Mississippi Valley Division
Regional Planning and Environmental Division South

Upper Barataria Basin, Louisiana Feasibility Report

Appendix F – Agency Coordination

October 2021

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506

April 15, 2020

Colonel Stephen Murphy
District Commander
U.S. Army Corps of Engineers
7400 Leake Avenue
New Orleans, LA 701118-3651

Dear Colonel Murphy:

Please reference the Upper Barataria Louisiana Risk Management Feasibility Study being conducted by the U.S. Army Corps of Engineers and the Coastal Protection and Restoration Authority Board. This study will evaluate the feasibility of providing hurricane protection, storm damage reduction, and related purposes for the communities in and around the upper Barataria Basin of Louisiana.

The following comments are provided on a planning-aid basis to assist the Corps in developing environmentally acceptable project alternatives and features. These comments and recommendations are intended to augment the November 2019 Draft Coordination Act Report but do not constitute the final report of the Secretary of Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The Service submits the following comments in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Project area wetlands include both marshes and forested wetlands (cypress-tupelo swamp and bottomland hardwood forest). Although vegetated with water tolerant plant species, flooding of excessive duration and magnitude can stress and kill marsh vegetation and some forested wetland tree species.

In the Barataria Basin and throughout coastal Louisiana, bottomland hardwood (BLH) forests are typically found along the slopes of natural distributary ridges. These wetland forests may be occasionally or seasonally flooded and they typically occupy higher elevation areas than cypress-tupelo swamps which experience more flooding. These coastal forests provide critically important stopover habitat for numerous species of trans-Gulf migrating songbirds (including the at-risk golden-winged warbler), nesting bald eagles and osprey, colonial nesting waterbirds, as well as habitat for a variety of other fish and wildlife species.

Coastal wetland forests like those in the upper Barataria and Verret Basins, once used to receive annual sediment inputs during flood events on the Mississippi and/or Atchafalaya Rivers. However, construction of flood protection levees during the early 1900s has eliminated those annual sediment inputs resulting in increased inundation due to the continuing effects of subsidence and sea level rise (Conner and Day 1988). The resulting chronic inundation affects not only tree mortality and forest composition, but also tree growth rates (Kozlowski 2002).

In coastal bottomland hardwood forests stressed by prolonged inundation, the less water tolerant tree species gradually die out leaving the more water tolerant bald cypress and water tupelo, if they were originally present (Kiem et al. 2013). If flooding is not permanent, seeds from prior existing cypress and tupelo may germinate and recruitment of young trees may occur. However, nutria herbivory and other factors may preclude recruitment of cypress and/or tupelo, or prolonged flooding may preclude seeds from germinating (Kozlowski 2002), often resulting in the conversion of the dying hardwood forests to emergent marsh.

The Maurepas swamps of the upper Pontchartrain Basin have been isolated from riverine inputs and are suffering from sea level rise, subsidence, and increased salinities. The lack of water exchange has led to stagnant standing water conditions causing decreased tree growth rates and increased tree mortality (Krauss et al. 2017). In the Atchafalaya Basin, cypress-tupelo stands established at lower elevations and experiencing more flooding than sites at higher elevation sites have experienced reduced growth and productivity (Kiem et al. 2013).

Project Area Forested Wetlands

The area protected by the proposed levee and floodgates includes marsh and forested wetlands. Project area BLH forests are located within the extreme upper basin and may also exist adjacent to or near developed areas where forest elevations are sometimes higher. Coastal Reference Monitoring System (CRMS) stations exist within project area marshes and forested wetlands.

CRMS species composition data for the forested wetlands demonstrates that the BLH forests exhibit a more diverse assemblage of trees unlike the swamps which are dominated primarily by cypress and tupelo (Table 1). Within the upper Barataria Basin (northwest of U.S. Highway 90), BLH forest decreased from 38% to 21% of the total area during the period 1972 to 1992 (Nelson et al. 2002). This reduction is due in part to development, but also to inundation and associated conversion to more frequently inundated swamp forest which increased from 30% to 41% over the same period.

CRMS data from project area forested wetland sites was used to compute the percent time flooded and average flooding depth (Table 2). The last full six years of data, illustrate that the BLH sites have experienced prolonged duration flooding. The swamp sites exhibit on average even more prolonged flooding and deeper flooding.

Table 1. CRMS 2018 basal area data by species for upper Barataria Basin forest stations.

CRMS BLH Stations

Scientific Name	Comon Name	Basal Area (M^2/ha)			
		CRMS 194	CRMS 200	CRMS 5116	CRMS 197
Taxodium distichum	Bald Cypress	5.69	1.82	5.14	4.69
Nyssa aquatica	Water Tupelo				
Nyssa sylvatica	Black Tupelo				
Acer rubrum	Red Maple	5.76	3.31	14.3	4.26
Acer negundo	Boxelder	2.07	0.92		
Carya aquatica	Water Hickory		4.46		
Fraxinus pennsylvanica	Green Ash		0.34		1.52
Fraxinus profunda	Pumpkin Ash	9.05	9.72	9.98	3.94
Fraxinus carolinana	Carolina Ash	1.6	3.72	0.86	1.22
Ulmus americana	American Elm	1.55	1.03		
Ulmus rubra	Slippery Elm	1.72		0.33	3.75
Celtis laevigata	Sugarberry	0.24			
Quercus texana	Nutall Oak	0.9		0.02	5.52
Quercus nigra	Water Oak	0.24	5.18	0.22	
Quercus laurifolia	Laurel Oak			0.44	
Quercus lyrata	Overcup Oak				
Liquidambar styraciflua	Sweetgum				
Gleditsia tricanthos	Honey locust				
Cornus foemina	Swamp dogwood				
Malus angustifolia	Southern crabapple	0.03			

CRMS Swamp Stations

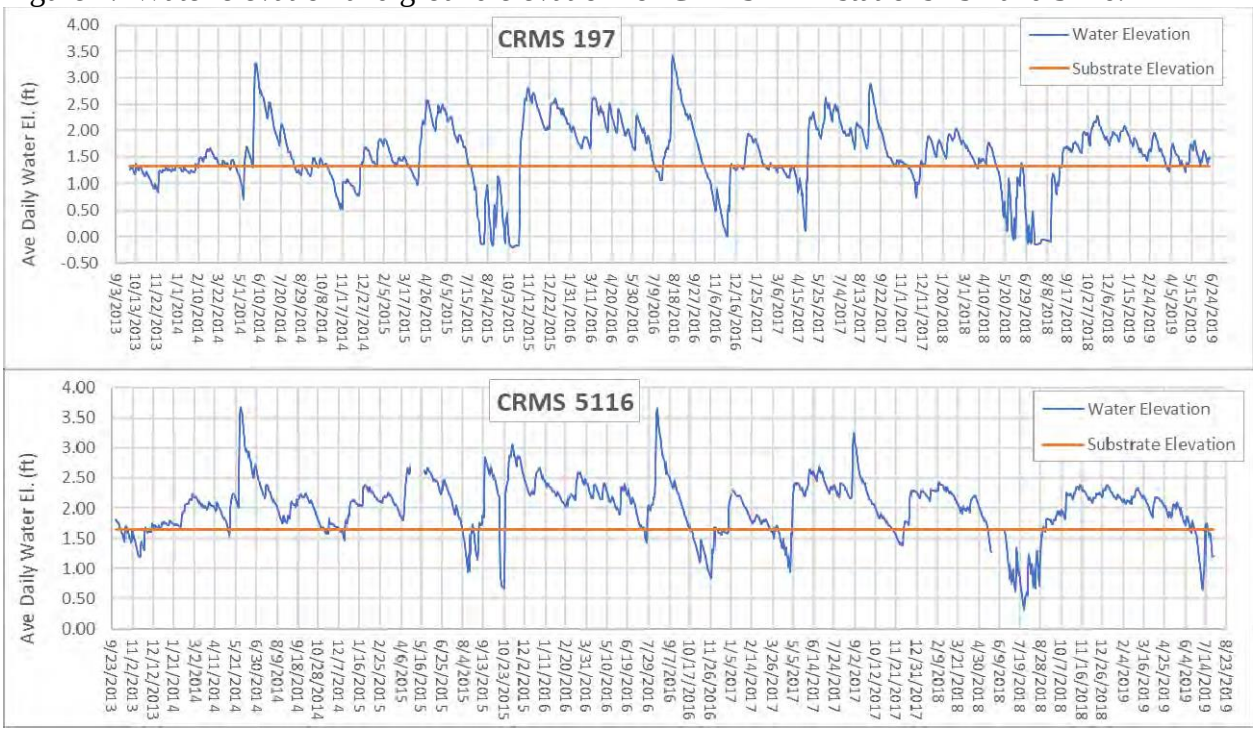
Scientific Name	Comon Name	Basal Area (M^2/ha)			
		CRMS 217	CRMS 5672	CRMS 206	CRMS 218
Taxodium distichum	Bald Cypress	17.41	22.53	31.61	27.15
Nyssa aquatica	Water Tupelo	19.66	22.44	18.86	20.06
Nyssa sylvatica	Black Tupelo				
Acer rubrum	Red Maple	11.83	2.28	3.63	0.84
Acer negundo	Boxelder				
Carya aquatica	Water Hickory				
Fraxinus pennsylvanica	Green Ash		0.15	0.62	
Fraxinus profunda	Pumpkin Ash	5.34	6.93	0.53	0.38
Fraxinus carolinana	Carolina Ash		0.15		
Ulmus americana	American Elm				
Ulmus rubra	Slippery Elm				
Celtis laevigata	Sugarberry				
Quercus texana	Nutall Oak	0.35			
Quercus nigra	Water Oak				
Quercus laurifolia	Laurel Oak				
Quercus lyrata	Overcup Oak				
Morella cerifera	Wax Myrtle			0.04	
Cephalanthus occietalis	Buttonbush			0.02	0.12
Cornus foemina	Swamp dogwood				
Malus angustifolia	Southern crabapple				

Management of greentree reservoirs has demonstrated that prolonged flooding during the growing season is harmful to the health of red oak species like those occurring in project area BLH forests (Arkansas GFC 2017). Instead, shallow flooding that occurs irregularly during the dormant season is a naturally aspect of BLH forest hydrology and can be tolerated by red oaks and other desirable BLH species. The CRMS data for project area BLH demonstrates that flooding is occurring for the majority of the year. Plots of water elevation for the two CMRS sites with the least amount of flooding shows that prolonged flooding during the growing season has been occurring (Figure 2).

Table 2. Mean flooding depth and percent time flooded for project area CRMS stations.

CRMS Station	Habitat Type	Station Elevation (feet)	Mean Water Elevation 2013-2019 (feet)	Mean Submergence 2013-2019 (feet)	Time WL Below Soil (percent)	Time Soil Flooded (percent)	Mean Salinity (ppt)	Max Salinity (ppt)
194	BLH	1.41	1.80	0.39	17.3%	82.7%	0.38	0.45
200	BLH	1.13	1.92	0.79	6.4%	93.6%	0.46	0.59
5116	BLH	1.64	2.02	0.38	17.1%	82.9%	na	na
197	BLH	1.32	1.54	0.22	32.6%	67.4%	na	na
217	Swamp	-0.36	0.30	0.66	20.1%	79.9%	0.09	4.36
5672	Swamp	-0.06	1.24	1.3	2.6%	97.4%	na	na
206	Swamp	0.13	0.70	0.57	15.4%	84.6%	0.08	0.45
218	Swamp	-0.94	0.95	1.89	0.0%	100.0%	0.06	0.13

Figure 2. Water elevation and ground elevation for CRMS BLH stations 197 and 5116.

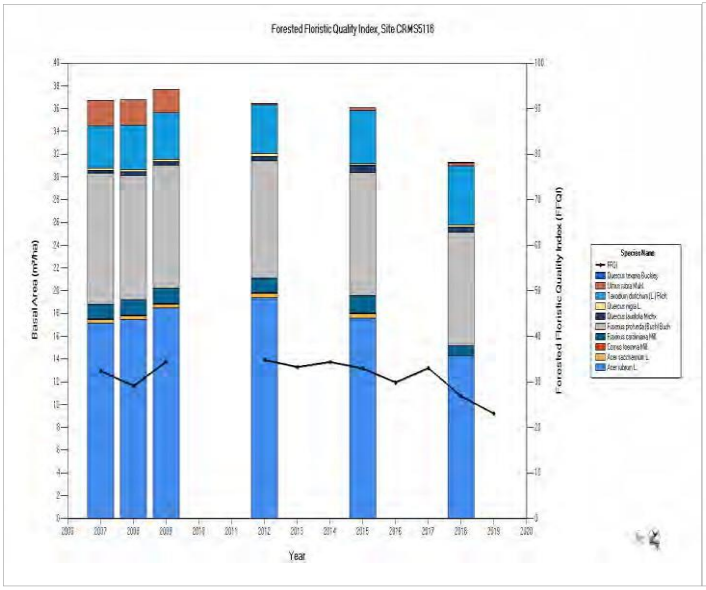


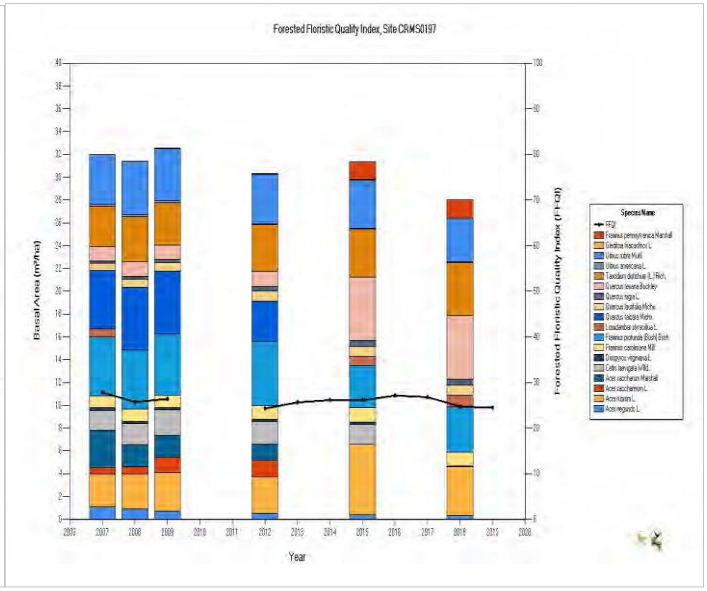
In forested wetlands, CRMS data includes annual or bi-annual diameter at breast height (dbh) measurements of individually tagged/identified trees (Figure 3). At each of the four BLH sites, the total basal area (m^2/ha) has decreased over the 11 year period of record. At two sites, impacts due to Hurricanes Gustav and Ike (2008) resulted in a marked decrease in total basal area. Although there was a quick recovery the following year, the long-term trend in total basal area is downward.

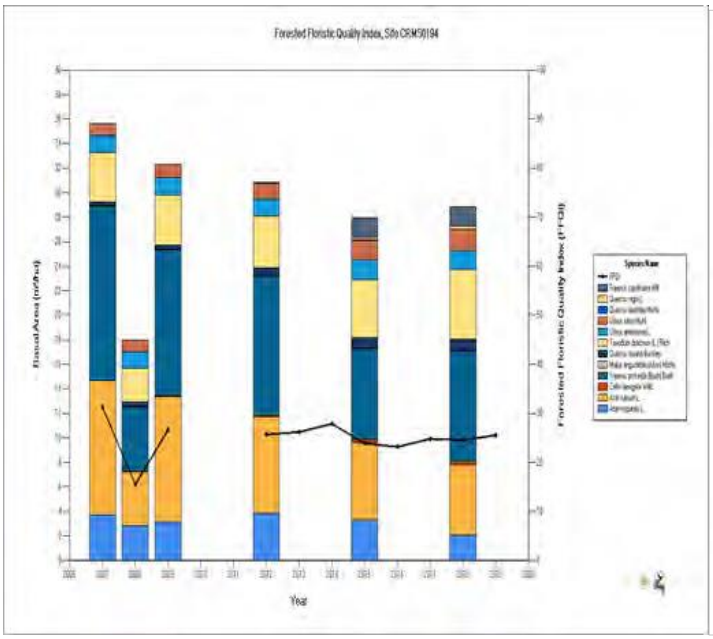
CRMS also measures canopy cover at its forested sites. For the four BLH stations, the canopy cover exhibits a decreasing trend (Figure 4). The decreasing basal area and canopy cover data depict a BLH forest experiencing stress and degradation associated with the prolonged flooding occurring at those sites.

At each of the CRMS swamp sites, the total basal area is trending upward (Figure 5). At several sites, less water tolerant species such as red maple and ash are showing decreases in basal area. Loss of those species may make more resources available for the remaining trees resulting in somewhat greater growth rates due to reduced competition. However, because of the prolonged flooding and lack of regeneration, when the established cypress and tupelo die, the forest will gradually thin out and convert to marsh or open water. Canopy cover data also exhibits an increasing trend in swamp canopy cover (Figure 6). These data suggest that the remaining cypress and tupelo are continuing to grow while other less water tolerant tree species are disappearing.

Figure 3. CMRS basal area data by species for BLH sites.







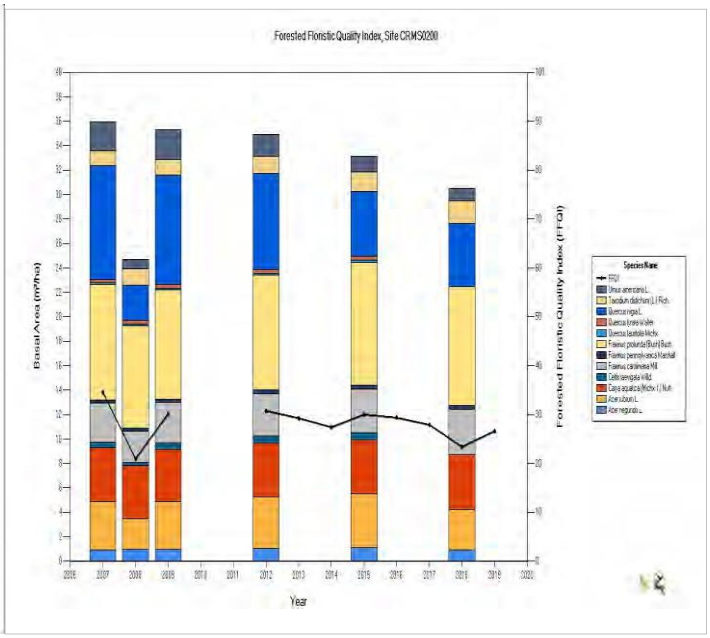


Figure 4. CRMS canopy cover data for BLH stations (2007-2019).

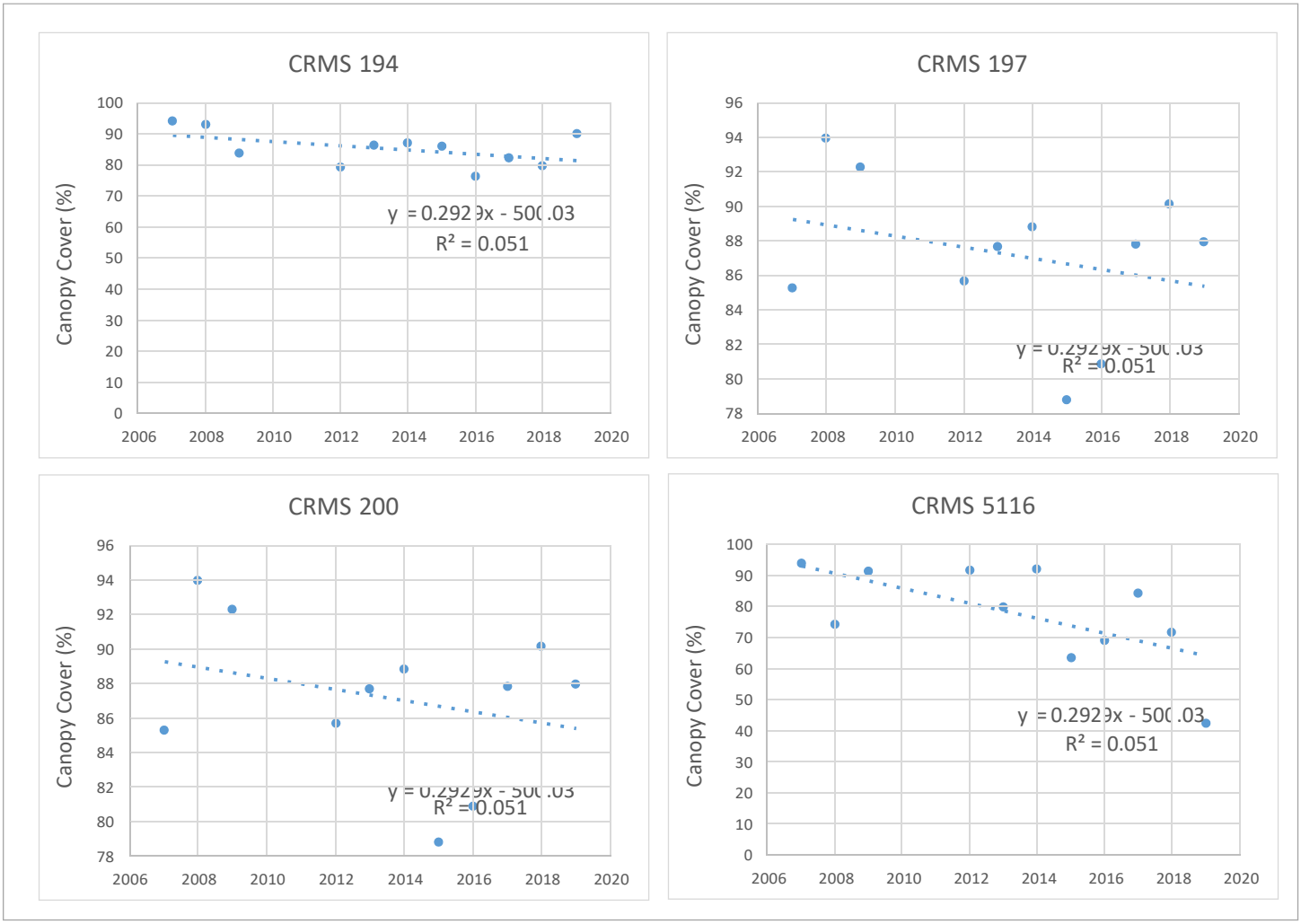
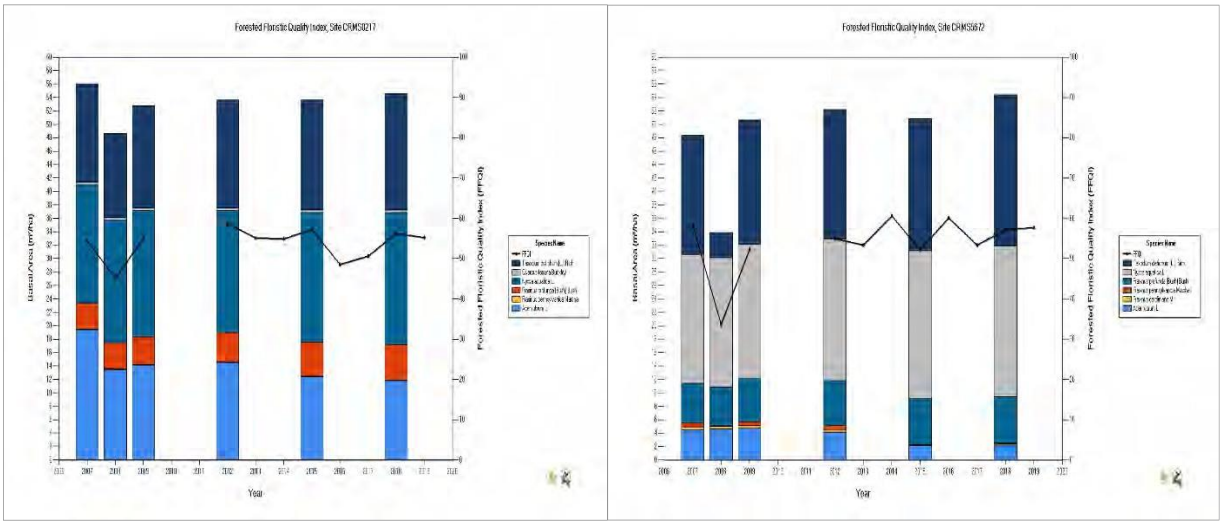


Figure 5. CMRS basal area data by species for swamp stations.



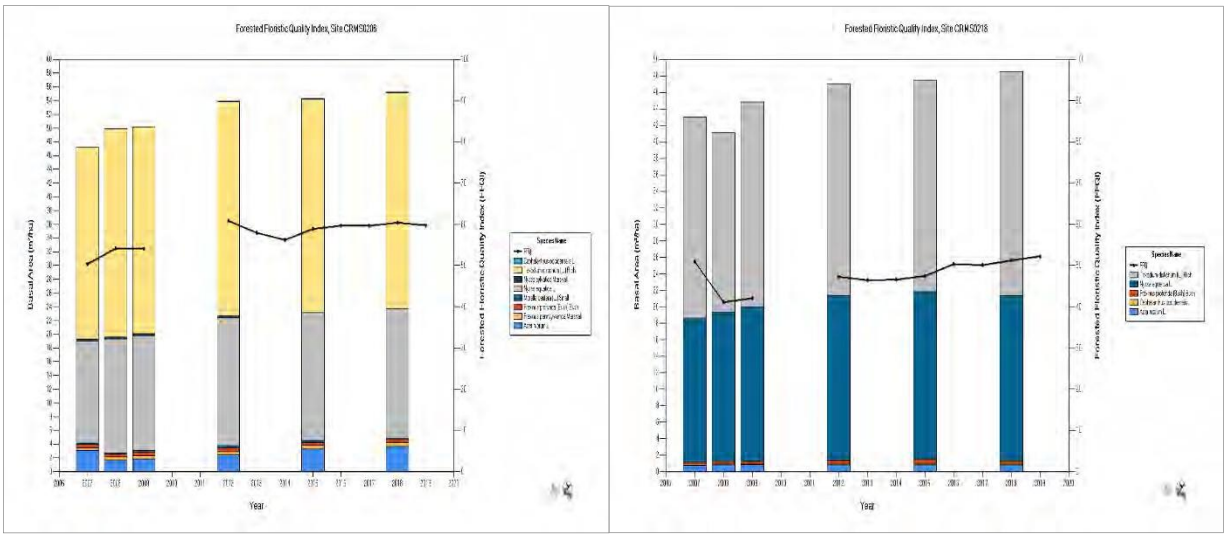
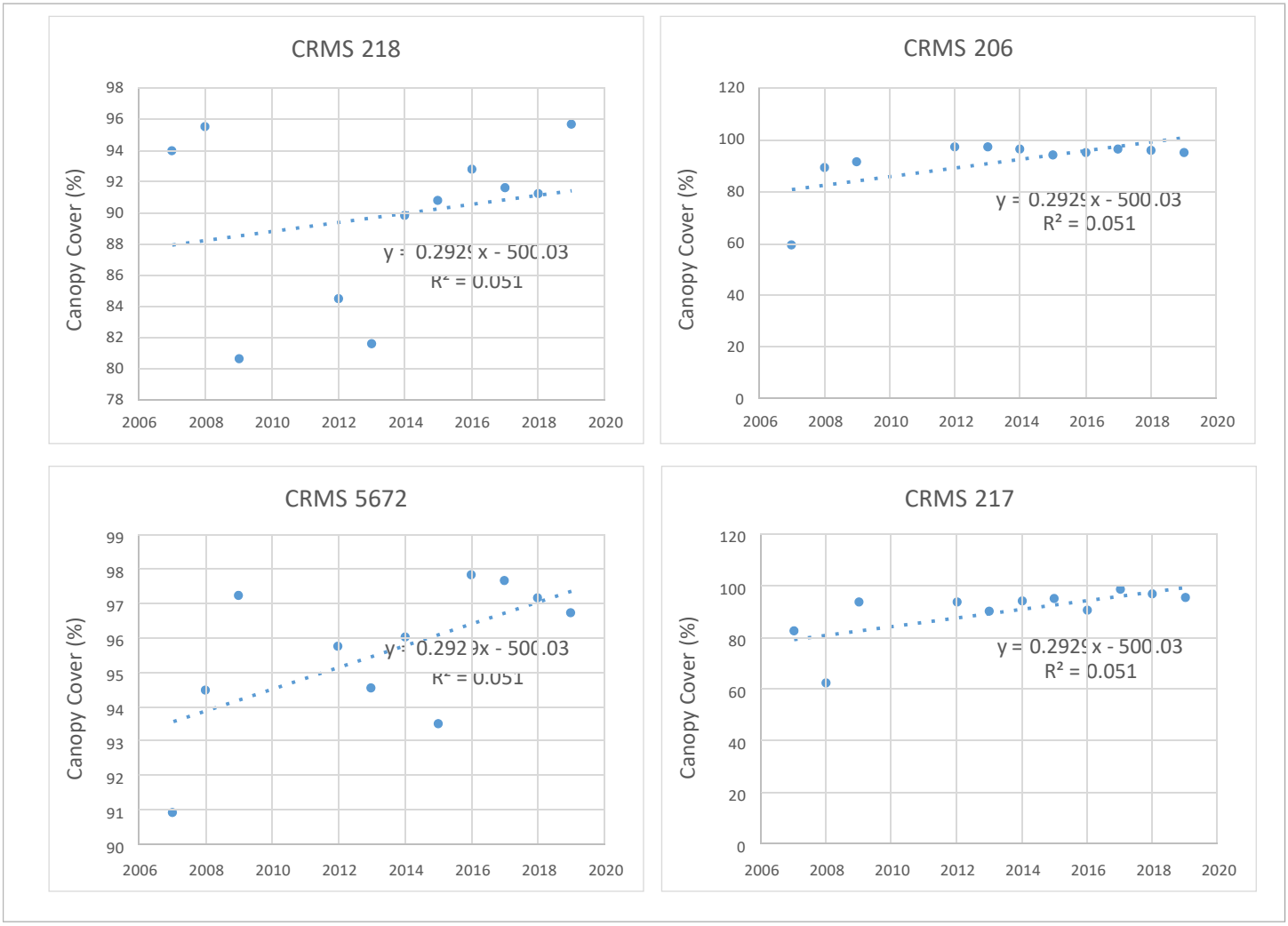
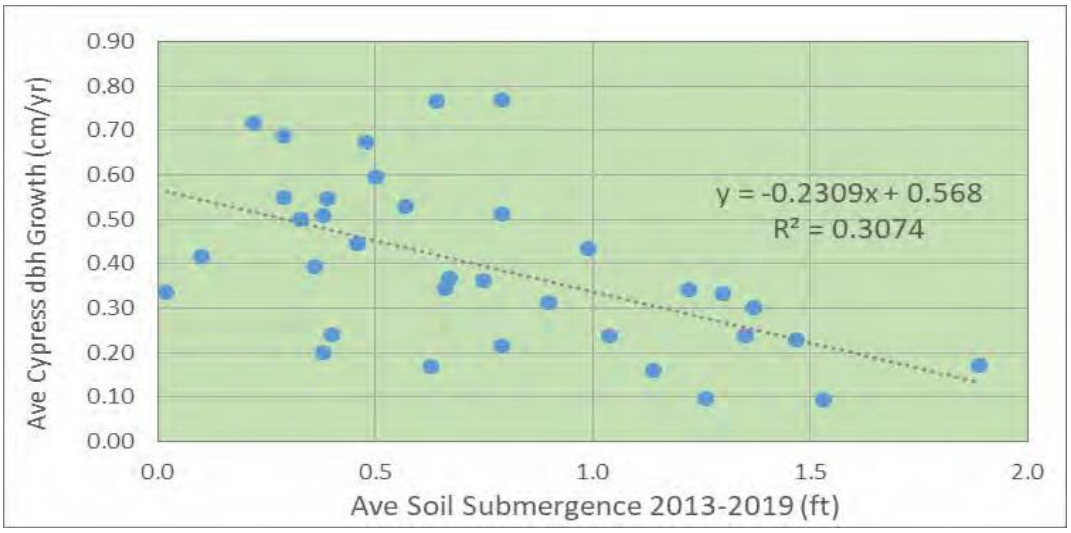


Figure 6. CRMS canopy cover data for swamp stations (2007-2019).



CRMS bald cypress dbh growth rates and mean depth of flooding (2013-2019) were compiled for all trees in the Teche/Vermilion, Terrebonne, Barataria, and Pontchartrain Basins (Atchafalaya Basin dbh growth rates were much higher and likely reflect abundant nutrient and sediment inputs not available to the swamps of the other coastal basins). Although there is a modest degree of variability, the dbh growth rates were found to decrease with increasing mean flooding depth (Figure 7). This relationship was derived from swamps isolated from riverine inputs. Therefore it would not apply to swamps benefitted by riverine freshwater/sediment re-introduction projects which would increase flooding depths but also provide freshwater, nutrients, sediments, and would flush photoxins out of the system. Where non-diversion activities would increase water depths, one could expect that those activities would decrease dbh growth rates of cypress and other trees. Under without-project conditions, increased water depths and stagnant conditions may increase mortality rates of cypress and other tree species (without increases in salinity).

Figure 7. Relationship between CRMS bald cypress dbh growth vs flooding depth.



Future With Project Forested Weltand Impacts

Water elevation data from the four CMRS swamp stations indicates that the average without-project water level decrease rate is 0.06 ft/day. At this rate, a 1.0 foot stage increase would dissipate in 17 days provided there was no additional rainfall. If the proposed Bayou des Allemands floodgate does not drain the protected area as efficiently as under without-project conditions, the flooding duration following heavy rainfall events would increase. The impacts of reduced drainage efficiency would be greatest during heavy rainfall years.

Assuming that the rainfall events occur randomly, a random number routine was developed to assess daily probabilities of occurrence. The 2-yr and 5-yr events were found to occasionally occur twice in one year. Similarly, 50-yr and 100-yr events may occur twice within the 50-year project life. Should multiple large events occur in one year, or should they occur in consecutive

years, the inundation impacts would likely be more severe than if those events were more widely spaced. Additionally, when these events occur during the growing season, they are likely more harmful to forest health than when outside the growing season. To assess the impacts associated with project-induced hydrology alternations, additional hydrologic modeling work is needed to better assess the spatial extent of with-project stage increases, and the duration and magnitude of those stage increases.

Given that heavy rainfall events often occur apart from tropical storm events, modeling of non-tropical storm rainfall events is needed when the floodgates are open to maintain drainage. Rather than model all possible rainfall events, the 2-yr and 50-yr events could be initially run. Daily water surface elevation across the model grid should be provided until the water surface elevation equals the pre-rainfall level for both with-project (gates open) and with-out project. If those runs show prolonged with-project elevated stages, then other rainfall events may need to be run.

Alternatively, the 50-yr event could be run with auxillary gates in the Bayou des Allemands floodgate to improve drainage efficiency. Model runs would be used to size those auxillary gates such that with-project water surface elevations are not higher than with-out project water surface elevations. Because several 2,000 cfs Mississippi River re-introduction projects have been proposed as a means of restoring degraded swamps in the upper Barataria Basin, we would encourage the inclusion of auxillary gates to provide sufficient drainage capacity for both discharge of rainfall and diverted river water.

Project area with-project water level should also be modeled during storm events. Under such events, gate closures would preclude entry of the tidal surge, but gate closures would also preclude drainage of rainfall. Modeling results are needed to determine the net effect on protected area water surface elevations both with and without storm surge levee overtopping. The models should be run long enough to capture the return to normal water levels, or to the point when the with-project water surface elevation once again equals that of the with-out project water surface elevation (with floodgates open).

Recommended modeling is summarized below:

1. Non-tropical storm 50-yr and 2-yr rainfall events.
   Provide daily water surface elevations for both with-project (gates open) and without-project. Models should be run until the with-project water surface elevation once again equals that of the without-project water surface elevation.

2. Tropical storm events with and without overtopping.
   Provide daily water surface elevations with-project and without-project, following the storm event or until interior water surface elevation once again equals with-out project water elevation under open-gate conditions.

To avoid with-project hydrology impacts to increasingly scarce coastal forested wetlands and the fish and wildlife resources they provide, the Service recommends that the design of the Bayou

des Allemands floodgate be modified to include auxillary gates to maintain or improve drainage of the protected area. Hydrologic modeling should be used to determine the size of the auxillary gates needed to avoid a with-project stage increase following heavy rainfall events. Failing that, additional hydrologic modeling will likely be needed to assess the extent of project impacts on the enclosed forested wetlands.

We look forward to assisting the Corps in the review of modeling output and possible modification of project water control structures to avoid impacts to forested wetlands and associated Federal trust resources. Should you have any questions regarding our comments, please contact Ronny Paille (337/291-3117) of this office.

Sincerely,

Joseph A. Ranson
Field Supervisor
Louisiana Ecological Services Office

cc: NMFS, Baton Rouge, LA
EPA, Dallas, TX
NRCS, Alexandria, LA
LDWF, Baton Rouge, LA
LA DNR, Baton Rouge, LA
CPRA, Baton Rouge, LA

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506

November 18, 2020

Mr. Kevin Harper
U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans, LA 70118-3651

Dear Mr. Harper:

Please reference the recently submitted Biological Assessment (BA) on the Upper Barataria Basin Risk Management Feasibility Study. In that BA, it is determined that the proposed measures, consisting of structural flood risk reduction measures, would be "Not Likely to Adversely Affect" the West Indian manatee, the eastern black rail, and the pallid sturgeon and its critical habitat.

The Service concurs with the not likely to adversely affect determinations. The Service recommends that the (your agency) contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

If you have any further questions, please contact Mr. Ronny Paille of this office (337-291-3117).

Sincerely,

Joseph A. Ranson
Field Supervisor
Louisiana Ecological Services Office

Biological Assessment
Upper Barataria Basin, Louisiana Feasibility Study with Integrated Environmental Impact Statement

Project Description

The proposed action is a structural alignment constructed to a 1 percent AEP (100-year future design) and totaling a little over 161,300 feet (30.6 miles) in length. The system starts in Luling where it connects the Mississippi River Levee through the Davis Pond Diversion Structure West Guide Levee. Continuing south, the proposed action improves upon and updates deficiencies in the St. Charles Parish Levee, crosses Bayou Des Allemands with a 270-feet barge gate structure, and continues parallel to US Highway 90 before it ties into high ground across the Barataria Basin near Raceland. The proposed levee is designed to HSDRRS specifications with a 1V:4H and a 10 foot crown, with multiple levee lifts authorized over the initial 50 years. Reaches A-H are shown in Figure 1. The smaller structures along the alignment were captured in the detailed map in Figure 2 and Figure 3.

Borrow material for construction is proposed to come from sites estimated to be within 15 miles of where US Highway 90 crosses Bayou Des Allemands. Existing Government borrow sites were not available within the designated distance. Potential borrow sites on farm lands (avoiding swamp and marsh lands) were identified in Raceland and can be seen in Figure 4. A total of 5,200,400 cubic yards of soil is needed for the first lift in 2026 and a grand total of 8,812,700 cubic yards is needed over the entire authorized 50 year period to sustain the 1 percent AEP design elevations out to year 2076. It was assumed that 10-15 feet of usable material could be found in these sites. The borrow pit needed for the quantity of soil would be approximately 500 acres.

