habitat within the area shall occur.

However, it is understood that the mitigation plan shall not prohibit hunting, fishing, trapping, non-consumptive recreational pursuits and exploration and production of minerals. Exploration and production of minerals shall be conducted in accordance with all applicable laws and regulations. The Service acknowledges that such activities have the potential to reduce the ability of the area to achieve the mitigation goal, depending on the extent of the impacts to the mitigation wetlands.

ANTICIPATED BENEFITS FROM THE MITIGATION SITE

Implementation of the proposed restoration plan is predicted to restore 145 acres (132.5 acres of marsh + 10.5 acres of associated open water + 2 acres of shoreline restoration) of intermediate marsh and increase the habitat value of the estuarine habitat for fish and wildlife. Approximately 2 acres of shallow open water will be filled to restore a breach in the Lake Pontchartrain shoreline and will be used as containment during construction. Mitigation-area habitat values would increase due to the increased quantity and quality of estuarine emergent wetlands. Very little emergent vegetation would be present immediately after construction as most of the project area would be un-vegetated dredged material. Planting of the marsh platform is proposed and will reduce the time to achieve a functional marsh community. Under the future-with project conditions, marsh loss would continue in the project area. The WVA assumes that land loss would continue in the project area at a reduced rate of -0.14% percent per year, compared to -0.28% percent per year under the No Action Alternative. Within the project area, 110 acres of marsh would remain at the end of the 50-year project life compared to 0 acres under the No Action Alternative, and a significant amount of acreage of marsh would remain within the project area after the project life. According to Corps' RSLR analysis, assuming an initial

elevation of 2.5 feet NAVD88, a majority of the project area will experience intertidal marsh elevations for a period of 18 years under the intermediate relative sea level rise scenario (Figure 4 and Table 1). While this considers local sediment rates, post construction accretion rates associated with organic production was not considered.

Figure 4. Settlement curves for constructed marsh beginning at 1.0, 1.5, 2.0, and 2.5 feet NAVD88, and tidal ranges for the three future sea level scenarios outlined in the Corps' EC 1165-2-212 (Corps 2014).

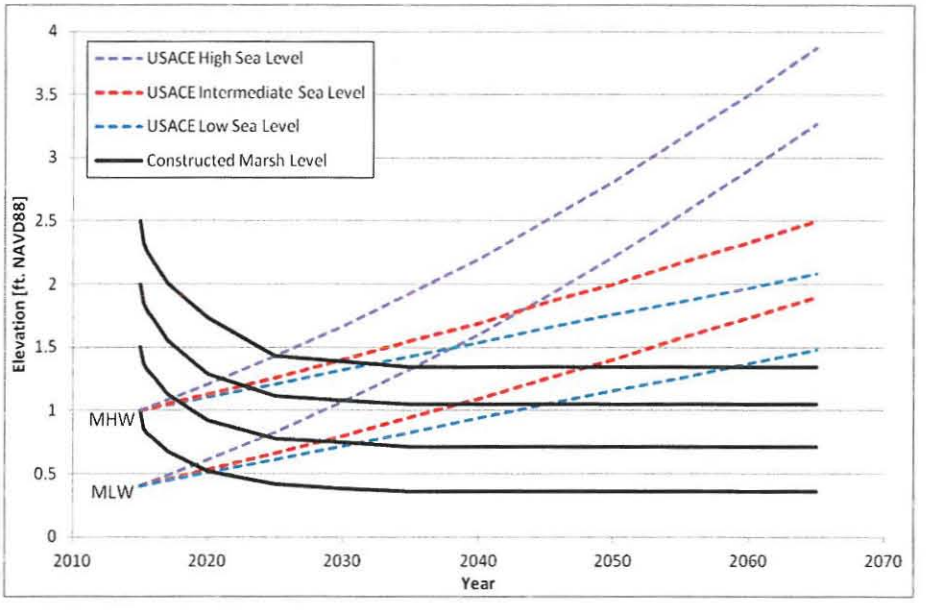


Table 1. Time periods of intertidal marsh elevation under various relative sea level rise scenarios, assuming initial elevation of 2.5 feet NAVD88, as provided by the Corps (2014).

2.5 Ft. Initial Elevation			
RSLR Scenario	USACE Low	USACE Intermediate	USACE High
Intertidal Start Year	2033	2031	2027
Intertidal End Year	2059	2049	2036
Intertidal Duration (Yrs)	26	18	9

The project area would continue to support a diverse assemblage of fishes and shellfishes. The creation and nourishment of intertidal marsh would ensure that the project area continues to provide important nursery functions throughout the project life offsetting those impacts that occurred as a result of the levee improvements. Improved habitat conditions would support several species of wildlife including migratory and resident waterfowl, shorebirds, wading birds, and furbearers. Migratory waterfowl utilizing the project area would benefit from a greater food supply resulting from the increased abundance and diversity of emergent and submerged species. Habitat for the resident mottled duck would also improve considerably as the marsh platform would provide more desirable nesting habitat.

Material to rebuild the shoreline would be obtained from the marsh side and lake side of the proposed shoreline. According to a drawing provided in a May 2, 2014, electronic mail correspondence, the lake side borrow area measures approximately 125 feet wide and 1,000 feet long. Depending on site conditions this area may contain submerged aquatic vegetation (SAV). Should the area contain SAV, we recommend alternative borrow areas be investigated. If alternatives are not available, impacts to SAV, a Resource Category 2 habitat, will need to be assessed and, if necessary, mitigated according to the Service's Mitigation Policy and the Corps' March 2, 2012, guidance for mitigating open water impacts, which were developed in coordination the Service.

Predicted habitat conditions under future-with and without-restoration scenarios are provided in the WVA (Appendix B). Net Change in Habitat Units is provided in Table 2. The difference between future with-project and future without-project Average Annual Habitat Unit (AAHU) values expected to result from the above-described mitigation scenario reflect the expected net benefit of the restoration action, and does not factor in the AAHU values lost as a result of the HSDRRS levee impacts.

Using the 145-acre project area (132.5 acres of marsh + 10.5 acres of open water + 2 acres of shoreline restoration), conditions under the future-with mitigation scenario (i.e., restoration of emergent marsh) proposed were input into the habitat model to calculate the AAHU value of the area over the life of the project. The AAHU value was then used to determine the per acre AAHU value (0.33). This project produces 47.91 AAHUs over the period of analysis accounting for the estimated 45.7 AAHUs of intermediate/fresh marsh habitat needed based on 95-100% design of levee impacts.

Table 2. Net Change in Habitat Units for the Proposed Milton Island Restoration Project

	Emergent Marsh	Open Water
Future With Out Project (AAHUs)	0.00	73.38
Future With Project (AAHUs)	98.04	16.01
Total	98.04	-57.37
Net Benefit	47.91	

SERVICE POSITION AND RECOMMENDATIONS

The Service supports the Corps' tentatively selected plan to mitigate impacts to fish and wildlife resources associated with HSDRRS, specifically the Milton Island Marsh Restoration project, and believes that the recommendations provided in our October 28, 2013, FWCA Report addressing PIER 36 continue to remain valid and should be incorporated into future project planning and implementation. Those recommendations have been provided in Appendix C for

reference. The following recommendation is provided specific to the Milton Island Marsh Restoration project:

1) Newly developed mitigation guidelines are being approved by the Corps' Regulatory Division and the Interagency Review Team. Mitigation guidelines, including monitoring and survey requirements, for this project, as well as future LPV mitigation features, should coincide with those Regulatory guidelines as much as possible and should continue to be conducted in coordination with the Interagency team. Once the Corps revises the Milton Island Marsh Mitigation Guidelines based on comments received on the TIER, please provide the revised plan to the agencies for review.

2) Material to rebuild the shoreline would be obtained from the marsh side and lake side of the proposed shoreline. Should the area contain SAV, we recommend alternative borrow areas be investigated. If alternatives are not available, impacts to SAV, a Resource Category 2 habitat, will need to be assessed and, if necessary, mitigated according to the Service's Mitigation Policy and the Corps' March 2, 2012, guidance for mitigating open water impacts.

Should you or your staff have any questions regarding this letter and our attached report, please contact David Walther (337/291-3122) of this office.

Sincerely,

Jeffrey D. Weller
Field Supervisor
Louisiana Ecological Services Office

cc: National Marine Fisheries Service, Baton Rouge, LA
EPA, Dallas, TX
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources, CMD, Baton Rouge, LA
LA Dept. of Natural Resources, CRD, Baton Rouge, LA

LITERATURE CITED

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Soil Conservation Service. 1990. Soil Survey of Orleans Parish, Louisiana. 141 pp.

U.S. Army Corps of Engineers. Draft 100% - Design Document Report – Milton Island Flood Side Intermediate Marsh Restoration, St. Tammany Parish, Louisiana. August 2013.

U.S. Army Corps of Engineers. 2014. Relative Sea Level Rise and Fill Material Settlement Milton Island, LA. HSDRRS LPV Mitigation Project, Staff Input Paper. January 2014.

APPENDIX A

Corps' Draft
Mitigation Guidelines: Plantings, Success Criteria, Monitoring, and Other General Guidance

TIERED IER #36
Milton Island Intermediate Marsh

GENERAL MITIGATION GUIDELINES: PLANTINGS, SUCCESS CRITERIA, MONITORING, AND OTHER GENERAL GUIDANCE

TIERED INDIVIDUAL ENVIRONMENTAL REPORT 36
MILTON ISLAND

INTRODUCTION

This document follows the general mitigation guidelines developed for both the Lake Pontchartrain and Vicinity and the West Bank and Vicinity Hurricane Storm Damage and Risk Reduction System (HSDRRS) Mitigation Program. They were developed by the U.S. Army Corps of Engineers (USACE) in coordination with an Interagency Team and the non-Federal project sponsor (NFS). The original guidelines were included as Appendix J in PIER 36. This Appendix makes project specific adjustments and outlines the project specific guidelines and success criteria.

The USACE would be responsible for the proposed mitigation construction and management until the initial success criteria are met. Initial construction and monitoring would be funded in accordance with all applicable cost-share agreements with the NFS. The USACE would monitor (on a cost-shared basis) the completed mitigation to determine whether additional construction, invasive/nuisance plant species control, and/or plantings are necessary to achieve initial mitigation success criteria. Once the USACE determines that the mitigation has met the initial success criteria, monitoring would be performed by the NFS as part of its OMRR&R obligations. If after meeting initial success criteria, the mitigation fails to meet its intermediate and/or long-term ecological success criteria, the USACE would consult with other agencies and the NFS to determine the appropriate management or remedial actions required to achieve ecological success. If structural changes are deemed necessary to achieve ecological success, the USACE would implement appropriate adaptive management measures in accordance with the contingency plan and subject to cost-sharing requirements, availability of funding, and current budgetary and other guidance.

MITIGATION PLANTING GUIDELINES

Herbaceous species would be planted on 7-foot centers (average) to achieve a density of approximately 890 plants per acre. Stock would typically be either 4-inch container size or bare-root or liner stock, depending on the species involved. Plants would be obtained from a registered licensed regional nursery/grower and of a regional eco-type species properly stored and handled to ensure viability. Planting should be conducted during the period from March 15 through June 15. Planting should not be undertaken later than approximately July 15, although planting during the early fall may be deemed acceptable on a case-by-case basis.

Species installed in the proposed intermediate marsh habitat would be selected from the species list provided in Table 1. Plantings would consist of at least 2 different species. The species used and the proportion of the total plantings represented by each species would be dependent on various factors including site conditions and planting stock availability and would be documented for the project.