List of structures associated with Figures 2 and 3:

1. River Road crossing ramp
2. Union Pacific Railroad crossing
3. BNSF Railroad crossing
4. US Highway 90 Crossing Ramp
5. Davis Pond Pump Station frontage protection
6. Willowdale Pump Station, two new tidal exchange structures
7. Willowridge Pump Station frontage protection
8. Cousins Pump Station frontage Protection
9. T-wall section for East Gas Pipeline
10. Kellogg Pump Station frontage protection
11. T-wall section for West Gas Pipeline
12. Ellington Pump Station Frontage Protection
13. T-wall section for Magnolia Pipeline
14. Magnolia Ridge Pump Station Frontage Protection
15. Existing Paradise Control Structure

16. Floodwall section in Hydraulic Reach D TOW El. 15.0
17. Floodwall section in Hydraulic Reach E TOW El. 18.5
    a. Floodwall type T-1 TOW El. 18.5
    b. Floodwall type T-2 TOW El. 18.5
    c. Floodwall type T-3 TOW El. 18.5
18. 45 foot Highway 306 (Bayou Gauche) Roller Gate TOW El. 18.5
19. Crawford Canal P.S. Fronting Protection TOW El 18.5 (50 LF of wall)
20. 270 foot Barge Gate crossing Bayou Des Allemands TOW El. 18.5
21. Environmental structures on either side of the Bayou Des Allemands Barge Gate, 12-15 X 20 foot box culverts with sluice gates
22. Godchaux Canal Bridge TOW El. 9.5
23. Drainage Structure – 4-6 X 6 foot RC box culverts with sluice gates in 3 locations
24. Drainage Structure – 4-6 X 6 foot RC box culverts with sluice gates
25. Drainage Structure – 4-6 X 6 foot RC box culverts with sluice gates
26. Drainage Structure – 2-84 inch RCP culverts with sluice gates
27. Drainage Structure – 1-60 inch RCP culvert with sluice gates
28. T-wall section, Enterprise and Shell Pipeline Crossing (Davis Pond Crossing #1)
29. T-wall section, Bridgeline Enlink Pipeline Crossing (Davis Pond Crossing #2)

Note: Screens are not being implemented in culverts with sluice gates.

Proposed Design for Construction by Reach

All listed access routes to access reaches A-H would have a 40 feet path width. There is a designated staging and access route for each reach listed below. The staging area totals approximately 20 acres and the access routes total approximately 40 acres. Table 6.1 provides all details of footprint width and ROW required to construct the proposed alignment. Also, note that the term frontage protection at existing pump stations entail T-walls with the pump outlet pipes going through the wall, pipe supports, and riprap.

Table 1. Earthen Levee Footprint Widths

	Existing Levee	2026 Construction		Final Lift Construction	
Reach	**Levee including ROW (ft)**	**Toe-To-Toe (ft)**	**Levee including ROW (ft)**	**Toe-To-Toe (ft)**	**Levee including ROW (ft)**
A, Davis Pond	285	125	190	173	238
A	100	125	190	236	301
B	100	125	190	236	301
C	100	125	190	236	301
D	100	125	190	173	238
E	75	122	187	244	309
F	130	169	234	244	309
G	0	170	250	170	250
H	0	170	250	170	250

Reach A

Reach A begins at the Mississippi River levee and extends approximately 24,700 feet south. The proposed earthen levee, with a centerline shifted away from the canals, would build off the existing Davis Pond West Guide Levee and the existing St. Charles Levee. All of the existing levee footprints, including ROW, would be incorporated into the proposed levee design.

From the Mississippi River Levee, the alignment continues south where it crosses River Road, the Union Pacific Rail Road track, the BNSF Rail Road track, and US Highway 90. Ramps would be constructed for the River Road and US Highway crossings and 2 railway gates would be constructed where the Union Pacific Rail Road track and the BNSF Rail Road track cross the alignment. Continuing south, the existing Davis Pond pump station would receive new frontage protection. At the Willowdale Pump Station, two existing tidal exchange structures, located on either side of the structure, would need to be replaced. New T-wall sections, one measuring 152 feet and one measuring 298 feet, would be constructed to allow the Enterprise/Shell Pipeline and the Bridgeline Enlink Pipeline to pass through the levee alignment without impacting the integrity of the alignment.

Approximately 11,000 feet from the Mississippi River Levee, along the Davis Pond Diversion West Guide Levee, the alignment then turns into the St. Charles Parish Levee which would be elevated with the centerline being shifted away from the canal.

Reach A would be accessed from US Highway 90 to Willowdale Boulevard and then to Lafayette Drive. Three staging areas are proposed for use during the construction of the alignment and structures within Reach A. The first staging area is located off Willowdale Boulevard and measures approximately 0.7 acres in size. A second staging area, approximately one (1) acre in size is located along Willowdale Boulevard, and the third staging area, approximately one (1) acre in size is located next to River Road. Staging area 3 would be utilized for construction of the ramp over the levee for River Road and the 2 Railroad roller gate structures (Union Pacific to the north and the BNSF to the south). Refer to Figure 6-4 for the locations of the staging areas.

Reach B

Reach B begins at Willowdale Pump Station and measures approximately 17,100 feet in length. The proposed new construction centerline of Reach B would be shifted away from the existing canal, similar to Reach A. All of the existing levee footprint, including ROW, has been incorporated into the proposed levee design.

Continuing southwest from the Willowdale Pump Station, along the St. Charles Parish Levee, frontage protection would be needed at the Willowridge, Kellogg and Cousins pump stations. Due to the design elevation requirements, T-wall sections would be constructed in order to accommodate both the East Gas Pipeline and the West Gas Pipeline. The T-wall would allow the gas pipelines to pass through the alignment while maintaining the integrity of the alignment.

Reach B would be accessed from the same access route outlined in Reach A. A second access route for Reach B would be from US Highway 90 to River Ridge Drive and then to Primrose Street. There is one approximately one (1) acre staging area, located off Lafayette Drive, next to the alignment, proposed for Reach B. Please reference Figure 6 for access and staging areas.

Reach C

Reach C begins at the Ellington Pump Station, and measures approximately 22,600 feet in length and continues to elevate the St. Charles Levee. The proposed new centerline of Reach C would be shifted away from the existing canal similar to previously defined Reaches A and B. All of the existing levee footprint, including ROW, has been incorporated into the proposed levee design.

Continuing from the Ellington Pump Station, along the St. Charles Parish Levee footprint, the levee alignment turns back south along the St. Charles Parish Levee. Fronting protection would be placed at the Ellington Pump Station and a new T-wall section, measuring approximately, 135 feet would be constructed to allow the Magnolia pipeline to pass through the levee alignment without impacting the integrity of the alignment.

Reach C would be accessed from US Highway 90 and then to Magnolia Ridge Road. The proposed staging area for Reach C would be located off Magnolia Ridge Road and would be approximately 1.6 acres in size. Please reference Figure 7 for access and staging areas.

Reach D

Reach D begins just south of the Paradise Control Structure at the end of Reach C, and measures approximately 19,000 feet in length. This reach would be constructed atop the existing Sunset Levee. The proposed new centerline of Reach D continues south and would be shifted away from the existing canal similar to previously discussed reaches. All of the existing levee footprint, including ROW, has been incorporated into the proposed levee design.

Within Reach D there is one section of T-wall, measuring approximately 2,700 feet which would be constructed in order to avoid existing houses and utilities along the levee alignment. The T-wall would have a 10 feet base slab, with an 80 feet construction easement, and an elevation of 15 feet. The T-wall would be constructed via the right of way from the land side.

Reach D would be accessed from Bayou Gauche Road (Highway 306) and then to Grand Bayou Road using a 1,527 feet long temporary access route. The 40 feet across access road would be constructed using crushed stone for the road surface that cuts across a local field to the alignment. The proposed staging area for Reach D would be located off of Grand Bayou Road and is approximately 2.2 acres in size. Please reference Figure 8 for the staging area and access route.

Reach E

Reach E begins just south of Grand Bayou Road and is a combination of earthen levee and floodwalls which total approximately 14,600 feet. The earthen levee portion measures approximately 3,340 feet in length while the floodwall section measures approximately 11,230 feet in length. The earthen levee portion of the reach would be constructed atop the existing Sunset Levee, with a newly proposed centerline shifted away from the existing canal, similar to previously defined reaches, All of the existing levee footprint, including ROW, have been incorporated into the proposed levee design.

Due to the minimal room for construction between the canal and the existing structures along the canal, the proposed floodwall portion (T-wall design) would be constructed to an elevation of 18.5 feet with a 10-20 feet wide concrete slab at the base. Within the T-wall section, where the alignment crosses highway 306, a roller gate would be constructed in the alignment. This roller gate would remain open during normal day to day operations and would only be closed proceeding a hurricane or tropical storm even. A 400 foot section of T-wall will also be needed for a pipeline crossing just west of the Crawford Canal where Reach E ties into Reach F.

Reach E would be accessed directly from Bayou Gauche Road with a proposed, approximately 2 acre staging area also located off of Bayou Gauche Road. Reference Figure 9 for the access route and staging area location. A new access route would be constructed for the community outside the system at the end of Badeaux Lane because the floodwall cuts off access to the community. The permanent route would go from highway 306, just outside the T-wall, and allow access to the community with a 30 feet wide road.

Reach F

Reach F begins just past the Crawford Canal Pump Station and measures approximately 15,400 feet in length. This reach would be constructed atop the existing Sunset Levee. The newly proposed centerline of Reach F continues south and would be shifted away from the bayou similar to previously defined reaches. All of the existing levee footprint of the Sunset Levee, including ROW, would be incorporated into the proposed levee design.

Reach F consists of mostly earthen levee and includes a 270 feet barge gate structure and culverts with sluice gates (Figures 10 through 12). The barge gate would be constructed across the Bayou Des Allemands crossing and would incorporate (6)15 feet X 20 feet box culverts on each side of the gate for a total of twelve culverts with sluice gates (no screens on the culverts). The channel where the structure would be placed would require dredging in order to achieve a sill depth around negative 14-19 feet.

Access for Reach F would be via an approximately 4,575 linear foot temporary crushed stone access route, 40 feet wide, constructed from the end of Down the Bayou Road to the barge gate crossing on top of the existing Sunset Levee. Access to this route will be via US Highway 90 to the eastern side of Bayou Des Allemands via Down the Bayou Road near the proposed barge gate placement site. The temporary access road would

be removed and the area returned to pre-construction conditions once construction has been completed.

Reach F has two proposed staging areas. The first one is located west of the Crawford Canal Pump Station with a second proposed staging area located on the east bank of Bayou Des Allemands where the alignment crosses the bayou. Both proposed staging areas are approximately 2.2 acres in size. Please reference Figure 13 for the locations of the staging and access routes.

Reach G

Reach G begins on the southern bank of Petit Lac Des Allemands and continues parallel to US Highway 90 through the marsh. Reach G measures approximately 31,000 feet in length and there are currently no existing levees located in this reach. Refer to Appendix A for this sections cross-sectional drawings for this new construction. Geotechnical fabric has been incorporated into the levee design to reduce the footprint in this reach.

The proposed action for Reach G includes construction of a new levee which would parallel US Highway 90 through the marsh. The newly constructed levee would incorporate five sets of culverts, 4-6 X 6 foot box culverts with sluice gates (no screens), which are needed to maintain the hydraulic flows in and out of the marsh (through small tributaries and oil and gas line canals) on the southern side of the alignment.

Access to Reach G would be from U.S. Highway 90 via a newly constructed permanent access route just southwest of Dufrene Ponds. The new access road would measure approximately 7,925 feet in length and would be surfaced with crushed stone. The access road includes construction of a permanent bridge across the Godchaux canal in order to gain access to the alignment for construction and future operation and maintenance. The proposed staging area for Reach G, approximately 2.3 acres in size, would be located on the north-east corner of where the Godchaux Canal and the access route intersect. Reference Figure 6-10 for the access route and staging area locations. These structures would be constructed using the temporary access route located along the alignment within the right of way. Refer to Figure 14 for the locations of these hydraulic structures.

Reach H

Reach H begins where Gibbons Road meets the alignment and continues to parallel US Highway 90 through the marsh and follow next to Amarada Hess Rd. Reach H measures approximately 16,900 feet in length and there is currently no existing levee in place. Geotechnical fabric has been incorporated into the levee design to reduce the footprint in this reach.

The proposed construction for Reach H includes construction of a new levee which would parallel US Highway 90 through the marsh. The newly constructed levee would incorporate two sets of culverts for hydraulic exchange from the north to the south of the alignment. These are 2-84 inch in diameter culverts with sluice gates and a 1-60 inch in diameter culvert with sluice gate (no screens).

Reach H and a portion of G would be accessed using Amarada Hess Rd. For access along the project site, it is assumed access would be for the length of the reach, a 40 feet wide access road positioned at least 15 feet from the levee toe is proposed. A two acre staging area is proposed along the intersection of highway 308 and Amarada Hess Rd. Reference Figure 15 for the locations of the staging area. These structures would be constructed using the temporary access route located along the alignment within the right of way.

Description of Proposed Action Requiring Consultation

Implementation of the proposed action would result in direct, permanent impacts to approximately 725 acres of wetlands in Reaches A through H during initial construction (the first levee lift) of the levees and floodwalls, which would occur in the year 2026. A second levee lift for reaches A, B, C, D, F, AR, and G, which is required to reach the 100 year level of protection, would result in direct, permanent impacts to approximately 344 additional acres. A third and final lift for Reach E would impact approximately another 5 acres. Although there is currently no estimated schedule for the second and third lifts, constructed in its entirety, the proposed action would impact a total of approximately 1,074 acres. Of the approximately 1,074 acres of impact associated with the proposed action, there would be approximately 292 acres of bottomland hardwood forest (BLH) impacts, 168 acres of cypress-tupelo swamp impacts, 267 acres of swamp impacts, and 95 acres of water bottom impacts as a result of construction. BLH impacts would occur within the forced drainage area of the Sunset Drainage District. A small acreage of the Paradis Mitigation Bank, located within that forced drainage district, would be impacted. Swamp and BLH on the flood side of the St. Charles levee would also be impacted.

Marsh impacts would occur primarily southwest of Bayou Des Allemands where a new levee would be constructed across the marsh. Small amounts of fresh marsh impacts would occur along the St. Charles levee, where inundation has converted former BLH to marsh.

Action Area

The project is located within the Barataria Basin, an irregularly shaped area located in south-central Louisiana. (Figure 17) It is bounded on the north and east by the Mississippi River, on the south by the Gulf of Mexico, and on the west by Bayou Lafourche. The basin itself encompasses approximately 1,565,000 acres and contains approximately 152,120 acres of swamp, 173,320 acres of fresh marsh, 59,490 acres of intermediate marsh, 102,720 acres of brackish marsh, and 133,600 acres of saline marsh. The study area (upper portion of the basin) covers 800 square miles within the basin and covers multiple parishes in Louisiana including, Assumption, Ascension, St. James, Lafourche, St. John the Baptist, St. Charles, Jefferson, Plaquemines, and Orleans. It is also divided into nine subbasins: Fastlands, Des Allemands, Salvador, Central Marsh, Grande Cheniere, L'Ours, North Bay, Bay, and Empire.

Species Considered and Critical Habitat

MVN has assessed the environmental impacts of the proposed action on threatened and endangered species in the project vicinity. There are two threatened or endangered species and three at-risk species that are known to occur within the study area. Information regarding those species and their preferred habitats are provided below.

West Indian Manatee (*Trichechus manatus*)

The West Indian manatee is one of the largest coastal mammals in North America. Manatees are classified as a marine species but they require access to deep water and freshwater, and thus can be found in inland rivers, coastal estuaries, seagrass beds, and marinas (Marmontel et al., 1997). Preferred habitats include areas near the shore featuring underwater vegetation like seagrass and eelgrass.

Based on data maintained by the Louisiana Natural Heritage Program (LNHP), over 80 percent of reported manatee sightings (1999-2011) in Louisiana have occurred from the months of June through December. Manatee occurrences in Louisiana appear to be increasing and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of southeastern Louisiana. Manatees range widely in between fresh, brackish, and marine waters throughout the Gulf of Mexico, Caribbean, and South America. They are known to regularly occur in Lakes Pontchartrain and Maurepas and their associated coastal waters and streams.

Manatees can be found less regularly in other Louisiana coastal areas, most likely while the average water temperature is warm as they are unable to tolerate water temperatures below 68 degrees Fahrenheit for extended periods of time. During the winter months, colder temperatures keep the population concentrated in peninsular Florida. (USFWS) Many manatees rely on the warm water from natural springs and they are known to sometimes congregate in and around water control structures and the warm wastewater discharge of power plants. During the summer, manatees expand their range, and on rare occasions are seen as far north as Massachusetts on the Atlantic coast and as far west as Texas on the Gulf coast.

Cold weather and outbreaks of red tide may adversely affect these animals. However, human activity is the primary cause for declines in species number due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Encounters with recreational and commercial watercraft significantly reduced the population levels of manatees along the Gulf coast and in 1967, the manatee was listed under the Endangered Species Act with critical habitat designated in 1976.

On March 30, 2017, the manatee was reclassified from “endangered” to “threatened” in response to a rebound in population. Manatees are also protected under the Marine Mammal Protection Act, which prohibits the take (i.e., harass, hunt, capture, or kill) of all marine mammals.

During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973.

Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable. We recommend the inclusion of the following measures into construction plans and specifications to minimize potential impacts to manatees in areas where they are potentially present:

- All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). We recommend the following to minimize potential impacts to manatees in areas of their potential presence:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in- water work can resume under careful observation for manatee(s).

- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at “no wake/idle” speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.

- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.

Pallid sturgeon (*Scapirhynchus albus*)

The pallid sturgeon is listed as a federally endangered species. It is an ancient species of fish that requires large, turbid, free-flowing riverine habitat with rocky or sandy substrate. They are usually found on the bottoms of the rivers on sand flats or gravel bars, and appear to prefer areas with strong currents in or near the main channel. The pallid sturgeon is one of the largest and rarest fish in the Mississippi and Missouri River basins. Pallid sturgeon are opportunistic feeders and forage on insects, crustaceans, mollusks, annelids, fish and eggs of other fish. Scant information exists on the range and habitat preferences of pallid sturgeon for this part of the Mississippi River. Most of the collected data is from populations in upper Missouri and other Midwest rivers, as well as the Atchafalaya River in Louisiana, however, it is possible that limited numbers of the species also exist in the Red River.

At-Risk Species

An “at risk species” is defined as those species that are:

1) Proposed for listing under the ESA by the USFWS;
2) Candidates for listing under the ESA, which means the species has a "warranted but precluded 12-month finding"; or
3) Petitioned for listing under the ESA, which means a citizen or group has requested that the USFWS add them to the list of protected species. Petitioned species include those for which the USFWS has made a substantial 90-day finding as well as those that are under review for a 90-day finding.

Discussed below are species currently designated as “at-risk” that may occur within the project area. While not all species identified as at-risk will become ESA listed species, typically their reduced populations warrant their identification and attention in mitigation planning.

Alligator Snapping Turtle (*Macrochelys temminckii*)

The alligator snapping turtle occurs in waterways that drain into the Gulf of Mexico. Although the species range is large, population densities are likely low throughout the range. They occur in various habitats including rivers, oxbows, lakes, and backwater swamps adjacent to large rivers. It is most common in freshwater lakes and bayous, but also found in coastal marshes and sometimes in brackish waters near river mouths. Typical habitat is mud bottomed waterbodies having some aquatic vegetation. The alligator snapping turtle is slow growing and long lived. Sexual maturity is reached at 11 to 13 year of age. Because of this and its low fecundity, loss of breeding females is thought to be the primary threat to the species. Threats include habitat alteration, exploitation by trappers, pollution, and pesticide accumulation (IUCNredlist.org).

Golden-Winged Warbler (*Vermivora chrysoptera*)

The golden-winged warbler breeds in higher elevations of the Appalachian Mountains and northeastern and north-central U.S. with a disjunct population occurring from southeastern Ontario and adjacent Quebec northwest to Minnesota and Manitoba. Wintering populations occur in Central and South America. The loss of wintering habitat in Central and South America and migratory habitat may also contribute to its decline. The golden-winged warbler is also known to hybridize with the blue-winged warbler (*Vermivora cyanoptera*).

This species may be found in forested habitats throughout Louisiana during spring and fall migrations. This imperiled songbird is dependent on forested habitats along the Gulf, including coastal Louisiana, to provide food and water resources before and after trans-Gulf and circum-Gulf migration. Population declines correlate with both loss of habitat owing to succession and reforestation and with expansion of the blue-winged warbler into the breeding range of the golden-winged warbler.

Threatened and Endangered Species

The ESA defines a threatened species as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Threatened species receive protections through separate regulations issued under Section 4(d) of the ESA. Unlike endangered species, when a species is listed as threatened, the prohibitions identified in section 9 of the ESA do not automatically apply to that species. Under section 9 of the ESA, it is illegal to import, export, or take endangered species for any purpose, including commercial activity.

Eastern Black Rail (*Laterallus jamaicensis ssp*.)

The USFWS listed the status of the eastern black rail status as threatened, effective November 9, 2020. A summary of the final report to the LDWF may be found in Appendix C.

The eastern black rail is the smallest of North America's rail species. It has a broad distribution inhabiting higher elevations of tidal marshes and freshwater wetlands throughout the Americas. The eastern black rail breeds from New York to Florida along the Atlantic Coast and in Florida and Texas along the Gulf Coast. There is little known about the spring and fall migration as well as wintering distribution of the eastern black rail, but it has been documented to winter on the Gulf Coast from southeast Texas to Florida.

Winter habitat for the eastern black rail is presumed to be similar to breeding habitat. They are found in a variety of salt, brackish, and freshwater marsh habitats that can be tidally or non-tidally influenced. Plant structure is considered more important than plant species composition in predicting habitat suitability (Flores and Eddleman, 1995). In Louisiana, occurrences have been documented in high brackish marsh vegetated with saltgrass (*Distichlis spicata),* sea oxeye *(Borrichia frutescens)*, gulf cordgrass (*Spartina spartinae*) and saltmeadow cordgrass (*S. patens)* and often interspersed with shrubs such as marsh elder (*Iva frutescens*) or saltbush (*Baccharis hamilifolia*). The high marsh is only inundated during extreme high tide events. In general, the character of the high marsh is a short grassy savannah. It may also occur in working wetland habitats such as rice fields.

Migratory Birds and Other Trust Resources

MVN has assessed the environmental impacts of the proposed action on species found in the project area that are protected under the Marine Mammal Protection Act of 1972, Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act of 1918 (MBTA), and Migratory Bird Conservation Act of 1929.

Bald Eagle (*Haliaeetus leucocephalus*)

The proposed project area may provide nesting habitat for the bald eagle, which was officially removed from the List of Endangered and Threatened Species as of August 8, 2007. However, the bald eagle remains protected under the MBTA and BGEPA. Comprehensive bald eagle survey data have not been collected by the Louisiana Department of Wildlife and Fisheries (LDWF) since 2008, and new active, inactive, or

alternate nests may have been constructed within the proposed project area since that time.

Bald eagles typically nest in large trees located near coastlines, rivers, or lakes that support adequate foraging from October through mid-May. In southeastern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants. Furthermore, bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. Disturbance during these periods may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival.

The USFWS developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf.

Those Guidelines recommend:

(1) Maintaining a specified distance between the activity and the nest (buffer area);
(2) Maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and
(3) Avoiding certain activities during the breeding

Birds

As the study area is located within the Mississippi Flyway, it supports various species of shore birds, wading birds and songbirds and experiences significant seasonal migrations of waterfowl species, which are of particular interest to recreational hunters.

In a recent survey conducted by MVN biologists, the following species were identified as utilizing the shrubs and/or waters adjacent to the proposed project sites: the little blue heron, the great blue heron, green-backed heron, yellow-crowned night heron, black-crowned night heron, great egret, snowy egret, cattle egret, white-faced ibis, white ibis and roseate spoonbill. Mudflats and shallow-water areas provide habitat for numerous species of shorebirds and seabirds. Shorebirds include the killdeer, black-necked stilt, and common snipe. Wading bird nesting colonies may occur within in the study. Other nongame birds such as boat-tailed grackle, red-winged blackbird, northern harrier, bald eagle, belted kingfisher, and sedge wren. Foraging and roosting were the only activities exhibited during the duration of the surveys. Although none of these birds were observed nesting, the potential for nesting and suitable habitat exist within the project area. MVN has determined that, with use of guidelines from USFWS and a nesting bird abatement plan, the proposed action would have no adverse impacts on protected birds.

Conclusion and Determination of Effects

Based on the above information, the MVN has determined that the proposed action are not likely to adversely affect the West Indian manatee or the Pallid Sturgeon or their critical habitat; and would not adversely impact the recently listed Eastern Black Rail or other protected species that could potentially be found in the project area. The project area is outside of those locations the West Indian manatee is known to be found, which includes in Gulf waters along the Louisiana coast, Lake Pontchartrain and the Amite, Tchefuncte, Blind and Tickfaw Rivers. In the event that a manatee would occur in the project area at the time of construction, the manatee best management conditions listed herein should preclude harm to the manatee. The Pallid Sturgeon is a riverine species, however no work will be taking place in the Mississippi River, where the Pallid Sturgeon is known to occur. In Louisiana, the eastern black rail is known to occur in high elevation saltmarshes of Cameron Parish that are located near the Gulf of Mexico shore. Project area marshes are freshwater floating marshes in southeastern Louisiana, and not located near the Gulf shoreline. Additionally, the project area marshes are of low elevation, and may be continuously flooded during the winter months when floating marshes tend to float at lower elevation than during the summer months. Given that these marshes are very dissimilar to the high elevation saltwater marshes were the eastern black rail is known to occur, we have concluded that project construction is not likely to adversely impact the eastern black rail. Please provide your opinion on our determination.

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Preparers

This BA was prepared by Patricia Naquin, U.S. Army Corps of Engineers, Planning Division, Environmental Planning Branch, Coastal Section: CEMVN-PDS-C with assistance from Ronald Paille, U.S. Department of the Interior, Fish and Wildlife Service, Louisiana Ecological Services Office.

DEPARTMENT OF THE ARMY
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October 22, 2021

New Orleans District
Chief of Regional Planning and
Environmental Division South

Ms. Brigette D. Firmin
Louisiana Ecological Services Field Office
U.S. Fish and Wildlife Service
200 Dulles Drive
Lafayette, LA 70506-3006

Dear Ms. Firmin:

On September 3, 2021, the U.S. Army Corps of Engineers, New Orleans District (the District), received the Conditional Final Coordination Act Report from the U.S. Fish and Wildlife Service (USFWS), Louisiana Ecological Services Field Office. The report was in response to the District's request for further review of information provided on August 23, 2021, concerning the Upper Barataria Basin, Louisiana Final Integrated Feasibility Study and Environmental Impact Statement.

We understand that the USFWS is requesting additional hydrologic modeling to verify our current indirect impact analysis. In reviewing hydrologic modeling performed for Upper Barataria Basin, the District determined that our proposed floodgate structure design at Bayou Des Allemands, a 270-foot-wide barge gate and 12 auxiliary drainage gates, would maintain the current flow. However, the District is committed to performing the hydrologic modeling as requested by the USFWS to assess any variation to hydrology as our design effort progresses and would require us to modify our indirect impacts analysis, as appropriate.

Given our commitment to performing the hydraulic modeling, the District requests that the USFWS revise the Conditional Final Coordination Act Report and provide a Final Coordination Act Report for Upper Barataria Basin. We appreciate the USFWS's ongoing coordination with the District to complete this study effort.

My point of contact for this action is Mr. Troy G. Constance, Chief of the Regional Planning and Environmental Division South, New Orleans District, 7400 Leake Avenue, New Orleans, LA 70118-3651, (504) 862-2742, or troy.g.constance@usace.army.mil.

Sincerely,

Diana M. Holland
Major General, U.S. Army
Commandeing

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive.
Lafayette, Louisiana 70506
October 27, 2021

Colonel Stephen Murphy
District Commander
U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans, LA 70118-3651

Dear Colonel Murphy:

The U.S. Fish and Wildlife Service (Service) has prepared this Final Fish and Wildlife Coordination Act Report on the U.S. Army Corps of Engineers' (Corps) Upper Barataria Louisiana Risk Management Feasibility Study. The objectives of that study are to evaluate the feasibility of providing storm surge protection for the communities located within the upper Barataria Basin of Louisiana in Lafourche, Jefferson, St. John the Baptist, St. Charles, St. James, Ascension, and Assumption Parishes. The study area encompasses an extensive complex of coastal wetland forests and marshes within the upper Barataria Basin north of U.S. Highway 90.

This Final Fish and Wildlife Coordination Act Report provides an analysis of fish and wildlife resource impacts associated with the final array of alternatives, including that of the newly developed 100-year storm event protection alternative. This new 100-year event protection alternative has been selected as the Recommended Plan (RP). A robust indirect impact analysis using hydrologic modeling could not be completed during the project's feasibility phase. A rudimentary indirect impact analysis was conducted to evaluate the likelihood of major indirect impacts to enclosed wetlands. That cursory analysis suggests that a with-project water level rise impact to fresh marsh is anticipated and associated marsh impacts were quantified. A robust indirect analysis is needed during the project's post-authorization phase to confirm the assumptions used in the cursory impact assessment. Additionally, impacts to estuarine fisheries access and Essential Fisheries Habitat (EFH) are also cursory and need to be addressed during post-authorization. This Final Fish and Wildlife Coordination Act Report does fulfill the requirements of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) as the final report of the Secretary of the Interior as required by Section 2(b) of the FWCA. When the above mentioned EFH and indirect impact analyses are completed, the Service will submit a revised Final Report, or a supplement to this Final Report of the Secretary of the Interior as required by Section 2(b) of the FWCA.

The Service's February 2021 Draft FWCA Report was provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS). The LDWF did not provide comments on that report. The NMFS provided comments which are contained herein (Appendix A), and the NMFS's recommendations have been incorporated into this Final FWCA Report.

For a description of project area habitat types, associated fish and wildlife resources, methodology, fish and wildlife resource concerns, and literature citations, please reference our April 15, 2020, Planning Aid Report and our November 2019 Draft FWCA Report at the following link: https://www.fws.gov/gisdownloads/R4/Louisiana%20ESO/Paille/.

Description of Alternatives

The final array of alternatives consists of three levee construction alternatives.

Alternative 1: This alternative consists of raising existing forced drainage levees from Paradis to the community of Des Allemands and constructing a new levee segment that would cross the basin from Des Allemands parallel to and south of U.S. Highway 90 and terminate near Raceland on Bayou Lafourche (Figure 1). The levee would be constructed to an elevation of 7.5 feet and would be 18.3 miles in length. A 270-foot-wide barge gate would be installed in Bayou Des Allemands to provide gravity drainage. Borrow would come from nearby farmlands.

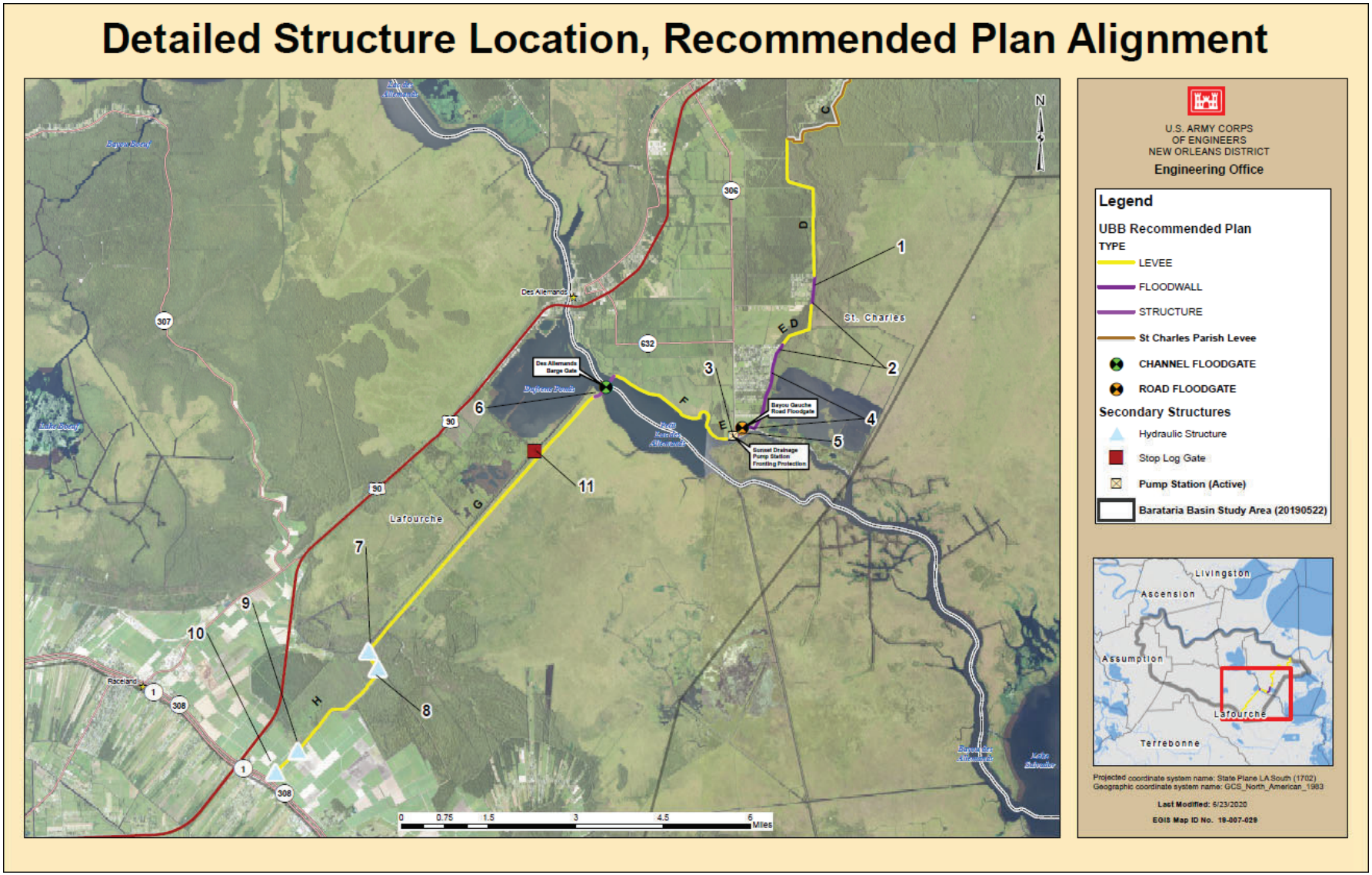
Alternative 2: This alignment incorporates all of the Alternative 1 footprint plus it includes raising the existing St. Charles Parish protection levee that extends northeastward to the Mississippi River at Luling (Figure 2). This alternative would be constructed to an elevation of 8.5 feet and would be 30.4 miles long. A 270-foot-wide barge gate would provide gravity drainage at Bayou Des Allemands. Borrow for levee construction would come from nearby farmlands.

Alternative 3, the 100-year event protection alternative: This alternative occupies generally the same footprint as Alternative 2, but would be constructed to an elevation of 14.5 to 16 feet, and would be up to 170 feet wide in the marshes southwest of Bayou Des Allemands and 260 feet wide along the existing St. Charles levee (Figure 3). A 40-foot-wide right-of-way (ROW) would be established on both sides of the levee footprint in marshes. Where existing local levees would be raised, the ROW is generally located on one side or the other. Most of the levees would be constructed in two lifts, with the second lift occurring roughly during the middle of the 50-year project life. Only the westernmost levee reach (Reach H) would be constructed in one lift. To avoid impacting residential communities located in close proximity to the existing Sunset Drainage District levee, the proposed levee would consist of a sheet pile or T-wall structure. Borrow for levee construction would come from nearby farmlands.

Figure 1. Map illustrating the proposed Alternative 1 levee alignment.

Figure 2. Map illustrating the proposed Alternative 2 levee alignment.

Figure 3. Map of water control structures and other features associated with the RP.



Each of these three alternatives includes a 270-foot-wide barge gate to preclude storm surge flooding within the protected area. The wing walls of that floodgate structure would include 12 auxiliary drainage gates to provide a total cross-sectional area greater than that at the existing railroad crossing located adjacent to the U.S. Highway 90 crossing. The RP also includes two small culvert structures through the levee in Reach G (southwest of Bayou Des Allemands) to maintain water exchange across the marsh. A 45-foot-wide water control structure would also be installed in Bayou Gauche at its junction with Bayou Des Allemands to reduce induced storm surge northward up that bayou (Figure 3).

List of structures associated with Figure 3:

1. Floodwall section in Hydraulic Reach D
2. Floodwall section in Hydraulic Reach D and E
3. Crawford Canal P.S. Fronting Protection
4. Floodwall section in Hydraulic Reach E and F
5. 45–foot-long Bayou Gauche Roller Gate
6. 270–foot-long Barge Gate crossing Bayou Des Allemands
7. Drainage Structure – 4 – 6 X 6 foot RC box culverts with sluice gates
8. Drainage Structure – 4 – 6 X 6 foot RC box culverts with sluice gates
9. Drainage Structure – 2 – 84 inch RCP culverts with sluice gates
10. Drainage Structure – 1 – 60 inch RCP culvert with sluice gates
11. Godchaux Canal Bridge
12. Drainage Structure – 3 – 6 X 6 foot RC box culverts with sluice gates

Right of Way (ROW) impacts

A 40-foot-wide ROW is planned adjacent to the levee toe for equipment access. In marshes, a ROW would be located on both sides of the levee. After construction, the contractor will be required to restore the ROW marshes to pre-construction conditions. In marshes, it was assumed that 20 percent of the ROW would become shrub scrub habitat post-restoration due to resulting higher elevations. Additionally, it is assumed that post-construction ROW restoration would be completed through natural revegetation processes over a 5-year period. In forested areas, the forest would be cleared from the ROW. It is assumed that ROWs would be maintained free of trees, and thus forested ROWs would be permanently impacted.

In addition to ROW impacts, some wetland impacts would also occur due to construction of access roads for equipment and staging areas. The Reach G access road would be permanent, and the Reach G staging area would be restored to marsh after construction of the second lift is completed (marsh ROW restoration assumptions applied). The Reach D access road is assumed to result in a permanent forest impact.

EVALUATION OF ALTERNATIVE PLANS

Fish and wildlife resource impacts were determined for the final array of alternatives using the Corps' provided shapefiles of levee footprints. Acreage of direct wetland construction impacts by habitat type were obtained by overlaying those shapefiles onto 2017 Digital Orthophoto Quarter Quad maps and habitat types were determined from that imagery in combination with field inspections conducted during October 2019 (Table 1). Given schedule constraints, Covid travel limitations, and lack of access to some future impact sites, the habitat type determinations in some areas is tentative. The direct impacts provided below include wetland impacts associated with construction of access roads in reaches D and G and impacts associated with temporary ROWs. The Corps has determined that Alternative 3 is the Recommended Plan (RP). The RP is the most environmentally damaging to fish and wildlife resources that would be affected by the final array of alternatives.

Table 1. Summary of direct impacts by habitat type and levee alternative.

Habitat Type	Alt 1 (acres)	Alt 2 (acres)	TSP (acres)
Bottomland Hardwood Forest	41.68	86.66	291.32
Cypress-Tupelo Swamp	1.04	36.43	167.28
Fresh Marsh	136.54	148.93	266.79
Water Bottoms*	36.71	36.71	36.71
* Conditional number - may be revised			

Bottomland hardwood forest (BLH) impacts would occur within the forced drainage area of the Sunset Drainage District. A small acreage of the Paradis Mitigation Bank located within that forced drainage district would be impacted. Wetlands within the Sunset Drainage District are not exposed to increasing sea level rise effects as are the remaining impact areas. Swamp and BLH on the flood side of the St. Charles levee would also be impacted by Alternatives 2 and 3.

Near the Raceland end of the proposed levee, impacted BLH consists of inundation stressed and stunted red maple. Along portions of the St. Charles levee, BLH is also stressed, but impacts to more healthy BLH stands would also occur there. The inundation stressed BLH could be classified as a Resource Category 3 rather than Category 2. A more thorough field inspection would be needed to consider this change.

Marsh impacts would occur primarily southwest of Bayou Des Allemands where a new levee would be constructed across marsh. Small amounts of fresh marsh impacts would occur along the St. Charles levee where inundation has converted former BLH to marsh. A more detailed breakdown of direct impacts (acres) by location is provided in Appendix A. A summary of direct impacts in AAHUs is provided in Table 2 below with a more detailed breakdown provided in Appendix B.

It is assumed that borrow for levee construction will come from existing agricultural areas. If borrow is taken from forested or wetland areas, additional borrow-related impacts would need to

be quantified. Construction of the RP will impact two established mitigation areas and a conservation area on the flood side of the existing St. Charles Parish levee (Figure 4 and Table 3).