Table 1: Preliminary Planting List for Intermediate Marsh Habitats

Common Name	Scientific Name
California bulrush	*Schoenoplectus californicus*
Black needle rush	*Juncus roemerianus*
Giant cutgrass	*Zizaniopsis miliacea*
Marsh-hay cordgrass	*Spartina patens*
Maidencane	*Panicum hemitomon*
Common threesquare	*Schoenoplectus americanus*
Big cordgrass	*Spartina cynosuroides*
Seashore paspalum	*Paspalum vaginatum*

MITIGATION SUCCESS CRITERIA AND MITIGATION MONITORING

1. General Construction

A. Within approximately 4 months following the start of construction all initial mitigation construction activities (e.g. construction of temporary retention/perimeter dikes, shoreline restoration feature, placement of fill/borrow material into mitigation site, etc.) would be completed as outlined in the project description found in the TIER and in accordance with the final contract plans and specifications. This would be accomplished by the USACE and would be cost-shared with the NFS in accordance with all relevant agreements. This requirement classifies as an initial success criterion.

B. Approximately 1 year following completion of all initial mitigation construction activities (Target Year 2) all final mitigation construction activities would be completed as specified in the TIER project description and in accordance with the final contract plans and specifications. Such activities could include, but are not limited to degrading and gapping temporary retention dikes, and planting appropriate vegetation as specified above. Finishing the construction components would be considered as the "completion of final mitigation construction activities". This would be accomplished by the USACE and would be cost-shared with the NFS in accordance with all relevant agreements. This requirement classifies as an initial success criterion.

2. Topography

A. At the end of the initial mitigation construction activities (Target Year 1) the USACE would demonstrate that at least 80% of the mitigation area has a surface elevation that is within 0.5 feet of the designed initial target surface elevation, which is +2.25 feet NAVD88. The mitigation area is the total area filled with dredged material (132.5 acres). The shoreline restoration feature of the south dike would be maintained to design specifications. This requirement classifies as an initial success criterion.

B. At or near the time that final mitigation construction activities are being implemented (Target Year 2), USACE would demonstrate that at least 80% of the mitigation area has a surface elevation that is within 0.5 feet of the expected surface elevation at this time. At Target Year 2,

when vegetation plantings and dike gapping are conducted, the elevation of the dredged fill is expected to be +1.9 feet NAVD88, plus or minus 0.5 feet. Note that this elevation was derived from settlement data provided by the USACE, New Orleans District, Geotechnical Branch. The mitigation area is the total area filled with dredged material (132.5 acres). The shoreline restoration feature of the south dike would be maintained to design specifications. This requirement classifies as an initial success criterion.

C. Three years following completion of final mitigation construction activities (Target Year 5) at least 80% of the mitigation area should have a surface elevation of 1.6 feet NAVD88, plus or minus 0.5 feet. The mitigation area is the total area filled with dredged material (132.5 acres). The shoreline restoration feature of the south dike would be maintained to design specifications. This requirement classifies as an intermediate success criterion.

3. Native Vegetation

A. Complete initial marsh planting (Target Year 2) in accordance with initial marsh planting guidelines within the 132.5 acre mitigation area. This requirement classifies as an initial success criterion.

B. Monitor vegetation one year following completion of initial plantings (Target Year 3). The monitoring should demonstrate at least 80% survival of planted species, or achieve a minimum average cover of 25%, within the area filled with dredged material (132.5 acres), comprised of native herbaceous species (includes planted species and volunteer species). The vegetation should meet USACE hydrophytic vegetation criteria (see definition of terms at end of this Appendix). This requirement classifies as an initial success criteria, with the exception that the requirement to demonstrate vegetation satisfies USACE hydrophytic vegetation criteria throughout the duration of the overall monitoring period classifies as a long-term success criterion.

C. Three years following completion of initial plantings (Target Year 5) the project should achieve a minimum average cover of 80% within the area filled with dredged material (132.5 acres), comprised of native herbaceous species (includes planted species and volunteer species). This requirement classifies as an intermediate success criterion.

D. For the period beginning 4 years following completion of final mitigation construction activities (Target Year 6) and continuing through 20 years following completion of final mitigation construction activities, maintain a minimum average cover of 80%, comprised of native herbaceous species. This requirement classifies as a long-term success criterion.

4. Invasive and Nuisance Vegetation

A. Complete the initial eradication of invasive and nuisance plant species within 1 year of completion of initial mitigation construction activities (Target Year 2). The eradication would occur during or around the same time as the initial vegetation plantings occur. This requirement classifies as an initial success criterion.

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B. Maintain all areas such that they are essentially free from invasive and nuisance plant species immediately following a given maintenance event and such that the total average vegetative cover accounted for by invasive and nuisance species each constitute less than 5% of the total average plant cover during periods between maintenance events. These criteria must be satisfied throughout the duration of the overall monitoring period. Until such time that monitoring responsibilities are transferred from the USACE to the NFS, this requirement classifies as an initial success criterion. Following the transfer of monitoring responsibilities, this requirement classifies as a long-term success criterion.

MITIGATION MONITORING GUIDELINES

Baseline Monitoring Report (First Monitoring Report)

The mitigation site would be monitored and a baseline monitoring report prepared after final construction is complete (Target Year 2). Information provided would typically include the following items:

A. A detailed discussion of all mitigation activities completed.

B. A plan view drawing of the mitigation site showing the approximate boundaries of the restored marsh features, significant interspersion features established within the marsh features (as applicable), monitoring transect locations, sampling quadrat locations, photo station locations, and staff gauge locations. The exact locations of the photo stations, transects, quadrats and the staff gauges would be determined during the initial site visit and the baseline monitoring event. The proposed sampling design is further described below and depicted in Figure 1. Note: Figure 1 is at the end of this document. It will be moved to the page following this one once all Corps internal review comments are addressed. An as-built survey of surface elevations (topographic survey) within each marsh feature would be required, along with an as-built survey of any dikes constructed as part of the marsh restoration features. If a particular marsh feature is immediately adjacent to existing marsh habitat, the topographic survey would include spot elevations collected within the existing marsh habitat near the restored marsh feature. In addition to the survey data, an analysis of the data would be provided addressing attainment of topographic success criteria.

C. Photographs documenting conditions in the restored marsh feature at the time of monitoring would be included. Photos would be taken at approximately 18 permanent photo stations (preliminarily at least three photo stations are planned along each of the four permanent transects) within the marsh feature. At least two photos would be taken at each station with the view of each photo always oriented in the same general direction from one monitoring event to the next.

D. A detailed inventory of all species planted, including the number of each species planted the stock size planted along with the general locations would be provided. This includes providing a itemization indicating the number of each species planted depicted on the plan view drawing of the mitigation site.

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E. Water level elevation readings would be collected at the time of monitoring from a single staff gauge. The monitoring report would provide the staff gauge data along with mean high and mean low water elevation data as gathered from a tidal elevation recording station in the general vicinity of the mitigation site. The report would further address estimated mean high and mean low water elevations at the mitigation site based on field indicators. It is proposed that the staff gauge be installed along the northern limit of the project area close to the mid-point between the eastern and western limits. The exact location of the proposed staff gauge would be determined during the initial site visit and the baseline monitoring event.

F. Various qualitative observations would be made in the mitigation site to help assess the status and success of mitigation and maintenance activities. These observations would include: General estimate of the average percent cover by native plant species; general estimates of the average percent cover by invasive and nuisance plant species; general observations concerning colonization of the mitigation site by volunteer native plant species; general condition of native vegetation; trends in the composition of the plant community; wildlife utilization as observed during monitoring (including fish species and other aquatic organisms); the natural formation of interspersion features within restored marshes; observations regarding general surface water flow characteristics within marsh interspersion features; and the general condition of permanent dikes. General observations made during the course of monitoring would also address potential problem zones and other factors deemed pertinent to the success of the mitigation program.

G. A summary assessment of all data and observations along with recommendations as to actions necessary to help meet mitigation and management/maintenance goals and mitigation success criteria.

H. A brief description of anticipated maintenance/management work to be conducted during the period from the current monitoring report to the next monitoring report.

Additional Monitoring Reports

All monitoring reports generated after the initial baseline report would provide the following information unless otherwise noted:

A. All items listed for the baseline monitoring report with the exception of: (a) the topographic/as-built survey, although additional topographic/as-built surveys are required for specific monitoring reports (see below); (b) the inventory of planted species; although such an inventory must be provided in any monitoring report generated for a year in which a restored intermediate marsh feature is re-planted to meet applicable success criteria.

B. Quantitative data concerning plants in the ground cover stratum. Data would be collected from permanent sampling quadrats established at approximately equal intervals along four permanent monitoring transects established within the marsh mitigation area. It is proposed that at least four permanent transect lines would be established perpendicular to the Lake Pontchartrain shoreline and the north and south dike construction. The sampling quadrats would be approximately 2 meters by 2 meters in size. Data recorded from the sampling

quadrats would include: Average percent cover by native plant species; average percent cover by invasive plant species; average percent cover by nuisance plant species; composition of plant species and the wetland indicator status of each species. The average percent survival of planted species (i.e. number of living planted species as a percentage of total number of plants installed) would also be recorded. However, data for percent survival of planted species would only be recorded until such time as it is demonstrated that success criteria for plant survivorship has been achieved or until planted species are undetectable from volunteered species. The exact placement of the transect lines and quadrats plots would be determined during the initial site visit and the baseline monitoring event.

C. A brief description of maintenance and/or management work performed since the previous monitoring report along with a discussion of any other significant occurrences would be included.

D. In addition to the above items, the monitoring report prepared upon completion of the final mitigation construction activities in Target Year 2 and the monitoring report prepared for 3 years following completion of final mitigation construction activities (estimated TY5) would include a topographic survey of each marsh restoration feature. These surveys would cover the same components as described for the topographic survey conducted for the baseline monitoring report. In addition to the surveys themselves, each of the two monitoring reports involving topographic surveys would include an analysis of the data as regards attainment of applicable topographic success criteria. If the second survey indicates topographic success criteria have not been achieved and supplemental topographic alterations are necessary, then another topographic survey may be required following completion of the supplemental alterations. This determination would be made by USACE in coordination with the Interagency Team and NFS.

MITIGATION MONITORING SCHEDULE AND RESPONSIBILITIES

Monitoring would typically take place in mid to late summer of the year of monitoring, but may be delayed until later in the growing season due to site conditions or other unforeseen circumstances. Monitoring reports would be submitted by December 31 of each year of monitoring. Monitoring reports would be prepared by the USACE or provided to the USACE by the NFS, depending on whether or not all of the initial success criteria have been achieved, for coordination with the agencies comprising the Interagency Team and the NFS. The various monitoring and reporting responsibilities addressed in this section are all subject to the provisions set forth in the Introduction section.

The USACE would be responsible for conducting the monitoring events and preparing the associated monitoring reports until such time that the following initial mitigation success criteria are achieved (criteria follow numbering system used in success criteria section):

1. General Construction – Criteria 1.A and 1.B.
2. Topography – Criteria 2.A and 2.B.
3. Native Vegetation – Criteria 3.A and 3.B.

4. Invasive and Nuisance Vegetation – Criterion 4.A, plus criterion 4.B until such time as monitoring responsibilities are transferred to the NFS.

Monitoring events associated with the above would include the baseline monitoring event in Target Year 2 and a second monitoring event 1 year after the baseline monitoring event (Target Year 3). The USACE would be responsible for conducting these monitoring activities and preparing the associated monitoring reports.

The NFS would be responsible for conducting the required monitoring events and preparing the associated monitoring reports after the USACE has demonstrated the mitigation success criteria listed above have been achieved. Once monitoring responsibilities have been transferred to the NFS, the next monitoring event should take place in TY5 in order to demonstrate attainment of success criteria 2.C and 3.C. Thereafter, monitoring would be conducted every 5 years throughout the remaining 50-year period of analysis (based on 50-year period of analysis beginning in TY0 and ending in TY50.