Table 2. Direct impacts in AAHUs by habitat type, alternative, and SLR scenario.*

Habitat Type	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)
Bottomland Hardwood Forest	-16.05	-15.83	-14.80
Cypress-Tupelo Swamp	-0.56	-0.56	-0.56
Fresh Marsh	-63.92	-69.62	-56.35

Habitat Type	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)
Bottomland Hardwood Forest	-25.83	-24.77	-21.28
Cypress-Tupelo Swamp	-24.13	-24.13	-22.05
Fresh Marsh	-69.72	-75.94	-61.45

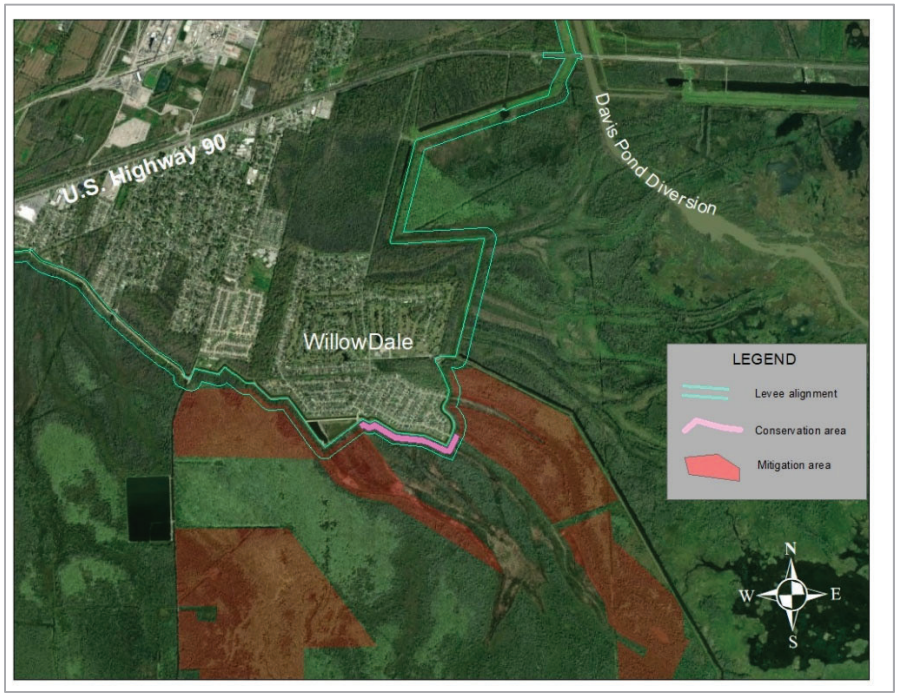
Habitat Type	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
Bottomland Hardwood Forest	-98.34	-94.94	-84.49
Cypress-Tupelo Swamp	-111.59	-111.40	-101.42
Fresh Marsh	-110.66	-119.79	-90.17

* *For waterbottom impacts and total fresh marsh impacts see Table 5.*

Table 3. Direct construction impacts on existing mitigation & conservation areas.

	St. Charles Conservation Area				St. Charles Mitigation Area				Paradis Mitigation Area			
	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs
BLH low quality	0.56	0.72	1.28	-0.10	0.82	10.14	10.96	-1.91	1.61	2.97	4.59	-2.88
BLH med quality	0.75	0.97	1.71	-0.20	0.20	0.76	0.96	-0.26	0	0	0	0
BLH high quality	0	0	0	0	0	0	0	0	0	0	0	0
Swamp	6.51	5.74	12.25	-8.19	0.31	7.06	7.37	-4.93	0	0	0	0
Marsh footprint	2.18	0	2.18	-1.16	0	0	0	0.00	0	0	0	0
Marsh ROW	0.61	0	0.61	-0.20	0.19	0	0.19	-0.07	0	0	0	0

Figure 4. Mitigation and conservation areas near RP Reaches A & B.



Indirect Impacts

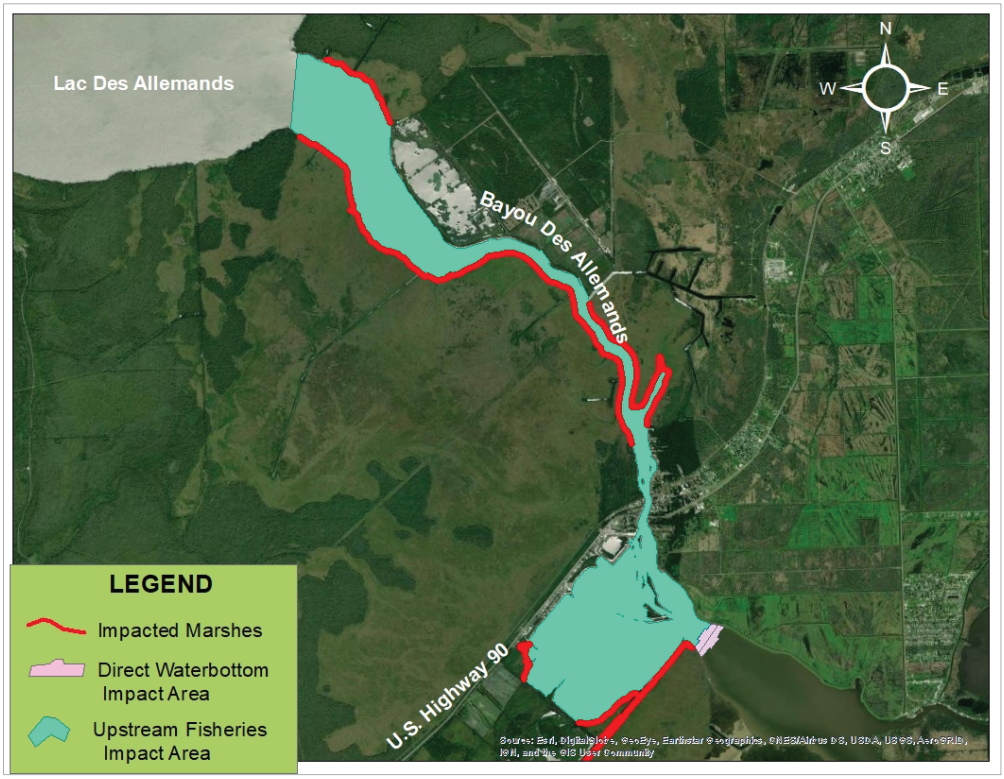
The proposed floodgate across Bayou Des Allemands would have a total cross-sectional area of 5,100 square feet. The upstream channel constriction near the railroad bridge has a cross-sectional area of 7,363 to 8,056 square feet. Relative to the 7,946 square foot cross-section at the railroad bridge, the floodgate provides only 64.2 percent of that cross-sectional area. During periods of heavy rainfall, this channel constriction may reduce drainage efficiency resulting in higher protected-side stages. Upper Barataria Basin forested wetlands are already near or at a permanently inundated condition. Consequently, growth rates of trees in those areas could be further reduced and tree mortality increased should the project cause stage increases of sufficiently long durations. Additionally, marshes suffering from submergence due to subsidence and sea level rise may also be impacted.

Assuming that the with-project water surface elevation decrease rates were only 64.2 percent of the without project rates, with-project average annual stages were found to increase an average of 15.6 mm. This stage increase was added to relative sea level rise increases to estimate increased marsh loss rates. It was assumed that the floating marshes typical of the area would not be impacted by this small stage increase. However, rooted marshes would be impacted. Those rooted marshes were assumed to occur within 200 feet of the shorelines of major water bodies (Figure 5). It was estimated that this 367 acre fresh marsh area would lose roughly 6.1 acres over the 50-year project life. This analysis is a preliminary estimate and is subject to considerable uncertainty. The area of impact is the foremost uncertainty. Floodgate closure triggers and operation plans are also needed to assess effects of storm related closures on hydroperiod within protected areas. The above-described indirect impact assessment is preliminary and should be re-assessed via hydrologic modeling and associated outputs.

Fish Access Impacts

The Bayou Des Allemands floodgate would reduce the channel cross-sectional area and consequently fisheries access to protected side waterbodies and wetlands. The fisheries access impacts were determined via three fresh marsh WVAs in which a V6 structure rating of 0.642 was used instead of the 0.5 rating typical for a passive weir with boat bay structure. The first WVA was that described above for fresh marsh impacts, which included 248 acres of Bayou Des Allemands waterbottoms. The second WVA was an open water WVA consisting of the remaining 2,960 acres of waterbottoms upstream of the floodgate and including the 17-acre loss of EFH (construction impact) on the upstream side of the floodgate. The third WVA was a waterbottom (EFH) assessment of the 19-acre construction impact on the downstream side of the floodgate.

Figure 5. Map of marshes impacted by indirect hydrology effects.



To better assess fish access impacts, floodgate closure triggers and operation plans are also needed to determine effects of floodgate closures. Utilizing the Corps Certified Fresh Marsh WVA Model, preliminary results of the indirect impacts to fresh marsh, fisheries access, and construction related waterbottom (EFH) losses are summarized below (Table 4). The combined direct and indirect project fresh marsh impacts would consist of fresh marsh impacts listed in Table 2 plus that from Table 4 as shown in Table 5.

Table 4. Preliminary indirect impacts (AAHUs) to marsh, fisheries access impacts, and EFH construction impacts.

	Low SLR (AAHUs)	Intermediate SLR (AAHUs)	High SLR (AAHUs)
Indirect marsh impacts[1]	-9.85	-14.19	-8.51
Upstream fisheries access and EFH impacts[2]	-10.40	-10.40	-10.40
Downstream EFH impacts[3]	-1.38	-1.38	-1.37
TOTAL	**-21.63**	**-25.97**	**-20.28**

[1] *Impacts due to floodgate induced elevated stages and reduced fisheries access*

[2] *Impacts due to reduced fisheries access and construction related waterbottom impacts*

[3] *Impacts due to construction related waterbottom impacts*

Table 5. Total project related direct and preliminary indirect fresh marsh impacts.

	Low SLR (AAHUs)	Intermediate SLR (AAHUs)	High SLR (AAHUs)
Fresh marsh direct impacts	-110.66	-119.79	-90.17
Fresh marsh indirect impacts & fish access/EFH impacts	-21.63	-25.97	-20.28
TOTAL	**-132.29**	**-145.76**	**-110.45**

SERVICE POSITION AND RECOMMENDATIONS

Because hydrologic modeling to determine project-induced water level rise upstream of the Bayou Des Allemands floodgate has not been conducted, the total fresh marsh impacts presented above are conditional or preliminary, and will need to be updated once that modeling has been completed. When that modeling has been completed, and information regarding the operation plan for the Bayou Des Allemands floodgate and other project water control structures is available, a revision of this Final Report will be needed so that we can then fulfill our reporting responsibilities under Section 2(b) of the FWCA. Additional Service involvement during the preconstruction engineering and design phase of this project, along with more-definitive project information, will be required so that we can fulfill our responsibilities under the FWCA. Regarding indirect project effects, the Service recommends:

1. The with and with-out project channel cross-sectional area (in square feet) should be provided for all project water control structures to enable assessment of potential structure-related fisheries access impacts.

2. Floodgate operation plans and closure criteria are needed for all actively operated water

control structures to assess impacts to fisheries access and hydrology impacts.

3. For each water control structure, information should be provided regarding how the structure location was selected, why the structure is needed, and how the structure size and type was determined.

4. Hydrologic modeling of stages throughout the wetlands upstream of the Bayou Des Allemands floodgate should be conducted to evaluate the magnitude and spatial extent of with-project water level rise.

5. The Chief of Engineer's Report and subsequent Record of Decision (ROD) document to be prepared should include a Corps of Engineers commitment to conduct the needed hydrologic modeling for determining project indirect hydrology impacts.

6. The project floodgate structures should be designed to handle the discharge associated with the two Mississippi River diversions (identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan) without corresponding wide-scale hydroperiod increases.

Available information indicates that substantial direct wetland losses will result from construction of project features. Consequently, avoidance and minimization of direct wetland impacts should be pursued to the greatest extent practicable. The Service provides the following recommendations to avoid and/or minimize project impacts on fish and wildlife resources and for mitigating unavoidable impacts to those resources:

1. The Corps should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the engineering and design of project features including levees, floodgates, and environmental water control structures to ensure that those features are designed, constructed, and operated consistent with wetland restoration and associated fish and wildlife resource needs.

2. Estimates of all direct and indirect project-related wetland impacts should be refined during the post-authorization phase.

3. To the greatest degree practical, the proposed levees and borrow pits should be located to avoid and minimize direct and indirect impacts to emergent wetlands. Efforts should be made to further reduce those direct impacts by hauling in fill material, using sheetpile for the levee crest, deep soil mixing, or other alternatives.

4. If organic soils must be removed from the construction site, that material should be used to create or restore emergent wetlands to the greatest extent practicable. If that is not practicable, then use of that material to improve borrow pit habitat quality (e.g., construct bank slopes, reduce depths, etc.) should be examined.

5. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

6. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. Surveys prior to construction such be undertaken to ensure no nesting birds are within 1,000 feet of any proposed work. If nesting birds are found within 1,000 feet of any proposed work sites, the Service and the Louisiana Department of Wildlife and Fisheries should be contacted for procedures to avoid impacts.

7. The Service recommends that the Corps contact the Service for additional Endangered Species Act section 7 consultation if: 1) the scope or location of the proposed project is changed significantly; 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

8. Full, in-kind compensation (quantified as AAHUs) should be provided for unavoidable net adverse impacts on forested wetlands, marsh, and associated submerged aquatic vegetation, including any additional losses identified during post-authorization engineering and design studies. To help ensure that the proposed mitigation features meet their goals, the Service provides the following recommendations:

    a. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
    b. Levee construction borrow sites should be designed to avoid and minimize impacts to fish and wildlife habitat; in the event new borrow sites are identified, guidelines for the selection of borrow sites are found in Appendix C.
    c. Mitigation measures should be constructed concurrently with the features that they are mitigating. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.
    d. The Service and other fish and wildlife conservation agencies should be consulted in the development of plans and specifications for all mitigation features and any monitoring and/or adaptive management plans.
    e. To avoid shortfalls in marsh creation acreage, the contractor should be required to guarantee the creation of at least the target acreage of marsh platform, or excess acres should be created.
    f. The acreage of marsh created to mitigate project impacts should meet or exceed the marsh acreage projected by the Habitat Evaluation Team for target year 5.
    g. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
    h. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements. Success requirements are provided in Appendix D.

i. A mitigation 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. See Appendix E for details.

Extensive additional information is needed by the Service to update the preliminary indirect impact assessment to fish and wildlife resources and fulfill our reporting responsibilities under Section 2(b) of the FWCA. Much of that information may not be available until engineering and design of the project features has progressed. To help ensure that sufficient information is provided, the Service recommends that the Corps perform the following tasks during the Preconstruction Engineering and Design phase:

1. Provide additional information on anticipated construction techniques and their associated wetland impacts, such as additional dredging to install floodgates and water control structures, dredging temporary by-pass channels, construction of access roads, staging areas, ROW activities and restoration methods, and the method for disposing organic surface soils that are unsuitable for levee construction.
2. Provide final levee footprint shapefiles and designs for borrow sites used in levee construction.
3. Provide without project Bayou des Allemands cross-sections where the floodgate would be installed.
4. To assess possible indirect project impacts, provide hydrologic model outputs on FWOP and FWP stages within the protected area wetlands following a variety of heavy rainfall events.

Sufficient funding should be provided for full Service participation in the post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the FWCA.

Although information needed to assess fisheries impacts and project-induced hydroperiod impacts will not be available until the Preconstruction Engineering and Design phase is underway, the Service submits this Final Report based on the available information, in combination with Major General Diana Holland's October 22, 2021, letter in which the Corps commits to conduct the remaining impact assessment work and to mitigate all fish and wildlife impacts resulting from project implementation (Appendix G).

We look forward to our continued involvement in this project moving forward. If you or your staff have further questions regarding this report or would like to meet and discuss our recommendations, please contact Mr. Ronny Paille of this office at 337-291-3117.

Sincerely,

Brigette D. Firmin

BRIGETTE FIRMIN

Digitally signed by BRIGETTE FIRMIN
Date: 2021.10.28 08:12:15 -05'00'

Brigette D. Firmin
Acting Field Supervisor
Louisiana Ecological Services Office

cc: EPA, Dallas, TX
NMFS, Baton Rouge, LA
LDWF, Baton Rouge, LA
LDNR, Coastal Management Division, Baton Rouge, LA
OCPR, Baton Rouge, LA

APPENDIX A

LETTER FROM NMFS ON THE FWS' FEBRUARY 2021 FINAL DRAFT COORDINATION ACT REPORT

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

August 24, 2021 F/SER46/JM:bh
225-380-0089

Mr. Ronald Paille, Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Louisiana Ecological Services
200 Dulles Drive
Lafayette, Louisiana 70506

Dear Mr. Paille:

NOAA's National Marine Fisheries Service (NMFS) has received the revised final draft Fish and Wildlife Coordination Act Report (CAR) on the U.S. Army Corps of Engineers' (USACE) Upper Barataria Basin (UBB) Louisiana Risk Management Feasibility Study dated February 19, 2021. The U.S. Fish and Wildlife Service (USFWS) has coordinated closely with NMFS on CAR revisions. The study objectives evaluated the feasibility of providing protection from storm surge and flooding due to heavy rainfall events for the communities located within the UBB of Louisiana in Lafourche, Jefferson, St. John the Baptist, St. Charles, St. James, Ascension, and Assumption Parishes. The following is provided in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.) and 600.920 of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; P.L. 104-297).

The wetlands in the vicinity of the project consist of estuarine emergent fresh marsh. Water bottoms in the project area are composed of a mixture of sand and mud substrates. The proposed project is in an area designated as essential fish habitat (EFH) for various life stages of federally managed species, including red drum, brown shrimp, and white shrimp. The primary categories of EFH, affected by project implementation, are estuarine emergent wetlands, estuarine water column, and estuarine water bottoms. Detailed information on federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council. The generic amendment was prepared as required by the Magnuson-Stevens Act; P.L. 104-297.

In addition to being designated as EFH for various federally managed fishery species, wetlands, and water bottoms in the project area provide nursery and foraging habitats for a variety of economically important marine fishery species such as blue crab, gulf menhaden, Atlantic croaker, southern flounder, bay anchovy, and striped mullet. Some of these species serve as prey for other fish species managed by the Gulf of Mexico Fishery Management Council (e.g., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (e.g., billfishes and sharks). Wetlands in the project area also produce nutrients and detritus, important components of the aquatic food web, which contributes to the overall productivity of the UBB.

The study area encompasses an extensive complex of coastal wetland forests and marshes within the UBB north of U.S. Highway 90. The revised final draft CAR provides an analysis of fish and wildlife resource impacts associated with the final array of alternatives. A newly developed 100 year storm event protection alternative has been selected as the Recommended Plan (RP). The RP is also the most damaging of the alternatives in the final array of alternatives. The CAR stated direct impacts by habitat type and levee alternative for the RP are 291.32 acres of bottomland hardwood (BLH) forest, 167.28 acres of cypress-tupelo swamp, and 266.79 acres of fresh marsh. Marsh impacts would occur primarily southwest of Bayou Des Allemands where a new 14-foot to 16-foot levee elevation would be constructed across marsh and 95 acres of EFH impacts to estuarine water bottoms and estuarine water column associated with dredging activities would occur with the construction of a barge gate with sluice gates. To maintain existing water exchanges and fisheries access, the RP proposes multiple water control structures including a 270-foot barge gate crossing Bayou Des Allemands channel and six screenless culverts with sluice gates positioned on either side of the gate, a 45-foot roller floodgate at Highway 306-Bayou Gauche, and seven culverts with sluice gates at multiple locations. Additionally, fresh marsh impacts would occur along the St. Charles levee where inundation has converted former BLH to marsh. The CAR indicated the indirect impact analysis could not be completed during the project's feasibility phase, hence the impact analysis is incomplete.

The NMFS has reviewed the CAR and finds it to be well written and concurs with its recommendations. Specifically, NMFS agrees with USFWS's nine recommendations related to direct project impacts, three recommendations related to indirect project impacts, and four recommendations requesting USACE provide extensive additional project information. The NMFS is concerned direct and indirect wetland losses from construction of project features and water control structures would adversely impact EFH and associated marine fishery resources by reducing fisheries access and water exchange in the Upper Barataria Basin.

U.S. Fish and Wildlife Service Recommendations
To ensure the conservation of EFH and associated marine fishery resources, NMFS requests expanding the recommendations to include:

1. As required by the Magnuson-Stevens Act, a revised complete EFH assessment should be provided to NMFS to conclude EFH consultation with USACE. The revised assessment should clarify, delineate, and quantify direct and indirect impacts to EFH by habitat type differentiating between the flood side and the protected side of all structures. All activities associated with this project including a description of measures to avoid, minimize, mitigate, or offset the adverse impacts of the proposed activities on EFH should be incorporated.

2. The NMFS is concerned the proposed levee alignment and all gate structures may reduce tidal drainage and exchange in the UBB. Impediments to drainage may increase inundation stress of wetlands and could increase wetland loss. Similarly, impediments to tidal exchange could reduce fisheries access to habitat. Sufficient information should be provided to assess impacts to fisheries access and water exchanges in UBB from construction of levees and water control structures. All structures (e.g., channel barge floodgate, roller floodgate, and culverts with sluice gates) should remain open and operation plans should be provided. The operational plan for these structures should

include triggers for gate closures (e.g., named storm events in the Gulf of Mexico, fixed water level elevations, crest setting, estimated frequency of closures, etc.). The USACE should also provide a reference to the specific flood protection authorization and hydrological modeling results for all structures justifying: (1) how particular locations were selected for each structure, (2) why each structure is needed, and (3) how the size and type of each structure was determined.

3. Given the indirect impacts assessment is incomplete, NMFS supports the future completion of this assessment in the post-authorization engineering and design phase to evaluate EFH impacts by hydrologic modeling outputs on future without project and future with project stages within the protected area wetlands following a variety of heavy rainfall events.

4. The USACE should develop, in coordination with NMFS, a mitigation and monitoring plan which fully compensates for all direct and indirect EFH impacts. To avoid additional mitigation for temporal impacts, the NMFS recommends implementation of the mitigation plan concurrent with the construction of the development. The quantity of EFH to be impacted should be clarified to inform determination of mitigation. Specifically, a functional assessment should be used to evaluate the compensatory mitigation requirements for unavoidable impacts to wetlands and water bottoms. Therefore when this information becomes available, we recommend the CAR be revised to include the final mitigation analysis and approximate total acres and AAHU's of impacts to fresh marsh and estuarine water bottoms. Open water impacts should also be included among the habitat types requiring mitigation. The USACE should: (1) refine the final assessment of EFH impacts by habitat type, (2) provide the information required to conduct a final Wetland Value Assessment (WVA), (3) provide the types of mitigation required, and (4) provide the final project design. Estimates of all direct and indirect project related impacts to tidally influenced habitat should be refined for inclusion in the project's final CAR.

The NMFS involvement is recommended during the preconstruction engineering and design phase of this project. The USACE should provide the specific information requested in the CAR to assess the potential impacts to EFH from proposed project features. The USACE should provide results from assessments to mitigate for any potentially induced flooding internally and externally to the levee alignment due to heavy rainfall events and high tides. The NMFS looks forward to coordination with USFWS for evaluation of the project's impacts via a functional assessment using WVA methodology.

We appreciate your consideration of our comments. If you wish to discuss this project further or have questions concerning our recommendations, please contact January Murray at (225) 380-0089, or by email at January.Murray@noaa.gov.

Sincerely,

Rusty Swafford
Acting Assistant Regional Administrator
Habitat Conservation Division

c:
USACE, New Orleans, Naquin
USFWS, Lafayette, Paille
F/SER46, Howard
F/SER4, Dale
F/SER1, Silverman
Files

APPENDIX B

DIRECT CONSTRUCTION IMPACTS

Acres of direct wetland impacts are listed below by four regions (see Figures A1, A2, A3). The Sunset Drainage District region is divided by Louisiana Highway 306 into an eastern and western region.

Figure A1. West of Bayou Des Allemands region.

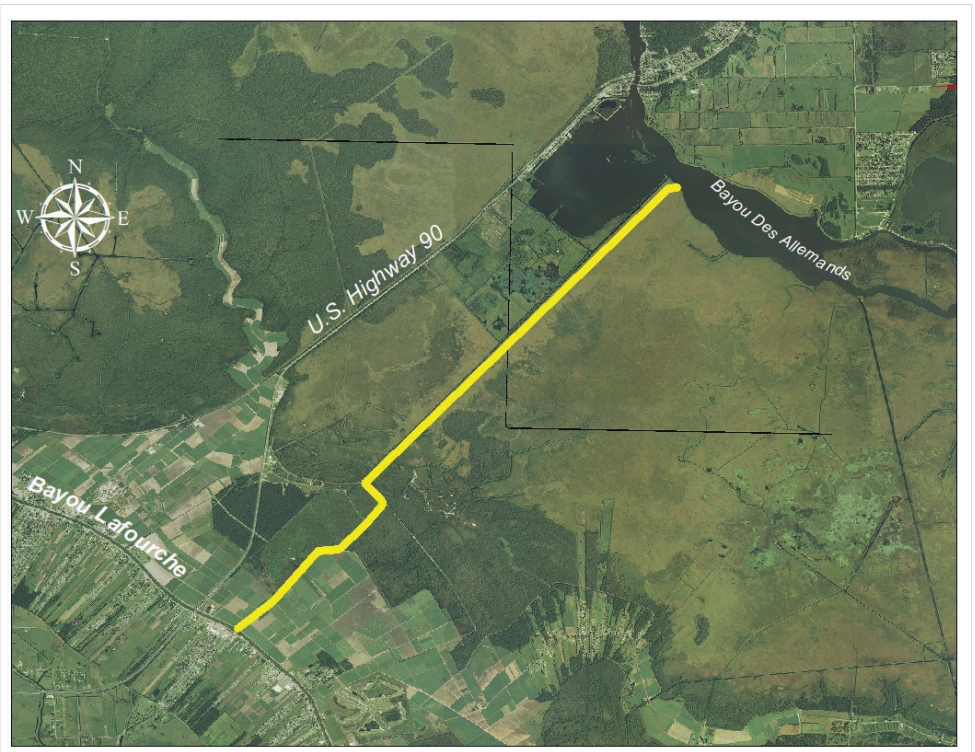


Figure A2. Map of the Sunset Drainage District region.

Figure A3. Map of the St. Charles Levee region.

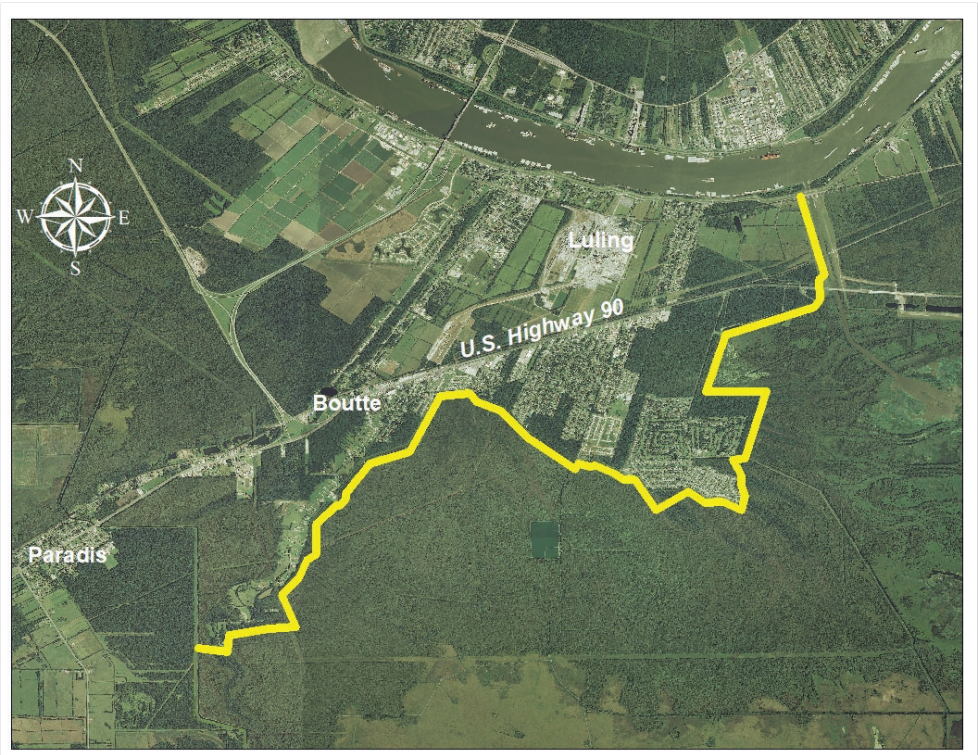


Table A-1. Acres of direct construction impacts by region, habitat type, and alternative.

BLH Impact & Loction	Alt 1 (acres)	Alt 2 (acres)	RP (acres)
West of Bayou Des Allemands			
Forested spoil banks	2.79	3.29	6.59
Reach G access rd	6.32	6.32	7.32
Low quality BLH	10.60	11.09	24.37
Sunset Drainage District - west of LA306			
Med qualti y BLH	1.92	2.04	9.32
Low quality BLH	5.63	5.97	8.62
Sunset Drainage District - east of LA306			
High quality BLH	1.92	1.96	8.19
Med qualti y BLH	1.12	1.21	7.82
Low quality BLH	3.93	4.03	39.97
Abandoned field	7.10	7.43	19.29
Mitigation Bank	0.35	0.37	3.92
St. Charles levee upgrade			
Med qualti y BLH	na	6.94	19.07
Low quality BLH	na	36.00	136.82
TOTAL	41.68	86.65	291.32
Swamp Impact & Location			
West of Bayou Des Allemands	0.00	0.00	0.35
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	1.04	1.08	2.59
St. Charles levee upgrade	na	35.35	164.33
TOTAL	1.04	36.43	167.28
Fresh Marsh Impact & Location			
West of Bayou Des Allemands	136.54	143.60	209.11
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	0.00	0.00	0.00
St. Charles levee upgrade	na	5.32	57.68
TOTAL	136.54	148.93	266.79

APPENDIX C

DIRECT CONSTRUCTION IMPACTS (AAHUs)

Table B-1. Direct construction impacts (AAHUs) by region, habitat type, and alternative.

BLH Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H									
Forested spoil banks	G&H	-0.79	-0.73	-0.41	-0.93	-0.86	-0.48	-1.86	-1.72	-0.97
Dufrene Ponds access rd	G&H	-0.50	-0.43	-0.30	-0.50	-0.43	-0.30	-0.57	-0.49	-0.35
Low quality BLH	G&H	-1.75	-1.66	-1.08	-1.82	-1.73	-1.13	-4.01	-3.80	-2.47
Sunset Drainage District west of LA 306	F									
Med quality BLH	F	-1.21	-1.21	-1.21	-1.28	-1.28	-1.28	-6.07	-6.07	-6.07
Low quality BLH	F	-2.32	-2.32	-2.32	-2.46	-2.46	-2.46	-3.65	-3.65	-3.65
Sunset Drainage District east of LA 306	D&E									
High quality BLH	D&E	-1.62	-1.62	-1.62	-1.65	-1.65	-1.65	-6.95	-6.95	-6.95
Med quality BLH	D&E	-0.92	-0.92	-0.92	-0.99	-0.99	-0.99	-6.45	-6.45	-6.45
Low quality BLH	D&E	-2.20	-2.20	-2.20	-2.26	-2.26	-2.26	-20.73	-20.73	-20.73
Abandoned field	D&E	-4.49	-4.49	-4.49	-4.70	-4.70	-4.7	-13.19	-13.19	-13.19
Mitigation bank	D&E	-0.25	-0.25	-0.25	-0.26	-0.26	-0.26	-2.88	-2.88	-2.88
St. Charles levee upgrade-lift	A to C									
Med quality BLH	A to C	na	na	na	-2.03	-1.87	-1.09	-5.58	-5.14	-3.01
Low quality BLH	A to C	na	na	na	-6.95	-6.28	-4.68	-26.4	-23.87	-17.77
	TOTAL	**-16.05**	**-15.83**	**-14.80**	**-25.83**	**-24.77**	**-21.28**	**-98.34**	**-94.94**	**-84.49**

Swamp Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	0.0	0.0	0.0	0.0	0.0	0.0	A	A	A
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	-0.56	-0.56	-0.56	-0.58	-0.58	-0.58	-1.4	-1.4	-1.4
St. Charles levee upgrade-lift	A to C	na	na	na	-23.55	-23.55	-21.47	-110.2	-110.0	-100.0
	TOTAL	**-0.56**	**-0.56**	**-0.56**	**-24.13**	**-24.13**	**-22.05**	**-111.59**	**-111.40**	**-101.42**

Fresh marsh Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	-63.9	-69.6	-56.4	-67.2	-73.2	-59.3	-98.5	-105.9	-79.7
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
St. Charles levee upgrade-lift	A to C	na	na	na	-2.48	-2.70	-2.17	-12.2	-13.9	-10.5
	TOTAL	**-63.92**	**-69.62**	**-56.35**	**-69.72**	**-75.94**	**-61.45**	**-110.66**	**-119.79**	**-90.17**

APPENDIX D

BORROW SITE SELECTION CRITERIA

Where multiple alternative borrow areas exists, use of those alternative sites should be prioritized in the following order: existing commercial pits, upland sources, previously disturbed/manipulated wetlands within a levee system, and low-quality wetlands outside a levee system. The Service supports the use of such protocols to avoid and minimize impacts to wetlands and bottomland hardwoods within project areas. Avoidance and minimization of those impacts helps to provide consistency with restoration strategies and compliments the authorized hurricane protection efforts. Such consistency is also required by Section 303(d)(1) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).
Accordingly, the Service recommends that prior to utilizing borrow sites every effort should be made to reduce impacts by using sheetpile and/or floodwalls to increase levee heights wherever feasible. In addition, the Service recommends that the following protocol be adopted and utilized to identify borrow sources in descending order of priority:

1. Permitted commercial sources, authorized borrow sources for which environmental clearance and mitigation have been completed, or non-functional levees after newly constructed adjacent levees are providing equal protection.
2. Areas under forced drainage that are protected from flooding by levees, and that are:
    a) non-forested (e.g., pastures, fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).
3. Sites that are outside a forced drainage system and levees, and that are:
    a) non-forested (e.g., pastures fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).

Notwithstanding this protocol, the location, size and configuration of borrow sites within the landscape is also critically important. Coastal ridges, natural levee flanks and other geographic features that provide forested/wetland habitats and/or potential barriers to hurricane surges should not be utilized as borrow sources, especially where such uses would diminish the natural functions and values of those landscape features.

To assist in expediting the identification of borrow sites, the Service recommends that immediately after the initial identification of a new borrow site the Corps should initiate informal consultation with the Service regarding potential impacts to federally listed threatened or endangered species. To aid you in complying with those proactive consultation responsibilities, the Service has provided (in the above letter) a list of threatened and endangered species and their critical habitats within the project area.

APPENDIX E

MITIGATION SUCCESS CRITERIA AND MITIGATION MONITORING: MARSH MITIGATION FEATURES (Fresh, Intermediate, and Brackish Marsh Habitats)

MITIGATION SUCCESS CRITERIA

The success (performance) criteria described herein are applicable to all proposed marsh habitats (fresh marsh, intermediate marsh, and brackish marsh restoration features), unless otherwise indicated.

1. General Construction

A. Complete all initial mitigation construction activities (e.g. construction of temporary retention/perimeter dikes, placement of fill (borrow material/dredged material), construction of permanent dikes if applicable, etc.) in accordance with the mitigation work plan and final project plans and specifications. Upon completion of construction, USACE or its contractor shall provide construction surveys to include all project features. These activities are classified as "initial construction requirements."

B. Approximately 1 year following completion of all initial mitigation construction activities (when the restored marsh feature has stabilized to the point that the containment berms are no longer required to prevent the loss of fill material from the project site), USACE or its contractor shall complete all final mitigation construction activities, in accordance with the mitigation work plan and final project plans and specifications. Such activities may include, but are not limited to: degrading temporary retention/perimeter dikes; completion of armoring of permanent dikes; "gapping" or installation of "fish dips"; soil testing; completion of plantings; and construction of trenasses or similar features within marsh features as a means of establishing shallow water interspersion areas within the marsh. Finishing the aforementioned construction activities will be considered as the "completion of final construction requirements".

2. Topography[1]

A. Initial Success Criteria:
   1. One year after completion of fill placement:
      - Demonstrate that at least 80% of each mitigation feature has a surface elevation that is within +0.5 to – 0.5 feet of the desired target surface elevation as determined by the settlement curve for that year.
   2. Two years after completion of fill placement:
      - Demonstrate that at least 80% of the mitigation site has a surface elevation that is within +0.5 feet to – 0.25 of the desired target surface elevation as determined by the settlement curve for that year.

B. Intermediate Success Criteria:
   1. Two years following achievement of Topography Criteria 2.A.2. —

- Demonstrate that at least 80% of the mitigation site has a surface elevation that is within the functional marsh elevation range[2].
- There are no additional monitoring or attainment requirements for topography beyond meeting the Intermediate Success Criteria for topography.

Notes:
[1]Elevation survey data and report will be provided to the IET for review in order to determine concurrence. The surveys must include water levels inside and outside the marsh creation site at locations representative of site conditions.
[2]The "functional marsh elevation range", i.e. the range of the marsh surface elevation that is considered adequate to achieve proper marsh functions and values, is determined during the final design phase.

3. Native Vegetation

A. Fresh marsh:

1. Initial Success Criteria (2 growing seasons following completion of initial construction activities in General Construction 1.A.):
   - Achieve a minimum average cover of 50% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
2. Intermediate Criteria (2 years following attainment of Native Vegetation Criteria 3.A.1.):
   - Achieve a minimum average cover of 60% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
3. Long-Term Success Criteria[3] (Every monitoring event after attainment of Native Vegetation Criteria 3.A.2.):
   - Achieve a minimum average cover of 60% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.

Notes:
[1]Fresh marsh is typically not planted due to the expectation that it will naturally vegetate more quickly than intermediate or brackish marsh. However, if percent cover success criteria are not met, plantings may become necessary in the absence of other recommended actions

B. Intermediate marsh and brackish marsh:

1. Initial Success Criteria (2 growing seasons following completion of initial construction activities in General Construction 1.A.):
   - Initial plantings must attain at least 80% survival of planted species, or achieve a minimum average cover of 25% native herbaceous species (includes planted species and volunteer species). If site self-vegetates, the site must achieve a minimum average cover of at least 50% native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
2. Intermediate Criteria (2 years following attainment of Native Vegetation Criteria 3.B.1):
   - Achieve a minimum average cover of 60%, comprised of native herbaceous species (includes planted species and volunteer species).

- Demonstrate that native vegetation satisfies USACE hydrophytic vegetation criteria.

3. Long-Term Success Criteria[3] (Every monitoring event after attainment of Native Vegetation Criteria 3.B.2.):
   - Achieve a minimum average cover of 60%, comprised of native herbaceous species (includes planted species and volunteer species).
   - Demonstrate that native vegetation satisfies USACE hydrophytic vegetation criteria.

Note:
[1]There is not a minimum average cover requirement for years 21 – 50. However, vegetation data will be collected throughout the 50-year project life.

4. Invasive and Nuisance Vegetation (for all marsh types)

A. Initial, Intermediate, and Long-term[1] Success Criteria
   - Maintain the project area such that the total average vegetative cover accounted for by invasive and nuisance species constitute less than 5% of the total average plant cover throughout the 50-year project life. The list of invasive and nuisance species is found in Appendix A and will be tailored to reflect specific site needs.

Note:
[1]Yearly inspections to determine the need for invasive/nuisance control would be conducted until the long term success criteria for vegetation is achieved. After it is achieved, the frequency of inspections to determine the need for invasive/nuisance control would be adjusted based on site conditions.

MITIGATION MONITORING GUIDELINES

The guidelines for mitigation monitoring provided herein are applicable to all types of marshes being restored unless otherwise indicated.

Baseline Monitoring Report (First Monitoring Report)

A "baseline" monitoring report will be prepared upon completion of Final Construction Requirements 1.B. and upon any re-plantings associated with construction. Information provided will typically include the following:

- A detailed discussion of all mitigation activities completed.

- A plan view drawing of the mitigation site showing the approximate boundaries of the restored marsh, significant interspersion features established within the marsh features (as applicable), proposed monitoring transect locations, proposed sampling plot locations, photo station locations and water level survey locations.

- Initial and final construction surveys of all project features (including but not limited to the fill area, fish dips, weirs, culverts, etc.) and an analysis of the survey data will be provided addressing attainment of topographic success criteria. If a project is immediately adjacent to

existing marsh habitat, the topographic survey will include spot elevations collected within the existing marsh habitat near the restored marsh.

- Photographs documenting conditions in the project area will be taken at the time of monitoring. Photos will be taken at permanent photo stations within the restored marsh. At least two photos will 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. The number of photo stations required and the locations of these stations will vary depending on the mitigation site. The USACE will make this determination in coordination with the Interagency Team and will specify the requirements in the Mitigation Monitoring Plan. At a minimum, 4 photo stations will be established within each marsh cell.

- For planted marsh only -- A detailed inventory of all species planted, including the number of each species planted, the stock size planted, and where the species were planted will be documented. For mitigation sites that include more than one planted marsh cell/feature, provide a breakdown itemization indicating the number of each species planted in each feature and correlate this itemization to the marsh features depicted on the plan view drawing of the mitigation site.

- As part of the as-built/final construction survey, water level surveys will be taken inside and outside the marsh creation site at predetermined locations identified in coordination with the IET and NFS. Each interior water level elevation should have a corresponding exterior water level elevation taken consecutively and within close proximity. If there appears to be disparity in water levels within the marsh creation site, additional shots may be required. The baseline monitoring report will provide the surveyed water level data and will compare it to mean high and mean low water elevation data collected from a tidal elevation recording station in the general vicinity of the mitigation site. The report will further address estimated mean high and mean low water elevations at the mitigation site based on field indicators.

- Various qualitative observations will be made in the mitigation site to help assess the status and success of mitigation and maintenance activities. These observations will 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 condition of interspersion features (tidal channels, trenasses, depressions, etc.) constructed within the marsh features, noting any excessive scouring and/or siltation occurring within such features; the natural formation of interspersion features within restored marshes; observations regarding general surface water flow characteristics within marsh interspersion features; the general condition of “gaps”, “fish dips”, or similar features constructed in permanent dikes; if present, the general condition of any armoring installed on permanent dikes. General observations made during the course of monitoring will also address potential problem zones and other factors deemed pertinent to the success of the mitigation project.

- 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.

- 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 Baseline Monitoring Report will be called either Initial, Intermediate or Long-Term Monitoring Reports and shall include the year in which the monitoring occurred (i.e. Monitoring Report 2019). All Monitoring Reports shall provide the following information unless otherwise noted:

- All items listed for the Baseline Monitoring Report with the exception of: (a) the topographic surveys, although additional topographic surveys are required for specific monitoring reports (see below); and (b) the inventory of species and location map for all planted species.

- Quantitative data for all plants in each stratum. Data will be collected from permanent sampling quadrats established at approximately equal intervals along permanent monitoring transects established within each marsh feature. Each sampling quadrat will be approximately 2 meters X 2 meters in size (although the dimensions of each quadrat may be increased, if necessary, to provide better data in planted marsh features). The number of monitoring transects and number of sampling quadrats per transect will vary depending on size of the mitigation site and will be determined by the IET during the final design phase of the project. The resulting requirements, including quadrat dimensions, will be specified in the Final Mitigation Monitoring Plan for the project. Data recorded from the sampling quadrats will include but not be limited to: average total percent cover by native plant species; average total percent cover by invasive plant species; average total percent cover by nuisance plant species; percent cover of each plant species; the wetland indicator status of each species; and the average percent survival of each planted species (i.e. number of living planted species as a percentage of total number of plants installed), if discernable at the time of monitoring.

- One photograph shall be taken from the SE corner of each sampling plot to clearly capture the vegetation plot and must include a sign that indicates the plot number and sampling date.

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

- Topographic surveys of each marsh restoration feature for initial and intermediate monitoring events (at approximately 2 years and 4 years following completion of final construction activities (General Construction 1.B.)). These surveys will 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 will

include an analysis of the topographic data in regards to the attainment of applicable topographic success criteria. If the surveys indicate topographic success criteria have not been achieved and supplemental topographic alterations are necessary, then another topographic survey will be required following completion of the supplemental alterations. This determination will be made by USACE and the IET.

Monitoring Reports Following Planting or Re-planting Activities

Planting or re-planting of certain areas within restored marsh habitats may be necessary to ensure attainment of applicable native vegetation success criteria. Any monitoring report submitted following completion of a planting event must include an inventory of the number of each species planted, the stock size used, and the locations for each species planted. 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. The perimeter of re-planted area should be documented with GPS coordinates. If single rows are replanted, then GPS coordinates should be taken at the end of the transect.

MITIGATION MONITORING SCHEDULE AND RESPONSIBILITIES

Monitoring will typically take place in mid to late summer during the required years for monitoring, but may be delayed until later in the growing season due to site conditions or other unforeseen circumstances. Monitoring Reports will be submitted by December 31 of each year of monitoring to the USACE, NFS, and the IET. The various monitoring and reporting responsibilities addressed in this section are all subject to the provisions set forth in the Introduction section.

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

1. General Construction – 1.A. and 1.B.
2. Topography – 2.A.1 and 2.A.2.
3. Native Vegetation – For fresh marsh features, criteria 3.A.1; for intermediate marsh and brackish marsh features, criteria 3.B.1.
4. Invasive & Nuisance Vegetation – 4.A. until such time as monitoring responsibilities are transferred to the NFS.

The USACE will be responsible for conducting Baseline and Initial Success Monitoring events and preparing the associated monitoring reports.

The NFS will be responsible for conducting the required monitoring events and preparing the associated monitoring reports for all other required years after the USACE has achieved the initial success criteria listed above. The responsibility for management, maintenance, and monitoring of the non-structural components of the mitigation project (i.e. vegetation) will typically be transferred to the NFS during the first quarter of the year immediately following submittal of the monitoring report that demonstrates attainment of the initial success criteria. Once monitoring responsibilities have been transferred to the NFS, the next monitoring event

(Intermediate) should take place 2 growing seasons after Initial Success (Topography 2.A.2 and Native Vegetation 3.A.1 or 3.B.1) has been met. After Intermediate Success Criteria (Topography 2B and Native Vegetation 3.A.2 or 3.B.2) has been met, Long-Term Success Criteria monitoring will be conducted every 5 years throughout the remaining 50-year period of analysis (which begins once initial success criteria have been met).

In certain cases, it is possible that the marsh mitigation features may be established along with other mitigation features, like swamp or bottomland hardwood habitats, at the same mitigation site. This scenario could require some adjustments to the typical monitoring schedule described above in order to develop a reasonable and efficient monitoring schedule that covers all the mitigation features. Such adjustments, if necessary, would be made at the time final mitigation plans are generated. This schedule must be in general accordance with the guidance provided above and will be prepared by the USACE and the IET.

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 would be responsible for conducting such additional monitoring and preparing the associated monitoring reports in the following instances:

(A) For fresh marsh features –

- If the initial vegetative cover success criteria (3.A.1) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable vegetative cover criteria have been satisfied. This requirement only exists if planting the marsh mitigation feature is required to meet the success criteria, the USACE would be responsible for the purchase and installation of the required plants.

(B) For intermediate and brackish marsh features –

- If the initial survival criteria for planted species or the initial vegetative cover criterion (3.B.1) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable survival criteria or vegetative cover criteria have been satisfied. The USACE would be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(C) For all types of marsh features–

- If initial topographic success criteria (2.A.1 and 2.A.2) are not achieved, the IET would convene to determine whether corrective actions are necessary. If corrective actions are necessary additional surveys and a monitoring report will be required to indicate whether applicable criteria have been satisfied. The USACE would also be responsible for performing the necessary corrective actions.

- If initial invasive and nuisance species criteria (4.A) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable criteria have been satisfied. The USACE would be responsible for the irradiation activities needed to attain the success criteria.

There could also be cases where failure to attain certain success criteria would trigger the need for additional monitoring events for which the NFS would be responsible:

(A) For fresh marsh features –

- If the native vegetation intermediate success criteria (3.A.2) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the success criteria have been satisfied. The Sponsor would also be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(B) For intermediate and brackish marsh features –

- If the native vegetation intermediate success criteria (3.B.2) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the native vegetation intermediate success criteria has been satisfied. The Sponsor would also be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(C) For all types of marsh features –

- If the topographic intermediate success criteria (2.B.) are not achieved, the IET would convene to determine whether corrective actions are necessary. If corrective actions are necessary, additional surveys and a monitoring report will be required to indicate whether applicable criteria have been satisfied. The NFS would also be responsible for performing the necessary corrective actions if the IET determines such corrective actions are necessary.

- If the native vegetation long term success criteria (3.A.3 and 3.B.3) are not achieved, the IET would convene to discuss whether corrective actions would be necessary. If corrective actions are necessary, a monitoring report will be required for each consecutive year following completion of the corrective actions until two sequential annual reports indicate that the native vegetative cover criteria have been attained. The NFS would be responsible for performing the corrective actions, conducting the additional monitoring events, and preparing the associated monitoring reports.

- If the intermediate and long term invasive and nuisance species criteria (4.A) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable criteria have been satisfied. The NFS would be responsible for the irradiation activities needed to attain the success criteria.

Once monitoring responsibilities have been transferred to the NFS, the NFS will 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. Fifteen years following achievement of Long Term Success Criteria, 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 and the IET.

APPENDIX F

TWELVE REQUIREMENTS FOR MITIGATION PLANNING
(from the U.S. Army Corps of Engineers & EPA 2008 Final Mitigation Rule in the FEDERAL REGISTER Vol. 73, No. 70, April 10, 2008)

Twelve Requirements for a Compensatory Mitigation Plan

1. Objectives. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.

2. Site selection. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

3. Site protection instrument. A description of the legal arrangements and instrument including site ownership, that will be used to ensure the long-term protection of the mitigation project site.

4. Baseline information. A description of the ecological characteristics of the proposed mitigation project site, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

5. Determination of credits. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.
    - For permittee-responsible mitigation, this should include an explanation of how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity.
    - For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these were determined.

6. Mitigation work plan. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. Maintenance plan. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance standards. Ecologically-based standards that will be used to determine whether the mitigation project is achieving its objectives.

9. Monitoring requirements. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

10. Long-term management plan. A description of how the mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

12. Financial assurances. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

Other information. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

APPENDIX G

Letter from Major General Holland Committing the U.S. Army Corps of Engineers to Conduct the Indirect Impact Assessments

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
MISSISSIPPI VALLEY DIVISION
1400 WALNUT STREET
VICKSBURG MS 39180-3262

October 22, 2021

New Orleans District
Chief of Regional Planning and
Environmental Division South

Ms. Brigette D. Firmin
Louisiana Ecological Services Field Office
U.S. Fish and Wildlife Service
200 Dulles Drive
Lafayette, LA 70506-3006

Dear Ms. Firmin:

On September 3, 2021, the U.S. Army Corps of Engineers, New Orleans District (the District), received the Conditional Final Coordination Act Report from the U.S. Fish and Wildlife Service (USFWS), Louisiana Ecological Services Field Office. The report was in response to the District's request for further review of information provided on August 23, 2021, concerning the Upper Barataria Basin, Louisiana Final Integrated Feasibility Study and Environmental Impact Statement.

We understand that the USFWS is requesting additional hydrologic modeling to verify our current indirect impact analysis. In reviewing hydrologic modeling performed for Upper Barataria Basin, the District determined that our proposed floodgate structure design at Bayou Des Allemands, a 270-foot-wide barge gate and 12 auxiliary drainage gates, would maintain the current flow. However, the District is committed to performing the hydrologic modeling as requested by the USFWS to assess any variation to hydrology as our design effort progresses and would require us to modify our indirect impacts analysis, as appropriate.

Given our commitment to performing the hydraulic modeling, the District requests that the USFWS revise the Conditional Final Coordination Act Report and provide a Final Coordination Act Report for Upper Barataria Basin. We appreciate the USFWS's ongoing coordination with the District to complete this study effort.

My point of contact for this action is Mr. Troy G. Constance, Chief of the Regional Planning and Environmental Division South, New Orleans District, 7400 Leake Avenue, New Orleans, LA 70118-3651, (504) 862-2742, or troy.g.constance@usace.army.mil.

Sincerely,

Diana M. Holland
Major General, U.S. Army
Commandeing

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive.
Lafayette, Louisiana 70506
February 19, 2021

Colonel Murphy
District Commander
U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans, LA 70118-3651

Dear Colonel Murphy:

The U.S. Fish and Wildlife Service (Service) has prepared this final Draft Fish and Wildlife Coordination Act Report on the U.S. Army Corps of Engineers' (Corps) Upper Barataria Louisiana Risk Management Feasibility Study. The objectives of that study are to evaluate the feasibility of providing storm surge protection and protection from flooding due to heavy rainfall events for the communities located within the upper Barataria Basin of Louisiana in Lafourche, Jefferson, St. John the Baptist, St. Charles, St. James, Ascension, and Assumption Parishes. The study area encompasses an extensive complex of coastal wetland forests and marshes within the upper Barataria Basin north of U.S. Highway 90.

This final Draft Coordination Act Report provides an analysis of fish and wildlife resource impacts associated with the final array of alternatives, including that of the newly developed 100-year storm event protection alternative. This new 100-yr event protection alternative has been selected as the Recommended Plan (RP). Because the indirect impact analysis could not be completed during the project's feasibility phase, the impact analysis is incomplete. Hence, this final Draft Coordination Act Report does not fulfill the requirements of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). When that analysis is completed, the Service can submit a final report of the Secretary of the Interior as required by Section 2(b) of that Act. The October 2020 Revised Draft Coordination Act Report was provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS). Comments from the National Marine Fisheries Service and the Louisiana Department of Wildlife and Fisheries will be incorporated into our final report.

For a description of project area habitat types, associated fish and wildlife resources, methodology, fish and wildlife resource concerns, and literature citations, please reference our April 15, 2020, Planning Aid Report and our November 2019 Draft Coordination Act Report at the following link: https://www.fws.gov/gisdownloads/R4/Louisiana%20ESO/Paille/.

Description of Alternatives
The final array of alternatives consists of three levee construction alternatives.

Alternative 1: This alternative consists of raising existing forced drainage levees extending from Paradis to the community of Des Allemands and constructing a new levee segment that would cross the basin from Bayou Des Allemands parallel to and south of U.S. Highway 90 and terminate near Raceland on Bayou Lafourche (Figure 1). The levee would be constructed to an elevation of 7.5 feet and would be 18.3 miles in length. A 270-foot-wide barge gate would be installed in Bayou Des Allemands to provide gravity drainage. Borrow would come from nearby farmlands.

Alternative 2: This alignment incorporates all of the Alternative 1 footprint plus it includes raising the existing St. Charles Parish protection levee that extends northeastward to the Mississippi River at Luling (Figure 2). This alternative would be constructed to an elevation of 8.5 feet and would be 30.4 miles long. A 270-foot-wide barge gate would provide gravity drainage at Bayou Des Allemands. Borrow for levee construction would come from nearby farmlands.

Figure 1. Map illustrating the proposed Alternative 1 levee alignment.

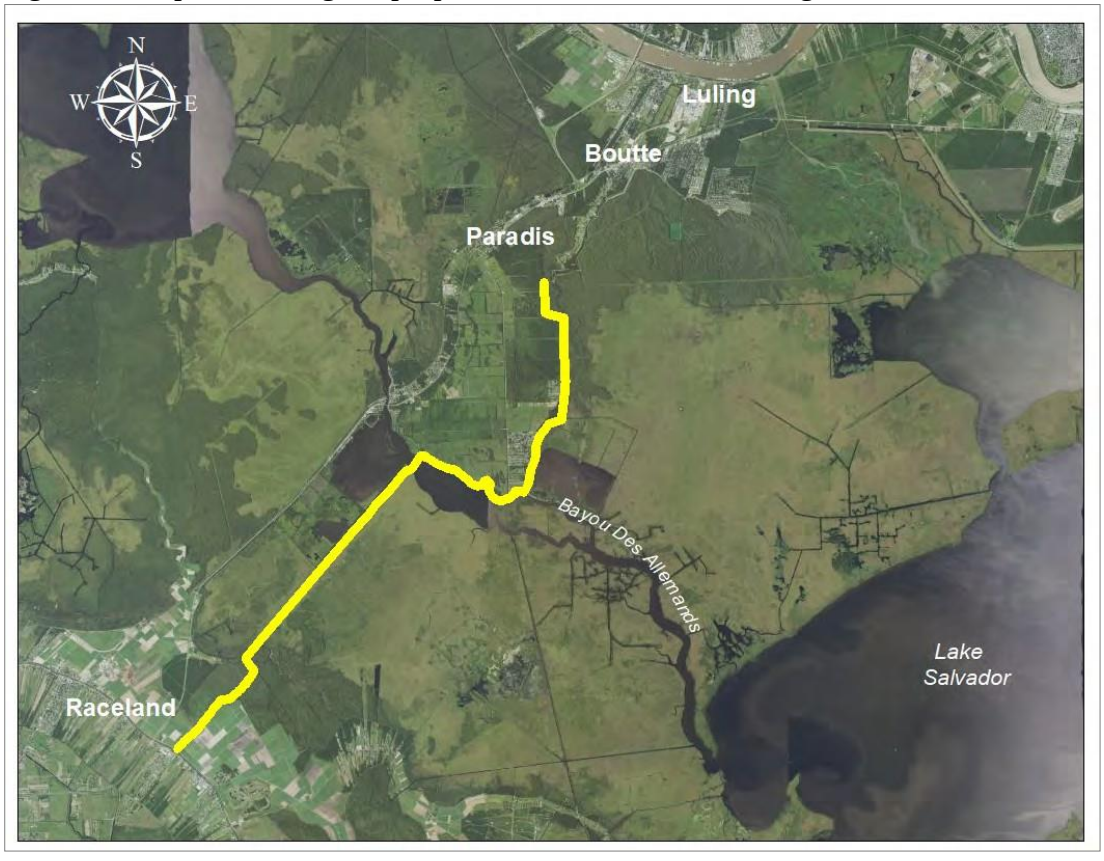


Figure 2. Map illustrating the proposed Alternative 2 levee alignment.

Alternative 3, the 100-year event protection alternative: This alternative occupies generally the same footprint as Alternative 2, but would be constructed to an elevation of 14.5 to 16 feet, and would be up to 170 feet wide in the marshes southwest of Bayou Des Allemands and 260 feet wide along the existing St. Charles levee. A 40-foot-wide right-of–way (ROW) would be established on both sides of the levee footprint in marshes. Where existing local levees would be raised, the ROW is generally located on one side or the other. Most of the levees would be constructed in two lifts, with the second lift occurring roughly during the middle of the 50-year project life. Only the westernmost levee reach (Reach H) would be constructed in one lift. To avoid impacting residential communities located in close proximity to the existing Sunset Drainage District levee, the proposed levee would consist of a sheet pile or T-wall structure. Borrow for levee construction would come from nearby farmlands.

Each of these three alternatives includes a 270-foot-wide barge gate to preclude storm surge flooding within the protected area. The wing walls of that floodgate structure would include 12 auxiliary drainage gates to provide a total cross-sectional area greater than that at the existing railroad crossing located adjacent to the U.S. Highway 90 crossing. The RP also includes two small culvert structures through the levee in Reach G

(southwest of Bayou Des Allemands) to maintain water exchange across the marsh. A 45-foot-wide water control structure would also be installed in Bayou Gauche at its junction with Bayou Des Allemands to reduce induced storm surge northward up that bayou (Figure 3).

List of structures associated with Figure 3:

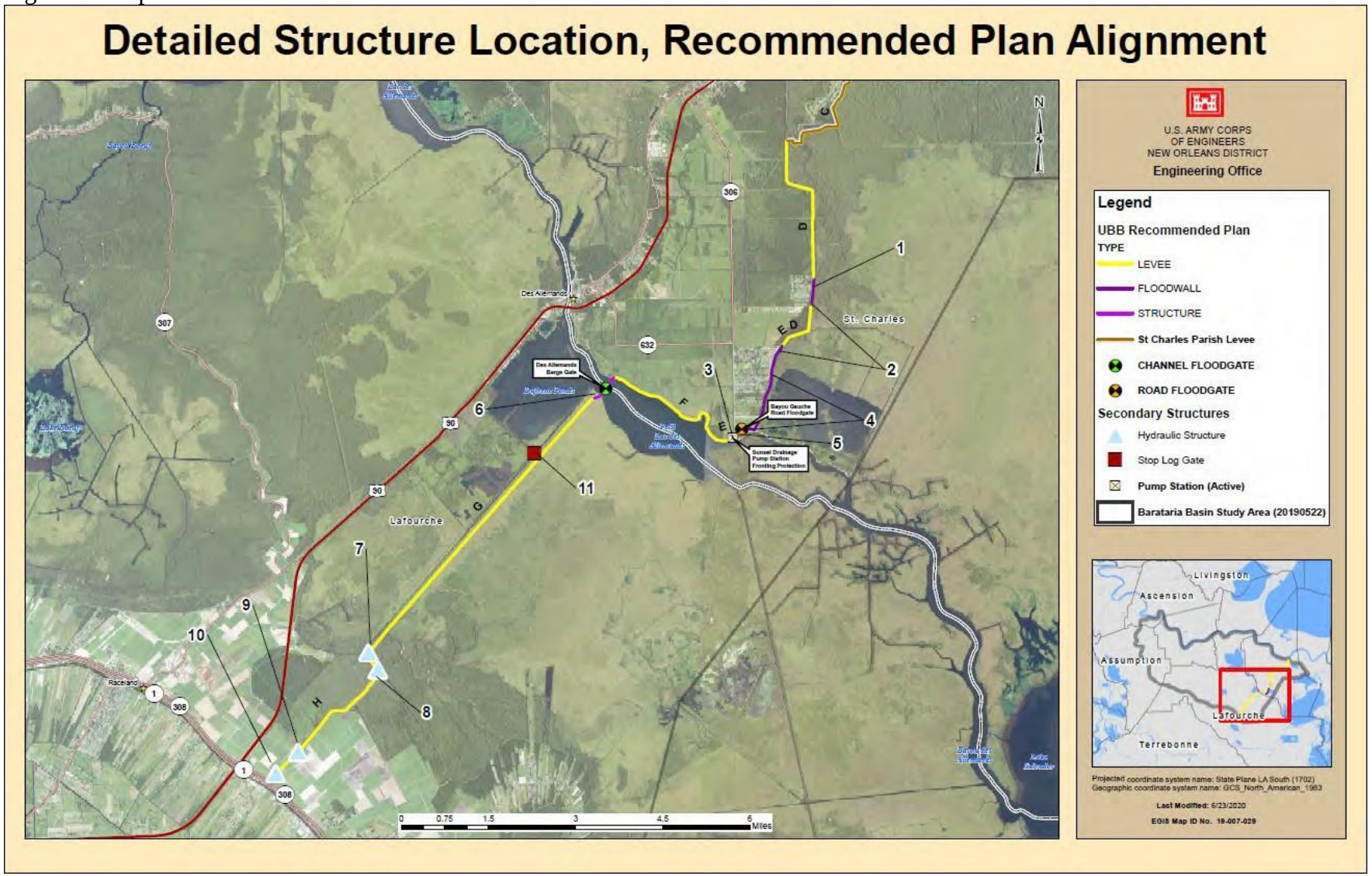
1. Floodwall section in Hydraulic Reach D
2. Floodwall section in Hydraulic Reach D and E
3. Crawford Canal P.S. Fronting Protection
4. Floodwall section in Hydraulic Reach E and F
5. 45–foot-long Bayou Gauche Roller Gate
6. 270–foot-long Barge Gate crossing Bayou Des Allemands
7. Drainage Structure – 4 – 6 X 6 foot RC box culverts with sluice gates
8. Drainage Structure – 4 – 6 X 6 foot RC box culverts with sluice gates
9. Drainage Structure – 2 – 84 inch RCP culverts with sluice gates
10. Drainage Structure – 1 – 60 inch RCP culvert with sluice gates
11. Godchaux Canal Bridge
12. Drainage Structure – 3 – 6 X 6 foot RC box culverts with sluice gates

Right of Way (ROW) impacts

A 40-foot-wide ROW is planned adjacent to the levee toe for equipment access. In marshes, a ROW would be located on both sides of the levee. After construction, the contractor will be required to restore the ROW marshes to pre-construction conditions. In marshes, it was assumed that 20% of the ROW would become shrub scrub habitat post-restoration due to resulting higher elevations. Additionally, it is assumed that post-construction ROW restoration would be completed through natural revegetation processes over a 5-year period. In forested areas, the forest would be cleared from the ROW. It is assumed that ROWs would be maintained free of trees, and thus forested ROWs would be permanently impacted.

In addition to ROW impacts, some wetland impacts would also occur due to construction of access roads for equipment and staging areas. The Reach G access road would be permanent, and the Reach G staging area would be restored to marsh after construction of the second lift is completed (marsh ROW restoration assumptions applied). The Reach D access road is assumed to result in a permanent forest impact.

Figure 3. Map of water control structures and other features associated with the RP.



EVALUATION OF ALTERNATIVE PLANS

Fish and wildlife resource impacts were determined for the final array of alternatives using the Corps' provided shapefiles of levee footprints. Acreage of direct wetland construction impacts by habitat type were obtained by overlaying those shapefiles onto 2017 Digital Orthophoto Quarter Quad maps and habitat types were determined from that imagery in combination with field inspections conducted during October 2019 (Table 1). Given schedule constraints, Covid travel limitations, and lack of access to some future impact sites, the habitat type determinations in some areas is tentative. The direct impacts provided below include wetland impacts associated with construction of access roads in reaches D and G and impacts associated with temporary ROWs. The Corps has determined that Alternative 3 is the Recommended Plan (RP). The RP is the most damaging of the alternatives in the final array of alternatives.

Table 1. Summary of direct impacts by habitat type and levee alternative.

Habitat Type	Alt 1 (acres)	Alt 2 (acres)	Alt 3 - RP (acres)
Bottomland Hardwood Forest	41.68	86.66	291.32
Cypress-Tupelo Swamp	1.04	36.43	167.28
Fresh Marsh	136.54	148.93	266.79

Bottomland hardwood forest (BLH) impacts would occur within the forced drainage area of the Sunset Drainage District. A small acreage of the Paradis Mitigation Bank located within that forced drainage district would be impacted. Wetlands within the Sunset Drainage District are not exposed to increasing sea level rise effects as are the remaining impact areas. Swamp and BLH on the flood side of the St. Charles levee would also be impacted by Alternatives 2 and 3.

Near the Raceland end of the proposed levee, impacted BLH consists of inundation stressed and stunted red maple. Along portions of the St. Charles levee, BLH is also stressed, but impacts to more healthy BLH stands would also occur there. The inundation stressed BLH could be classified as a Resource Category 3 rather than Category 2. A more thorough field inspection would be needed to consider this change.

Marsh impacts would occur primarily southwest of Bayou Des Allemands where a new levee would be constructed across marsh. Small amounts of fresh marsh impacts would occur along the St. Charles levee where inundation has converted former BLH to marsh. A more detailed breakdown of direct impacts (acres) by location is provided in Appendix A. A summary of direct impacts in AAHUs is provided in Table 2 with a more detailed breakdown provided in Appendix B.

It is assumed that borrow for levee construction will come from existing agricultural areas. If borrow is taken from forested or wetland areas, additional borrow-related impacts would need to be quantified. Construction of the RP will impact two established mitigation areas and a conservation area on the flood side of the existing St. Charles Parish levee (Figure 4 and Table 3).

Table 2. Direct impacts in AAHUs by habitat type, alternative, and SLR scenario.

Habitat Type	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)
Bottomland Hardwood Forest	-16.05	-15.83	-14.80
Cypress-Tupelo Swamp	-0.56	-0.56	-0.56
Fresh Marsh	-63.92	-69.62	-56.35

Habitat Type	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)
Bottomland Hardwood Forest	-25.83	-24.77	-21.28
Cypress-Tupelo Swamp	-24.13	-24.13	-22.05
Fresh Marsh	-69.72	-75.94	-61.45

Habitat Type	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
Bottomland Hardwood Forest	-98.34	-94.94	-84.49
Cypress-Tupelo Swamp	-111.59	-111.40	-101.42
Fresh Marsh	-110.66	-119.79	-90.17

Figure 4. Mitigation and conservation areas near the RP Reaches A & B.

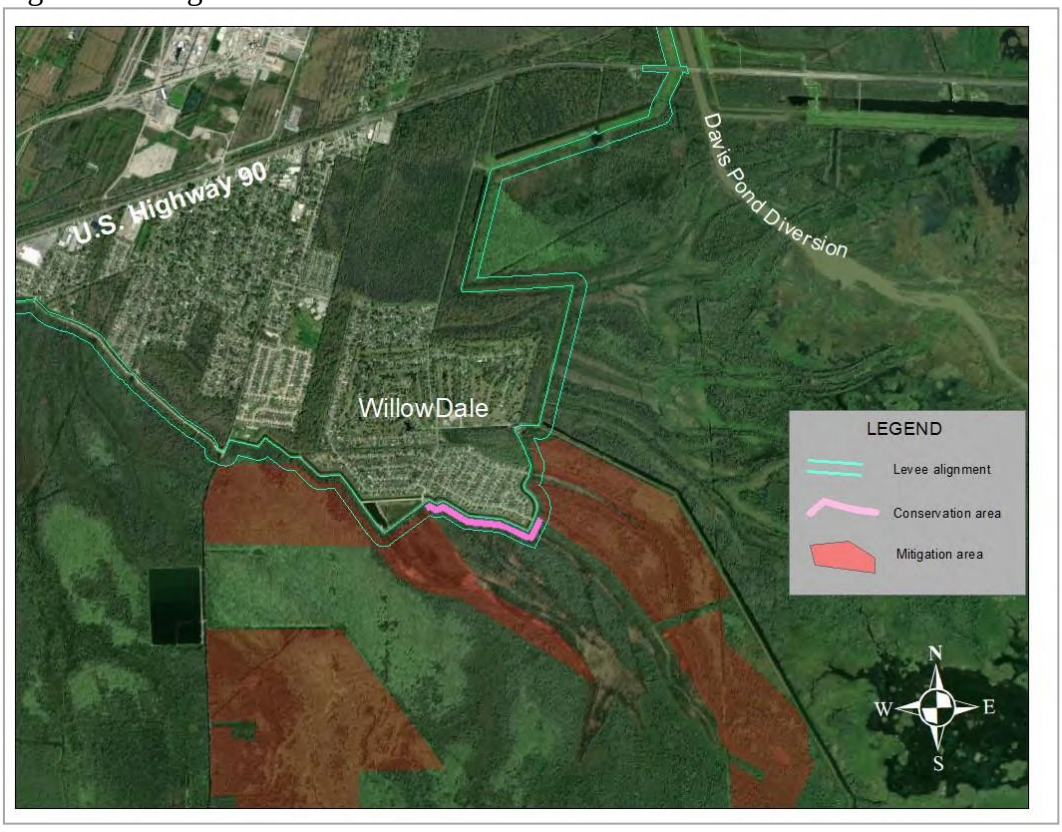


Table 3. Direct construction impacts on existing mitigation & conservation areas.

	St. Charles Conservation Area				St. Charles Mitigation Area				Paradis Mitigation Area			
	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs
BLH low quality	0.56	0.72	1.28	-0.10	0.82	10.14	10.96	-1.91	1.61	2.97	4.59	-2.88
BLH med quality	0.75	0.97	1.71	-0.20	0.20	0.76	0.96	-0.26	0	0	0	0
BLH high quality	0	0	0	0	0	0	0	0	0	0	0	0
Swamp	6.51	5.74	12.25	-8.19	0.31	7.06	7.37	-4.93	0	0	0	0
Marsh footprint	2.18	0	2.18	-1.16	0	0	0	0.00	0	0	0	0
Marsh ROW	0.61	0	0.61	-0.20	0.19	0	0.19	-0.07	0	0	0	0

Indirect Impacts

Installation of the floodgate across Bayou Des Allemands has the potential to reduce water exchange and increase the hydroperiod of the upper Barataria Basin. Upper Barataria Basin forested wetlands are already near or at a permanently inundated condition. Consequently, growth rates of trees in those areas could be further reduced and tree mortality increased should the project cause stage increases of sufficiently long durations. Funding to conduct hydrologic modeling of this possible indirect effect was not available. At the railroad crossing just north of U.S. Highway 90, the Bayou Des Allemands channel is constricted with a channel cross-section of only 5,180 square feet. The proposed floodgate with its auxillary gates would have a total cross-sectional area of 7,140 square feet (138% of the existing channel constriction). This total floodgate cross-sectional area may be sufficient to preclude any project-induced hydroperiod increases, but modeling should be conducted to confirm this. Lacking the more robust modeling confirmation, it cannot be assumed that the project would not result in system-level hydroperiod impacts to upper basin wetlands. Floodgate closure triggers and operation plans are also needed to assess effects of storm related closures on hydroperiod within protected areas.

Fish Access Impacts

The Bayou Des Allemands floodgate may also reduce water exchange and fisheries access to the upper basin. To assess fish access impacts, the without project channel cross-sectional area at the floodgate location is needed. When those cross-sectional areas become available, then the fisheries access impact can be assessed. Floodgate closure triggers and operation plans are also needed to assess effects from the duration of storm related floodgate closures.

SERVICE POSITION AND RECOMMENDATIONS

Because information regarding possible system-level hydroperiod impacts and fisheries access impacts associated with proposed water control structures are not yet available, we cannot complete our evaluation of project effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. When available, that information will be incorporated into our Final Coordination Act Report. Additional Service involvement during the preconstruction engineering and design phase of this project, along with more-definitive project information, will be required so that we can fulfill our responsibilities under the Fish and Wildlife Coordination Act. Regarding indirect project effects, the Service recommends:

1. The existing Bayou Des Allemands channel cross-section (in square feet) should be provided to enable assessment of potential structure-related fisheries access impacts.

2. Floodgate operation plans and closure criteria are needed for all actively operated water control structures to assess closure duration and closure impacts to fisheries access.

3. The project floodgate structures should be designed to handle the discharge associated with the two Mississippi River diversions (identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan) without corresponding widescale hydroperiod increases.

Available information indicates that substantial direct wetland losses will result from construction of project features. Consequently, avoidance and minimization of direct wetland impacts should be pursued to the greatest extent practicable. The Service provides the following recommendations to avoid and/or minimize project impacts on fish and wildlife resources, and for mitigating unavoidable impacts to those resources:

1. The Corps should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the engineering and design of project features including levees, floodgates, and environmental water control structures to ensure that those features are designed, constructed, and operated consistent with wetland restoration and associated fish and wildlife resource needs.

2. Estimates of all direct and indirect project-related wetland impacts should be refined for inclusion in the project's Final Report and Environmental Impact Statement.

3. Locations of borrow for levee construction material should be identified and provided to the Service and other interested natural resource agencies.

4. To the greatest degree practical, the proposed levees and borrow pits should be located to avoid and minimize direct and indirect impacts to emergent wetlands. Efforts should be made to further reduce those direct impacts by hauling in fill material, using sheetpile for the levee crest, deep soil mixing, or other alternatives.

5. If organic soils must be removed from the construction site, that material should be used to create or restore emergent wetlands to the greatest extent practicable. If that is not practicable, then use of that material to improve borrow pit habitat quality (e.g., construct bank slopes, reduce depths, etc.) should be examined.

6. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

7. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. Surveys prior to construction such be undertaken to ensure no nesting birds are within 1,000 feet of any

proposed work. If nesting birds are found within 1,000 feet of any proposed work sites, the Service and the Louisiana Department of Wildlife and Fisheries should be contacted for procedures to avoid impacts.

8. The Service recommends that the Corps contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly; 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

9. Full, in-kind compensation (quantified as AAHUs) should be provided for unavoidable net adverse impacts on forested wetlands, marsh, and associated submerged aquatic vegetation, including any additional losses identified during post-authorization engineering and design studies. To help ensure that the proposed mitigation features meet their goals, the Service provides the following recommendations:

    a. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
    b. Levee construction borrow sites should be designed to avoid and minimize impacts to fish and wildlife habitat; in the event new borrow sites are identified, guidelines for the selection of borrow sites are found in Appendix C.
    c. Mitigation measures should be constructed concurrently with the features that they are mitigating. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.
    d. The Service and other fish and wildlife conservation agencies should be consulted in the development of plans and specifications for all mitigation features and any monitoring and/or adaptive management plans.
    e. To avoid shortfalls in marsh creation acreage, the contractor should be required to guarantee the creation of at least the target acreage of marsh platform, or excess acres should be created.
    f. The acreage of marsh created to mitigate project impacts should meet or exceed the marsh acreage projected by the Habitat Evaluation Team for target year 5.
    g. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
    h. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
    i. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements. Success requirements are provided in Appendix D.

j. Dredged material borrow pits, including those utilized to create marsh for mitigation purposes, should be carefully designed and located to minimize anoxia problems and excessive disturbance to area water bottoms, and to avoid increased saltwater intrusion.

k. If applicable, a General Plan for mitigation 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. See Appendix E for details.

Extensive additional information is needed by the Service to complete the required evaluation of project effects and fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Much of that information may not be available until engineering and design of the project features has progressed. To help ensure that sufficient information is provided, the Service recommends that the Corps perform the following tasks during the engineering and design phase:

1. Provide additional information on anticipated construction techniques and their associated wetland impacts, such as additional dredging to install floodgates and water control structures, dredging temporary by-pass channels, construction of access roads, ROW activities and restoration methods, and the method for disposing organic surface soils that are unsuitable for levee construction.
2. Provide final levee footprint shapefiles and designs for borrow sites used in levee construction.
3. Provide without project Bayou des Allemands cross-sections where the floodgate would be installed.
4. To assess possible indirect project impacts, provide hydrologic model outputs on FWOP and FWP stages within the protected area wetlands following a variety of heavy rainfall events.

Sufficient funding should be provided for full Service participation in the post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.

Given that information needed to assess fish impact impacts and project-induced hydroperiod impacts are not available, the Service cannot fulfill its Fish and Wildlife Coordination Act responsibilities at this time. Hence, we will require additional funding during the post-authorization engineering and design phase of this project to fulfill those responsibilities. Estimates of those funding needs should be coordinated in advance with the Service, and should be based on the nature and complexity of the issues.

Provided that Service funding needs are met and the above recommendations are incorporated into the feasibility report and related authorizing documents, the Service does not oppose further planning and implementation of the RP.

We look forward to our continued involvement in this project moving forward. If you or your staff have further questions regarding the above letter or would like to meet and discuss our recommendations, please contact Mr. Ronny Paille of this office at 337-291-3117.

Sincerely,

Jeffrey D. Weller
Program Supervisor
Mississippi Basin Region
South Atlantic-Gulf Region

cc: EPA, Dallas, TX
NMFS, Baton Rouge, LA
LDWF, Baton Rouge, LA
LDNR, CMD, Baton Rouge, LA
OCPR, Baton Rouge, LA

APPENDIX A

DIRECT CONSTRUCTION IMPACTS

Acres of direct wetland impacts are listed below by four regions (see Figures A1, A2, A3). The Sunset Drainage District region is divided by Louisiana Highway 306 into an eastern and western region.

Figure A1. West of Bayou Des Allemands region.