If certain success criteria are not achieved, failure to attain these criteria would trigger the need for additional monitoring events not addressed in the preceding paragraphs. The USACE and/or the NFS would be responsible for conducting such additional monitoring and preparing the associated monitoring reports. The following lists instances requiring additional monitoring that would be the responsibility of the USACE:

A. If the initial survival criterion for planted species or the initial vegetative cover criterion are not achieved (i.e. the criteria specified in success criteria 3.B), a monitoring report would be required for each consecutive year until two sequential annual reports indicate that the applicable survival criterion or vegetative cover criteria have been satisfied (i.e. that corrective actions were successful). The USACE would also be responsible for the purchase and installation of supplemental plants needed to attain the success criteria, but the overall cost would be shared with the NFS according to the project cost-sharing agreement.

B. If topographic success criteria 2.A or 2.B are not achieved, a monitoring report would be required for each consecutive year until two sequential annual reports indicate the applicable criteria have been satisfied. Since failure to meet topographic success criteria would mandate corrective actions such as addition of fill, removal of fill, or other actions to change grades within the subject marsh feature, the USACE would also be responsible for performing the necessary corrective actions, but the overall cost would be shared with the NFS according to the project cost-sharing agreement.

There could also be cases where failure to attain intermediate or long-term success criteria (after meeting initial success criteria) would trigger the need for additional monitoring events for which the NFS would be responsible:

A. If the vegetative cover criterion specified for 3 years after the initial planting of the marsh feature is not achieved (i.e. success criterion 3.C), a monitoring report would be required for each consecutive year until two sequential annual reports indicate that the vegetative cover

criterion has been satisfied. The NFS would also be responsible for the purchase and installation of supplemental plants needed to attain the success criterion, at their cost.

B. If the topographic success criterion 2.C is not achieved, a monitoring report would be required for each consecutive year until two sequential annual reports indicate success criteria have been satisfied. Since failure to meet this topographic success criteria would mandate corrective actions such as addition of fill, removal of fill, or other actions to change grades within the marsh feature, the NFS would also be responsible for performing the necessary corrective actions, at their expense.

C. Native vegetation success criterion 3.D is applicable to the period extending from 5 years through 20 years following completion of mitigation construction activities. If this criterion is not satisfied at the time of monitoring, the NFS would be responsible for implementing corrective actions, at their expense. Such actions could include installing additional plants in the subject marsh (probable course of action), adding sediment to the subject marsh in problem zones (marsh nourishment), or a combination of these activities. Under this scenario, a monitoring report would be required for each consecutive year following completion of the corrective actions until two sequential annual reports indicate that the vegetative cover criterion has been attained. The NFS would be responsible for conducting these additional monitoring events and preparing the associated monitoring reports, at their cost.

The following table indicates the currently anticipated monitoring report schedule and the party responsible for conducting the monitoring and preparing the report.

Table 2. Standard mitigation monitoring report schedule and monitoring responsibility.

Target Year	Monitoring Report Number	Party Responsible for Monitoring and Reporting
1 Complete initial construction activities	N/A	N/A
2 Complete final construction activities	1 (Baseline Report)	USACE
3 Monitor vegetation cover, re-plant as necessary	2	USACE
4 Monitor vegetation cover, re-plant as necessary	3	NFS
5 Monitor vegetation cover, re-plant as necessary	4	NFS
10-50 (every 5 years)	5-13	NFS

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Re-planting of certain areas within the restored marsh habitat may be necessary to ensure attainment of applicable native vegetation success criteria. Any monitoring report submitted following completion of a re-planting event must include an inventory of the number of each species planted and the stock size used. It must also include a depiction of the areas re-planted or those planted, as applicable, cross-referenced to a listing of the species and number of each species planted in each area.

Although the USACE would be responsible for conducting the first and second monitoring efforts and would be responsible for preparing the reports, the cost for these activities would be cost-shared with the NFS. The costs associated with conducting the monitoring and preparing all monitoring reports following this initial report.

Once monitoring responsibilities have been transferred to the NFS, the NFS would retain the ability to modify the monitoring plan and the monitoring schedule should this become necessary due to unforeseen events or to improve the information provided through monitoring. Twenty years following completion of mitigation construction activities, the number of monitoring transects and/or quadrats that must be sampled during monitoring events may be reduced substantially if it is clear that mitigation success is proceeding as anticipated. Any significant modifications to the monitoring plan or the monitoring schedule must first be approved by the USACE in coordination with the Interagency Team.

DEFINITION OF TERMS

Certain terms used herein shall have the meaning discussed in the following section.

Interagency Team
The "Interagency Team" consists of representatives from the following resource agencies; US Fish and Wildlife Service, National Marine Fisheries Service, US Environmental Protection Agency, Louisiana Department of Wildlife and Fisheries, State of Louisiana Office of Coastal Protection and Restoration, Louisiana Department of Natural Resources.

Non-Federal Sponsor (NFS)
This term refers to the Non-Federal Sponsor for the mitigation projects. In this case, the NFS is the Louisiana Coastal Protection & Restoration Authority Board (CPRAB).

Target Year
This document often refers to a mitigation "Target Year". Target Year 0 is the year in which mitigation construction activities are anticipated to commence, which is presently estimated to occur in calendar year 2015. Target Year 2 is the year in which the initial construction contract is expected to be completed. Target years increase from this time forward. Hence, based on construction beginning in 2015, Target Year 1 would be calendar year 2016, Target Year 2 would be calendar year 2017, etc.

Invasive Plant Species
All plant species identified as invasive or as non-indigenous (exotic) in the following two sources:

Louisiana Aquatic Invasive Species Task Force. 2005. State Management Plan for Aquatic Invasive Species in Louisiana, Appendix B. Invasive Species in Louisiana (plants). Center for Bioenvironmental Research, Tulane & Xavier Universities, New Orleans, LA. (Website - http://is.cbr.tulane.edu/docs_IS/LAISMP7.pdf)

Barataria-Terrebonne National Estuary Program (BTNEP). 2012. Exotic Invasive Species of the Barataria-Terrebonne, Invasive Species in Louisiana. BTNEP, Thibodaux, LA. (Website - http://invasive.btnep.org/invasivesvsnatives/invasivesinla2list.aspx)

In addition, invasive plant species include; Japanese climbing fern (*Lygodium japonicum*), tall fescue (*Festuca arundinacea*), chinaberry (*Miscanthus sinensis*), Brazilian vervain (*Verbena litoralis* var. *brevibrateata*), coral ardisia (*Ardisia crenata*), Japanese ardisia (*Ardisia japonica*), cogon grass (*Imperata cylindrical*), golden bamboo (*Phyllostachys aurea),* and rescuegrass (*Bromus catharticus*).

Nuisance Plant Species

Nuisance plant species will include native species deemed detrimental due to their potential adverse competition with desirable native species. Nuisance plant species identified for the mitigation project include; dog-fennel (*Eupatorium* spp.), ragweed (*Ambrosia* spp.), cattail (*Typha* spp.), grapevine (*Vitis* spp.), wild balsam apple (*Momordica charantia*), climbing hempvine (*Mikania scandens, M. micrantha*), pepper vine (*Ampelopsis arborea*), common reed (*Phragmites australis*), catbrier (*Smilax* spp.), blackberry (*Rubus* spp.), black willow (*Salix nigra*), and box elder (*Acer negundo*). Following completion of the initial mitigation activities (e.g. placement of fill, initial plantings), the preceding list may be expanded to include other nuisance plant species. Any such addition to the list would be based on the results of the standard monitoring reports. The determination of whether a particular new plant species should be considered as a nuisance species and therefore eradicated or controlled would be determined by the USACE in coordination with the Non-Federal Sponsor and Interagency Team.

Native Plant Species

This category includes all plant species that are not classified as invasive plant species and are not considered to be nuisance plant species.

USACE Hydrophytic Vegetation Criteria

Reference to satisfaction of USACE hydrophytic vegetation criteria (i.e. plant community is dominated by hydrophytic vegetation) shall mean that sampling of the plant community demonstrates that one or more of the hydrophytic vegetation indicators set forth in the following reference is achieved:

USACE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0); ERDC/EL TR-10-20. USACE Engineer Research and Development Center, Vicksburg, MS.

Wetland Indicator Status of Plant Species

The wetland indicator status of plants is a means of classifying the estimated probability of a species occurring in wetlands versus non-wetlands. Indicator categories include; obligate wetland (OBL),

facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and obligate upland (UPL). The wetland indicator status of a particular plant species shall be as it is set forth in the following reference (the "2012 National Wetland Plant List), using the Region 2 listing contained therein. However, if the USACE approves and adopts a new list in the future, then the currently approved list will apply.

> Lichvar, Robert W. and J.T. Kartesz. 2009. North American Digital Flora: National Wetland Plant List, version 2.4.0 (https://wetland_plants.usace.army.mil). USACE, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH and BONAP, Chapel Hill, NC.

Growing Season
As used herein, the growing season is considered to be the period from April through October of any given year, although some deviation from this typical range is allowed.

Planting Season
This is generally considered to be the period from approximately December 15 through March 15, although some deviation from this typical range is allowed.

Interspersion Features
This term refers to shallow open water features situated within marsh habitats. Examples include tidal channels, creeks, trenasses, and relatively small, isolated ponds. Emergent vegetation is typically absent in such features although they may contain submerged aquatic vegetation. They provide areas of foraging and nursery habitat for fish and shellfish along with associated predators, and provide loafing areas for waterfowl and other waterbirds. The marsh/open water interface forms an ecotone where post-larval and juvenile organisms can find cover and where prey species frequently concentrate.

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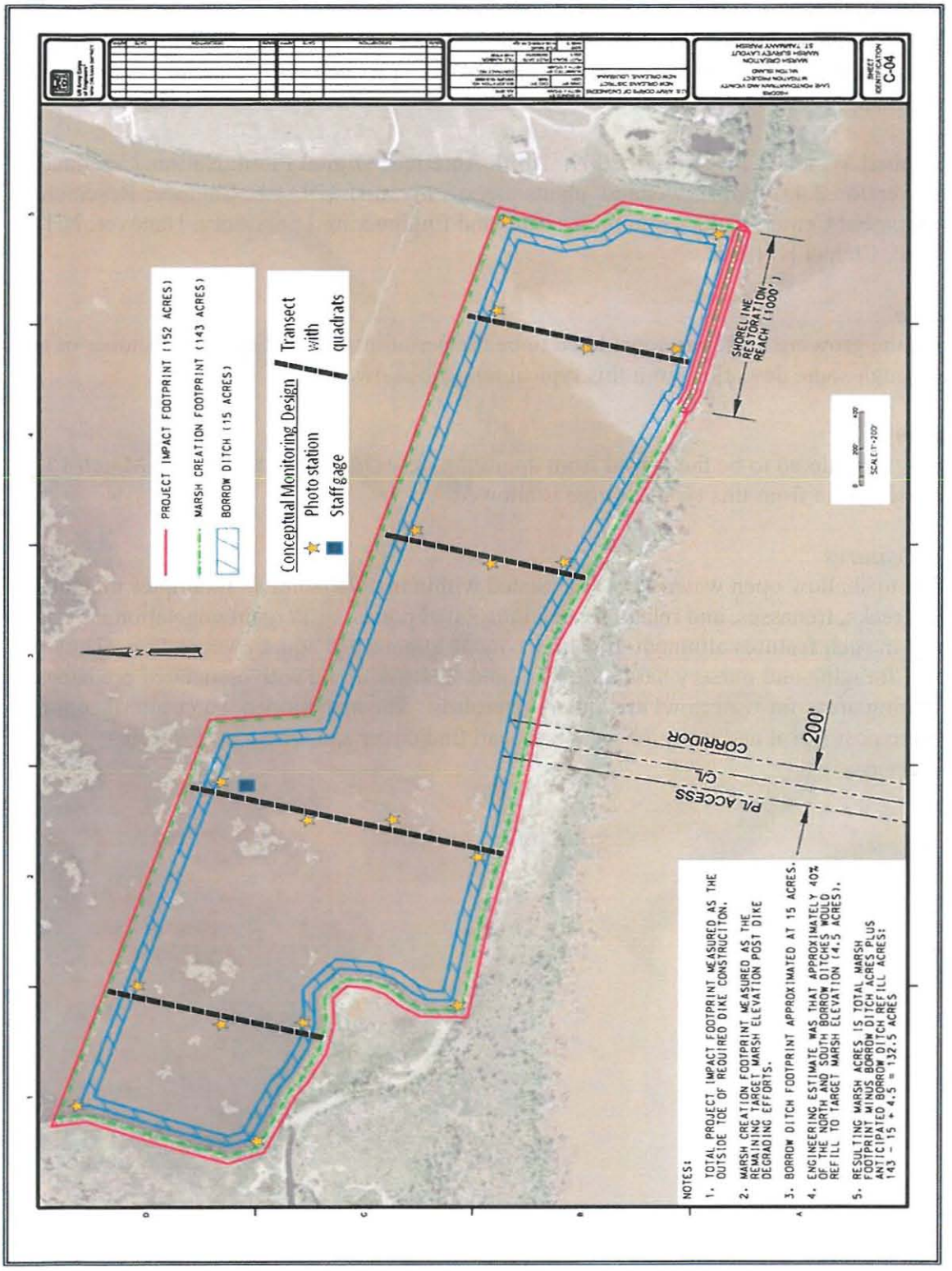