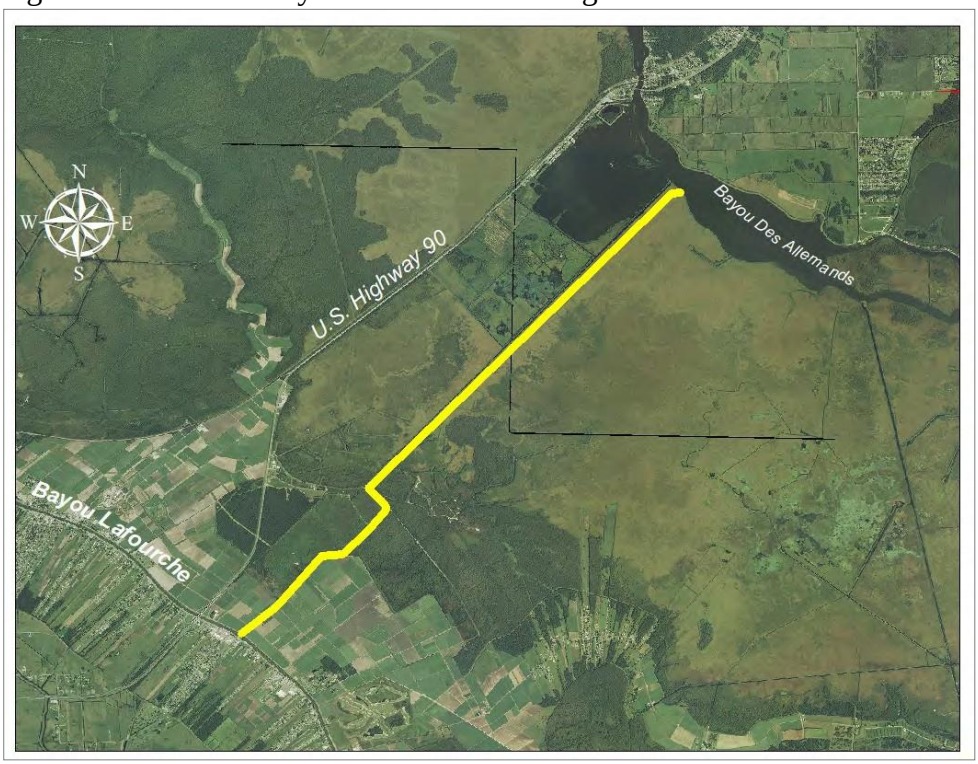


Figure A2. Map of the Sunset Drainage District region.

Figure A3. Map of the St. Charles Levee region.

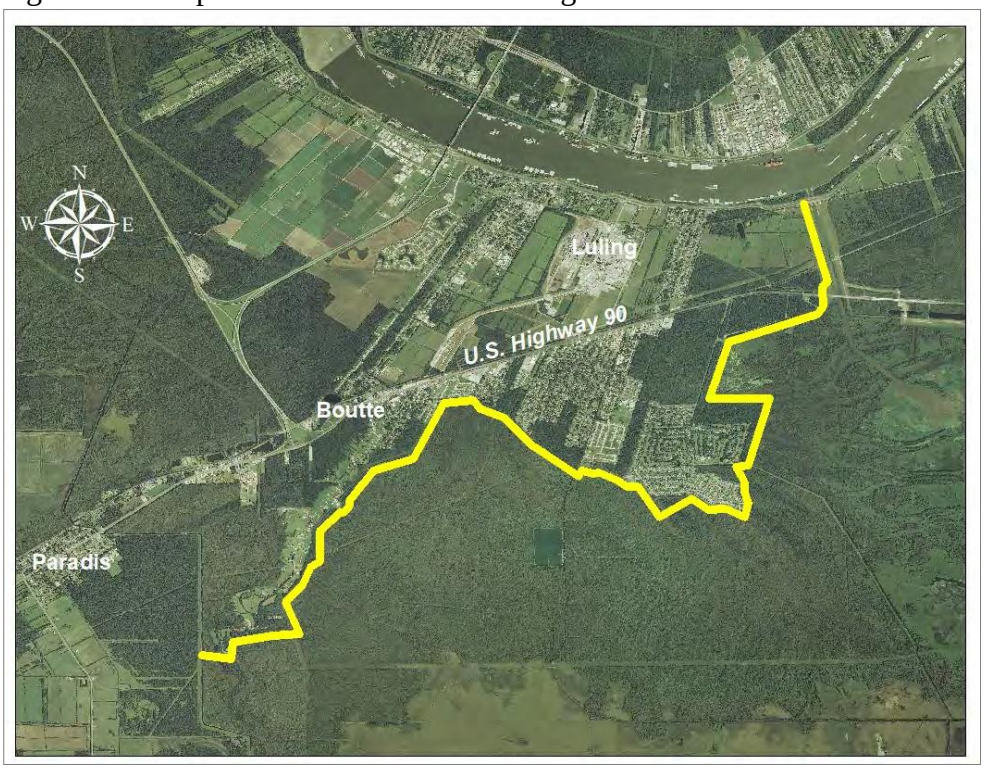


Table A-1. Acres of direct construction impacts by region, habitat type, and alternative.

BLH Impact & Loction	Alt 1 (acres)	Alt 2 (acres)	RP (acres)
West of Bayou Des Allemands			
Forested spoil banks	2.79	3.29	6.59
Reach G access rd	6.32	6.32	7.32
Low quality BLH	10.60	11.09	24.37
Sunset Drainage District - west of LA306			
Med qualti y BLH	1.92	2.04	9.32
Low quality BLH	5.63	5.97	8.62
Sunset Drainage District - east of LA306			
High quality BLH	1.92	1.96	8.19
Med qualti y BLH	1.12	1.21	7.82
Low quality BLH	3.93	4.03	39.97
Abandoned field	7.10	7.43	19.29
Mitigation Bank	0.35	0.37	3.92
St. Charles levee upgrade			
Med qualti y BLH	na	6.94	19.07
Low quality BLH	na	36.00	136.82
TOTAL	41.68	86.65	291.32
Swamp Impact & Location			
West of Bayou Des Allemands	0.00	0.00	0.35
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	1.04	1.08	2.59
St. Charles levee upgrade	na	35.35	164.33
TOTAL	1.04	36.43	167.28
Fresh Marsh Impact & Location			
West of Bayou Des Allemands	136.54	143.60	209.11
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	0.00	0.00	0.00
St. Charles levee upgrade	na	5.32	57.68
TOTAL	136.54	148.93	266.79

APPENDIX B

DIRECT CONSTRUCTION IMPACTS (AAHUs)

Table B-1. Direct construction impacts (AAHUs) by region, habitat type, and alternative.

BLH Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H									
Forested spoil banks	G&H	-0.79	-0.73	-0.41	-0.93	-0.86	-0.48	-1.86	-1.72	-0.97
Dufrene Ponds access rd	G&H	-0.50	-0.43	-0.30	-0.50	-0.43	-0.30	-0.57	-0.49	-0.35
Low quality BLH	G&H	-1.75	-1.66	-1.08	-1.82	-1.73	-1.13	-4.01	-3.80	-2.47
Sunset Drainage District west of LA 306	F									
Med quality BLH	F	-1.21	-1.21	-1.21	-1.28	-1.28	-1.28	-6.07	-6.07	-6.07
Low quality BLH	F	-2.32	-2.32	-2.32	-2.46	-2.46	-2.46	-3.65	-3.65	-3.65
Sunset Drainage District east of LA 306	D&E									
High quality BLH	D&E	-1.62	-1.62	-1.62	-1.65	-1.65	-1.65	-6.95	-6.95	-6.95
Med quality BLH	D&E	-0.92	-0.92	-0.92	-0.99	-0.99	-0.99	-6.45	-6.45	-6.45
Low quality BLH	D&E	-2.20	-2.20	-2.20	-2.26	-2.26	-2.26	-20.73	-20.73	-20.73
Abandoned field	D&E	-4.49	-4.49	-4.49	-4.70	-4.70	-4.7	-13.19	-13.19	-13.19
Mitigation bank	D&E	-0.25	-0.25	-0.25	-0.26	-0.26	-0.26	-2.88	-2.88	-2.88
St. Charles levee upgrade-lift	A to C									
Med quality BLH	A to C	na	na	na	-2.03	-1.87	-1.09	-5.58	-5.14	-3.01
Low quality BLH	A to C	na	na	na	-6.95	-6.28	-4.68	-26.4	-23.87	-17.77
	TOTAL	**-16.05**	**-15.83**	**-14.80**	**-25.83**	**-24.77**	**-21.28**	**-98.34**	**-94.94**	**-84.49**

Swamp Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	0.0	0.0	0.0	0.0	0.0	0.0	A	A	A
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	-0.56	-0.56	-0.56	-0.58	-0.58	-0.58	-1.4	-1.4	-1.4
St. Charles levee upgrade-lift	A to C	na	na	na	-23.55	-23.55	-21.47	-110.2	-110.0	-100.0
	TOTAL	**-0.56**	**-0.56**	**-0.56**	**-24.13**	**-24.13**	**-22.05**	**-111.59**	**-111.40**	**-101.42**

Fresh marsh Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	RP Low SLR (AAHUs)	RP Int SLR (AAHUs)	RP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	-63.9	-69.6	-56.4	-67.2	-73.2	-59.3	-98.5	-105.9	-79.7
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
St. Charles levee upgrade-lift	A to C	na	na	na	-2.48	-2.70	-2.17	-12.2	-13.9	-10.5
	TOTAL	**-63.92**	**-69.62**	**-56.35**	**-69.72**	**-75.94**	**-61.45**	**-110.66**	**-119.79**	**-90.17**

APPENDIX C

BORROW SITE SELECTION CRITERIA

Where multiple alternative borrow areas exists, use of those alternative sites should be prioritized in the following order: existing commercial pits, upland sources, previously disturbed/manipulated wetlands within a levee system, and low-quality wetlands outside a levee system. The Service supports the use of such protocols to avoid and minimize impacts to wetlands and bottomland hardwoods within project areas. Avoidance and minimization of those impacts helps to provide consistency with restoration strategies and compliments the authorized hurricane protection efforts. Such consistency is also required by Section 303(d)(1) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).
Accordingly, the Service recommends that prior to utilizing borrow sites every effort should be made to reduce impacts by using sheetpile and/or floodwalls to increase levee heights wherever feasible. In addition, the Service recommends that the following protocol be adopted and utilized to identify borrow sources in descending order of priority:

1. Permitted commercial sources, authorized borrow sources for which environmental clearance and mitigation have been completed, or non-functional levees after newly constructed adjacent levees are providing equal protection.
2. Areas under forced drainage that are protected from flooding by levees, and that are:
    a) non-forested (e.g., pastures, fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).
3. Sites that are outside a forced drainage system and levees, and that are:
    a) non-forested (e.g., pastures fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).

Notwithstanding this protocol, the location, size and configuration of borrow sites within the landscape is also critically important. Coastal ridges, natural levee flanks and other geographic features that provide forested/wetland habitats and/or potential barriers to hurricane surges should not be utilized as borrow sources, especially where such uses would diminish the natural functions and values of those landscape features.

To assist in expediting the identification of borrow sites, the Service recommends that immediately after the initial identification of a new borrow site the Corps should initiate informal consultation with the Service regarding potential impacts to federally listed threatened or endangered species. To aid you in complying with those proactive consultation responsibilities, the Service has provided (in the above letter) a list of threatened and endangered species and their critical habitats within the project area.

APPENDIX E

TWELVE REQUIRMENTS FOR MITIGATION PLANNING
(from the U.S. Army Corps of Engineers & EPA 2008 Final Mitigation Rule in the FEDERAL REGISTER Vol. 73, No. 70, April 10, 2008)

Twelve Requirements for a Compensatory Mitigation Plan

1. Objectives. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.

2. Site selection. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

3. Site protection instrument. A description of the legal arrangements and instrument including site ownership, that will be used to ensure the long-term protection of the mitigation project site.

4. Baseline information. A description of the ecological characteristics of the proposed mitigation project site, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

5. Determination of credits. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.
    - For permittee-responsible mitigation, this should include an explanation of how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity.
    - For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these were determined.

6. Mitigation work plan. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. Maintenance plan. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance standards. Ecologically-based standards that will be used to determine whether the mitigation project is achieving its objectives.

9. Monitoring requirements. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

10. Long-term management plan. A description of how the mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

12. Financial assurances. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

Other information. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive.
Lafayette, Louisiana 70506
October 16, 2020

Colonel Murphy
District Commander
U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans, LA 70118-3651

Dear Colonel Murphy:

The U.S. Fish and Wildlife Service has prepared this Revised Draft Fish and Wildlife Coordination Act Report on the U.S. Army Corps of Engineers' (USACE) Upper Barataria Louisiana Risk Management Feasibility Study. The objectives of that study are to evaluate the feasibility of providing storm surge protection and protection from flooding due to heavy rainfall events for the communities located within the upper Barataria Basin of Louisiana in Lafourche, Jefferson, St. John the Baptist, St. Charles, St. James, Ascension, and Assumption Parishes. The study area encompasses an extensive complex of coastal wetland forests and marshes within the upper Barataria Basin above the U.S. Highway 90 crossing.

This Revised Draft Coordination Act Report provides an updated analysis of preliminary fish and wildlife resource impacts associated with the final array of alternatives, including that of the newly developed alternative which would provide protection against the 100-year storm event. This new 100-yr event protection alternative has been selected as Tentatively Selected Plan (TSP). Because this analysis is preliminary, this Revised Draft Coordination Act Report does not fulfill the requirements of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). When finalized, this report would constitute the final report of the Secretary of the Interior as required by Section 2(b) of that Act. This Revised Draft Coordination Act Report has been provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS). Their comments on this Revised Draft Coordination Act Report will be incorporated into the Service's final report.

For a description of project area habitat types, associated fish and wildlife resources, methodology, fish and wildlife resource concerns, and literature citations, please reference our April 15, 2020, Planning Aid Report and our November 2019 Draft Coordination Act Report at the following link:
https://www.fws.gov/gisdownloads/R4/Louisiana%20ESO/Paille/

Description of Alternatives
The final array of alternatives consists of three levee construction alternatives.

Alternative 1: This, alternative raises existing forced drainage levees extending from Paradis to the community of Des Allemands and then a new levee segment would cross the basin from Bayou Des Allemands parallel to and south of Highway 90, terminating near Raceland on Bayou Lafourche (Figure 6). The levee would be constructed to an elevation of 7.5 feet and would be 18.3 miles in length. A 270-foot-wide barge gate would be installed in Bayou Des Allemands to provide gravity drainage. Borrow would come from nearby farmlands.

Alternative 2: This alignment incorporates all of the Alternative 1 footprint plus it includes raising the existing St. Charles Parish protection levee northeastward to the Mississippi River at Luling (Figure 7). This alternative would be constructed to an elevation of 8.5 feet and would be 30.4 miles long. A 270-foot-wide barge gate would provide gravity drainage at Bayou Des Allemands. Borrow for levee construction would come from nearby farmlands.

Figure 6. Map illustrating the proposed Alternative 1 levee alignment.

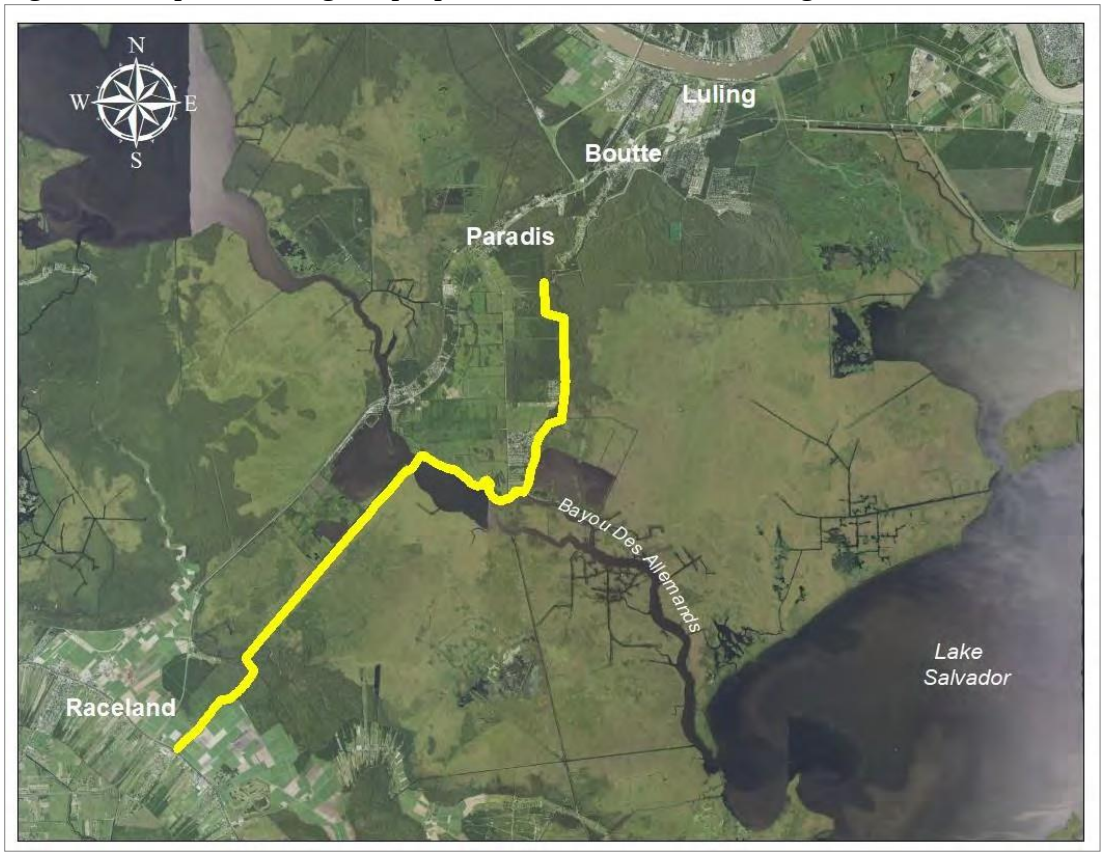


Figure 7. Map illustrating the proposed Alternative 2 levee alignment.

Alternative 3, the 100-year event protection alternative:
This alternative occupies generally the same footprint as Alternative 2, but would be constructed to an elevation of 14.5 to 16 feet, and would be up to 170 feet wide in the marshes southwest of Bayou Des Allemands and 260 feet wide along the existing St. Charles levee. A 40-foot-wide right of way would be established on both sides of the levee footprint in marshes. Where existing local levees would be raised, the ROW is generally located on one side or the other. Most of the levee would be constructed in two lifts, with the second lift occurring roughly during the middle of the 50-year project life. Only the westernmost levee reach (Reach H) would be constructed in one lift. To avoid impacting residential communities located in close proximity to the existing Sunset Drainage District levee, the proposed levee would consist of a sheet pile or T-wall structure. Borrow for levee construction would come from nearby farmlands.

Each of these three alternatives includes a 270-foot-wide barge gate to preclude storm surge flooding within the protected area. The wing walls of that floodgate structure would include 12 auxillary drainage gates to provide a total cross-sectional area greater than that at the existing railroad crossing located adjacent to the U.S. Highway 90 crossing. The TSP also includes two small culvert structures through the levee in Reach

G (southwest of Bayou Des Allemands) to maintain water exchange across the marsh. A 45-foot-wide water control structure would also be installed in Bayou Gauche at its junction with Bayou Des Allemands to reduce induced storm surge northward up that bayou (Figure 8).

List of structures associated with Figure 8:

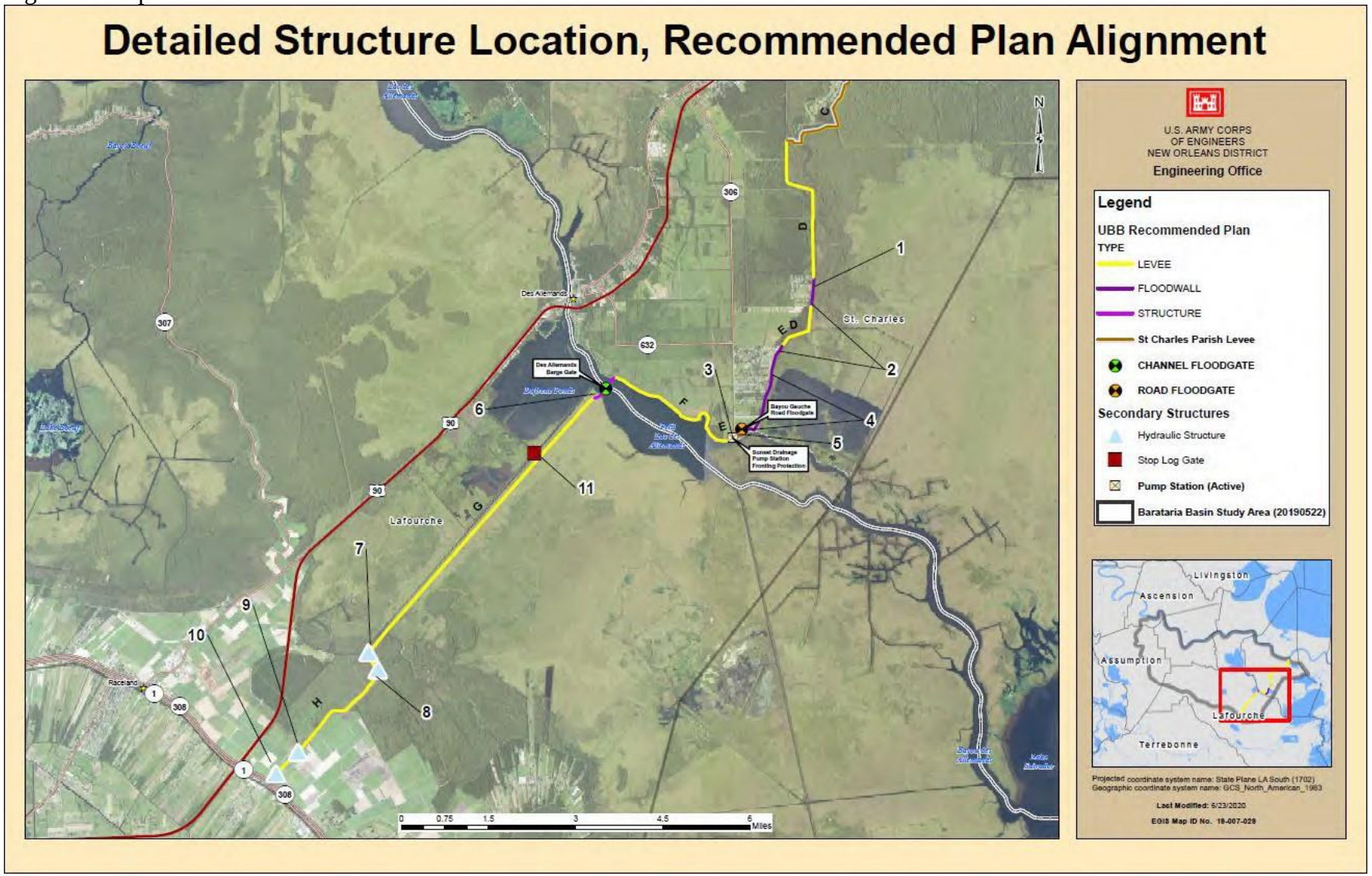
1. Floodwall section in Hydraulic Reach D
2. Floodwall section in Hydraulic Reach D and E
3. Crawford Canal P.S. Fronting Protection
4. Floodwall section in Hydraulic Reach E and F
5. 45 foot Bayou Gauche Roller Gate
6. 270 foot Barge Gate crossing Bayou Des Allemands
7. Drainage Structure – 4-6 X 6 foot RC box culverts with sluice gates
8. Drainage Structure – 4-6 X 6 foot RC box culverts with sluice gates
9. Drainage Structure – 2-84 inch RCP culverts with sluice gates
10. Drainage Structure – 1-60 inch RCP culvert with sluice gates
11. Godchaux Canal Bridge
12. Drainage Structure – 3-6 X 6 foot RC box culverts with sluice gates

Right of Way (ROW) impacts

A 40-foot-wide ROW is planned adjacent to the levee toe for equipment access. In marshes, a ROW would be located on both sides of the levee. After construction, the contractor will be required to restore the ROW marshes to pre-construction conditions. In marshes, it was assumed that 20% of the ROW would become shrub scrub habitat post-restoration due to resulting higher elevations. Additionally, it is assumed that post-construction ROW restoration would be completed through natural revegetation processes over a 5-year period. In forested areas, the forest would be cleared from the ROW. It is assumed that ROWs would be maintained free of trees and thus forested ROWs would be permanently impacted.

In addition to ROW impacts, some wetland impacts would also occur due to construction of access roads for equipment and staging areas. The Reach G access road would be permanent, and the Reach G staging area would be restored to marsh after construction of the second lift is completed (marsh ROW restoration assumptions applied). The Reach D access road is assumed to result in a permanent forest impact.

Figure 8. Map of water control structures and other features associated with the TSP.



EVALUATION OF ALTERNATIVE PLANS

Fish and wildlife resource impacts were determined for the final array of alternatives using USACE provided shapefiles of levee footprints. Acreage of direct wetland construction impacts by habitat type were obtained by overlaying shapefiles onto 2017 Digital Orthophoto Quarter Quad maps and habitat types were determined from that imagery in combination with field inspections conducted during October 2019 (Table 1). Given schedule constraints and lack of access to some future impact sites, the habitat type determinations in some areas is tentative. The direct impacts provided below include wetland impacts associated with construction access roads in reach D and G, and impacts associated with temporary ROWs. The USACE has determined that Alternative 3 is the Tentatively Selected Plan (TSP). The TSP is the most damaging of the alternatives in the final array of alternatives.

Table 1. Summary of direct impacts by habitat type and levee alternative.

Habitat Type	Alt 1 (acres)	Alt 2 (acres)	TSP (acres)
Bottomland Hardwood Forest	41.68	86.66	291.32
Cypress-Tupelo Swamp	1.04	36.43	167.28
Fresh Marsh	136.54	148.93	266.79

Bottomland hardwood forest (BLH) impacts would occur within the forced drainage area of the Sunset Drainage District. A small acreage of the Paradis Mitigation Bank located within that forced drainage district would be impacted. Wetlands within the Sunset Drainage District are not exposed to increasing SLR effects as are the remaining impact areas. Swamp and BLH on the flood side of the St. Charles levee would also be impacted by Alternatives 2 and 3.

Near the Raceland end of the proposed levee, impacted BLH consists of inundation stressed and stunted red maple. Along portions of the St. Charles levee, BLH is also stressed, but impacts to more healthy BLH stands would also occur there. The inundation stressed BLH could be classified as a Resource Category 3 rather than Category 2. A more thorough field inspection would be needed to consider this change.

Marsh impacts would occur primarily southwest of Bayou Des Allemands where a new levee would be constructed across marsh. Small amounts of fresh marsh impacts would occur along the St. Charles levee where inundation has converted former BLH to marsh. A more detailed breakdown of direct impacts (acres) by location is provided in Appendix A. A summary of direct impacts in AAHUs is provided in Table 3 with a more detailed breakdown provided in Appendix B.

It is assumed that borrow for levee construction will come from existing agricultural areas. If borrow is taken from forested or wetland areas, additional borrow-related impacts would need to be quantified. Construction of the TSP will impact two established mitigation areas and a conservation area on the flood side of the existing St. Charles Parish levee (Figure 9 and Table 4).

Table 3. Direct impacts in AAHUs by habitat type, alternative, and SLR scenario.

Habitat Type	Alt 1		
	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)
Bottomland Hardwood Forest	-16.05	-15.83	-14.80
Cypress-Tupelo Swamp	-0.56	-0.56	-0.56
Fresh Marsh	-63.92	-69.62	-56.35

Habitat Type	Alt 2		
	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)
Bottomland Hardwood Forest	-25.83	-24.77	-21.28
Cypress-Tupelo Swamp	-24.13	-24.13	-22.05
Fresh Marsh	-69.72	-75.94	-61.45

Habitat Type	TSP		
	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)
Bottomland Hardwood Forest	-98.34	-94.94	-84.49
Cypress-Tupelo Swamp	-111.59	-111.40	-101.42
Fresh Marsh	-110.66	-119.79	-90.17

Figure 9. Mitigation and conservation areas impacted by TSP construction Reaches A & B.

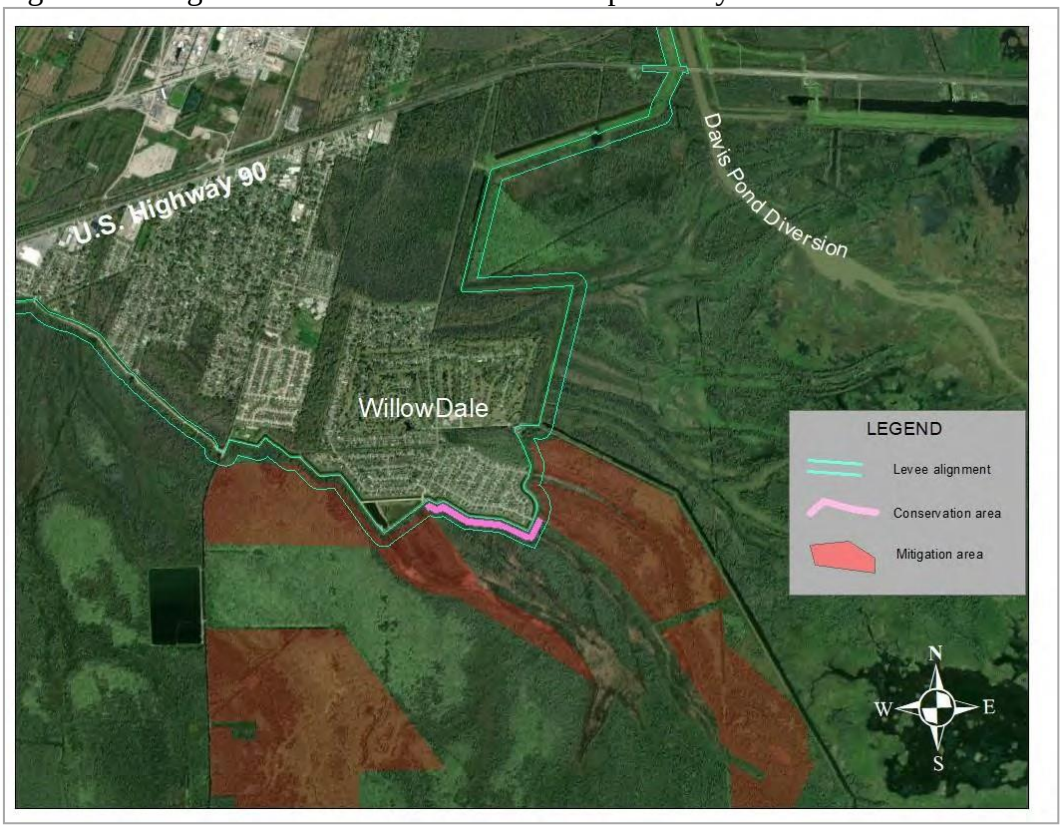


Table 4. Direct construction impacts on existing mitigation & conservation areas.

	St. Charles Conservation Area				St. Charles Mitigation Area				Paradis Mitigation Area			
	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs	1stLift & ROW Impact (acres)	2ndLift & ROW Impact (acres)	TOTAL Impact (acres)	TOTAL est. medSLR AAHUs
BLH low quality	0.56	0.72	1.28	-0.10	0.82	10.14	10.96	-1.91	1.61	2.97	4.59	-2.88
BLH med quality	0.75	0.97	1.71	-0.20	0.20	0.76	0.96	-0.26	0	0	0	0
BLH high quality	0	0	0	0	0	0	0	0	0	0	0	0
Swamp	6.51	5.74	12.25	-8.19	0.31	7.06	7.37	-4.93	0	0	0	0
Marsh footprint	2.18	0	2.18	-1.16	0	0	0	0.00	0	0	0	0
Marsh ROW	0.61	0	0.61	-0.20	0.19	0	0.19	-0.07	0	0	0	0

Indirect Impacts

Installation of the floodgate across Bayou Des Allemands has the potential to reduce water exchange and increase the hydroperiod of the upper Barataria Basin. Upper Barataria Basin forested wetlands are already near or at a permanently inundated condition. Consequently, growth rates of trees in those areas could be further reduced and tree mortality increased should the project cause stage increases of sufficiently long durations. Funding to conduct hydrologic modeling of this possible indirect effect was not available. At the railroad crossing just north of U.S. Highway 90, the Bayou Des Allemands channel is constricted having a channel cross-section of 5,180 square feet. The proposed floodgate with its auxillary gates would have a total cross-sectional area of 7,140 square feet (138% of the existing channel constriction). This total floodgate cross-sectional area may be sufficient to preclude any project-induced hydroperiod increases, but modeling should be conducted to confirm this. Lacking the more robust modeling confirmation, it cannot be assumed that the project would not result in system-level hydroperiod impacts to upper basin wetlands.

Fish Access Impacts

The Bayou Des Allemands floodgate may also reduce water exchange and fisheries access to the upper basin. To assess fish access impacts, the without project channel cross-sectional area at the floodgate location is needed. When those cross-sectional areas become available, then the fisheries access impact can be assessed.

SERVICE POSITION AND RECOMMENDATIONS

Because information regarding possible system-level hydroperiod impacts and fisheries access impacts associated with proposed water control structures are not yet available, we cannot complete our evaluation of project effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. When available, that information will be incorporated into our Final Coordination Act Report. Additional Service involvement during the preconstruction engineering and design phase of this project, along with more-definitive project information, will be required so that we can fulfill our responsibilities under the Coordination Act. Regarding indirect project effects, the Service recommends:

1. Auxillary drainage structures should be installed in the Bayou Des Allemands floodgate to preclude any with-project hydroperiod increase following heavy rainfall events.

2. The existing Bayou Des Allemands channel cross-section (in square feet) should be provided to enable assessment of potential structure related fisheries access impacts.

3. The project floodgate structures should be designed to handle the discharge associated with the two Mississippi River diversions identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan without corresponding widescale hydroperiod increases.

Available information indicates that substantial direct wetland losses will result from construction of project features. Consequently, avoidance and minimization of direct wetland impacts should be pursued to the greatest extent practicable. The Service provides the following recommendations to avoid and/or minimize project impacts on fish and wildlife resources, and for mitigating unavoidable impacts to those resources.

4. The USACE should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the engineering and design of project features including levees, floodgates, and environmental water control structures to ensure that those features are designed, constructed and operated consistent with wetland restoration and associated fish and wildlife resource needs.

5. Estimates of all direct and indirect project-related wetland impacts should be refined for inclusion in the project's Final Report and Environmental Impact Statement.

6. Locations of borrow for levee construction material should be identified and provided to the Service and other interested natural resource agencies.

7. To the greatest degree practical, the proposed levees and borrow pits should be located to avoid and minimize direct and indirect impacts to emergent wetlands. Efforts should be made to further reduce those direct impacts by hauling in fill material, using sheetpile for the levee crest, deep soil mixing, or other alternatives.

8. If organic soils must be removed from the construction site, that material should be used to create or restore emergent wetlands to the greatest extent practicable. If that is not practicable, then use of that material to improve borrow pit habitat quality (e.g., construct bank slopes, reduce depths, etc.) should be examined.

9. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

10. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. Surveys prior to construction such be undertaken to ensure no nesting birds are within 1,000 feet of any proposed work. If nesting birds are found within 1,000 feet of any proposed work sites, the Service and the Louisiana Department of Wildlife and Fisheries should be contacted

for procedures to avoid impacts.

11. The Service recommends that the USACE contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

12. Full, in-kind compensation (quantified as AAHUs) should be provided for unavoidable net adverse impacts on forested wetlands, marsh, and associated submerged aquatic vegetation, including any additional losses identified during post-authorization engineering and design studies. To help ensure that the proposed mitigation features meet their goals, the Service provides the following recommendations.

    a. The USACE should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
    b. Levee construction borrow sites should be designed to avoid and minimize impacts to fish and wildlife habitat; in the event new borrow sites are identified, guidelines for the selection of borrow sites are found in Appendix C.
    c. Mitigation measures should be constructed concurrently with the features that they are mitigating. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.
    d. The Service and other fish and wildlife conservation agencies should be consulted in the development of plans and specifications for all mitigation features and any monitoring and/or adaptive management plans.
    e. To avoid shortfalls in marsh creation acreage, the contractor should be required to guarantee the creation of at least the target acreage of marsh platform, or excess acres should be created.
    f. The acreage of marsh created to mitigate project impacts should meet or exceed the marsh acreage projected by the Habitat Evaluation Team for target year 5.
    g. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
    h. The USACE should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements. Success requirements are provided in Appendix D.
    i. Dredged material borrow pits, including those utilized to create marsh for mitigation purposes, should be carefully designed and located to minimize anoxia problems and excessive disturbance to area water bottoms, and to avoid increased saltwater intrusion.
    j. If applicable, a General Plan for mitigation should be developed by the USACE,

the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

k. The USACE should ensure adherence to the 12 Steps of Mitigation Planning for all mitigation. See Appendix E for details.

Extensive additional information is needed by the Service to complete the required evaluation of project effects and fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Much of that information may not be available until engineering and design of the project features has progressed. To help ensure that sufficient information is provided, the Service recommends that the USACE perform the following tasks early during the engineering and design phase.

1. Provide additional information on anticipated construction techniques and their associated wetland impacts, such as additional dredging to install floodgates and water control structures, dredging temporary by-pass channels, construction of access roads, ROW activities and restoration methods, and the method for disposing organic surface soils that are unsuitable for levee construction.

2. Provide final levee footprint shapefiles and designs for borrow sites used in levee construction.

3. Provide with-out project Bayou des Allemands cross-sections at or near where the floodgate would be installed.

4. Provide hydrologic model outputs on FWOP and FWP stages within the protected area wetlands following an variety of heavy rainfall events.

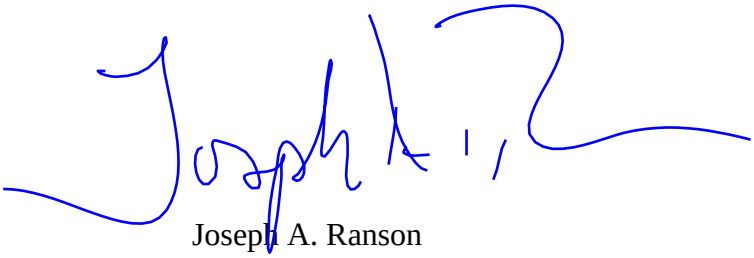
Sufficient funding should be provided for full Service participation in the post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.

Given that information needed to assess fish impact impacts and project-induced hydroperiod impacts are not available, the Service cannot fulfill its Coordination Act responsibilities at this time. Hence, we will require additional funding during the post-authorization engineering and design phase of this project to fulfill our responsibilities under the Fish and Wildlife Coordination Act. Estimates of those funding needs should be coordinated in advance with the Service, and should be based on the nature and complexity of the issues.

Provided that Service funding needs are met and that all of the above recommendations are incorporated into the feasibility report and related authorizing documents, the Service does not oppose further planning and implementation of the TSP.

We look forward to our continued involvement in this project moving forward. If you or your staff have further questions regarding the above letter or would like to meet and discuss our recommendations, please contact Mr. Ronny Paille of this office at 337-291-3117.

Sincerely,



Joseph A. Ranson
Field Supervisor
Louisiana Ecological Services Office

cc: EPA, Dallas, TX
NMFS, Baton Rouge, LA
LDWF, Baton Rouge, LA
LDNR, CMD, Baton Rouge, LA
OCPR, Baton Rouge, LA

APPENDIX A

DIRECT CONSTRUCTION IMPACTS

Acres of direct wetland impacts are listed below by four regions (see Figures A1, A2, A3). The Sunset Drainage District region is divided by Louisiana Highway 306 into an eastern and western region.

Figure A1. West of Bayou Des Allemands region.