PROJECT IMPACT FOOTPRINT (152 ACRES)
MARSH CREATION FOOTPRINT (143 ACRES)
BORROW DITCH (15 ACRES)
Conceptual Monitoring Design
Photo station
Staff gage
Transect with quadrats
SHORELINE RESTORATION REACH (1000')
SCALE 1"=200'
200'
CORRIDOR
C/L
PL ACCESS
NOTES:
1. TOTAL PROJECT IMPACT FOOTPRINT MEASURED AS THE OUTSIDE TOE OF REQUIRED DIKE CONSTRUCITON.
2. MARSH CREATION FOOTPRINT MEASURED AS THE REMAINING TARGET MARSH ELEVATION POST DIKE DEGRADING EFFORTS.
3. BORROW DITCH FOOTPRINT APPROXIMATED AT 15 ACRES.
4. ENGINEERING ESTIMATE WAS THAT APPROXIMATELY 40% OF THE NORTH AND SOUTH BORROW DITCHES WOULD REFILL TO TARGET MARSH ELEVATION (4.5 ACRES).
5. RESULTING MARSH ACRES IS TOTAL MARSH FOOTPRINT MINUS BORROW DITCH ACRES PLUS ANTICIPATED BORROW DITCH REFILL ACRES:
143 - 15 + 4.5 = 132.5 ACRES
C-04

Figure 1

APPENDIX B

Milton Island Intermediate Marsh Project Information Sheet

Wetland Value Assessment Project Information Sheet

April 30, 2014

Prepared for:
U.S. Army Corps of Engineers

Prepared by
U.S. Fish and Wildlife Service

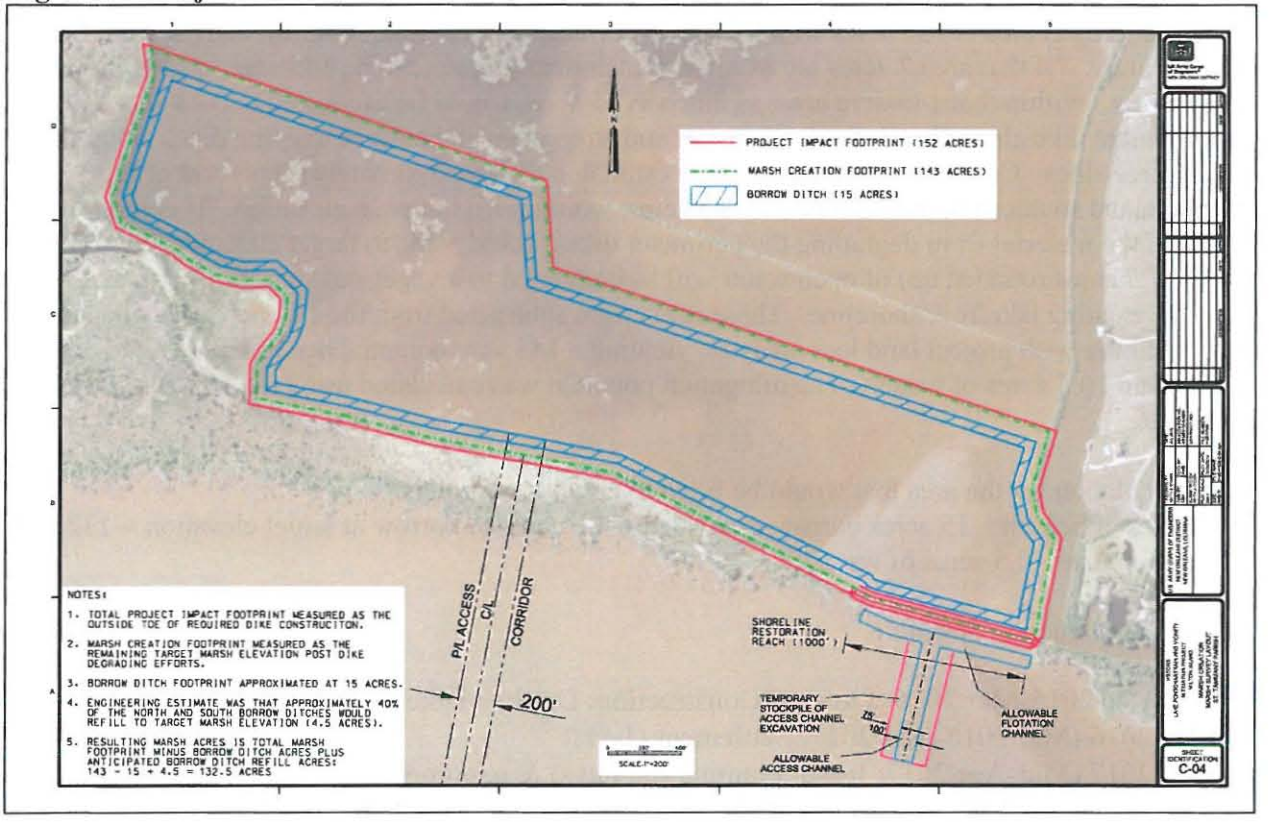
Project Name: LPV HSDRRS Mitigation- Milton Island Marsh Creation

Mitigation Potential: 95% = 0.33 AAHUs/acre; 35% = 0.41 AAHUs/ acre

Project Type(s): Intermediate marsh restoration project

Project Area: The Milton Island marsh is located along the north shore of Lake Pontchartrain, west of the Tchefuncta River, in St. Tammany Parish.

Figure 1. Project Area



Project Goal: Restore a sufficient amount of intermediate marsh habitat within the Milton Island Marsh project area to mitigate for the 45.7 AAHUs of non-refuge, fresh and intermediate marsh habitat impacted by the LPV HSDRRS. The proposed marsh site initial target elevation for dredge fill would be elevation +2.0' to +2.5' NAVD88, to ultimately hit a target marsh elevation of +1.0 within the project life.

The proposed marsh layout results in an open water area immediately north and adjacent to the marsh footprint. The entire northern retention dike will be degraded to marsh elevation in year two (2), allowing immediate access for fish and wildlife between the open water and marsh platforms. The created marsh will provide an additional expanse of shoreline buffer for other interior swamp and marsh habitats. As such, construction of trenasses will not be proposed within the marsh platform. It is anticipated that natural sloughs and/or access corridors will develop over the project life.

A final element of the project construction will be the restoration of a 1,000 foot reach of the lake shoreline which has breached, allowing lake waters to freely enter the project footprint. An earthen berm, with a 25 foot crown width, 1:4 foot (rise to run) side slope, at elevation +5.0' NAVD88 is proposed. An earthen-filled bag system, which will accommodate planting of shoreline vegetation, will be considered as a viable shoreline protection alternative, and included in the construction cost estimate. It is estimated that the footprint of the shoreline restoration would result in 2 acres (rounded up from 1.7 acres) of impacted water bottoms.

The total project area is 152 acres which includes the containment dike footprint and the shoreline berm feature. Of that area 7 acres are existing containment dikes, leaving 145 acres within the area of analysis. Within that 145-acre area, as much as 15 acres would be excavated to construct a new containment dike along the northern perimeter and strengthen and enlarge existing dikes along the other three sides. Corps Engineering Division estimated that approximately 40 percent of the northern and southern borrow ditches, or 4.5 acres, would refill to marsh elevation. This is assuming some of the material from degrading the perimeter dikes would settle to target elevation. Two (2) acres (1.7 acres rounded up) of open water will be converted to a vegetated shoreline berm and tie into the existing lakefront shoreline. These acres were subtracted from the 145-acre area of analysis for the future with project land loss analysis, yielding a 143 acre potential benefit area (132.5 acres of marsh and 10.5 acres of water). The mitigation potential was calculated using the 145-acre area of analysis.

The calculation for the area that would be filled to target elevation is:
143 acres of benefit – 15 acres borrow excavated + 4.5 acres of borrow at target elevation = 132.5 acres of marsh (10.5 acres of water)

Project Construction Schedule:

TY0 – Dec 2015-Mar 2016: Physical Construction: Dredge, Dikework, etc. (120 days)
TY1 – 2016 (Mar 2016-Mar 2017: Settlement (1-yr))
TY2 – 2017 (Mar-Apr 2017: Initial Planting (60 days) & gapping)
May-Aug 2017: NCC Project after Initial Planting complete (per MVD guidance); process takes 4 months per LPV/WBV project teams experience with NFS

Habitat Assessment Method

The WVA operates under the assumption that optimal conditions for general fish and wildlife habitat within a given coastal wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated or expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of 1) a list of variables that are considered important in characterizing fish and wildlife habitat, 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values, and 3) a mathematical formula that combines Suitability Index for each variable into a single value for wetland habitat quality; that single value is referred to as the Habitat Suitability Index, or HSI.

The WVA models assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. This standardized, multi-species, habitat-based methodology facilitates the assessment of project-induced impacts on fish and wildlife resources. The coastal marsh WVA model consists of six variables: 1) percent of wetland area covered by emergent vegetation; 2) percent of open water area covered by aquatic vegetation; 3) marsh edge and interspersion; 4) percent of open water area $\leq$ 1.5 feet deep in relation to marsh surface; 5) salinity; and 6) aquatic organism access.

Values for those variables are derived for existing conditions and are estimated for conditions projected into the future if no restoration efforts are applied (i.e., future-without-project), and for conditions projected into the future if the proposed restoration project is implemented (i.e., future-with-project), providing an index of quality or habitat suitability of the habitat for the given time period. The habitat suitability index (HSI) is combined with the acres of habitat to get a number that is referred to as "habitat units". Expected project benefits are estimated as the difference in habitat units between the future-with-project (FWP) and future-without project (FWOP). To allow comparison of WVA benefits to costs for overall project evaluation, total benefits are averaged over a 50-year period, with the result reported as Average Annual Habitat Units (AAHUs).

V1 - Emergent Vegetation

Existing – The project area is classified as open water as determined by FWS analysis of 2012 and 2013 aerial photography. Chabreck and Linscombe (1997) identified fresh marsh as occurring within the project area, while Sasser et al. (2007) classified the area as intermediate marsh.

The two major soil types in the project area are classified by Trahan (1987) as Allemands muck and Maurepas muck. Both soil types are very poorly drained, occurring within former freshwater marshes and swamps.

Land Loss Data

To calculate loss rates USGS evaluated a 9,848 acre extended boundary (Figure 2). USGS determined the 1985-2010 rate from a linear regression that is depicted in Figure 3. The loss rate

(-0.28%/yr) was calculated from percent land values (acres) from that 1984-2010 timeframe. USGS excluded some data points from the regression analysis due to low and high water events.

USGS's percent is percent of the total area (marsh + water). The FWS percent loss rate was determined as a percent of the 1985 land area and also included all data points provided. Typically, in WVAs and other such evaluations, we have used the FWS method as there might in some cases be non-wetlands within the polygon and then use of the total polygon area would result in obvious errors. Therefore, the FWS method has been the standard method used in the past. Based on the data provided by USGS, the FWS determined a loss rate of -0.28% per year. For FWP it is assumed that the loss rate would be reduced by 50% until a point when post-construction accretion exceeds 10 inches above the created marsh platform; and therefore, a loss rate of -0.19 acres per year (0.28%/2*132.5) was applied under the FWP scenario.

Figure: 2. USGS Extended Boundary for Milton Island Marsh - polygon 05

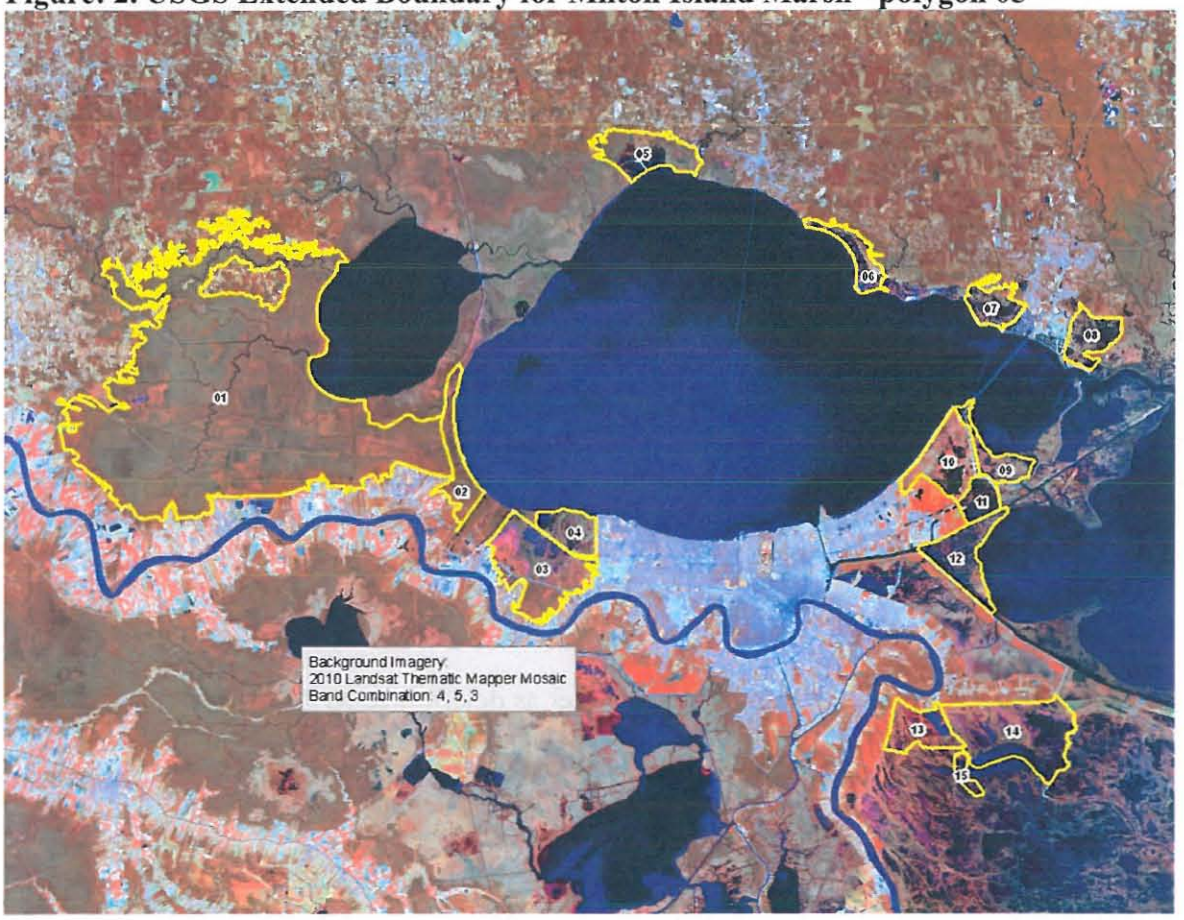
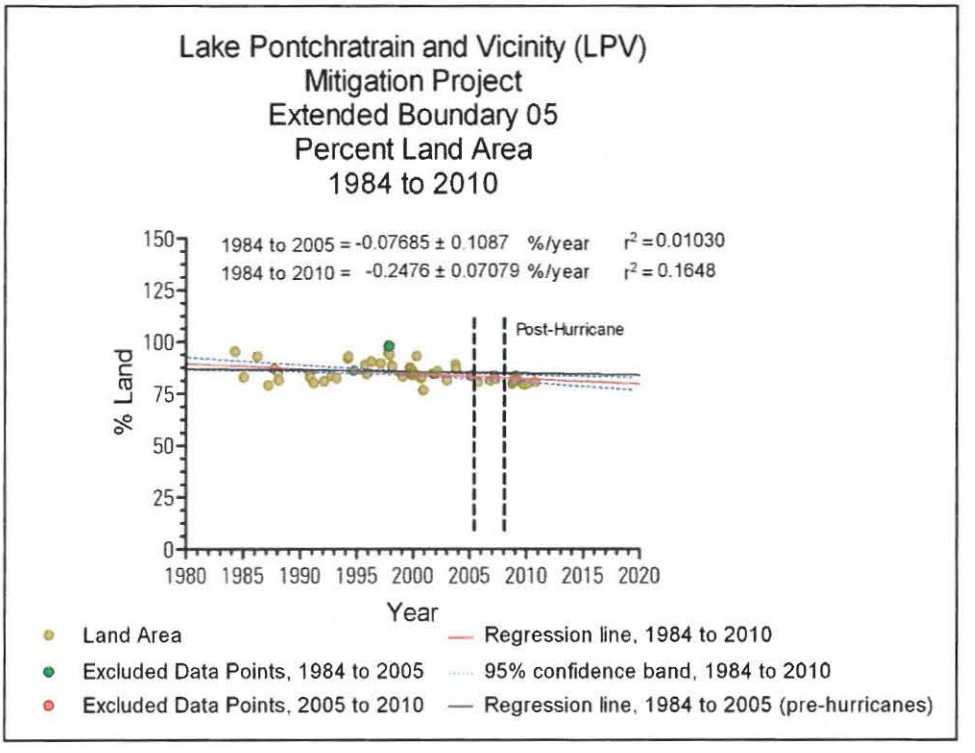


Figure3. Land loss rate determined by USGS



FWOP

Loss Rate: -0.28% /year (FWS LLR, 0 acres/yr due to no land being in the PA polygon)

TY0-50	Marsh	0 acres (0%)	TY0 = 2015
	Water	145 acres (100%)	

FWP

For use in the WVA models, projected Relative Sea Level Rise (RSLR) estimates were developed according to EC 1165-2-211, using a nearby reference gage (Mandeville gage) in the Lake Pontchartrain and Vicinity mitigation watershed. The reference gage was used to develop low, intermediate and high RSLR estimates. Based on MVD planning guidance, the Intermediate RSLR scenario was used for the purpose of WVA modeling for alternative comparison. Analysis of USGS landloss data indicates that land change is still occurring under the low SLR scenario. Therefore, the FWS applied the intermediate RSLR scenario starting from the last year of USGS landloss data, 2010 (Table 1, Figure 4).

Created marsh platform has limited marsh function until settlement, breaching of retention dikes, and vegetation occurs. Land loss is applied at the time of marsh creation. The rate is 50% of the background loss rate until TY40 when at least 10 inches of water is assumed to cover the marsh and, therefore, 10 inches of post-construction accretion is assumed to occur. At that time background loss rate is resumed. A settlement period of 5 years was also applied based on the

Corps settlement analysis that indicates 75% of settlement occurs in the first 5 years. This assumption will delay when the loss rate changes back to 100% (YR, Settlement curves). Percent loss rate is of the entire project area acreage.

Table 1: Future-With-Project Elevations (TY0-5) Based on Settlement and FWS' RSLR Analysis.

	Year	Fill +1 Elevation	Fill +1.5 Elevation	Fill +2 Elevation	Fill +2.5 Elevation
2016.00	0.0000	1	1.5	2	2.5
2016.25	0.2500	0.86	1.37	1.84	2.32
2016.50	0.5000	0.82	1.32	1.79	2.26
2017.00	1.0000	0.77	1.26	1.72	2.17
2018.00	2.0000	0.67	1.13	1.55	2.01
2021.00	5.0000	0.52	0.92	1.29	1.73

Research by Nyman et al. (1993) suggests that coastal marshes may undergo rapid degradation and conversion to open water beyond a critical rate of submergence/inundation. Louisiana Coastal Protection and Restoration Authority (CPRA) personnel working to model marsh loss for the 2012 Louisiana Coastal Master Plan have used statewide Coastal Reference Monitoring System data to develop plant productivity vs inundation (i.e., accretion deficit) relationships. From those relationships, they identified inundation ranges at the primary production low-end points to predicting onset of abrupt marsh collapse (Coastal Protection and Restoration Authority of Louisiana 2012). In this study, the median value for intermediate marsh (34.4 cm) was considered to predict onset of abrupt marsh collapse; however, marsh collapse does not occur under the intermediate RSLR scenario.

Loss Rate: -0.19 acres/year (FWS LLR)

TY0	Marsh	0 acres (0%)
	Water	145 acres (100%)
TY1	Marsh	0 acres (assume 0% credit of the remaining 132.5-ac marsh platform)
	Water	12.7 acres (7.5%)
TY2	Marsh	13.2 acres (9%) (assume 10% credit of the remaining marsh platform for gapping/planting)
	Water	12.9 acres (9%, borrow & marsh loss)
TY3	Marsh	33.0 acres (23%) (assume 25% credit of remaining marsh platform)
	Water	13.1 acres (9%)
TY5	Marsh	131.5 acres (91% - assume full credit of remaining marsh platform)
	Water	13.5 acres (9%)
TY6	Marsh	131.2 acres (92%)
	Water	13.8 acres (9.5%)
TY40	Marsh	117.7 acres (82%)
	Water	27.3 acres (19%)
TY50	Marsh	110.1 acres (76%)

Water	34.9 acres (24%)

V2 – Submerged Aquatic Vegetation (SAV)

The project area is primarily open water with depths ranging from approximately 0.5 to 3 feet (see Milton Island Marsh Raw WVA Data.xlsx). During a May 17, 2011, HSDRRS WVA field trip it was estimated that approximately 55% of the open water had SAV cover. It is assumed that this value will decrease over the 50 year project life as open water areas continue to deepen over time. Also the shoreline has breached opening the area to the lake. Increased turbidity is expected under the FWOP. The Corps RSLR data was applied to FWOP conditions.

FWOP

TY0	55%	
TY1	55%	
TY3	55%	
TY5	55%	
TY6	55%	
TY40	35%	Assume decrease due to subsidence and continued deepening of open Water. Water level increases 0.34 ft by TY 40.
TY50	15%	Assume 70% decrease due to subsidence and continued deepening of open Water. Water level increases 0.44 ft by TY 50.