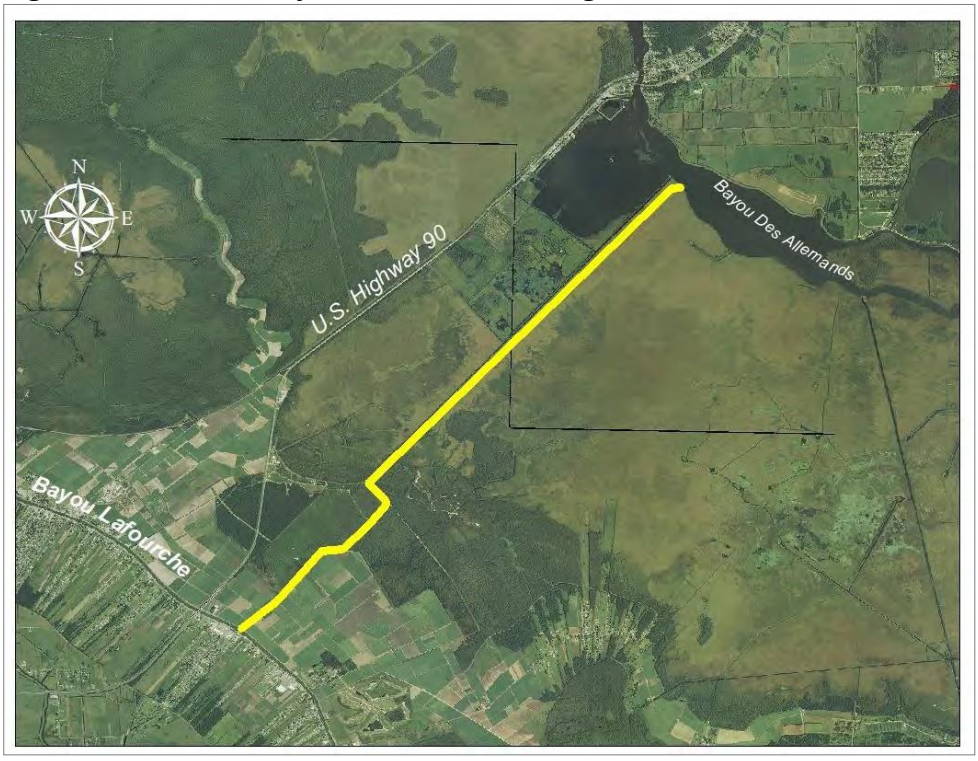


Figure A2. Map of the Sunset Drainage District region.

Figure A3. Map of the St. Charles Levee region.

Table A-1. Acres of direct construction impacts by region, habitat type, and alternative.

BLH Impact & Loction	Alt 1 (acres)	Alt 2 (acres)	TSP (acres)
West of Bayou Des Allemands			
Forested spoil banks	2.79	3.29	6.59
Reach G access rd	6.32	6.32	7.32
Low quality BLH	10.60	11.09	24.37
Sunset Drainage District - west of LA306			
Med qualti y BLH	1.92	2.04	9.32
Low quality BLH	5.63	5.97	8.62
Sunset Drainage District - east of LA306			
High quality BLH	1.92	1.96	8.19
Med qualti y BLH	1.12	1.21	7.82
Low quality BLH	3.93	4.03	39.97
Abandoned field	7.10	7.43	19.29
Mitigation Bank	0.35	0.37	3.92
St. Charles levee upgrade			
Med qualti y BLH	na	6.94	19.07
Low quality BLH	na	36.00	136.82
TOTAL	41.68	86.65	291.32
Swamp Impact & Location			
West of Bayou Des Allemands	0.00	0.00	0.35
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	1.04	1.08	2.59
St. Charles levee upgrade	na	35.35	164.33
TOTAL	1.04	36.43	167.28
Fresh Marsh Impact & Location			
West of Bayou Des Allemands	136.54	143.60	209.11
Sunset Drainage District - west of LA306	0.00	0.00	0.00
Sunset Drainage District - east of LA306	0.00	0.00	0.00
St. Charles levee upgrade	na	5.32	57.68
TOTAL	136.54	148.93	266.79

APPENDIX B

DIRECT CONSTRUCTION IMPACTS (AAHUs)

Table B-1. Direct construction impacts (AAHUs) by region, habitat type, and alternative.

BLH Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	TSP Low SLR (AAHUs)	TSP Int SLR (AAHUs)	TSP High SLR (AAHUs)
West of Bayou Des Allemands	G&H									
Forested spoil banks	G&H	-0.79	-0.73	-0.41	-0.93	-0.86	-0.48	-1.86	-1.72	-0.97
Dufrene Ponds access rd	G&H	-0.50	-0.43	-0.30	-0.50	-0.43	-0.30	-0.57	-0.49	-0.35
Low quality BLH	G&H	-1.75	-1.66	-1.08	-1.82	-1.73	-1.13	-4.01	-3.80	-2.47
Sunset Drainage District west of LA 306	F									
Med quality BLH	F	-1.21	-1.21	-1.21	-1.28	-1.28	-1.28	-6.07	-6.07	-6.07
Low quality BLH	F	-2.32	-2.32	-2.32	-2.46	-2.46	-2.46	-3.65	-3.65	-3.65
Sunset Drainage District east of LA 306	D&E									
High quality BLH	D&E	-1.62	-1.62	-1.62	-1.65	-1.65	-1.65	-6.95	-6.95	-6.95
Med quality BLH	D&E	-0.92	-0.92	-0.92	-0.99	-0.99	-0.99	-6.45	-6.45	-6.45
Low quality BLH	D&E	-2.20	-2.20	-2.20	-2.26	-2.26	-2.26	-20.73	-20.73	-20.73
Abandoned field	D&E	-4.49	-4.49	-4.49	-4.70	-4.70	-4.7	-13.19	-13.19	-13.19
Mitigation bank	D&E	-0.25	-0.25	-0.25	-0.26	-0.26	-0.26	-2.88	-2.88	-2.88
St. Charles levee upgrade-lift	A to C									
Med quality BLH	A to C	na	na	na	-2.03	-1.87	-1.09	-5.58	-5.14	-3.01
Low quality BLH	A to C	na	na	na	-6.95	-6.28	-4.68	-26.4	-23.87	-17.77
	TOTAL	**-16.05**	**-15.83**	**-14.80**	**-25.83**	**-24.77**	**-21.28**	**-98.34**	**-94.94**	**-84.49**

Swamp Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	TSP Low SLR (AAHUs)	TSP Int SLR (AAHUs)	TSP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	0.0	0.0	0.0	0.0	0.0	0.0	A	A	A
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	-0.56	-0.56	-0.56	-0.58	-0.58	-0.58	-1.4	-1.4	-1.4
St. Charles levee upgrade-lift	A to C	na	na	na	-23.55	-23.55	-21.47	-110.2	-110.0	-100.0
	TOTAL	**-0.56**	**-0.56**	**-0.56**	**-24.13**	**-24.13**	**-22.05**	**-111.59**	**-111.40**	**-101.42**

Fresh marsh Impact & Location	Levee Reach	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)	TSP Low SLR (AAHUs)	TSP Int SLR (AAHUs)	TSP High SLR (AAHUs)
West of Bayou Des Allemands	G&H	-63.9	-69.6	-56.4	-67.2	-73.2	-59.3	-98.5	-105.9	-79.7
Sunset Drainage District west of LA 306	F	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
Sunset Drainage District east of LA 306	D&E	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.0
St. Charles levee upgrade-lift	A to C	na	na	na	-2.48	-2.70	-2.17	-12.2	-13.9	-10.5
	TOTAL	**-63.92**	**-69.62**	**-56.35**	**-69.72**	**-75.94**	**-61.45**	**-110.66**	**-119.79**	**-90.17**

APPENDIX C

BORROW SITE SELECTION CRITERIA

Where multiple alternative borrow areas exists, use of those alternative sites should be prioritized in the following order: existing commercial pits, upland sources, previously disturbed/manipulated wetlands within a levee system, and low-quality wetlands outside a levee system. The Service supports the use of such protocols to avoid and minimize impacts to wetlands and bottomland hardwoods within project areas. Avoidance and minimization of those impacts helps to provide consistency with restoration strategies and compliments the authorized hurricane protection efforts. Such consistency is also required by Section 303(d)(1) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).
Accordingly, the Service recommends that prior to utilizing borrow sites every effort should be made to reduce impacts by using sheetpile and/or floodwalls to increase levee heights wherever feasible. In addition, the Service recommends that the following protocol be adopted and utilized to identify borrow sources in descending order of priority:

1. Permitted commercial sources, authorized borrow sources for which environmental clearance and mitigation have been completed, or non-functional levees after newly constructed adjacent levees are providing equal protection.
2. Areas under forced drainage that are protected from flooding by levees, and that are:
    a) non-forested (e.g., pastures, fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).
3. Sites that are outside a forced drainage system and levees, and that are:
    a) non-forested (e.g., pastures fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).

Notwithstanding this protocol, the location, size and configuration of borrow sites within the landscape is also critically important. Coastal ridges, natural levee flanks and other geographic features that provide forested/wetland habitats and/or potential barriers to hurricane surges should not be utilized as borrow sources, especially where such uses would diminish the natural functions and values of those landscape features.

To assist in expediting the identification of borrow sites, the Service recommends that immediately after the initial identification of a new borrow site the USACE should initiate informal consultation with the Service regarding potential impacts to federally listed threatened or endangered species. To aid you in complying with those proactive consultation responsibilities, the Service has provided (in the above letter) a list of threatened and endangered species and their critical habitats within the project area.

APPENDIX D

MITIGATION BANK CRITERIA

APPENDIX E

TWELVE REQUIRMENTS FOR MITIGATION PLANNING
(from the U.S. Army Corps of Engineers & EPA 2008 Final Mitigation Rule in the FEDERAL REGISTER Vol. 73, No. 70, April 10, 2008)

Twelve Requirements for a Compensatory Mitigation Plan

1. Objectives. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.

2. Site selection. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

3. Site protection instrument. A description of the legal arrangements and instrument including site ownership, that will be used to ensure the long-term protection of the mitigation project site.

4. Baseline information. A description of the ecological characteristics of the proposed mitigation project site, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

5. Determination of credits. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.
    - For permittee-responsible mitigation, this should include an explanation of how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity.
    - For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these were determined.

6. Mitigation work plan. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. Maintenance plan. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance standards. Ecologically-based standards that will be used to determine whether the mitigation project is achieving its objectives.

9. Monitoring requirements. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

10. Long-term management plan. A description of how the mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

12. Financial assurances. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

Other information. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
200 Dulles Drive
Lafayette, Louisiana 70506

November 6, 2019

Colonel Stephen Murphy
District Commander
U.S. Army Corps of Engineers
7400 Leake Avenue
New Orleans, LA 701118-3651

Dear Colonel Murphy:

We are providing the enclosed draft Fish and Wildlife Coordination Act (FWCA) Report on the Upper Barataria Louisiana Risk Management Feasibility Study. Our draft FWCA Report was prepared under the authority of the FWCA (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), but does not entirely fulfill the final reporting requirements of Section (2)b of that Act. A copy of this report is being provided to the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service for review. Comments received from those agencies will be included in the final report.

Sincerely,

Joseph A. Ranson
Field Supervisor
Louisiana Ecological Services Office

UPPER BARATARIA LOUISIANA RISK MANAGEMENT FEASIBILITY STUDY

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

NOVEMBER 2019

UPPER BARATARIA LOUISIANA RISK MANAGEMENT FEASIBILITY STUDY

DRAFT
FISH AND WILDLIFE COORDINATION ACT REPORT

SUBMITTED TO

NEW ORLEANS DISTRICT

U.S. ARMY CORPS OF ENGINEERS

NEW ORLEANS, LOUISIANA

PREPARED BY

RONNY PAILLE
FISH AND WILDLIFE FIELD BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

NOVEMBER 2019

Executive Summary

The U.S. Fish and Wildlife Service has prepared a draft Fish and Wildlife Coordination Act Report on the U.S. Army Corps of Engineers' (Corps) Upper Barataria Louisiana Risk Management Feasibility Study. The objectives of that study are to evaluate the feasibility of providing storm surge protection and protection from flooding due to heavy rainfall events for the communities located within the upper Barataria Basin of Louisiana in Lafourche, Jefferson, St. John the Baptist, St. Charles, St. James, Ascension, and Assumption Parishes. The study area encompasses an extensive complex of coastal wetland forests and marshes within the upper Barataria Basin and extends down-basin several miles below the U.S. Highway 90 crossing.

This Draft Coordination Act Report provides a preliminary analysis of fish and wildlife resource impacts associated with construction of the final array of alternative plans. Because the analysis is preliminary, this Draft Coordination Act Report does not fulfill the requirements of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). When finalized, this report would constitute the final report of the Secretary of the Interior as required by Section 2(b) of that Act. This Draft Coordination Act Report has been provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS). Their comments on this Draft Coordination Act Report will be incorporated into the Service's final report.

The study area forested and herbaceous wetlands are suffering from increased inundation due to the combined effects of subsidence, sea level rise, and loss of Mississippi River suspended sediment inputs. As a result, study area cypress-tupelo swamps are no longer sustainable. Bottomland hardwoods at higher elevations are converting to cypress-tupelo swamp or marsh. Upper basin marshes have remained healthy and are expected to remain relatively healthy provided that area salinities do not increase and middle and lower basin marshes remain intact.

Through the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), the Corps, the Service, and other Federal and State agencies have jointly developed strategies to protect and restore Louisiana's coastal wetlands, including those within the Upper Barataria Basin. Introduction of Mississippi River suspended sediment through two small river diversion projects is proposed as the foremost strategy to help maintain the upper basin forested wetlands.

Of the two alternatives in the final array of feasible plans, the Corps has chosen the least damaging (Alternative 1). This alternative would result in direct wetland impacts to marshes, swamps, and bottomland hardwood forests of approximately 137, 1, and 42 acres, respectively. Given access difficulties and study schedule/reporting deadlines, not all impact areas could be inspected. Hence, the above referenced habitat impact estimates are tentative and need revision when time and access can be provided. Likewise, the Wetland Value Assessment (WVA) results contained herein are preliminary and subject to change when access can be provided and proper field work conducted.

Information needed to assess the magnitude of potential indirect project impacts associated with fisheries access reductions and hydroperiod increases was not available. Once that information becomes available, those indirect impact assessments can begin. Given the tentative and incomplete nature of Service-provided fish and wildlife resource impacts to date, we cannot

complete our evaluation of project effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. If the needed information becomes available and time permits, that information and analysis will be incorporated into our Final Coordination Act Report. Additional Service involvement during the preconstruction engineering and design phase of this project, along with more-definitive project information, will be required so that we can fulfill our responsibilities under the Coordination Act. With regard to indirect project effects, the Service offers the following recommendations:

1. Additional drainage structures should be installed in the Bayou Des Allemands levee crossing should the hydrologic analysis show a with-project hydroperiod increase associated with heavy rainfall events.

2. The project drainage structures should be designed to handle inputs associated with the two Mississippi River diversions identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan without corresponding widescale hydroperiod increases.

Available information indicates that substantial direct wetland losses will result from construction of project features. Consequently, avoidance and minimization of direct wetland impacts should be pursued to the greatest extent practicable. The Service provides the following recommendations to avoid and/or minimize project impacts on fish and wildlife resources, and for mitigating unavoidable impacts to those resources.

3. The Corps should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the engineering and design of project features including levees, floodgates, and environmental water control structures to ensure that those features are designed, constructed and operated consistent with wetland restoration and associated fish and wildlife resource needs.

4. Estimates of all direct and indirect project-related wetland impacts should be refined for inclusion in the project's Final Report and Environmental Impact Statement.

5. Locations of borrow for levee construction material should be identified and provided to the Service and other interested natural resource agencies.

6. To the greatest degree practical, the proposed levees and borrow pits should be located to avoid and minimize direct and indirect impacts to wetlands. Efforts should be made to further reduce those direct impacts by hauling in fill material, using sheetpile for the levee crest, deep soil mixing, or other alternatives.

7. If organic soils must be removed from the construction site, that material should be used to create or restore emergent wetlands to the greatest extent practicable. If that is not practicable, then use of that material to improve borrow pit habitat quality (e.g., construct bank slopes, reduce depths, etc.) should be examined.

8. Forest clearing associated with project features should be conducted during the fall or

winter to minimize impacts to nesting migratory birds, when practicable.

9. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. Surveys prior to construction such be undertaken to ensure no nesting birds are within 1,000 feet of any proposed work. If nesting birds are found within 1,000 feet of any proposed work sites, the Service and the Louisiana Department of Wildlife and Fisheries should be contacted for procedures to avoid impacts.

10. The Service recommends that the Corps contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

11. Full, in-kind compensation (quantified as AAHUs) should be provided for unavoidable net adverse impacts on forested wetlands, marsh, and associated submerged aquatic vegetation, including any additional losses identified during post-authorization engineering and design studies. To help ensure that the proposed mitigation features meet their goals, the Service provides the following recommendations.

    a. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
    b. Levee construction borrow sites should be designed to avoid and minimize Impacts to fish and wildlife habitat; in the event new borrow sites are identified, guidelines for the selection of borrow sites are found in Appendix C.
    c. Mitigation measures should be constructed concurrently with the features that they are mitigating. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.
    d. The Service and other fish and wildlife conservation agencies should be consulted in the development of plans and specifications for all mitigation features and any monitoring and/or adaptive management plans.
    e. To avoid shortfalls in marsh creation acreage, the contractor should be required to guarantee the creation of at least the target acreage of marsh platform, or excess acres should be created.
    f. The acreage of marsh created to mitigate project impacts should meet or exceed the marsh acreage projected by the Habitat Evaluation Team for target year 5.
    g. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
    h. The acreage of marsh created for mitigation purposes, and adjacent affected

wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.

i. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, the effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.

j. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements.

k. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements. Success requirements are provided in Appendix D.

l. Dredged material borrow pits, including those utilized to create marsh for mitigation purposes, should be carefully designed and located to minimize anoxia problems and excessive disturbance to area water bottoms, and to avoid increased saltwater intrusion.

m. If applicable, a General Plan for mitigation 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. See Appendix E for details.

Extensive additional information is needed by the Service to complete the required evaluation of project effects and fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Much of that information may not be available until engineering and design of the project features has progressed. To help ensure that sufficient information is provided, the Service recommends that the Corps perform the following tasks during the engineering and design phase.

a. Provide additional information on anticipated construction techniques and their associated wetland impacts, such as additional dredging to install floodgates and water control structures, dredging temporary by-pass channels, construction of access roads, and the method for disposing organic surface soils that are unsuitable for levee construction.

b. Provide final levee footprint shapefiles and designs for borrow sites used in levee construction.

c. Provide with-out project channel cross-sections at or near where water control structures would be installed.

d. Provide hydrologic model outputs on FWOP and FWP stages within the protected area wetlands following a variety of heavy rainfall events.

Given that information needed to assess fish impact impacts and project-induced hydroperiod impacts are not available, the Service cannot fulfill its Coordination Act responsibilities at this time. Hence, we will require additional funding during the post-authorization engineering and

design phase of this project to fulfill our responsibilities under the Fish and Wildlife Coordination Act. Estimates of those funding needs should be coordinated in advance with the Service, and should be based on the nature and complexity of the issues.

Provided that Service funding needs are met and the above recommendations are incorporated into the feasibility report and related authorizing documents, the Service does not oppose further planning and implementation of the TSP.

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INTRODUCTION

The Upper Barataria Louisiana Risk Management Feasibility Study was authorized under the Bipartisan Budget Act of 2018, H.R. 1892 -13, Title IV, Corps of Engineers – Civil Department of the Army Investigations. The non-federal sponsor for the study is the Coastal Protection and Restoration Authority Board (CPRA) of Louisiana. That Act authorized the Corps to evaluate the feasibility of measures to reduce impacts associated with coastal storm tidal surges and headwater flooding due to rainfall within the upper Barataria Basin of Louisiana, in Lafourche, Jefferson, Ascension, St. John the Baptist, St. Charles, St. James, and Assumption Parishes.

This Coordination Act Report provides an analysis of fish and wildlife resource impacts associated with construction and the final array of alternative plans. The impact analysis utilizes the Wetland Value Assessment (WVA) methodology to assess habitat type impacts over time. When finalized, this Coordination Act Report fulfills the requirements of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and would constitute the final report of the Secretary of the Interior as required by Section 2(b) of that Act. Comments on this draft Coordination Act Report from the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS) will be incorporated into the Service's final report.

DESCRIPTION OF STUDY AREA

The upper Barataria Basin study area lies between Bayou Lafourche to the west, the Mississippi River to the east, and extends southward to below the U.S. Highway 90 crossing. This area is a region dominated by extensive coastal wetlands created by deltaic processes of the Mississippi River. Because of its deltaic history, the study area is characterized by a number of former distributary channels extending into the basin from either Bayou Lafourche or from the Mississippi River. Because the highest land elevations occur on the banks of those former distributary channels, developed areas are generally located there. The remainder of the upper basin consists of coastal forested wetlands, marshes and associated water bodies. The Barataria Basin exhibits a northwest-southeast salinity gradient with fresh or low-salinity conditions toward the northwest, and more saline conditions nearer the Gulf. Given that the study area is located within the upper basin, the study area is characterized by freshwater conditions, with low-salinity brackish water occurring infrequently in the more tidally influenced southern portion of the study area.

Because of the lack of mineral sediment accretion in upper basin marshes, those marshes are characterized by highly organic substrates that in many areas are floating or semi-floating. Such marshes are vulnerable to potential catastrophic degradation and loss if exposed to brackish water conditions. Additionally, such floating marshes are more susceptible to storm surge impacts than heavier mineral soil marshes.

Riverine freshwater and sediment inputs once available to the study area via Bayou Lafourche were eliminated when the bayou was damned in 1903. Seasonal freshwater and suspended sediment inputs from the Mississippi River were eliminated by construction of flood protection

levees along the Mississippi River following the catastrophic 1927 Mississippi River flood. The elimination of the riverine suspended sediment inputs has resulted in net subsidence as sediment inputs are no longer available to counteract subsidence and sea level rise. This problem, manifested in wetland loss, is most severe in the middle and lower basin (CPRA 2017) and with additional time may impact the upper basin study area as well. To address this coastal wetland loss crisis, the Davis Pond Freshwater Diversion Project was authorized and began operating in 2002. The Mid-Barataria Sediment Diversion Project, currently in engineering and design, is planned to introduce large amounts of Mississippi River water and sediments into the middle basin.

FISH AND WILDLIFE CONCERNS IN THE STUDY AREA

Construction of flood protection levees along the Mississippi River have halted annual suspended sediment inputs to upper basin swamps and marshes. With the resulting accretion deficit, the majority of those swamps are no longer capable of natural regeneration due to increasing water levels (Conner and Day 1988).

Because of sea level rise, suspended sediment deprivation and subsidence of forested wetlands within the upper basin, plans for two small-scale Mississippi River diversions or siphons were proposed in Louisiana's 2007 Comprehensive Master Plan for a Sustainable Coast (CPRA 2007). Although no longer in the current Master Plan (CPRA 2017), the subsidence-related conversion of upper basin cypress swamp to marsh or open water is only a matter of time without major efforts to restore suspended sediment inputs to the upper basin. Should upper basin swamps convert largely to open water, flood protection risks will substantially increase during tropical storm events and armoring of local protection levees may be needed to protection against wave induced erosion and failure.

Bottomland hardwood forests at slightly higher elevations are also converting to swamp, shrub-scrub, or marsh due to the increasing hydroperiod. The regional loss of coastal forested wetlands due to development and natural degradation is a concern because those forested habitats are critically important stopover habitat providing food and water resources for many species of neotropical migratory songbirds after spring migration northward across the Gulf of Mexico.

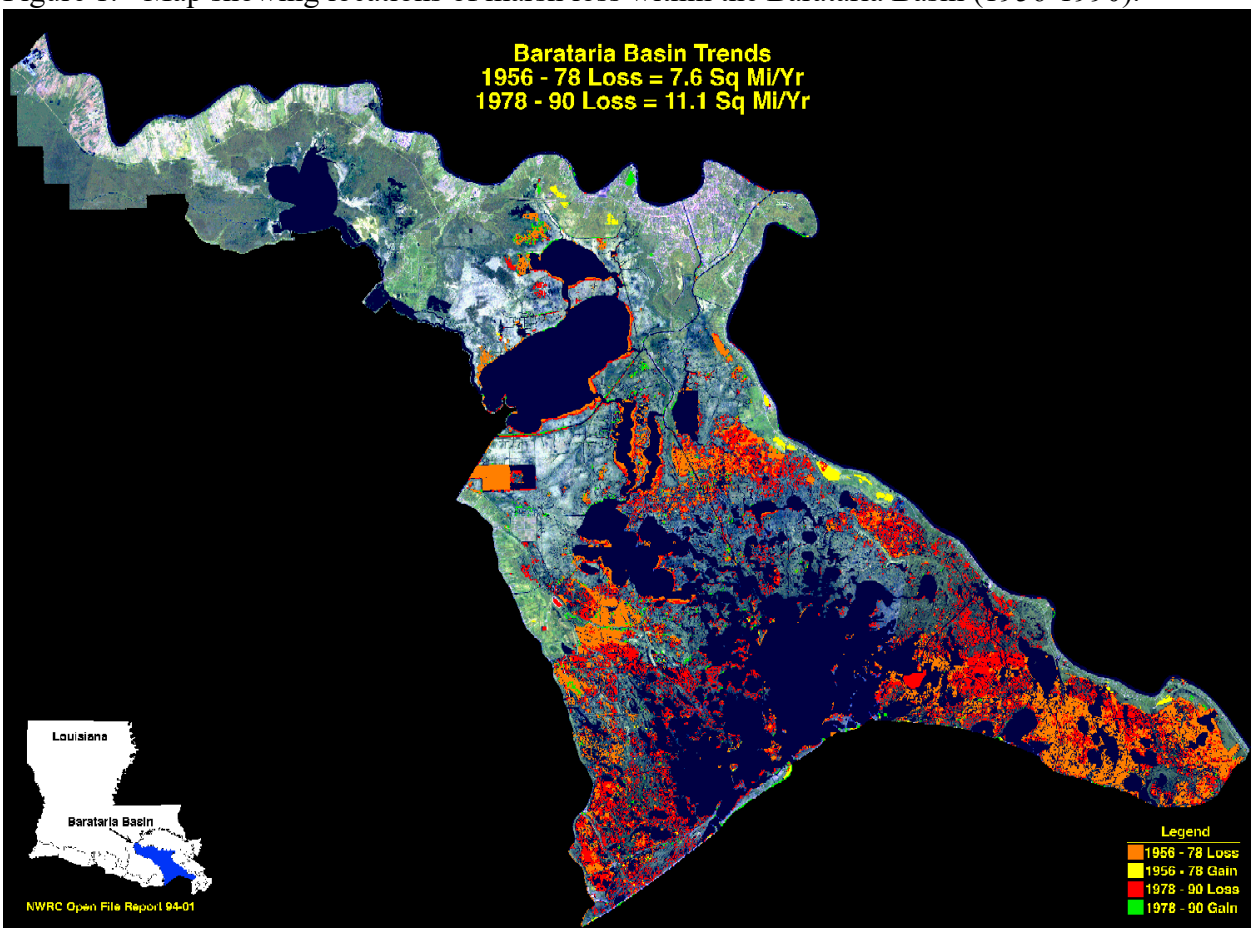
The Barataria Basin has lost over 1,120 square kilometers (276,757 acres) of marsh (1932-2016) second only to the Terrebonne Basin Basin (Table 1, from: Couvillion et al. 2017).

Table 1. Land area and change within Louisiana coastal basins 1932-2016 (square km).

Year	Atchafalaya Basin	Barataria Basin	Breton Sound Basin	Calcasieu Sabine Basin	Miss. River Basin	Mermentau Basin	Pontchartrain Basin	Teche Vermilion Basin	Terrebonne Basin
1932	550.58	3,832.61	1,107.56	2,136.71	678.75	2,481.92	2,862.43	1,421.74	4,471.55
2016	566.90	2,712.53	682.01	1,619.01	303.98	1,993.69	2,390.08	1,272.90	3,169.56
change	+16.32	-1,120.08	-425.55	-517.70	-374.77	-488.23	-472.35	-148.84	-1,301.99
%change	+3.96%	-29.22%	-38.42%	-24.23%	-55.24%	-19.67%	-16.50%	-10.47%	-29.12%

The majority of this marsh loss has occurred in the middle and lower basin (Figure 1). The fresh and low salinity marshes of the upper basin have not experienced much loss due in part to the ability of those marshes to accumulate organic matter to keep pace with subsidence and sea level rise. However, continued loss of the middle and lower basin marshes may expose the upper basin freshwater marshes and swamps to increased tidal action and salinities, resulting in accelerated losses of marshes and swamps in the project area. Continuing wetland loss constitutes a serious threat to the nationally important fish and wildlife resources of the study area.

Figure 1. Map showing locations of marsh loss within the Barataria Basin (1956-1990).



Loss of middle and lower basin marshes may also result in higher project area storm surge elevations and will increase the likelihood that open water conditions may occur on the Gulf side of proposed levees, thus increasing levee maintenance costs.

Currently the project is authorized to provide protection against tropical storm surges and heavy rainfall events. Floodgate operations to protect against tidal flooding is not an authorized project purpose. If the project sponsors wish to close floodgates to reduce tidal flooding, additional impact assessments will be needed to address associated impacts. A project alternative that would avoid this impact would be a construction of ring levee/floodwall system around communities such that the upper basin is not enclosed within a flood protection system.

If the water exchange capacity of floodgates in the cross-basin levee alternatives is insufficient to handle evacuation of heavy rainfall events, then the project may result in increased flooding of developed areas and wetlands already stressed due to the combined effects of subsidence and sea level rise. The project's storm water evacuation capacity should be designed to handle both rainfall evacuation and discharge of water diverted from the Mississippi River for wetland restoration purposes. That structure design capacity should be planned for future conditions when sea level is higher. Additionally, the proposed operation of the mid-Barataria Basin Sediment Diversion project may result in higher water elevations and may reduce the extent of low-tide events which would otherwise facilitate gravity drainage of the project area.

Section 303 (d) of Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) requires the Secretary of the Army, in consultation with the Director of the Service and the Administrator of the Environmental Protection Agency, to ensure that the project be consistent with the purposes of the restoration plan prepared in compliance with Section 303(b) of CWPPRA. In that plan, the CWPPRA Task Force identified small Mississippi River diversions into the upper Barataria Basin as the number one Regional Ecosystem Strategy for addressing loss of upper Barataria Basin swamps (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). Therefore, to be consistent with these coastal restoration plans, the desired flood protection floodgate structures must be designed to accommodate one or more small upper basin Mississippi River diversions, in addition to the capacity needed for evacuation of water following heavy rainfall events.

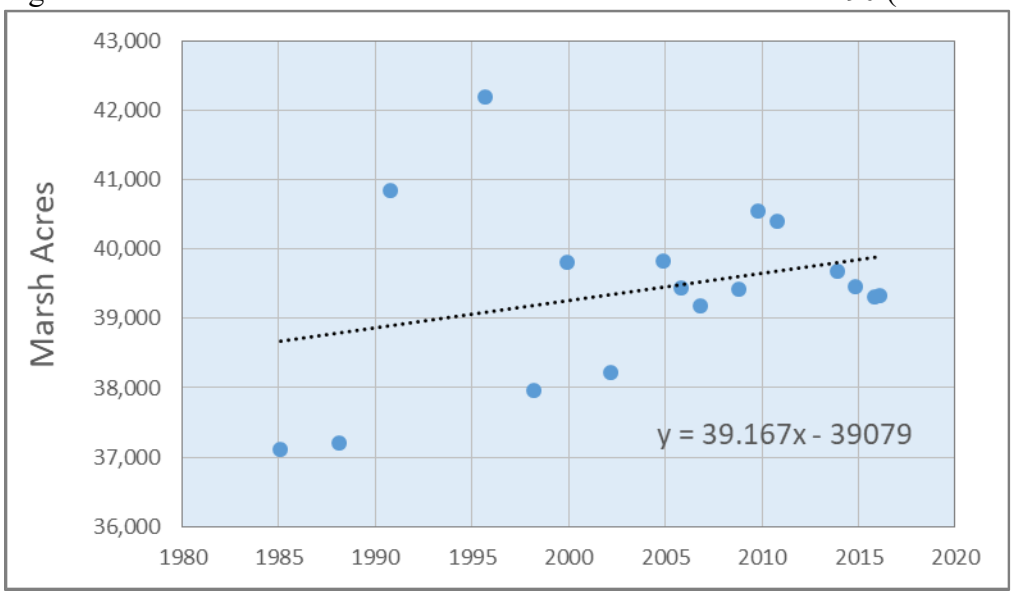
EVALUATION METHODOLOGY

Based on Corps-provided shapefiles of project alternative footprints, project impacts would occur to marshes, cypress-tupelo swamp, and bottomland hardwood forest.

Marsh - To assess construction impacts to coastal marshes, wetland acreage data (1985 through 2016) was obtained from U.S. Geological Survey (USGS) satellite imagery for each of the study area subunits. Future-without-project (FWOP) subunit marsh loss rates were determined by producing a linear trendline through the data (Figure 2) for each study area subunit. Using the trendline, marsh acreages within each study area subunit were projected from 1985 through the project life (2023 to 2073). The trendline projections are assumed to represent a continuation of the historic low sea level rise (SLR) scenario. However, future marsh acreages were also calculated for the intermediate and high SLR scenarios as explained below.

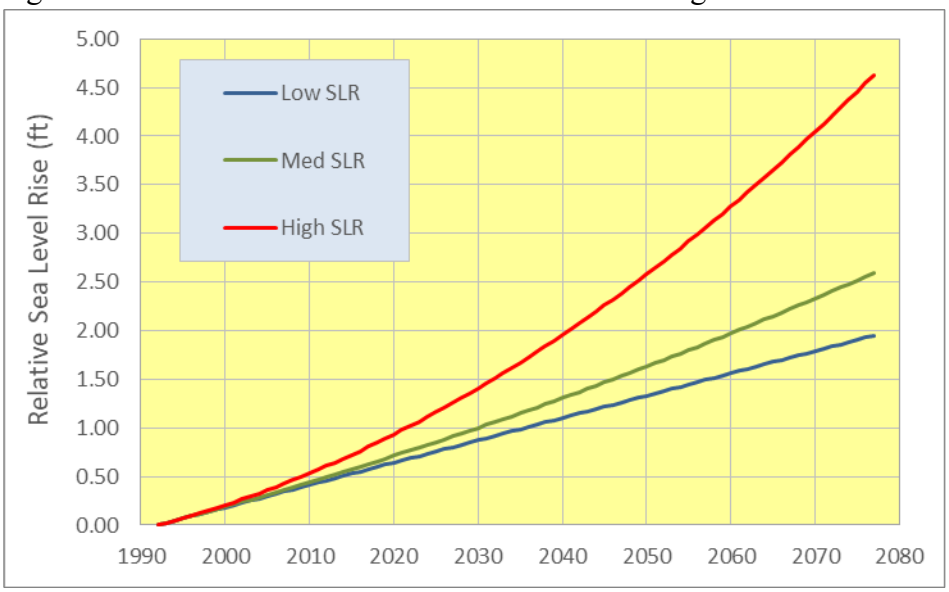
Long-term water level gage data from the Bayou Barataria at Barataria gage was utilized per the Corps' Engineering Circular (EC) 1165-2-212 to develop relative sea level rise rates associated with low (historic), intermediate, and high sea level rise scenarios. According to EC guidance,

Figure 2. Observed data and trendline for marshes south of U.S. 90 (Dufrene Pond subunit).



the intermediate and high estimates of eustatic SLR were derived using the National Research Council (NRC) equations NRC I and NRC III, respectively. Based on the Bayou Barataria gage, the historic water level rise trend has been 7.0 millimeters/year (mm/yr). Subtracting the historic eustatic SLR rate of 1.7 mm/yr yields a subsidence rate of 5.3 mm/yr. By adding the subsidence rate to the predicted eustatic SLR, RSLR rates were determined for the historic (low), medium (or intermediate) and high SLR scenarios (Figure 3).

Figure 3. Predicted RSLR estimates determined using EC 1165-2-212.



Recent wetland loss rates (1985-2016) were assumed to have occurred under a constant low or historic SLR rate. Therefore, for the low RSLR scenario (i.e., the continuation of the current 7.0

mm per year RSLR rate observed at the Bayou Barataria gage), the historic marsh loss rates were held constant and projected forward to provide yearly land acreages through the life of the project. For the intermediate and high scenarios, the 1985-2016 annual wetland loss rates for each subunit were gradually increased (beginning in 1992 per the Corps' EC 1165-2-212), by adding an additional annual increment of loss based on the SLR increase for that year. Those annual wetland loss rate increases were based on the slope of the negative relationship observed between wetland loss rates and RSLR rates from coastwide non-fresh marshes outside of active deltaic influences. In this relationship, RSLR was calculated as the sum of subsidence per statewide subsidence zones (see Figure 4) plus a eustatic SLR rate of 1.7 mm/yr. Those land loss rates in percent per year, were plotted against RSLR determined for those subsidence zones (Figure 5). According to the slope of this wetland loss versus RSLR relationship, every 1.0 mm/yr increase in RSLR would result in a 0.11%/yr increase in the wetland loss rate. The additional RSLR related wetland loss rate was then added to the baseline or historic loss rate to obtain total annual loss rates for each year, under the increasing sea level rise scenarios.

Figure 4. Coastwide subsidence zones from the Corps of Engineers.

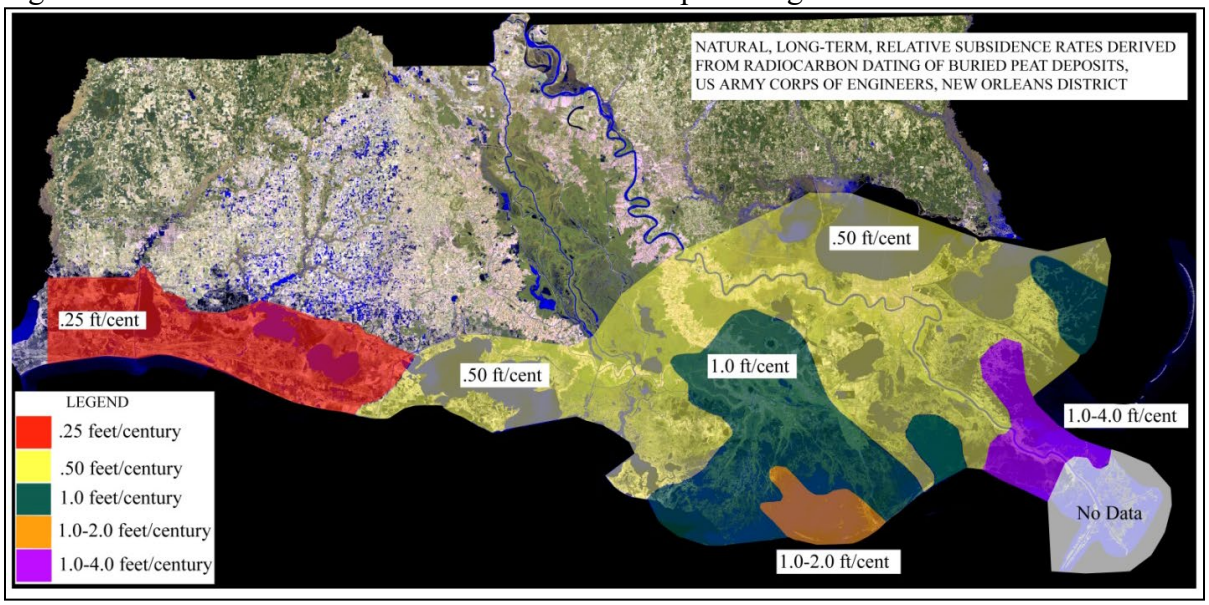
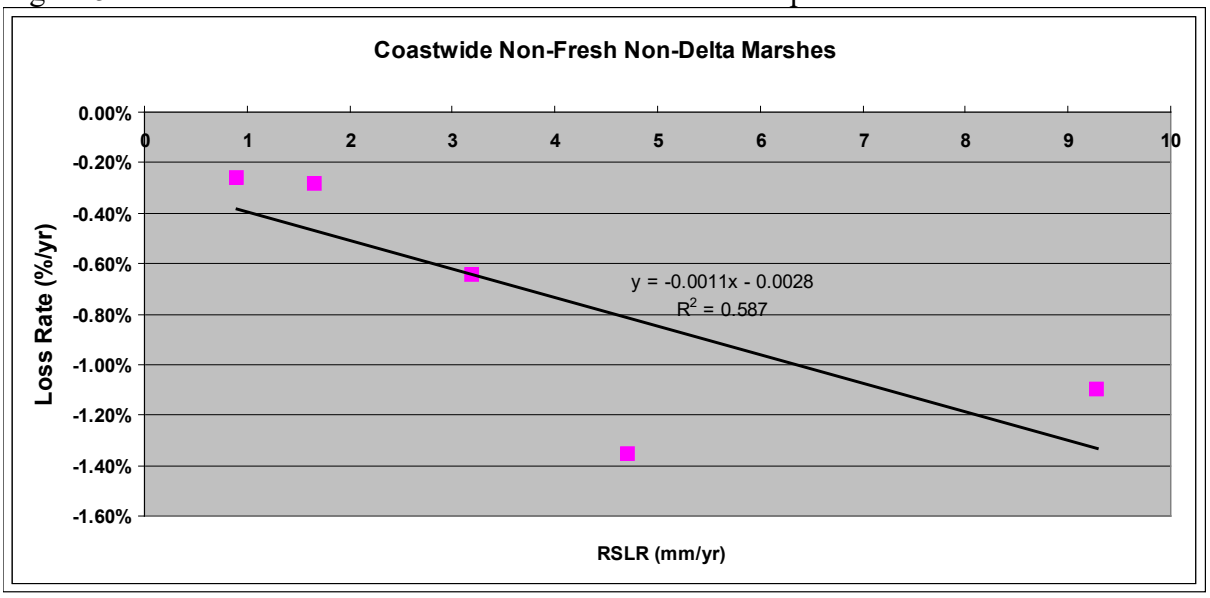


Figure 5. Coastwide wetland loss rates vs. RSLR relationship.