FWP

For the HSDRRS Mitigation alternatives analysis the interagency team developed the following assumptions for a 50 year project life:

TY0	55%
TY1	0%
TY3	0%
TY5	55% (baseline)
TY6	63% (increase baseline X 15%)
TY40	50% (assume decrease as open water areas deepen)
TY50	28% (decrease baseline X 50%)

V3 – Interspersion

The marsh creation cell is 100% open water. For the HSDRRS Mitigation alternatives analysis it is assumed that marsh creation would occur within the entire cell and, therefore, no marsh nourishment would be credited. Therefore, the site will be classified as Class 5 for FWOP.

FWOP

TY0-50	100% Class 5

FWP

The created marsh will be considered a "carpet marsh" at TY3 (i.e., 100% Class 3) transitioning to a Class 1 by TY6.

TY0	100% Class 5	
TY1	100% Class 5	
TY2	100% Class 3	
TY3	100% Class 3 ("carpet marsh")	
TY5	90% Class 3/10% Class 1 (accounting for north dike degradation & portions of the borrow canal)	
TY6	90% Class 3/10% Class 1	
TY40	100% Class 1	TY 40 = 81% marsh/19% water (boarder line class 1*)
TY50	100% Class 2	Assume would drop to a class 2 with 76% marsh/24% water

* USGS Interspersion tool assumes marsh areas >82% marsh = Class 1

V4 – Shallow Open Water Habitat

Water depths were taken throughout the project site during a May 17, 2011 field investigation. Refer to Milton Island Marsh Raw WVA Data.xlsx for existing water depth and adjusted water depth information.

CRMS6209-H01 Average Water Elevation (ft NAVD88) - 1/2010-1/2011 = 0.74

Lake Pontchartrain at Mandeville (85575) 13:00 hours 4/14/2011 0.9 NAVD88

0.16 ft above average, therefore, subtract 0.16 to measured water depths to bring to average water depths

19% of the project area is currently ≤ 1.5 ft depth.

FWOP

Table 2: FWOP Increases in Water Levels Under Intermediate SLR Scenario.

Med RSLR WL increase (ft)	TY	Year	FWOP Percent OW </= 1.5 ft
0.03	0	2015	18.8
0.03	1	2016	18.8
0.04	2	2017	18.8
0.05	3	2018	18.8
0.05	4	2019	18.8
0.06	5	2020	18.8
0.07	6	2021	18.8
0.34	40	2055	14.5
0.44	50	2065	14.0

FWP

TY0	19%	
TY1	100%	including borrow area
TY2	100%	
TY3	100%	
TY5	100%	assume the 1% marsh lost would become shallow open water
TY6	100%	
TY40	90%	assume that marsh lost would convert to shallow open water and that shallow open water (i.e., $\leq$ 1.5 feet) would deepen over time (i.e., to > 1.5 feet)
TY50	83%	assume 1/6 of shallow open water (marsh loss) becomes deep based on 0.44 feet of water level rise

V5 – Salinity

Average salinity during the growing season information was obtained from the Guste Island Mitigation Bank (located east of Milton Island Marsh) project. It is not expected that the project will affect salinity because of the tidal exchange with adjacent Lake Pontchartrain.

FWOP & FWP

TY0-50 3.0 ppt

V6 – Fish Access

All of the study area is accessible and the access points are open and unobstructed.

FWOP

TY0-50 1.0 open system

FWP

TY0	1.0	open system
TY1	0.0001	solid plug
TY2	0.8	open system resulting from gapping and degrading dikes, but applied some reduced suitability due to settlement curves projecting fill elevations being +2.0, trenasses are not proposed
TY3	0.8	open system, limited access due to elevations
TY5	0.9	open system, 75 % settlement has occurred at TY 5
TY6	1.0	open system
TY40	1.0	open system
TY50	1.0	open system

Literature Cited

Chabreck, R. H. and G. Linscombe. 1997. Vegetation type map of the Louisiana coastal marshes. Baton Rouge, LA. Louisiana Department of Wildlife and Fisheries.

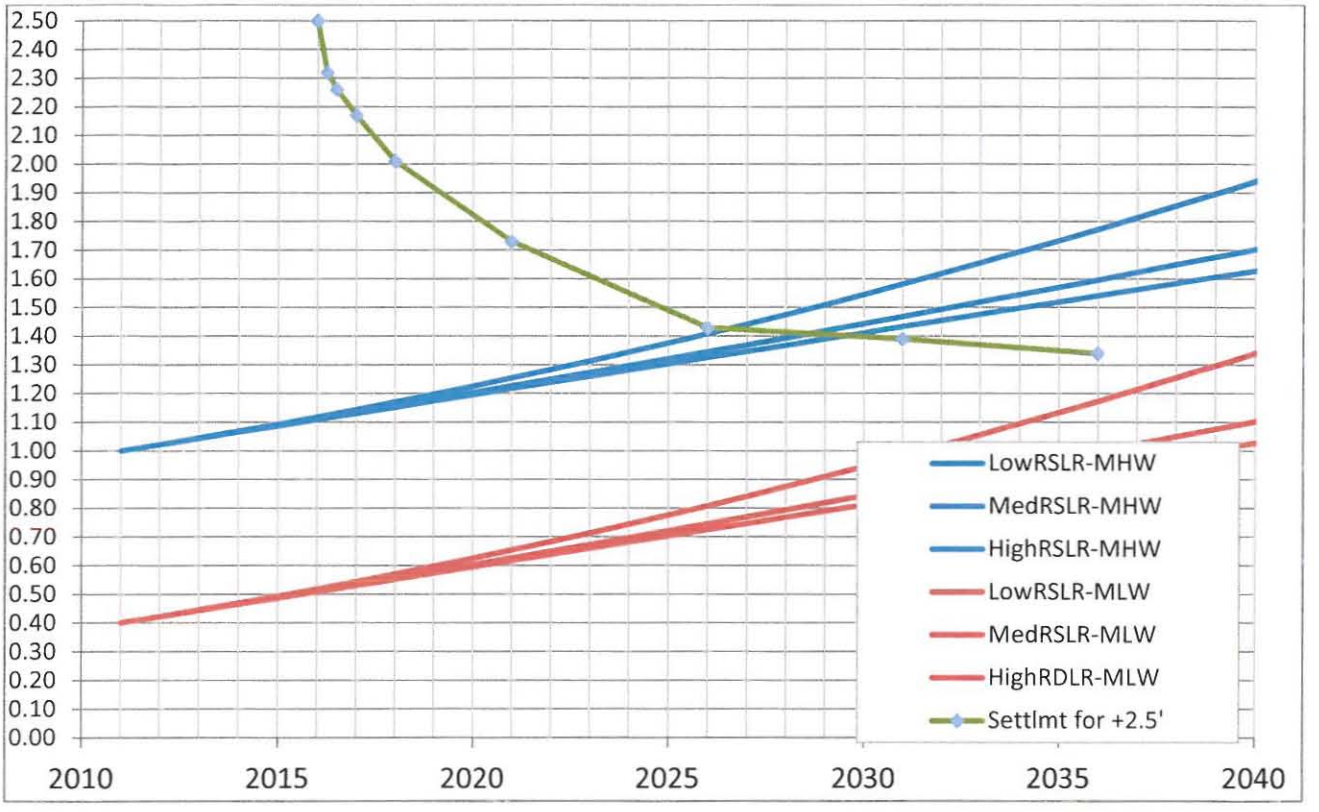
Nyman, J.A., R.D. Delaune, H.H. Roberts, and W.H. Patrick Jr. 1993. Relationship between vegetation and soil formation in a rapidly submerging coastal marsh. Marine Ecology Progress Series 96:269-279.

O'Neil, T. 1949. The muskrat in Louisiana coastal marshes: New Orleans, Louisiana Wildlife and Fisheries Commission, 28 p.

Sasser, C.E., J.M. Visser, E. Mouton, J. Linscombe, and S.B. Hartley. 2008. Vegetation types in coastal Louisiana in 2007: U.S. Geological Survey Open-File Report 2008–1224, 1 sheet, scale 1:550,000.

Trahan, Larry. 1990. Soil Conservation Service Soil Survey of St. Tammany Parish, Louisiana. United States Department of Agriculture, Soil Survey Service. March 1990.

Appendix: Figure of Corps' Settlement Data Compared to FWS RSLR Analysis



APPENDIX C

October 28, 2013, FWCA Report Recommendations
Provided for PIER #36

PIER # 36

October 28, 2013

FISH AND WILDLIFE COORDINATION ACT REPORT

SERVICE POSITION AND RECOMMENDATIONS

The Service supports the Corps' current constructible features and recognizes that additional Tiered IERs will further address individual mitigation features that are still in early design phases. We support the Corps' plan to mitigate impacts to fish and wildlife resources associated with LPV HSDRRS provided that the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation and outstanding issues are adequately resolved via ongoing planning efforts:

1. Avoid adverse impacts to bald eagle and osprey nesting locations and wading bird colonies through careful design project features and timing of construction. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

2. We recommend that the Corps initiate ESA consultation with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat. Subsequently, ESA consultation should be reinitiated should the proposed project features change significantly or are not implemented within one year of the last ESA consultation with this office to ensure that the proposed project does not adversely affect any federally listed threatened or endangered species or their habitat.

3. With regards to the Bonne Carré Dry- BLH, Wet-BLH, and Swamp Restoration projects, the Corps made a "no effect" determination in the Programmatic IER for project impacts on West Indian manatee, Gulf sturgeon, pallid sturgeon, and sea turtles. Because these species may occur in either one of the alternative borrow areas, we cannot support a "no effect" determination at this time. A "no effect" determination is the appropriate conclusion when the proposed action will not affect listed species or critical habitat. A "may affect," but "not likely to adversely affect" determination is an appropriate conclusion when effects on listed species are expected to be discountable, or insignificant, or completely beneficial. In order to ensure compliance with the ESA, we recommend that the Corps re-examine the projects to determine whether they may affect those species listed above and provide a basis for that determination.

4. Impacts to wetland habitat (including SAV habitat) and non-wet BLH associated with the construction of the mitigation features should be avoided and minimized to the greatest extent possible. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet BLH caused by project features

preferably through resizing of the mitigation features and in close coordination with the natural resource agencies.

5. Impacts to EFH should be avoided and minimized to the greatest extent possible. For proposed project areas that impact designated EFH habitat, coordination with the NMFS should be conducted.

6. Sediment borrow sites for the marsh creation areas should be designed to avoid and minimize impacts to water quality. The general guidelines for borrow design found in Appendix C should be incorporated into project design, and close coordination with the natural resource agencies should continue since borrow design can be case specific and influenced by a number of factors.

7. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, Water Control Plans, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA and LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

9. We recommend that the Corps consider the availability of credits at a bank and within a hydrologic unit when evaluating the mitigation bank alternative to avoid exhausting credits available for individual landowners/permittee within a particular hydrologic unit.

10. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

11. The Corps should continue to coordinate with refuge personnel during planning and compatibility determination processes. A Special-Use Permit should be obtained prior to any entrance onto the refuge. Coordination should continue until construction of the flood protection project and restoration projects are complete and prior to any subsequent maintenance. Points of contacts for that refuge are Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Neil Lalonde (985) 822-2000, Refuge Manager for the Bayou Sauvage NWR. The Corps should not sign the Decision of Record until a Compatibility Determination is complete.

12. The local sponsor should also be made aware of the above requirements should it be their responsibility to transfer mitigation lands to the Service or other land-managing natural resource agency.

13. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation and/or maintenance of mitigation lands, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

14. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

15. The Service encourages the Corps to finalize mitigation plans and proceed to mitigation construction so that it will be concurrent with project construction and revising the impact and mitigation period-of-analysis to reflect additional temporal losses will not be required.

16. For on-refuge impacts the Service prefers and recommends implementation of the proposed TSP, including the Bayou Sauvage brackish marsh alternative, because this alternative ranks higher in long-term sustainability and property management feasibility over other brackish marsh alternatives. Further, the Service does not support the selection of the Golden Triangle mitigation alternative for on-refuge impacts; however, we would not object to that alternative should it be selected for non-refuge impacts.