The USGS data indicate that under study area marshes are experiencing net wetland gains rather than losses (Figure 2). Given there are no shallow open water ponds within the impacted area, there are no shallow protected water bodies for the marsh to encroach upon (assuming marsh would not encroach into Bayou Des Allemands). Consequently, under the low SLR scenario, marsh acreage was assumed unchanged over time. However, under the two higher SLR scenarios, wetland loss begins to occur at the beginning of the project life.

To determine the acreage of habitats impacted by construction, the impact area shapefiles were overlaid on 2017 Digital Orthophoto Quarter Quads (DOQQs). Use of National Wetland Inventory Data (2008), other imagery, and field inspections conducted during October were used to subdivide the impact area shapefile into habitat types and acreage by type obtained. One temporary construction access corridor was assumed to be a permanent impact as details regarding management of the site are unknown. Additionally, it was assumed that the full construction impact would occur in the first year (first levee lift). Using wetland impact acres determined as described above, the Wetland Value Assessment (WVA v1.1) methodology was then used to assess project impacts to both habitat quantity and quality over time.

Swamp - The Corps-provided shapefiles of levee footprints were subdivided into habitat types based on site visits (October 2019). Where field observations could not be made, National Wetland Inventory data (2008) and Light Detection and Ranging (LIDAR) data were used to help distinguish swamp from BLH. Once the shapefiles were divided into habitat type, the acreage of swamp impacts were determined. Notes regarding tree canopy cover, mid-story cover, herbaceous cover, tree species, estimated tree diameter breast high (dbh), and other information were taken for a number of locations that could be accessed during the October 2019 field visits. The swamp WVA requires dbh change over time. Faster dbh and basal area growth rates were used for low SLR conditions and slower rates for higher SLR conditions. All sites were assumed to be permanently inundated. Coastal Reference Monitoring System data indicates that salinities are currently fresh for all impacted swamps. From 2017 DOQQs, estimates of forest size, and adjacent land use and disturbance were made.

Bottomland Hardwood Forest - The Corps-provided shapefiles of levee footprints were subdivided into habitat types based on site visits (October 2019). Where field observations could not be made, National Wetland Inventory data (2008) and Lidar data were used to help distinguish swamp from BLH. Once the shapefiles were divided into habitat type, the acreage of BLH impacts were determined. Notes regarding tree composition, canopy cover, mid-story cover, herbaceous cover, general health of trees, and other information were taken for a number of locations that could be accessed during the October 2019 field visits. All sites were assumed to be semi-permanently inundated. From 2017 DOQQs, estimates of forest size, and adjacent land uses and disturbance were made.

WVA Methodology

The Wetland Value Assessment (WVA) methodology was initially developed to evaluate proposed Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) projects. The WVA methodology is similar to the Service's Habitat Evaluation Procedures (HEP), in that habitat quality and quantity are measured for baseline conditions and predicted for FWOP and

FWP conditions. The Fresh/Intermediate Marsh Model was used for this project. Instead of the species-based approach of HEP, the WVA models use an assemblage of variables considered important to the suitability of a given habitat type for supporting a diversity of fish and wildlife species. As with HEP, the WVA allows a numeric comparison of each future condition and provides a combined quantitative and qualitative estimate of project-related impacts to fish and wildlife resources.

WVA models operate under the assumption that optimal conditions for 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 and expressed through the use of a mathematical model developed specifically for each habitat 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 Indices) and different variable values; and 3) a mathematical formula that combines the Suitability Indices for each variable into a single value for wetland habitat quality, termed the Habitat Suitability Index (HSI).

WVA models for fresh marsh, cypress-tupelo swamp, and bottomland hardwoods were used. The habitat variable-habitat suitability relationships within those WVA models have not been verified by field experiments or validated through a rigorous scientific process. However, the variables were originally derived from HEP suitability indices taken from species models for species found in that habitat type. Habitat variable-habitat suitability relationships are, in most cases, supported by scientific literature and research findings. In other cases, best professional judgment by a team of fisheries biologists, wildlife biologists, ecologists, and university scientists may have been used to determine certain habitat variable-habitat suitability relationships. In addition, the WVA models have undergone a refinement process and habitat variable-habitat suitability relationships, HSIs, and other model aspects are periodically modified as more information becomes available regarding coastal fish and wildlife habitat suitability, coastal processes, and the efficacy of restoration projects being evaluated.

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.

Information on the WVA models, WVA variables, and other information/spreadsheets are available in the "WVA Model Docs" folder at following ftp site: https://www.fws.gov/gisdownloads/R4/Louisiana%20ESO/Paille/. Actual WVA files and supporting information/documents are available in the "WVAs and Supporting Docs" folder at the above referenced ftp site. More detailed information regarding WVAs conducted for this study may be obtained upon request.

Target years are established when significant changes in habitat quality or quantity were expected during the project life, under FWP and FWOP conditions. Construction of levees would begin in 2023. It is assumed that all construction impacts would occur at the beginning of that

year. WVA values quantify conditions at the end of the specified target year. WVAs for this study utilized target years (TYs) of 0, 1, and 50 for both with-project and without-project conditions.

The product of an HSI and the acreage of available habitat for a given target year is known as the Habitat Unit (HU). The HU is the basic unit for measuring project effects on fish and wildlife habitat. Future HUs change according to changes in habitat quality and/or quantity. Results are annualized over the period of analysis (i.e., 50 years) to determine the Average Annual Habitat Units (AAHUs) available for each habitat type.

The change in AAHUs for each FWP scenario, compared to FWOP project conditions, provides a measure of anticipated impacts. A net gain in AAHUs indicates that the project is beneficial to the habitat being evaluated; a net loss of AAHUs indicates that the project is damaging to that habitat type. Construction of the proposed levee segments would replace a FWOP functional marsh, swamp, or forest with a levee having no fish and wildlife habitat value. To quantify this construction related habitat loss, the WVAs' FWP acreage of marsh, swamp, and BLH was reduced to zero beginning in year 1.

Under continued low SLR, it is assumed that future salinities will remain constant given the Davis Pond Freshwater Diversion Project is authorized and operated to maintain a relatively constant salinity regime within the middle and lower basin. Under the intermediate and high SLR scenarios, it was assumed that average salinities would increase slightly. Given that the proposed mid-Barataria Sediment Diversion project has not been permitted, and since there is considerable uncertainty regarding when it might become operational, it is not considered as operating under FWOP conditions.

EXISTING FISH AND WILDLIFE RESOURCES

The study area consists of an abandoned deltaic complex. Fish and wildlife habitats include bottomland hardwood forests, cypress-tupelo swamp, shrub scrub, fresh marshes, and open water areas.

Bottomland Hardwood Forest - Bottomland hardwood forests found in coastal portions of the project area occur primarily on the natural levees of distributary channels. Dominant vegetation may include sugarberry, water oak, live oak, bitter pecan, black willow, American elm, Drummond red maple, Chinese tallow-tree, boxelder, green ash, baldcypress, and elderberry. These forests may exhibit standing water at times or seasonally, but if flooding is prolonged, less flood tolerant trees will die off and the forest will convert to cypress swamp or scrub-shrub habitats.

Cypress-tupelo swamp - These swamps are generally dominated with baldcypress, water tupelo, swamp red maple, and various understory plant species. In permanently flooded coastal swamps floating aquatic vegetation such as duckweed, Azolla, Salvinia, and water hyacinth may be common. Coastal swamp forests typically occupy the area between fresh marshes and areas of higher elevation, including the transition zones between bottomland hardwood forests on riverine

interdistributary ridges and lower elevation marshes. Healthy cypress swamps occur in fresh water areas experiencing minimal daily tidal action and where the salinity range does not normally exceed 2 parts per thousand (ppt). Salinities of 3 ppt or higher may cause significant stress and mortality of baldcypress. However, short-term exposure to such salinities may be tolerated if it does not penetrate into and persist in the soil.

Scrub-Shrub - Scrub-shrub habitat is often found along the flanks of distributary ridges. Typically it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry, wax myrtle, buttonbush, black willow, Drummond red maple, Chinese tallow-tree, and groundselbush.

Fresh Marsh - Fresh marshes occur at the upper ends of interdistributary basins and are often characterized by floating or semi-floating vegetated mats. Most fresh marshes exhibit minimal daily tidal action. Vegetation may include maidencane, bulltongue, cattail, California bulrush, pennywort, giant cutgrass, American cupscale, spikerushes, bacopa, and alligatorweed. Associated open water habitats may often support extensive beds of floating-leafed and submerged aquatic vegetation including water hyacinth, Salvinia, duckweeds, American lotus, white water lily, water lettuce, coontail, Eurasian milfoil, hydrilla, pondweeds, naiads, fanwort, wild celery, water stargrass, elodea, and others.

Developed Areas - Most developed areas are located on higher elevations of former distributary channels and are typically well drained. They include crop lands, pasture, and commercial and residential developments. In some cases, the developed areas are drained via pumping stations together with low-elevation levees.

Ponds and Lakes - Natural marsh ponds and lakes are typically shallow, ranging in depth from 6 inches to over 2 feet. Typically, the smaller ponds are shallow and the larger lakes are deeper. In fresh and low-salinity areas, ponds and lakes may support varying amounts of submerged and/or floating-leaved aquatic vegetation. Dead-end canals and small bayous are typically shallow and their bottoms may be filled in to varying degrees with semi-fluid organic material. Along larger canals and bayous, erosion due to wave action and boat wakes, together with shading from overhanging woody vegetation, may retard the amount of marsh vegetation growing along the edges of those waterways.

Fishery Resources

Wetlands throughout the study area abound with small resident fishes and shellfishes such as least killifish, rainwater killifish, sheepshead minnow, mosquitofish, sailfin molly, grass shrimp, and others. Those species are typically found along marsh edges and among submerged aquatic vegetation, and provide forage for a variety of fish and wildlife. Fresh water and low-salinity marshes provide habitat for commercially and recreationally important resident freshwater fishes such as largemouth bass, yellow bass, black crappie, bluegill, redear sunfish, warmouth, blue catfish, channel catfish, buffalo, freshwater drum, bowfin, and gar. Water bodies having minimal water exchange and heavy cover of floating vegetation may exhibit low dissolved oxygen conditions and reduces fisheries abundance.

The project area fresh marshes also provide nursery habitat for estuarine-dependent commercial and recreational fishes and shellfishes that are tolerant of fresh water such as blue crab, white shrimp, Gulf menhaden, Atlantic croaker, red drum, southern flounder, bay anchovy, striped mullet, and others. Fresh marshes also provide habitat for largemouth bass, sunfish, warmouth, crappie, blue catfish, bowfin, and gar.

Essential Fish Habitat

The project site is located in an area that has been identified as essential fish habitat (EFH) for various life stages of federally managed species, including postlarval and juvenile life stages of brown shrimp, white shrimp, and red drum. Categories of EFH in the project area include mud and shell substrates, submerged aquatic vegetation, estuarine water column, and estuarine emergent wetlands. Detailed information on federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council. The generic amendment was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (P.L. 104-297).

In addition to being designated as EFH for brown shrimp, white shrimp, and red drum, wetlands in the project area provide nursery and foraging habitats supportive of a variety of economically-important marine fishery species, including spotted seatrout, sand seatrout, southern flounder, black drum, gulf menhaden, and blue crab. Some of these species serve as prey for other fish species managed under the Magnuson-Stevens Act by the Gulf of Mexico Fishery Management Council (e.g., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (e.g., billfishes and sharks). These wetlands also produce nutrients and detritus, important components of the aquatic food web, which contribute to the overall productivity of the Louisiana's estuaries.

Where tidally-influenced waters designated as EFH are converted to a non-tidal elevation, loss of EFH would result. Should EFH be impacted, those losses should be quantified and presented in the Corps report. Close coordination with the NMFS is recommended because mitigation for those impacts is necessary.

Wildlife Resources

Numerous species of birds utilize study-area marshes, including migratory waterfowl which winter there. Small openings in project area cypress-tupelo swamps may also provide habitat puddle ducks like mallard and gadwall. Ducks that occur in the study area include mallard, gadwall, northern pintail, blue-winged teal, green-winged teal, American widgeon, wood duck, and northern shoveler. The resident mottled duck also utilizes project-area coastal marshes. Diving ducks prefer larger ponds, lakes, and open water areas. Common diving duck species include lesser scaup, canvasback, redhead, ring-necked duck, red-breasted merganser, and hooded merganser. Other migratory game birds found in coastal marshes include the king, Virginia, and sora rails along with the American coot, purple moorhen, common moorhen, and common snipe.

Marshes and associated shallow open water areas provide habitat for a number of wading birds, shorebirds, and other nongame birds. Common wading birds include the little blue heron, great blue heron, green-backed heron, yellow-crowned night heron, black-crowned night heron, great

egret, snowy egret, cattle egret, white-faced ibis, white ibis, and roseate spoonbill. Shorebirds include the killdeer, black-necked stilt, and common snipe. Wading bird nesting colonies may occur within in the study. Other nongame birds such as boat-tailed grackle, red-winged blackbird, northern harrier, bald eagle, belted kingfisher, and sedge wren also utilize coastal marsh areas.

Common mammals occurring in the coastal marshes include feral hogs, nutria, muskrat, mink, river otter, raccoon, swamp rabbit, white-tailed deer, and coyote.

Reptiles are most abundant in fresh marhes. Common species include the American alligator, western cottonmouth, water snakes, mud snake, speckled kingsnake, ribbon snakes, rat snakes, red-eared turtle, common snapping turtle, alligator snapping turtle, mud turtles, and softshell turtles. Amphibians commonly found in the area include the bullfrog, pig frog, bronze frog, leopard frog, cricket frogs, tree frogs, chorus frogs, three-toed amphiuma, sirens, and several species of toads.

Forested wetlands and scrub-shrub areas provide habitats for songbirds such as the mockingbird, yellow-billed cuckoo, northern parula, yellow-rumped warbler, prothonotary warbler, white-eyed vireo, Carolina chickadee, and tufted titmouse. Additionally, these areas also provide important resting and feeding areas for songbirds migrating across the Gulf of Mexico. Other avian species found in forested wetlands include the American woodcock, common flicker, brown thrasher, white-eyed vireo, belted kingfisher, pileated woodpecker, red-headed woodpecker, downy woodpecker, common grackle, and common crow. Numerous other bird species use forested wetlands throughout the study area.

Forested habitats and associated waterbodies also support raptors such as the red-tailed hawk, red-shouldered hawk, Mississippi kite, northern harrier, screech owl, great horned owl, and barred owl. Wading bird colonies typically occur in cypress swamp and scrub-shrub habitat. Species found in those nesting colonies include great egret, white ibis, black-crowned night heron, tricolored heron, little blue heron, snowy egret, white-faced ibis, and glossy ibises. Waterfowl species found in forested wetlands and adjacent waterbodies in the project area include, but are not limited to, wood duck, mallard, green-winged teal, gadwall, and hooded merganser.

Game mammals associated with forested wetlands include eastern cottontail, swamp rabbit, gray and fox squirrels, and white-tailed deer. Commercially important fur bearers include river otter, muskrat, nutria, mink, and raccoon. Other mammals found in forested wetlands include striped skunk, coyote, Virginia opossum, bobcat, armadillo, gray fox, and red bat. Smaller mammal species serve as forage for both mammalian and avian carnivores and include the cotton rat, marsh rice rat, white-footed mouse, eastern wood rat, harvest mouse, least shrew, and southern flying squirrel.

Reptiles which utilize study area bottomland hardwoods, cypress swamps, and associated shallow water include the American alligator, ground skink, five-lined skink, broad-headed skink, green anole, Gulf coast ribbon snake, yellow-bellied water snake, speckled kingsnake, southern copperhead, western cottonmouth, pygmy rattlesnake, broad-banded water snake,

diamond-backed water snake, spiny softshell turtle, red-eared turtle, southern painted turtle, Mississippi mud turtle, stinkpot, common and alligator snapping turtle, in addition to numerous other species.

Some of the amphibians believed to be in study-area forested wetlands include dwarf salamander, three-toed amphiuma, lesser western siren, central newt, Gulf coast toad, eastern narrow-mouthed toad, green treefrog, squirrel treefrog, pigfrog, bullfrog, southern leopard frog, bronze frog, upland chorus frog, southern cricket frog, and spring peeper.

Most developed areas provide low-quality wildlife habitat. Sites developed for agricultural purposes are located on low ridges and on lower elevation areas that have improved drainage. In agricultural areas, wildlife habitat is primarily provided by unmaintained ditch banks and field edges, fallow fields, pasture lands, and rainfall-flooded fields. Cultivated crops can provide forage for some wildlife species. Game species that utilize agricultural lands include the white-tailed deer, mourning dove, bobwhite quail, eastern cottontail, and common snipe. Seasonally flooded cropland and fallow fields may provide important feeding habitat for wintering waterfowl, wading birds, and other waterbirds.

Threatened and Endangered Species

Current Federally listed threatened and endangered species and their critical habitat that may be found in or near the study area include the West Indian manatee (*Trichechus manatus*) and the pallid sturgeon (*Scaphirhynchus albus*).

In accordance with Section 7(c) of the Endangered Species Act, the Corps must prepare a biological assessment to determine the effects of the recommended plan on the above-mentioned species. That biological assessment should be completed and submitted to this office prior to initiating construction or operation of proposed project features.

If the Corps determines that the proposed work may affect any listed species, the Corps must request, in writing, a formal consultation from this office pursuant to Section 7(a) of the Endangered Species Act. A request to initiate formal consultation can accompany submission of the biological assessment to the Service. In keeping with the consultation requirements of the Endangered Species Act (ESA), informal and formal (if needed) consultation must be completed before the Record of Decision for these tier-off projects can be signed.

The Service recommends that the Corps contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

At-Risk species

The Service's Southeast Region has defined "at-risk species" as those that are:

1. Proposed for listing under the ESA by the Service;
2. Candidates for listing under the ESA, which means the species has a "warranted but precluded 12-month finding"; or
3. Petitioned for listing under the ESA, which means a citizen or group has requested that the Service add them to the list of protected species. Petitioned species include those for which the Service has made a substantial 90-day finding as well as those that are under review for a 90-day finding. As the Service develops proactive conservation strategies with partners for at-risk species, the states' Species of Greatest Conservation Need (defined as species with low or declining populations) will also be considered.

The Service's goal is to work with private and public entities on proactive conservation to conserve these species thereby precluding the need to federally list as many at-risk species as possible. Discussed below are species currently designated as "at-risk" that may occur within the project area. While not all species identified as at-risk will become ESA listed species, typically their reduced populations warrant their identification and attention in mitigation planning.

Eastern Black Rail

The eastern black rail (*Laterallus jamaicensis ssp.*), an at-risk species, is the smallest of North America's rail species. It has a broad distribution inhabiting higher elevations of tidal marshes and freshwater wetlands throughout the Americas. The eastern black rail breeds from New York to Florida along the Atlantic Coast and in Florida and Texas along the Gulf Coast. There is little known about the spring and fall migration as well as wintering distribution of the eastern black rail, but it has been documented to winter on the Gulf Coast from southeast Texas to Florida.

Winter habitat for the eastern black rail is presumed to be similar to breeding habitat. They are found in a variety of salt, brackish, and freshwater marsh habitats that can be tidally or non-tidally influenced. Plant structure is considered more important than plant species composition in predicting habitat suitability (Flores and Eddleman, 1995). In Louisiana, occurrences have been documented in high brackish marsh vegetated with saltgrass (*Distichlis spicata),* sea oxeye *(Borrichia frutescens)*, gulf cordgrass (*Spartina spartinae*) and saltmeadow cordgrass (*S. patens)* and often interspersed with shrubs such as marsh elder (*Iva frutescens*) or saltbush (*Baccharis hamilifolia*). The high marsh is only inundated during extreme high tide events. In general, the character of the high marsh is a short grassy savannah. It may also occur in working wetland habitats such as rice fields.

Alligator Snapping Turtle

The alligator snapping turtle (*Macrochelys temminckii*) occurs in waterways that drain into the Gulf of Mexico. Although the species range is large, population densities are likely low throughout the range. They occur in various habitats including rivers, oxbows, lakes, and backwater swamps adjacent to large rivers. It is most common in freshwater lakes and bayous, but also found in coastal marshes and sometimes in brackish waters near river mouths. Typical habitat is mud bottomed waterbodies having some aquatic vegetation. The alligator snapping turtle is slow growing and long lived. Sexual maturity is reached at 11 to 13 year of age. Because of this and its low fecundity, loss of breeding females is thought to be the primary threat to the

species. Threats include habitat alteration, exploitation by trappers, pollution, and pesticide accumulation (IUCNredlist.org).

Golden-Winged Warbler

The golden-winged warbler (*Vermivora chrysoptera*) breeds in higher elevations of the Appalachian Mountains and northeastern and north-central U.S. with a disjunct population occurring from southeastern Ontario and adjacent Quebec northwest to Minnesota and Manitoba. Wintering populations occur in Central and South America. The loss of wintering habitat in Central and South America and migratory habitat may also contribute to its decline. The golden-winged warbler is also known to hybridize with the blue-winged warbler (*Vermivora cyanoptera*).

This species may be found in forested habitats throughout Louisiana during spring and fall migrations. This imperiled songbird is dependent on forested habitats along the Gulf, including coastal Louisiana, to provide food and water resources before and after trans-Gulf and circum-Gulf migration. Population declines correlate with both loss of habitat owing to succession and reforestation and with expansion of the blue-winged warbler into the breeding range of the golden-winged warbler.

Migratory Birds and Other Trust Resources

Bald Eagle

The proposed project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), which was officially removed from the List of Endangered and Threatened Species as of August 8, 2007. However, the bald eagle remains protected under the MBTA and BGEPA. Comprehensive bald eagle survey data have not been collected by the Louisiana Department of Wildlife and Fisheries (LDWF) since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time.

Bald eagles typically nest in large trees located near coastlines, rivers, or lakes that support adequate foraging from October through mid-May. In southeastern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants. Furthermore, bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. Disturbance during these periods may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival.

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those Guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding

season. During any project construction, on-site personnel should be informed of the possible presence of nesting bald eagles in the vicinity of the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

On September 11, 2009, the Service published two federal regulations establishing the authority to issue permits for non-purposeful bald eagle take (typically disturbance) and eagle nest take when recommendations of the NBEM Guidelines cannot be achieved. Permits may be issued for nest take only under the following circumstances where: 1) necessary to alleviate a safety emergency to people or eagles, 2) necessary to ensure public health and safety, 3) the nest prevents the use of a human-engineered structure, or 4) the activity or mitigation for the activity will provide a net benefit to eagles. Except in emergencies, only inactive nests may be permitted to be taken. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting consultations and issuance of permits. Should you need further assistance interpreting the guidelines, avoidance measures, or performing an on-line project evaluation, please contact Ulgonda Kirkpatrick (phone: 321/972-9089, e-mail: ulgonda_kirkpatrick@fws.gov).

Coastal forest & neotropical migrating songbirds

The construction of levees and borrow canals can result in temporary and/or permanent impacts to migratory birds and the habitats upon which they depend for various life requisites. The Service has concerns regarding the direct and cumulative impacts resulting from the loss and fragmentation of forest and grassland habitats, and the direct and indirect impacts that these losses will have upon breeding migratory birds of conservation concern within the Mississippi Alluvial Valley Bird Conservation Region (http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf). Many migratory birds of conservation concern require large blocks of contiguous habitat to successfully reproduce and survive.

In Louisiana, the primary nesting period for forest-breeding migratory birds occurs between April 15 and August 1. Some species or individuals may begin nesting prior to April 15 or complete their nesting cycle after August 1, but the vast majority nest during this period. The proposed project may directly impact migratory birds of conservation concern because habitat clearing that occurs during the aforementioned primary nesting period may result in unintentional take of active nests (i.e., eggs and young) in spite of all reasonable efforts to avoid such take. The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for allowing incidental take, the Service recognizes that some birds may be taken during project construction/operation even if all reasonable measures to avoid take are implemented.

In addition to the direct loss of grassland and forested habitat, the proposed project may indirectly impact migratory birds of conservation concern because construction of large-scale

projects within forested habitats typically results in habitat fragmentation. Forest fragmentation may contribute to population declines in some avian species because fragmentation reduces avian reproductive success (Robinson et al. 1995). Fragmentation can alter the species composition in a given community because biophysical conditions near the forest edge can significantly differ from those found in the center or core of the forest. As a result, edge species could recruit to the fragmented area and species that occupy interior habitats could be displaced. The fragmentation of intact forests could have long-term adverse impacts on some forest interior bird species.

The primary impact to forest habitat conditions from the proposed project would result from the conversion of forest habitat to levees and open water borrow sites. We recommend that the Corps avoid impacts to forested areas (particularly those containing a hardwood species component) to the maximum extent practicable.

Colonial Nesting Birds

In accordance with the Migratory Bird Treaty Act of 1918 (as amended) and Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), please be advised that the project area includes habitats which are commonly inhabited by colonial nesting waterbirds and/or seabirds.

Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by (1) monitoring previously known colony sites and (2) augmenting point-to-point surveys with flyovers of adjacent suitable habitat. Although several comprehensive coast-wide surveys have been recently conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds, the following restriction on activity should be observed:

> For colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present).

In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season. Should on-site contractors and inspectors observe potential nesting activity, coordination with the LDWF and the Service should occur.

Refuges and Wildlife Management Areas

Within the study area, the Lake Boeuf Wildlife Management Area is located in marshes south of Lake Boeuf. This area would be enclosed by cross-basin levee alternatives. There are no National Wildlife Refuges within the study area or in areas likely to be affected by construction and operation of the proposed project.

FUTURE WITHOUT-PROJECT FISH AND WILDLIFE RESOURCES

Study-area fresh marshes will likely remain relatively healthy provided salinities do not increase and provided that SLR remains relatively low. Increases in salinity or rapid SLR will likely result in gradually increasing marsh loss. Continued operation of the Davis Pond Freshwater Diversion should help to preclude detrimental salinity increases. However, under the higher SLR scenarios, continued loss of middle and lower basin marshes would allow tidal exchange to increase project area salinities despite Davis Pond Diversion freshwater inputs.

Fish and wildlife resources that use area marshes may initially benefit from increased marsh loss as degradation would convert project area marshes having no internal open water to a complex having more interspersed internal water areas. With continued marsh loss, fish and wildlife habitat quantity and quality will decrease, thereby reducing fish and wildlife abundance. As lower basin marshes continue to degrade, estuarine-dependent fisheries will increasingly seek to utilize upper basin marshes and degrading forested wetlands. This would partially offset the loss of nursery habitat in the middle and lower basin and extend the period of high Barataria Basin estuarine fisheries production. But eventually should upper basin wetlands degrade sufficiently, fisheries production will decrease substantially.

Because of semi-permanent or permanent inundation, a majority of the upper basin cypress-tupelo forests are unsustainable and will gradually thin out and convert to marsh or open water. If rapid salinity increases occur, the mortality of cypress will be accelerated and impacted swamps would be more likely convert to open water rather than marsh. The bottomland hardwoods, already suffering from excessive inundation, will convert to degraded swamp, scrub-shrub, or marsh. Migratory songbirds which use these coastal forests as important stop-over habitat when migrating northward across the Gulf, will have to fly further north to encounter suitable stop-over habitat. Resident forest-dependent wildlife will be gradually displaced to adjoining developed areas and there suffer from loss of food resources and increased mortality.

DESCRIPTION OF ALTERNATIVE PLANS

The final array of alternatives consists of two levee construction alternatives.

Alternative 1: This, alternative raises existing forced drainage levees extending from Paradis to the community of Des Allemands and then a new levee segment would cross the basin from Bayou Des Allemands parallel to and south of Highway 90, terminating near Raceland on Bayou Lafourche (Figure 6). The levee would be constructed to an elevation of 7.5 feet and would be 18.3 miles in length. A 270-foot-wide barge gate would be installed in Bayou Des Allemands to provide gravity drainage. Borrow would come from nearby farmlands. Alternative 1 has been chosen as the Tentatively Selected Plan (TSP)

Alternative 2: This alignment incorporates all of Alternative 1 footprint plus it includes raising the existing St. Charles Parish protection levee northeastward to the Mississippi River at Luling (Figure 7). The levee would be constructed to an elevation of 8.5 feet and would be 30.4 miles

long. A 270-foot-wide barge gate would provide gravity drainage at Bayou Des Allemands. Borrow for levee construction would come from nearby farmlands.

Figure 6. Map illustrating the proposed Alternative 1 levee alignment.

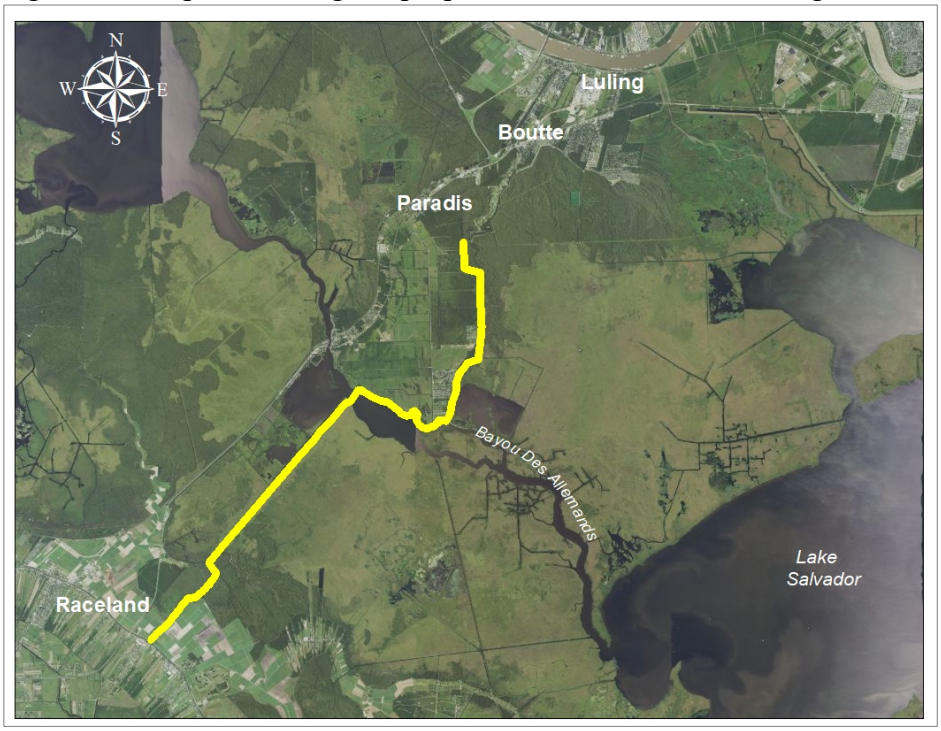


Figure 7. Map illustrating the proposed Alternative 2 levee alignment.

EVALUATION OF ALTERNATIVE PLANS

Fish and wildlife resource impacts were determined for the final array of alternatives described above. The Corps has determined that Alternative 1 is the Tentatively Selected Plan (TSP). Acreage of direct wetland construction impacts by habitat type were obtained from 2017 DOQQs and habitat types determined from that imagery in combination with field inspections conducted during October 2019 (Table 2). Given schedule constraints and lack of access to some future impact sites, the habitat type determination in areas is tentative. The direct impacts provided below include impacts associated with two construction access roads. The TSP is the least damaging of the alternatives in the final array of alternatives.

Table 2. Direct impacts by habitat type and levee alternative.

Habitat Type	Alt 1 (acres)	Alt 2 (acres)
Bottomland Hardwood Forest	41.68	86.66
Cypress-Tupelo Swamp	1.04	36.43
Fresh Marsh	136.54	148.93

Bottomland hardwood forest (BLH) impacts would occur within the forced drainage area of the Sunset Drainage District. A small acreage of the Paradis Mitigation Bank located within that forced drainage district would be impacted. An acre of cypress swamp within the Sunset District would also be impacted. Wetlands within the Sunset Drainage District are not exposed to increasing SLR effects as are the remaining impact areas.

Near the Raceland end of the proposed levee, impacted BLH consists of inundation stressed and stunted red maple. Along portions of the St. Charles levee, BLH is also stressed, but impacts to more healthy BLH stands would also occur. Due to its low quality, the inundation stressed BLH could be classified as a Resource Category 3 rather than Category 2. A more thorough field inspection would be needed to consider this change.

More acres of fresh marsh are directly impacted by both alternatives than any other habitat type. Those impacts are greatest immediately southwest of Bayou Des Allemands where a new levee would be constructed across marsh. Lesser fresh marsh impact acreage is located adjacent to the St. Charles levee where inundation has converted former BLH to marsh. A more detailed breakdown of direct impacts by location is provided in Appendix A. Direct impacts in AAHUs are provided in Table 3 with a more detailed breakdown provided in Appendix B.

Because Alternative 1 has the narrowest footprint and is a shorter levee alignment, impacts for this alternative are less than those of alternative 2. Temporal impacts to BLH forest (for both alternatives) could be reduced if the northern construction access route were replanted after construction. It is assumed that borrow for levee construction will come from existing agricultural areas. If borrow is taken from forested or wetland areas, additional borrow-related impacts would need to be quantified.

Table 3. Direct impacts in AAHUs by habitat type, alternative, and SLR scenario.

Habitat Type	Alt 1 Low SLR (AAHUs)	Alt 1 Int SLR (AAHUs)	Alt 1 High SLR (AAHUs)
Bottomland Hardwood Forest	-16.05	-15.83	-14.80
Cypress-Tupelo Swamp	-0.56	-0.56	-0.56
Fresh Marsh	-63.92	-69.62	-56.35

Habitat Type	Alt 2 Low SLR (AAHUs)	Alt 2 Int SLR (AAHUs)	Alt 2 High SLR (AAHUs)
Bottomland Hardwood Forest	-25.83	-24.77	-21.28
Cypress-Tupelo Swamp	-21.57	-21.57	-19.84
Fresh Marsh	-69.72	-75.94	-61.45

Indirect Impacts

Installation of the 270-foot-wide barge gate in Bayou Des Allemands has the potential to reduce water exchange and increase the hydroperiod of the upper Barataria Basin. Upper Barataria Basin forested wetlands are already near or at a permanently inundated condition. Consequently, growth rates of trees in those areas could be further reduced and tree mortality increased should the project cause stage increases of sufficiently long durations. Information needed to assess this possible impact is not available at this time. Hence, this impact assessment is incomplete in regard to this potentially large-scale indirect impact.

Fish Access Impacts

The proposed stoplog water control structure on the Godchaux Canal would reduce the canal width from 125 feet to 15 feet (82% reduction when structure open). Consequently, this structure may reduce fishery access to fresh marsh areas southwest of that structure. The Bayou Des Allemands floodgate may also reduce water exchange and fisheries access. Additional channel cross-section information is needed to assess this possible impact.

FISH AND WILDLIFE CONSERVATION MEASURES

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include the following elements as the desirable sequence of steps in the mitigation planning process:

a) avoiding the impact altogether by not taking a certain action or parts of an action;

b) minimizing impacts by limiting the degree or magnitude of the action and its implementation;

c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and

e) compensation for the impact by replacing or providing substitute resources or environments.

The Service's mitigation policy (Federal Register, Volume 46, Number 15, pages 7656-7663, January 23, 1991) provides guidance to help ensure that the level of mitigation recommended by the Service is consistent with the value and scarcity of the fish and wildlife resources involved. In keeping with that policy, the Service usually recommends that losses of high-value habitats which are becoming scarce be avoided or minimized to the greatest extent possible. Unavoidable losses of such habitats should be fully compensated by replacement of the same kind of habitat value; this is called "in-kind" mitigation.

Coastal marshes are considered by the Service to be aquatic resources of national importance due to their increasing scarcity and high habitat value for fish and wildlife within Federal trusteeship (i.e., migratory waterfowl, wading birds, other migratory birds, threatened and endangered species, and interjurisdictional fisheries). Likewise, forested wetlands (swamp and BLH) and dry forest are nationally significant resources having high fish and wildlife value that are becoming increasingly scarce, especially in coastal Louisiana. Therefore, the Service recommends that unavoidable losses of those habitats be compensated in-kind. Highly degraded/dying BLH may be considered as a Resource Category 3 and could be mitigated out-of-kind (i.e., other forest types).

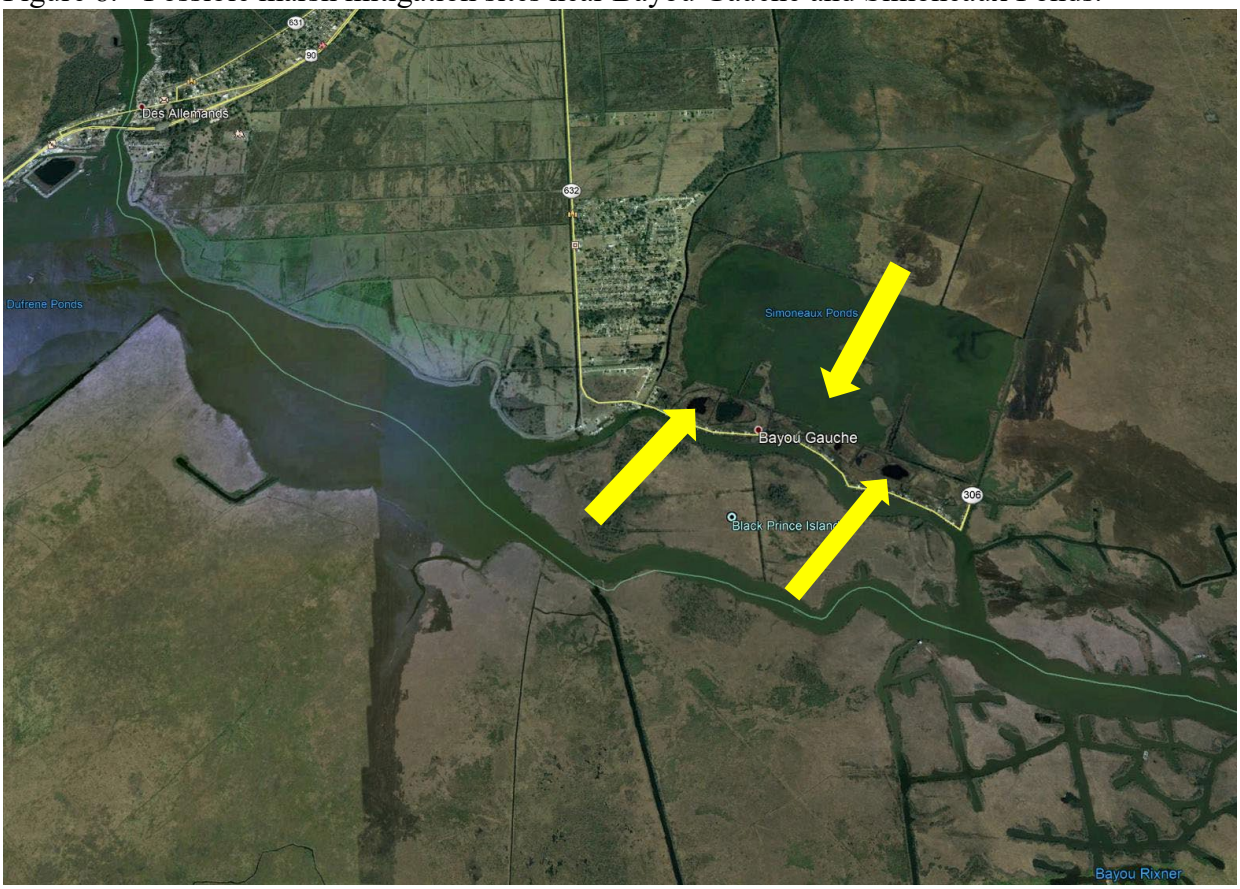
The impacts to swamp and BLH might be mitigated through use of nearby mitigation banks. Fresh marsh impacts associated with the TSP are rather large. Mitigation for those impacts might be achieved by creating marsh near the project site in the open areas north of the Bayou Gauche road (Highway 306) or in the Simoneaux Ponds area (Figure 8). If the mitigation site borders large open water areas, containment dikes might need to be armored to preclude erosional losses of the dikes and marshes therein. The deadlines for completion of this Coordination Act Report did not allow for a mitigation analysis of these areas.