17. It is the position of the Service at this time that any lands acquired through the condemnation process (excluding those condemned for unclear title) will not be accepted by donation, transfer, sale, or other means to become part of a national wildlife refuge. Based on this position the Service would not consider any such action as meeting the necessary mitigation requirements for impacts to refuge lands. Should condemnation be foreseeable to acquire lands for on-refuge mitigation, we recommend alternatives be further investigated and developed. We will continue to work with the Corps to seek alternatives within refuge lands or from willing sellers to fulfill the necessary mitigation requirements.

18. The Service supports the mitigation of on-refuge flood-side BLH impacts on either side of the levee (flood or protected) and recommends that the Corps, in consultation with the Service, develop acceptable mitigation for such impacts should the proposed TSP mitigation feature (i.e., Fritchie alternative) not be feasible.

19. The habitat assessment for the Fritchie BLH alternative is based on a surrogate BLH habitat located in the vicinity of the project area. Once access is granted to the proposed restoration area, a reassessment should be conducted. Should further development of feature designs result in a lower mitigation potential, a supplemental FWCA report may be necessary.

20. The Service recommends that the Corps work with the natural resource agencies to incorporate proposed modifications (Appendix G) and finalize the "GUIDELINES – WET BLH HABITAT ENHANCEMENT, SWAMP HABITAT RESTORATION, AND SWAMP HABITAT ENHANCEMENT" and the untitled document for marsh mitigation (Appendix F).

21. The Service recommends that the Corps maintain full responsibility for any BLH mitigation project for a minimum of 4-years post planting. The Corps should maintain full responsibility for all marsh mitigation projects until monitoring guidelines to be developed are completed and demonstrate the projects are fully compliant with success and performance requirements.

22. At this time none of the mitigation planning documents describe in detail actions needed by the Corps and/or the local sponsor if mitigation is not succeeding as planned. The Service recommends that this important component of the mitigation plan be developed.

APPENDIX D

Draft FWCA Report Comments and Comments on the Draft TIER #1
Provided by
National Marine Fisheries Service

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue, South
St. Petersburg, Florida 33701

April 22, 2014 F/SER46/PW:jk
225/389-0508

Mr. Jeffrey D. Weller, Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service
646 Cajundome Blvd., Suite 400
Lafayette, Louisiana 70506

Dear Mr. Weller:

NOAA's National Marine Fisheries Service (NMFS) has received the draft Fish and Wildlife Coordination Act Report (Report) for the U.S. Army Corps of Engineers' (USACE) Tiered Individual Environmental Report (TIER) on the Milton Island Mitigation Project for the Hurricane and Storm Damage Risk Reduction System (HSDRRS), Lake Pontchartrain and Vicinity (LPV). This is TIER 1 for LPV mitigation covered under the Programmatic Individual Report (PIER) 36. The USACE's primary objective in this TIER is to provide compensatory mitigation to offset non-refuge fresh and intermediate marsh impacts for the LPV components of HSDRRS.

As described in the Report, the TIER will recommend USACE construction of the Milton Island Intermediate Marsh Restoration project based on previous determination of the Tentatively Selected Plan by the USACE. The mitigation project is planned to offset 100 acres and 45.7 average annual habitat units (AAHUs) of impacts to fresh and intermediate marsh which has occurred with construction of flood protection features of the LPV portion of HSDRRS. The proposed mitigation project consists of acquisition, construction and management of 145 acres of marsh to be created within a 152 acre area on the north shore of Lake Pontchartrain in St. Tammany Parish, Louisiana. The project would be constructed by confined disposal of sediment hydraulically-dredged from Lake Pontchartrain. The site would be planted with marsh vegetation and containment dikes would be degraded or gapped with the exception of the dike along the lake which would remain to provide erosion protection. The USACE is responsible for the mitigation until the initial success criteria are met at which time responsibility shifts to the non-Federal sponsor.

General Comments

The NMFS supports the Report recommendations which incorporate by reference those previously submitted in the October 2013 Report for PIER 36. The WVA analysis for the levee impacts and the Milton Island mitigation incorporated temporal losses of wetland functions based on the difference in levee impacts between the time of construction and the projected schedule for completing the mitigation. The NMFS supports the U.S. Fish and Wildlife Service

(USFWS) in recommending progressing to construction of the mitigation because the levee impacts already have occurred. If the mitigation project is not constructed as scheduled during 2015, additional temporal losses will occur and additional mitigation likely should be assessed and required.

Without interagency coordination, the USACE provided project-specific updates for the marsh mitigation guidelines which were inserted as Appendix A to the Report. Generally, the guidelines are well prepared. However, coordination by the USACE with the USFWS, NMFS, and the rest of the interagency team is encouraged to further update these guidelines case-specifically where needed. A similar, but generic document recently has been completed through interagency review for the Regulatory program and previously served as a partial basis for the civil works mitigation guidelines. The final Regulatory version is suggested to be considered when finalizing the Milton Island-specific mitigation guidelines. In the specific comments section below, NMFS provides some cursory recommendations pending interagency coordination. The NMFS will submit detailed comments on the project-specific guidelines when responding to the USACE's TIER and will supply a copy to the USFWS. Those detailed comments are requested to be included in the final Report.

Specific Comments

Project Impacts & Mitigation, paragraph three. Suggest inserting, "Using an iterative analysis" before, "That mitigation potential was used to refine the project size to meet mitigation needs."

Milton Island Intermediate Marsh Mitigation Site and Plan, paragraph two. The first sentence should be revised to indicate the mitigation project will consist of 145 acres of marsh. During review of the final WVA, the acreage was clarified to be 143 acres on the interior of the containment dikes and the 1,000-foot shoreline restoration reach plus two acres on the lakeside slope of the shoreline restoration reach for a total of 145 acres. This distinction could be made in the Report text, but is not necessary in Figure 1.

Appendix A, Draft Mitigation Guidelines

Page 2 and 3, Topography A, B, and C. The elevations listed for target years 1, 2, and 5 should be verified to confirm they come from the settlement curve data and its corresponding use in the WVA. This section should be augmented at each target year to also indicate the average of elevations should be at or above the target construction elevation.

Page 2, 2. Topography, A. The 132.5 acres listed in this section may be confusing relative to the 143 and 145 acres listed in the body of the Report. To assist with stand-alone clarity for compliance tracking, this section of the Appendix is suggested to be revised to include, "(143 acres of benefit – 15 acres of borrow excavated + 4.5 acres of borrow at target elevation = 132.5 acres)." This is to clarify 80% of the 132.5 acres (not 143 acres) must meet the elevation requirements.

Demonstrating "at least 80% of the mitigation area has a surface elevation that is within 0.5 feet of the designed initial target surface elevation" should be clarified if it means the target elevation +/- six inches or +/- three inches. As stated, it is unclear and subject to interpretation.

Page 3, 3. Native Vegetation, D. For long-term success, the minimum cover comprised of native vegetation should be increased to 97%. This would be consistent with the success criteria developed for the Regulatory program.

Page 4, Invasive or Nuisance Vegetation.
The site should be required to contain less than 3% invasive or nuisance species as interim and long-term success criteria. This would be consistent with the success criteria developed for the Regulatory program.

Page 4, Mitigation Monitoring Guidelines. The NMFS suggests the spatial coverage for elevation and vegetation be revised to be more similar with the guidelines developed of the Regulatory program. Although the proposed monitoring transects depicted in Figure 1 on page 12 may be sufficient in combination with aerial photography for vegetation monitoring, it is not sufficient in spatial coverage for elevation monitoring. For example, a minimum of 200 survey plots is required in the Regulatory program, if a marsh creation mitigation bank is greater than 20 acres.

Page 8, Table 2. Standard mitigation monitoring report schedule and monitoring responsibility. Column one in this table should be revised to include elevation monitoring for emphasis of importance.

We appreciate the close coordination with NMFS and for the opportunity to review and comment on the Report. Continued coordination with NMFS under the Fish and Wildlife Coordination Act will be necessary as this project progresses. If there are questions, please coordinate with Patrick Williams at (225) 389-0508, extension 208.

Sincerely,

Virginia M. Fay

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

c:
USACE, Boe
EPA, Keeler, Ettinger
LDWF, Balkum, Hebert
CPRA, Bennett
F/SER46, Swafford
Files

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701

May 14, 2014 F/SER46/PW:jk
225/389-0508

Ms. Joan M Exnicios, Chief
Regional Planning and Environmental Division South
New Orleans District Environmental Branch
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Ms. Exnicios:

NOAA's National Marine Fisheries Service (NMFS) has received your letter dated April 11, 2014, transmitting the draft tiered Individual Environmental Report (TIER) #1 titled, "Milton Island Marsh Restoration Project, Saint Tammany Parish, Louisiana." This is the first supplement to the Programmatic Individual Environmental Report (PIER) #36 covering mitigation for the Lake Pontchartrain and Vicinity (LPV) component of the Hurricane and Storm Damage Risk Reduction System (HSDRRS). The TIER evaluates compensatory mitigation to offset non-refuge fresh and intermediate marsh impacts for LPV.

The TIER identifies construction of the Milton Island Marsh Restoration project as the proposed action to offset fresh and intermediate marsh impacts for LPV. The mitigation project is planned to offset 100 acres and 45.7 average annual habitat units (AAHUs) of impacts to fresh and intermediate marsh which has occurred with construction of flood protection features of the LPV portion of HSDRRS. The proposed mitigation project consists of acquisition, construction and management of 145 acres of marsh to be created within a 152 acre area on the north shore of Lake Pontchartrain in St. Tammany Parish, Louisiana. The project would be constructed by confined disposal of sediment hydraulically-dredged from Lake Pontchartrain. The site would be planted with marsh vegetation and containment dikes would be degraded or gapped with the exception of the dike along the lake which would remain to provide erosion protection.

The NMFS has reviewed the draft TIER and overall finds the proposed type and amount of mitigation acceptable and the document thorough and well prepared. Thank you for coordinating with NMFS on developing and evaluating the mitigation. Close and cooperative coordination by the U.S. Army Corps of Engineers (USACE) with NMFS during mitigation planning, review of the Design Delivery Report, Wetland Value Assessment (WVA) of the mitigation, and drafting of the TIER is appreciated. The following general and specific comments are offered.

General Comments

The NMFS acknowledges the fresh and intermediate marsh impacted by the LPV flood protection features was comprised of limited quality wetlands which in some cases were not tidally-influenced (e.g. perched). In contrast, the Milton mitigation would result in tidal intermediate marsh connected with Lake Pontchartrain. Therefore, a net gain of tidal marsh supportive of NMFS-trust resources could occur with implementation of the Milton mitigation project. Accordingly, please consider comments herein in a programmatic context for other HSDRRS, LPV mitigation despite being submitted project-specifically.

While NMFS acknowledges the project could result in a net gain of tidal marsh, there is a concern project implementation could at least temporarily and unnecessarily re-impound shallow water bottoms north of the marsh creation project which have recently become tidally influenced. If that were to occur, more than 500 acres of shallow water bottoms having submerged aquatic vegetation, and a small amount of marsh, would be re-impounded. Such an impact was not evaluated as part of the WVA done for this project. To ensure such impacts do not occur, the project should be revised to include one 50-ft wide gap in the eastern boundary of the project area just north of the northern limits of the containment dike. The recommended location for such a gap is shown on the enclosed figure (attached).

The document should be revised to identify mitigation is part of the overall project which includes the levee impacts. Specifically, the TIER should be revised to indicate the future with mitigation would not improve wetlands or associated support functions (e.g. fisheries) relative to the overall project, only the mitigation site. The overall project objective is merely to attain no net loss of wetlands, other habitats, and associated functions. This issue could be addressed by clarifying and expanding Section 1.1 (Purpose and Need for the Proposed Action).

The NMFS encourages the USACE to immediately progress to mitigation construction. The USACE is not achieving the intent to implement mitigation concurrent with construction of the levees, floodgates, and pump stations and the impact assessment does not account for all temporal losses if the successful mitigation is not achieved in a timely manner. The USACE should commit to reassessing additive temporal losses and offsetting such losses with additional mitigation if the mitigation project is not constructed as scheduled during 2015. Additional mitigation may be constructed as part of the Milton project or alternatively combined with another marsh mitigation project provided it is constructed in the same watershed as the impacts.

In addition to the already occurred planning and design delays, NMFS is concerned mitigation for non-Federal land may experience implementation delays due to USACE's desire for fee ownership of mitigation lands. To minimize additional delays, increased temporal habitat losses, and potential need to reassess and increase mitigation, the USACE is requested to also consider the option of non-standard real estate agreements by seeking perpetual conservation servitudes in lieu of fee simple acquisition.

The USACE developed project-specific updates for the marsh mitigation guidelines (Appendix C) without coordination with the natural resource agencies who were involved with drafting

programmatic guidelines for HSDRRS. Generally, the project-specific guidelines are well prepared and are acceptable. However, coordination by the USACE with the U.S. Fish and Wildlife Service (USFWS), NMFS, and the rest of the interagency team is encouraged to further update these guidelines case-specifically where needed. A similar, but generic document recently has been completed through interagency review for the Regulatory program and previously served as a partial basis for the civil works mitigation guidelines. The final Regulatory version is suggested to be considered when finalizing the Milton Island-specific mitigation guidelines.

The NMFS has coordinated often with USACE on potential impacts to water quality associated with borrow pits in open water. As the literature suggests, potential environmental impacts from open water borrow pits vary by location and estuary. The USACE is encouraged to include water quality monitoring in the TIER to assess if hypoxia develops in the borrow pit. Such monitoring would help with the development of adaptively manage future designs. Scopes of work similar to water quality monitoring conducted on Individual Environmental Report 11 and the Mississippi River-Gulf Outlet Ecosystem Restoration Study are recommended to be included and repeated annually for three years. The NMFS is willing to assist USACE in further scoping a monitoring plan to assess impacts to water quality.

Specific Comments

Sections 1.3 (Prior Reports) and 1.4 (Integration with other Individual Environmental Reports) These sections incorporate by reference information in PIER #36 and discuss the Cumulative Environmental Document. As written, it is not clear if as-built levee impacts to non-refuge fresh and intermediate marsh have been obtained to determine the final mitigation needs for LPV. For public disclosure, the TIER should be revised to indicate final mitigation needs will not be reconciled until receipt of as-built surveys for the levees and associated flood protection features. The TIER should acknowledge this would occur under additional environmental clearance.

Section 3.2.4, Aquatic Resources and Water Quality
Page 21. The depth specification for excavating the borrow pit in Lake Pontchartrain was developed through consideration of existing literature pit impacts to water quality and interagency input. However, adverse impacts to water quality may result. The NMFS recommends the TIER be revised to incorporate a commitment to conduct water quality monitoring of the borrow pit or the USACE develop a programmatic monitoring plan of borrow pits in open water. This would expand the understanding of potential environmental risks of open water borrow pits in Louisiana.

The last paragraph should be revised to clarify that any lift in environmental function is relative to the mitigation site only and not in consideration of the overall adverse impacts from constructing flood protection features.

3.2.5 Essential Fish Habitat

Page 23. The proposed action section should be revised to clarify the overall project, including the flood protection features and mitigation, would result in no net gain in habitat, whereas a net gain in habitat would result when only considering the mitigation in isolation.

Page 24. The NMFS does not concur the overall objective of the LPV HSDRRS mitigation is to improve EFH within the Lake Pontchartrain Basin. The TIER should be revised to indicate the overall objective is to conserve EFH or attain no net loss of EFH.

Appendix C, General Mitigation Guidelines
2. Topography A, B, and C, Page C-4
The guidelines for years 1, 2, and 5 in the TIER should be revised to the elevations used in the WVA at the corresponding years. This section should be augmented at each target year to also indicate the average of elevations should be at or above the target construction elevation.

The NMFS accepts requiring 80% of the 143 acres for years 1, 2, and 5. However, the elevations and percent cover are relative to the Variable 1 marsh acres projected under the WVA which do not include the water acres. For example, 143 acres of benefit – 15 acres of borrow excavated + 4.5 acres of borrow at target marsh elevation = 132.5 acres. At minimum, 80% of the 132.5 acres must therefore meet the elevation requirements. This acreage comment also applies to items A, B, and C under "3. Native Vegetation".

3. Native Vegetation, D
For long-term success, the minimum cover comprised of native vegetation should be increased to 97%. This would be consistent with the success criteria developed for the Regulatory program.

4. Invasive or Nuisance Vegetation
Item B should be revised to indicate the site should contain less than 3% invasive or nuisance species. This would be consistent with the success criteria developed for the Regulatory program.

Mitigation Monitoring Guidelines
Elevation monitoring is necessary to demonstrate hydroperiod and function. The NMFS requests the spatial coverage for elevation and vegetation be revised to be more similar with the guidelines developed of the Regulatory program. Although the proposed monitoring transects depicted in Figure 1 on page C-6 may be sufficient in combination with aerial photography for vegetation monitoring, it is not sufficient in spatial coverage for elevation monitoring. For example, a minimum of 100 survey plots is required in the Regulatory program if a marsh creation mitigation bank is greater than 20 acres. An additional transect bisecting the length of the disposal area should be included in the TIER for elevation monitoring or alternatively spot shots throughout the disposal area should be recorded over time by reoccupying the same locations each time.

The TIER should be revised to commit to reassessing mitigation if the site is created higher than supportive of a tidal hydroperiod. This is necessary to ensure a loss of tidal waters is incorporated into the impacts assessed and then is offset.

Table 2. Page C-10. Standard mitigation monitoring report schedule and monitoring responsibility. Column one in this table should be revised to include elevation monitoring for emphasis of importance.

Appendix D, Adaptive Management Plan
This section is recommended to be amended to include building additional marsh mitigation elsewhere in the event there is a shortage of necessary acres meeting the required elevations (e.g. settle below water or is higher than the target tidal hydroperiod). Filling small areas in the mitigation site that settle below water may not be practicable and degrading high elevations may do more harm than good. Therefore, including this additive potential action would allow another option.

The NMFS appreciates the close and cooperative coordination by the USACE and your staff on HSDRRS mitigation. If you have questions or wish to discuss our comments, please contact Patrick Williams at (225)389-0508, extension 208 or patrick.williams@noaa.gov.

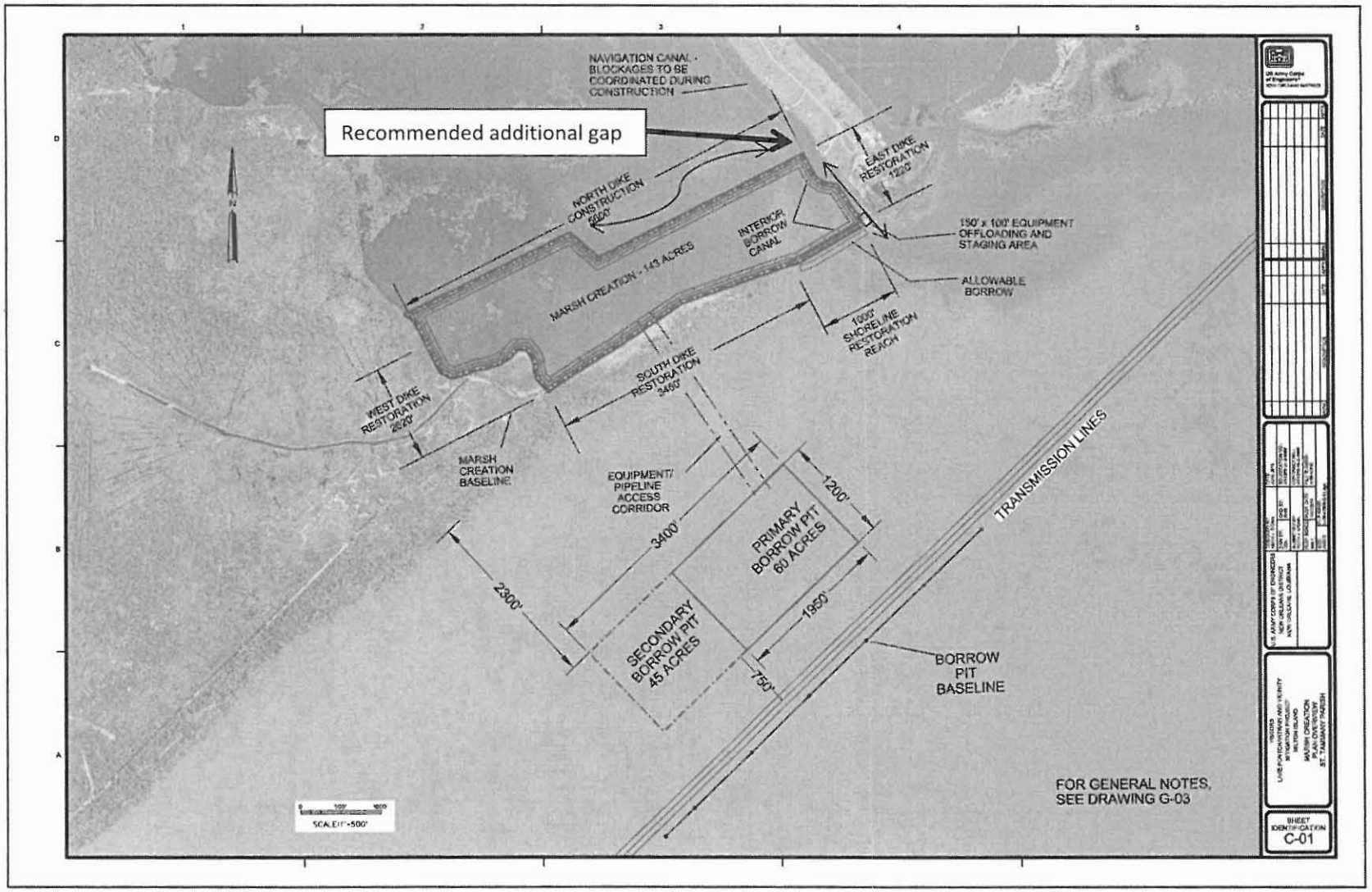
Sincerely,

Virginia M. Fay

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

Enclosure

c:
FWS, Lafayette, Trahan, Walther
EPA, Dallas, Ettinger
LA DNR, Consistency, Haydel
LA CPRA, Bennett
F/SER46, Swafford
F/SER4, Rolfes, Dale
F/SER, Keys, Silverman
Files


Recommended additional gap
NAVIGATION CANAL - BLOCKAGES TO BE COORDINATED DURING CONSTRUCTION
NORTH DIKE CONSTRUCTION 6600'
EAST DIKE RESTORATION 1220'
INTERIOR BORROW CANAL
150' x 100' EQUIPMENT OFFLOADING AND STAGING AREA
ALLOWABLE BORROW
MARSH CREATION - 143 ACRES
1000' SHORELINE RESTORATION REACH
SOUTH DIKE RESTORATION 3460'
WEST DIKE RESTORATION 2520'
MARSH CREATION BASELINE
EQUIPMENT/ PIPELINE ACCESS CORRIDOR
3400'
2300'
PRIMARY BORROW PIT 60 ACRES
1200'
1950'
SECONDARY BORROW PIT 45 ACRES
750'
TRANSMISSION LINES
BORROW PIT BASELINE
FOR GENERAL NOTES, SEE DRAWING G-03
SCALE: 1" = 500'
SHEET IDENTIFICATION C-01