Marsh creation mitigation projects should be monitored to ensure that the desired mitigation is achieved at a point 5 years after project implementation, and at 10 year intervals thereafter. Successful marsh creation will depend on achieving a settled disposal area elevation conducive to marsh vegetation establishment.

Because past experience shows that shortfalls in created marsh acreage often occur, especially when borrow for containment dike construction is taken from within the mitigation area. The Service recommends that the target marsh acreage should be set above the required acreage, or that the contractor must guarantee that the required acreage will be established. The Service also recommends that the Corps monitor the acreage of created marsh, and other affected wetlands in the project area, throughout the project life to help assess project impacts and ensure that full

compensatory mitigation is achieved. The resulting monitoring should be used to assess the need for additional mitigation, if monitoring reveals a mitigation shortfall.

Figure 8. Possible marsh mitigation sites near Bayou Gauche and Simoneaux Ponds.



Dredging of water bottoms for borrow material may result in the creation of deep holes. Reduced flushing in those areas may promote development of anoxic conditions due to the accumulation of organic matter and pollutants. Anoxia would be aggravated by high temperature and salinity stratification, particularly during the summer months. To avoid such problems, borrow areas should be designed to minimize the likelihood that anoxic conditions would develop.

Because of the large quantity of dredged material potentially needed to mitigate project impacts, careful consideration should be given to the borrow site design. If borrow sites are dredged to shallow depths to avoid creating anoxic sumps, then more surface area will need to be dredged to obtain the needed quantity of material. By dredging over a larger surface area, potential complications may include: 1) more benthos may be affected, which may reduce (at least temporarily) food availability for fishery organisms; 2) other sessile organisms, such as oysters, could be affected; and 3) by continually moving the cutterhead, the resuspended sediments will take longer to settle and could prolong the periods of high turbidity associated with dredging operations. The Service is also concerned that extensive borrow from linear waterways or canals may exacerbate saltwater intrusion and/or bank failure, resulting in accelerated marsh loss rates.

Borrow sites should be located and designed to avoid those possible impacts.

Because of relative sea level rise combined with long-term deprivation of Mississippi River suspended sediment inputs, the upper basin wetlands are suffering from excessive hydroperiod impacts. Indirect hydrologic effects of the proposed levee and floodgate on water levels could worsen this problem causing accelerated degradation of upper basin wetlands. Information regarding project effects on upper basin hydroperiod are not yet available.

For the proposed project to be consistent with the Coastal Wetlands Planning and Restoration Act (CWPPRA) as required by Section 303(d)(1) of that Act, the drainage capacity of the Bayou Des Allemands floodgate should be sized to handle local drainage needs plus that of the two small Mississippi River diversions identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan.

To ensure that project features do not worsen the hydroperiod and are capable of handling drainage associated with those two small CWPPRA proposed Mississippi River diversions, the Service recommends that additional drainage structures be installed in the Bayou Des Allemands levee crossing should the hydrologic analysis show a with-project hydroperiod increase associated with heavy rainfall events. Given that the Bayou Des Allemands levee crossing exceeds 1,500 feet, there should be room for the proposed 270-foot-wide floodgate, plus additional gates.

SERVICE POSITION AND RECOMMENDATIONS

Because information regarding possible fisheries access impacts associated with proposed water control structures and the project related hydrologic effects are not yet available, we cannot complete our evaluation of project effects on fish and wildlife resources, nor can we entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. If available, that information will be incorporated into our Final Coordination Act Report. Additional Service involvement during the preconstruction engineering and design phase of this project, along with more-definitive project information, will be required so that we can fulfill our responsibilities under the Coordination Act. With regard to indirect project effects, the Service recommends:

1. Additional drainage structures should be installed in the Bayou Des Allemands levee crossing should the hydrologic analysis show a with-project hydroperiod increase associated with heavy rainfall events.

2. The project drainage structures should be designed to handle inputs associated with the two Mississippi River diversions identified in the 1993 CWPPRA Louisiana Coastal Wetlands Restoration Plan without corresponding widescale hydroperiod increases.

Available information indicates that substantial direct wetland losses will result from construction of project features. Consequently, avoidance and minimization of direct wetland

impacts should be pursued to the greatest extent practicable. The Service provides the following recommendations to avoid and/or minimize project impacts on fish and wildlife resources, and for mitigating unavoidable impacts to those resources.

3. The Corps should coordinate closely with the Service and other fish and wildlife conservation agencies throughout the engineering and design of project features including levees, floodgates, and environmental water control structures to ensure that those features are designed, constructed and operated consistent with wetland restoration and associated fish and wildlife resource needs.

4. Estimates of all direct and indirect project-related wetland impacts should be refined for inclusion in the project's Final Report and Environmental Impact Statement.

5. Locations of borrow for levee construction material should be identified and provided to the Service and other interested natural resource agencies.

6. To the greatest degree practical, the proposed levees and borrow pits should be located to avoid and minimize direct and indirect impacts to emergent wetlands. Efforts should be made to further reduce those direct impacts by hauling in fill material, using sheetpile for the levee crest, deep soil mixing, or other alternatives.

7. If organic soils must be removed from the construction site, that material should be used to create or restore emergent wetlands to the greatest extent practicable. If that is not practicable, then use of that material to improve borrow pit habitat quality (e.g., construct bank slopes, reduce depths, etc.) should be examined.

8. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

9. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of project features and timing of construction. Surveys prior to construction such be undertaken to ensure no nesting birds are within 1,000 feet of any proposed work. If nesting birds are found within 1,000 feet of any proposed work sites, the Service and the Louisiana Department of Wildlife and Fisheries should be contacted for procedures to avoid impacts.

10. The Service recommends that the Corps contact the Service for additional consultation if: 1) the scope or location of the proposed project is changed significantly, 2) new information reveals that the action may affect listed species or designated critical habitat; 3) the action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. Additional consultation as a result of any of the above conditions or for changes not covered in this consultation should occur before changes are made and or finalized.

11. Full, in-kind compensation (quantified as AAHUs) should be provided for unavoidable

net adverse impacts on forested wetlands, marsh, and associated submerged aquatic vegetation, including any additional losses identified during post-authorization engineering and design studies. To help ensure that the proposed mitigation features meet their goals, the Service provides the following recommendations.

n. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
o. Levee construction borrow sites should be designed to avoid and minimize impacts to fish and wildlife habitat; in the event new borrow sites are identified, guidelines for the selection of borrow sites are found in Appendix C.
p. Mitigation measures should be constructed concurrently with the features that they are mitigating. If construction is not concurrent with mitigation implementation then revising the impact and mitigation period-of-analysis to reflect additional temporal losses will be required.
q. The Service and other fish and wildlife conservation agencies should be consulted in the development of plans and specifications for all mitigation features and any monitoring and/or adaptive management plans.
r. To avoid shortfalls in marsh creation acreage, the contractor should be required to guarantee the creation of at least the target acreage of marsh platform, or excess acres should be created.
s. The acreage of marsh created to mitigate project impacts should meet or exceed the marsh acreage projected by the Habitat Evaluation Team for target year 5.
t. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
u. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
v. The acreage of marsh created for mitigation purposes, and adjacent affected wetlands, should be monitored over the project life to evaluate project impacts, the effectiveness of compensatory mitigation measures, and the need for additional mitigation should those measures prove insufficient.
w. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirements.
x. The Corps should maintain full responsibility for all mitigation projects until the projects are found to be fully compliant with success and performance requirments. Success requirements are provided in Appendix D.
y. Dredged material borrow pits, including those utilized to create marsh for mitigation purposes, should be carefully designed and located to minimize anoxia problems and excessive disturbance to area water bottoms, and to avoid increased saltwater intrusion.
z. If applicable, a General Plan for mitigation 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. See Appendix E for details.

Extensive additional information is needed by the Service to complete the required evaluation of project effects and fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act. Much of that information may not be available until engineering and design of the project features has progressed. To help ensure that sufficient information is provided, the Service recommends that the Corps perform the following tasks during the engineering and design phase.

1. Provide additional information on anticipated construction techniques and their associated wetland impacts, such as additional dredging to install floodgates and water control structures, dredging temporary by-pass channels, construction of access roads, and the method for disposing organic surface soils that are unsuitable for levee construction.

2. Provide final levee footprint shapefiles and designs for borrow sites used in levee construction.

3. Provide with-out project channel cross-sections at or near where water control structures would be installed.

4. Provide hydrologic model outputs on FWOP and FWP stages within the protected area wetlands following an variety of heavy rainfall events.

Sufficient funding should be provided for full Service participation in the post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.

Given that information needed to assess fish impact impacts and project-induced hydroperiod impacts are not available, the Service cannot fulfill its Coordination Act responsibilities at this time. Hence, we will require additional funding during the post-authorization engineering and design phase of this project to fulfill our responsibilities under the Fish and Wildlife Coordination Act. Estimates of those funding needs should be coordinated in advance with the Service, and should be based on the nature and complexity of the issues.

Provided that Service funding needs are met and the above recommendations are incorporated into the feasibility report and related authorizing documents, the Service does not oppose further planning and implementation of the TSP.

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APPENDIX A

DIRECT CONSTRUCTION IMPACTS

Acres of direct wetland impacts are listed below by four regions (see Figures A1, A2, A3). The Sunset Drainage District region is divided by Louisiana Highway 306 into an eastern and western region.

Figure A1. West of Bayou Des Allemands region.

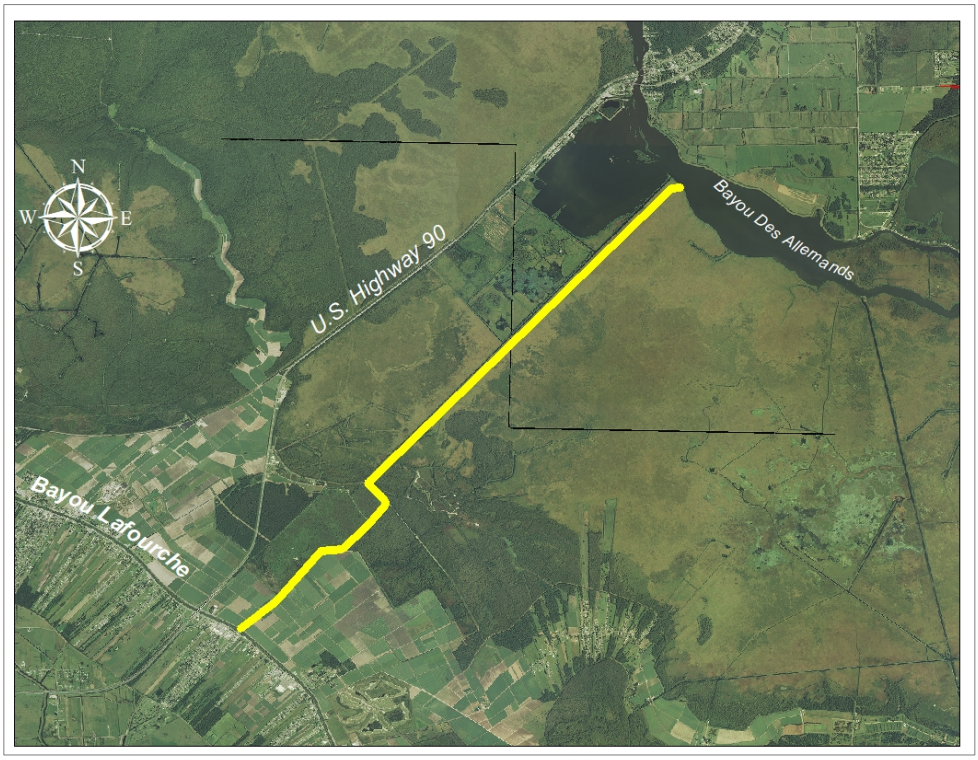

Figure A2. Map of the Sunset Drainage District region.

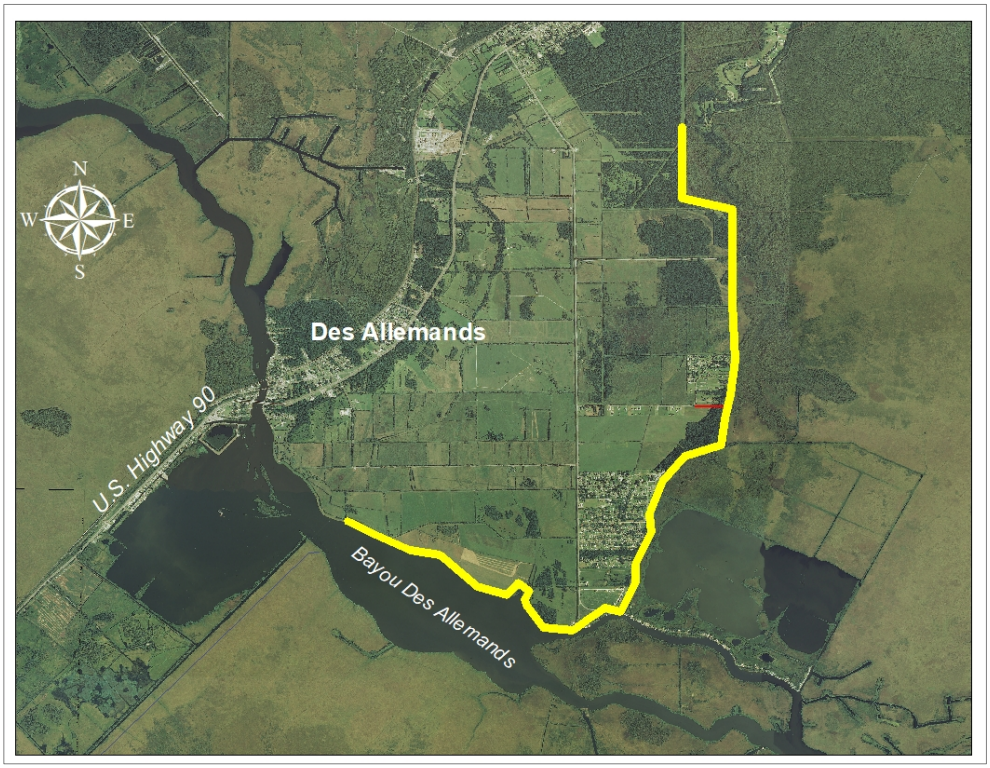

Figure A3. Map of the St. Charles Levee region.

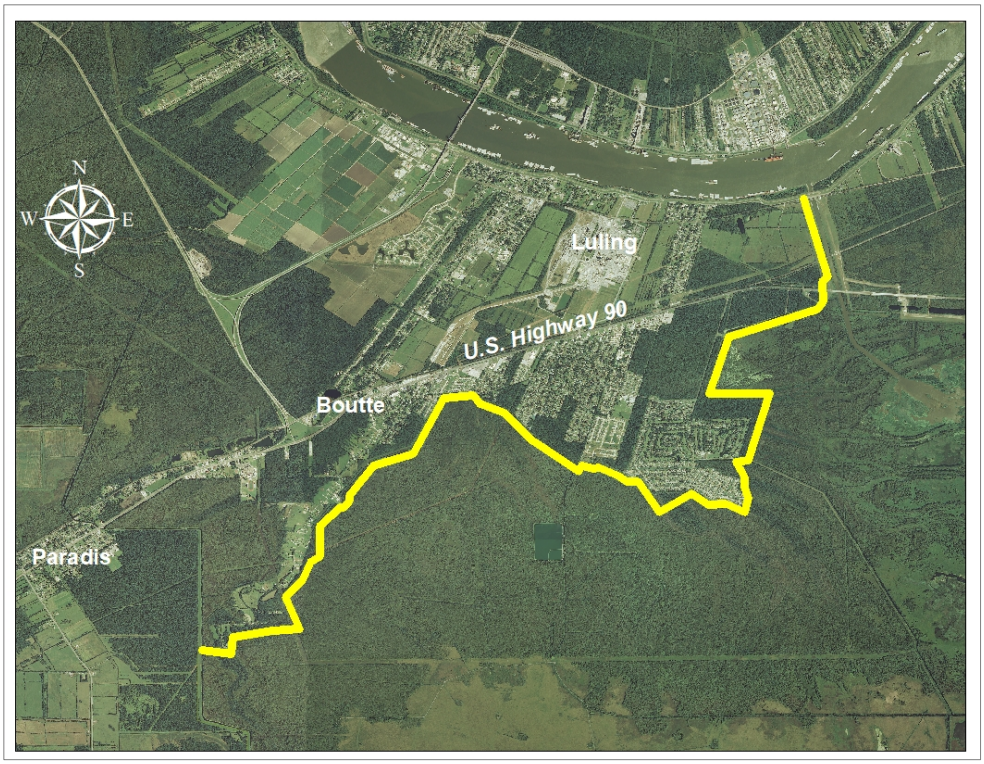

Table A-1. Acres of direct construction impacts by region, habitat type, and alternative.

BLH Impact & Location	Alt 1 (acres)	Alt 2 (acres)
West of Bayou Des Allemands		
Forested spoil banks	2.79	3.29
Dufrene Ponds access rd	6.32	6.32
Low quality BLH	10.60	11.09
Sunset Drainage District west of LA 306		
Med quality BLH	1.92	2.04
Low quality BLH	5.63	5.97
Sunset Drainage District east of LA 306		
High quality BLH	1.92	1.96
Med quality BLH	1.12	1.21
Low quality BLH	3.93	4.03
Abandoned field	7.10	7.43
Mitigation bank	0.35	0.37
St. Charles levee upgrade-lift		
Med quality BLH	na	6.94
Low quality BLH	na	36.00
TOTAL	**41.68**	**86.66**

Swamp Impact & Location	Alt 1 (acres)	Alt 2 (acres)
West of Bayou Des Allemands	0.00	0.00
Sunset Drainage District west of LA 306	0.00	0.00
Sunset Drainage District east of LA 306	1.04	1.08
St. Charles levee upgrade-lift	na	35.35
TOTAL	**1.04**	**36.43**

Fresh marsh Impact & Location	Alt 1 (acres)	Alt 2 (acres)
West of Bayou Des Allemands	136.5	143.6
Sunset Drainage District west of LA 306	0.00	0.00
Sunset Drainage District east of LA 306	0.00	0.00
St. Charles levee upgrade-lift	na	5.32
TOTAL	**136.54**	**148.93**

APPENDIX B

DIRECT CONSTRUCTION IMPACTS (AAHUs)

Table B-1. Direct construction impacts (AAHUs) by region, habitat type, and alternative.

	Alt 1		
BLH Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands			
Forested spoil banks	-0.79	-0.73	-0.41
Dufrene Ponds access rd	-0.50	-0.43	-0.30
Low quality BLH	-1.75	-1.66	-1.08
Sunset Drainage District west of LA 306			
Med quality BLH	-1.21	-1.21	-1.21
Low quality BLH	-2.32	-2.32	-2.32
Sunset Drainage District east of LA 306			
High quality BLH	-1.62	-1.62	-1.62
Med quality BLH	-0.92	-0.92	-0.92
Low quality BLH	-2.20	-2.20	-2.20
Abandoned field	-4.49	-4.49	-4.49
Mitigation bank	-0.25	-0.25	-0.25
St. Charles levee upgrade-lift			
Med quality BLH	na	na	na
Low quality BLH	na	na	na
TOTAL	**-16.05**	**-15.83**	**-14.80**

	Alt 2		
BLH Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands			
Forested spoil banks	-0.93	-0.86	-0.48
Dufrene Ponds access rd	-0.50	-0.43	-0.30
Low quality BLH	-1.82	-1.73	-1.13
Sunset Drainage District west of LA 306			
Med quality BLH	-1.28	-1.28	-1.28
Low quality BLH	-2.46	-2.46	-2.46
Sunset Drainage District east of LA 306			
High quality BLH	-1.65	-1.65	-1.65
Med quality BLH	-0.99	-0.99	-0.99
Low quality BLH	-2.26	-2.26	-2.26
Abandoned field	-4.70	-4.70	-4.7
Mitigation bank	-0.26	-0.26	-0.26
St. Charles levee upgrade-lift			
Med quality BLH	-2.03	-1.87	-1.09
Low quality BLH	-6.95	-6.28	-4.68
TOTAL	**-25.83**	**-24.77**	**-21.28**

	Alt 1		
Swamp Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands	0.0	0.0	0.0
Sunset Drainage District west of LA 306	0.00	0.00	0.00
Sunset Drainage District east of LA 306	-0.56	-0.56	-0.56
St. Charles levee upgrade-lift	na	na	na
TOTAL	**-0.56**	**-0.56**	**-0.56**

	Alt 2		
Swamp Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands	0.0	0.0	0.0
Sunset Drainage District west of LA 306	0.00	0.00	0.00
Sunset Drainage District east of LA 306	-0.58	-0.58	-0.58
St. Charles levee upgrade-lift	-23.55	-23.55	-21.47
TOTAL	**-24.13**	**-24.13**	**-22.05**

	Alt 1		
Fresh marsh Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands	-63.9	-69.6	-56.4
Sunset Drainage District west of LA 306	0.00	0.00	0.00
Sunset Drainage District east of LA 306	0.00	0.00	0.00
St. Charles levee upgrade-lift	na	na	na
TOTAL	**-63.92**	**-69.62**	**-56.35**

	Alt 2		
Fresh marsh Impact & Location	**Low SLR (AAHUs)**	**Int SLR (AAHUs)**	**High SLR (AAHUs)**
West of Bayou Des Allemands	-67.2	-73.2	-59.3
Sunset Drainage District west of LA 306	0.00	0.00	0.00
Sunset Drainage District east of LA 306	0.00	0.00	0.00
St. Charles levee upgrade-lift	-2.48	-2.70	-2.17
TOTAL	**-69.72**	**-75.94**	**-61.45**

APPENDIX C

BORROW SITE SELECTION CRITERIA

Where multiple alternative borrow areas exists, use of those alternative sites should be prioritized in the following order: existing commercial pits, upland sources, previously disturbed/manipulated wetlands within a levee system, and low-quality wetlands outside a levee system. The Service supports the use of such protocols to avoid and minimize impacts to wetlands and bottomland hardwoods within project areas. Avoidance and minimization of those impacts helps to provide consistency with restoration strategies and compliments the authorized hurricane protection efforts. Such consistency is also required by Section 303(d)(1) of the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA).
Accordingly, the Service recommends that prior to utilizing borrow sites every effort should be made to reduce impacts by using sheetpile and/or floodwalls to increase levee heights wherever feasible. In addition, the Service recommends that the following protocol be adopted and utilized to identify borrow sources in descending order of priority:

1. Permitted commercial sources, authorized borrow sources for which environmental clearance and mitigation have been completed, or non-functional levees after newly constructed adjacent levees are providing equal protection.
2. Areas under forced drainage that are protected from flooding by levees, and that are:
    a) non-forested (e.g., pastures, fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).
3. Sites that are outside a forced drainage system and levees, and that are:
    a) non-forested (e.g., pastures fallow fields, abandoned orchards, former urban areas) and non-wetlands;
    b) wetland forests dominated by exotic tree species (i.e., Chinese tallow-trees) or non-forested wetlands (e.g., wet pastures), excluding marshes;
    c) disturbed wetlands (e.g., hydrologically altered, artificially impounded).

Notwithstanding this protocol, the location, size and configuration of borrow sites within the landscape is also critically important. Coastal ridges, natural levee flanks and other geographic features that provide forested/wetland habitats and/or potential barriers to hurricane surges should not be utilized as borrow sources, especially where such uses would diminish the natural functions and values of those landscape features.

To assist in expediting the identification of borrow sites, the Service recommends that immediately after the initial identification of a new borrow site the Corps should initiate informal consultation with the Service regarding potential impacts to federally listed threatened or endangered species. To aid you in complying with those proactive consultation responsibilities, the Service has provided (in the above letter) a list of threatened and endangered species and their critical habitats within the project area.

APPENDIX D

MITIGATION SUCCESS CRITERIA AND MITIGATION MONITORING: MARSH MITIGATION FEATURES (Fresh, Intermediate, and Brackish Marsh Habitats)

MITIGATION SUCCESS CRITERIA

The success (performance) criteria described herein are applicable to all proposed marsh habitats (fresh marsh, intermediate marsh, and brackish marsh restoration features), unless otherwise indicated.

1. General Construction

A. Complete all initial mitigation construction activities (e.g. construction of temporary retention/perimeter dikes, placement of fill (borrow material/dredged material), construction of permanent dikes if applicable, etc.) in accordance with the mitigation work plan and final project plans and specifications. Upon completion of construction, USACE or its contractor shall provide construction surveys to include all project features. These activities are classified as "initial construction requirements."

B. Approximately 1 year following completion of all initial mitigation construction activities (when the restored marsh feature has stabilized to the point that the containment berms are no longer required to prevent the loss of fill material from the project site), USACE or its contractor shall complete all final mitigation construction activities, in accordance with the mitigation work plan and final project plans and specifications. Such activities may include, but are not limited to: degrading temporary retention/perimeter dikes; completion of armoring of permanent dikes; "gapping" or installation of "fish dips"; soil testing; completion of plantings; and construction of trenasses or similar features within marsh features as a means of establishing shallow water interspersion areas within the marsh. Finishing the aforementioned construction activities will be considered as the "completion of final construction requirements".

2. Topography[1]

A. Initial Success Criteria:
   1. One year after completion of fill placement:
      - Demonstrate that at least 80% of each mitigation feature has a surface elevation that is within +0.5 to – 0.5 feet of the desired target surface elevation as determined by the settlement curve for that year.
   2. Two years after completion of fill placement:
      - Demonstrate that at least 80% of the mitigation site has a surface elevation that is within +0.5 feet to – 0.25 of the desired target surface elevation as determined by the settlement curve for that year.

B. Intermediate Success Criteria:
   1. Two years following achievement of Topography Criteria 2.A.2. —

- Demonstrate that at least 80% of the mitigation site has a surface elevation that is within the functional marsh elevation range[2].
- There are no additional monitoring or attainment requirements for topography beyond meeting the Intermediate Success Criteria for topography.

Notes:
[1]Elevation survey data and report will be provided to the IET for review in order to determine concurrence. The surveys must include water levels inside and outside the marsh creation site at locations representative of site conditions.
[2]The "functional marsh elevation range", i.e. the range of the marsh surface elevation that is considered adequate to achieve proper marsh functions and values, is determined during the final design phase.

3. Native Vegetation

A. Fresh marsh:

1. Initial Success Criteria (2 growing seasons following completion of initial construction activities in General Construction 1.A.):
   - Achieve a minimum average cover of 50% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
2. Intermediate Criteria (2 years following attainment of Native Vegetation Criteria 3.A.1.):
   - Achieve a minimum average cover of 60% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
3. Long-Term Success Criteria[3] (Every monitoring event after attainment of Native Vegetation Criteria 3.A.2.):
   - Achieve a minimum average cover of 60% comprised of native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.

Notes:
[1]Fresh marsh is typically not planted due to the expectation that it will naturally vegetate more quickly than intermediate or brackish marsh. However, if percent cover success criteria are not met, plantings may become necessary in the absence of other recommended actions

B. Intermediate marsh and brackish marsh:

1. Initial Success Criteria (2 growing seasons following completion of initial construction activities in General Construction 1.A.):
   - Initial plantings must attain at least 80% survival of planted species, or achieve a minimum average cover of 25% native herbaceous species (includes planted species and volunteer species). If site self-vegetates, the site must achieve a minimum average cover of at least 50% native herbaceous species.
   - Demonstrate that vegetation satisfies USACE hydrophytic vegetation criteria.
2. Intermediate Criteria (2 years following attainment of Native Vegetation Criteria 3.B.1):
   - Achieve a minimum average cover of 60%, comprised of native herbaceous species (includes planted species and volunteer species).

- Demonstrate that native vegetation satisfies USACE hydrophytic vegetation criteria.

3. Long-Term Success Criteria[3] (Every monitoring event after attainment of Native Vegetation Criteria 3.B.2.):
   - Achieve a minimum average cover of 60%, comprised of native herbaceous species (includes planted species and volunteer species).
   - Demonstrate that native vegetation satisfies USACE hydrophytic vegetation criteria.

Note:
[1]There is not a minimum average cover requirement for years 21 – 50. However, vegetation data will be collected throughout the 50-year project life.

4. Invasive and Nuisance Vegetation (for all marsh types)

A. Initial, Intermediate, and Long-term[1] Success Criteria
   - Maintain the project area such that the total average vegetative cover accounted for by invasive and nuisance species constitute less than 5% of the total average plant cover throughout the 50-year project life. The list of invasive and nuisance species is found in Appendix A and will be tailored to reflect specific site needs.

Note:
[1]Yearly inspections to determine the need for invasive/nuisance control would be conducted until the long term success criteria for vegetation is achieved. After it is achieved, the frequency of inspections to determine the need for invasive/nuisance control would be adjusted based on site conditions.

MITIGATION MONITORING GUIDELINES

The guidelines for mitigation monitoring provided herein are applicable to all types of marshes being restored unless otherwise indicated.

Baseline Monitoring Report (First Monitoring Report)

A "baseline" monitoring report will be prepared upon completion of Final Construction Requirements 1.B. and upon any re-plantings associated with construction. Information provided will typically include the following:

- A detailed discussion of all mitigation activities completed.

- A plan view drawing of the mitigation site showing the approximate boundaries of the restored marsh, significant interspersion features established within the marsh features (as applicable), proposed monitoring transect locations, proposed sampling plot locations, photo station locations and water level survey locations.

- Initial and final construction surveys of all project features (including but not limited to the fill area, fish dips, weirs, culverts, etc.) and an analysis of the survey data will be provided addressing attainment of topographic success criteria. If a project is immediately adjacent to

existing marsh habitat, the topographic survey will include spot elevations collected within the existing marsh habitat near the restored marsh.

- Photographs documenting conditions in the project area will be taken at the time of monitoring. Photos will be taken at permanent photo stations within the restored marsh. At least two photos will 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. The number of photo stations required and the locations of these stations will vary depending on the mitigation site. The USACE will make this determination in coordination with the Interagency Team and will specify the requirements in the Mitigation Monitoring Plan. At a minimum, 4 photo stations will be established within each marsh cell.

- For planted marsh only -- A detailed inventory of all species planted, including the number of each species planted, the stock size planted, and where the species were planted will be documented. For mitigation sites that include more than one planted marsh cell/feature, provide a breakdown itemization indicating the number of each species planted in each feature and correlate this itemization to the marsh features depicted on the plan view drawing of the mitigation site.

- As part of the as-built/final construction survey, water level surveys will be taken inside and outside the marsh creation site at predetermined locations identified in coordination with the IET and NFS. Each interior water level elevation should have a corresponding exterior water level elevation taken consecutively and within close proximity. If there appears to be disparity in water levels within the marsh creation site, additional shots may be required. The baseline monitoring report will provide the surveyed water level data and will compare it to mean high and mean low water elevation data collected from a tidal elevation recording station in the general vicinity of the mitigation site. The report will further address estimated mean high and mean low water elevations at the mitigation site based on field indicators.

- Various qualitative observations will be made in the mitigation site to help assess the status and success of mitigation and maintenance activities. These observations will 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 condition of interspersion features (tidal channels, trenasses, depressions, etc.) constructed within the marsh features, noting any excessive scouring and/or siltation occurring within such features; the natural formation of interspersion features within restored marshes; observations regarding general surface water flow characteristics within marsh interspersion features; the general condition of “gaps”, “fish dips”, or similar features constructed in permanent dikes; if present, the general condition of any armoring installed on permanent dikes. General observations made during the course of monitoring will also address potential problem zones and other factors deemed pertinent to the success of the mitigation project.

- 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.

- 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 Baseline Monitoring Report will be called either Initial, Intermediate or Long-Term Monitoring Reports and shall include the year in which the monitoring occurred (i.e. Monitoring Report 2019). All Monitoring Reports shall provide the following information unless otherwise noted:

- All items listed for the Baseline Monitoring Report with the exception of: (a) the topographic surveys, although additional topographic surveys are required for specific monitoring reports (see below); and (b) the inventory of species and location map for all planted species.

- Quantitative data for all plants in each stratum. Data will be collected from permanent sampling quadrats established at approximately equal intervals along permanent monitoring transects established within each marsh feature. Each sampling quadrat will be approximately 2 meters X 2 meters in size (although the dimensions of each quadrat may be increased, if necessary, to provide better data in planted marsh features). The number of monitoring transects and number of sampling quadrats per transect will vary depending on size of the mitigation site and will be determined by the IET during the final design phase of the project. The resulting requirements, including quadrat dimensions, will be specified in the Final Mitigation Monitoring Plan for the project. Data recorded from the sampling quadrats will include but not be limited to: average total percent cover by native plant species; average total percent cover by invasive plant species; average total percent cover by nuisance plant species; percent cover of each plant species; the wetland indicator status of each species; and the average percent survival of each planted species (i.e. number of living planted species as a percentage of total number of plants installed), if discernable at the time of monitoring.

- One photograph shall be taken from the SE corner of each sampling plot to clearly capture the vegetation plot and must include a sign that indicates the plot number and sampling date.

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

- Topographic surveys of each marsh restoration feature for initial and intermediate monitoring events (at approximately 2 years and 4 years following completion of final construction activities (General Construction 1.B.)). These surveys will 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 will

include an analysis of the topographic data in regards to the attainment of applicable topographic success criteria. If the surveys indicate topographic success criteria have not been achieved and supplemental topographic alterations are necessary, then another topographic survey will be required following completion of the supplemental alterations. This determination will be made by USACE and the IET.

Monitoring Reports Following Planting or Re-planting Activities

Planting or re-planting of certain areas within restored marsh habitats may be necessary to ensure attainment of applicable native vegetation success criteria. Any monitoring report submitted following completion of a planting event must include an inventory of the number of each species planted, the stock size used, and the locations for each species planted. 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. The perimeter of re-planted area should be documented with GPS coordinates. If single rows are replanted, then GPS coordinates should be taken at the end of the transect.

MITIGATION MONITORING SCHEDULE AND RESPONSIBILITIES

Monitoring will typically take place in mid to late summer during the required years for monitoring, but may be delayed until later in the growing season due to site conditions or other unforeseen circumstances. Monitoring Reports will be submitted by December 31 of each year of monitoring to the USACE, NFS, and the IET. The various monitoring and reporting responsibilities addressed in this section are all subject to the provisions set forth in the Introduction section.

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

1. General Construction – 1.A. and 1.B.
2. Topography – 2.A.1 and 2.A.2.
3. Native Vegetation – For fresh marsh features, criteria 3.A.1; for intermediate marsh and brackish marsh features, criteria 3.B.1.
4. Invasive & Nuisance Vegetation – 4.A. until such time as monitoring responsibilities are transferred to the NFS.

The USACE will be responsible for conducting Baseline and Initial Success Monitoring events and preparing the associated monitoring reports.

The NFS will be responsible for conducting the required monitoring events and preparing the associated monitoring reports for all other required years after the USACE has achieved the initial success criteria listed above. The responsibility for management, maintenance, and monitoring of the non-structural components of the mitigation project (i.e. vegetation) will typically be transferred to the NFS during the first quarter of the year immediately following submittal of the monitoring report that demonstrates attainment of the initial success criteria. Once monitoring responsibilities have been transferred to the NFS, the next monitoring event

(Intermediate) should take place 2 growing seasons after Initial Success (Topography 2.A.2 and Native Vegetation 3.A.1 or 3.B.1) has been met. After Intermediate Success Criteria (Topography 2B and Native Vegetation 3.A.2 or 3.B.2) has been met, Long-Term Success Criteria monitoring will be conducted every 5 years throughout the remaining 50-year period of analysis (which begins once initial success criteria have been met).

In certain cases, it is possible that the marsh mitigation features may be established along with other mitigation features, like swamp or bottomland hardwood habitats, at the same mitigation site. This scenario could require some adjustments to the typical monitoring schedule described above in order to develop a reasonable and efficient monitoring schedule that covers all the mitigation features. Such adjustments, if necessary, would be made at the time final mitigation plans are generated. This schedule must be in general accordance with the guidance provided above and will be prepared by the USACE and the IET.

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 would be responsible for conducting such additional monitoring and preparing the associated monitoring reports in the following instances:

(A) For fresh marsh features –

- If the initial vegetative cover success criteria (3.A.1) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable vegetative cover criteria have been satisfied. This requirement only exists if planting the marsh mitigation feature is required to meet the success criteria, the USACE would be responsible for the purchase and installation of the required plants.

(B) For intermediate and brackish marsh features –

- If the initial survival criteria for planted species or the initial vegetative cover criterion (3.B.1) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable survival criteria or vegetative cover criteria have been satisfied. The USACE would be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(C) For all types of marsh features–

- If initial topographic success criteria (2.A.1 and 2.A.2) are not achieved, the IET would convene to determine whether corrective actions are necessary. If corrective actions are necessary additional surveys and a monitoring report will be required to indicate whether applicable criteria have been satisfied. The USACE would also be responsible for performing the necessary corrective actions.

- If initial invasive and nuisance species criteria (4.A) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable criteria have been satisfied. The USACE would be responsible for the irradiation activities needed to attain the success criteria.

There could also be cases where failure to attain certain success criteria would trigger the need

for additional monitoring events for which the NFS would be responsible:

(A) For fresh marsh features –

- If the native vegetation intermediate success criteria (3.A.2) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the success criteria have been satisfied. The Sponsor would also be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(B) For intermediate and brackish marsh features –

- If the native vegetation intermediate success criteria (3.B.2) are not achieved, a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the native vegetation intermediate success criteria has been satisfied. The Sponsor would also be responsible for the purchase and installation of supplemental plants needed to attain the success criteria.

(C) For all types of marsh features –

- If the topographic intermediate success criteria (2.B.) are not achieved, the IET would convene to determine whether corrective actions are necessary. If corrective actions are necessary, additional surveys and a monitoring report will be required to indicate whether applicable criteria have been satisfied. The NFS would also be responsible for performing the necessary corrective actions if the IET determines such corrective actions are necessary.

- If the native vegetation long term success criteria (3.A.3 and 3.B.3) are not achieved, the IET would convene to discuss whether corrective actions would be necessary. If corrective actions are necessary, a monitoring report will be required for each consecutive year following completion of the corrective actions until two sequential annual reports indicate that the native vegetative cover criteria have been attained. The NFS would be responsible for performing the corrective actions, conducting the additional monitoring events, and preparing the associated monitoring reports.

- If the intermediate and long term invasive and nuisance species criteria (4.A) are not achieved a monitoring report will be required for each consecutive year until two sequential annual reports indicate that the applicable criteria have been satisfied. The NFS would be responsible for the irradiation activities needed to attain the success criteria.

Once monitoring responsibilities have been transferred to the NFS, the NFS will 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. Fifteen years following achievement of Long Term Success Criteria, 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 and the IET.

APPENDIX E

TWELVE REQUIRMENTS FOR MITIGATION PLANNING
(from the U.S. Army Corps of Engineers & EPA 2008 Final Mitigation Rule in the FEDERAL REGISTER Vol. 73, No. 70, April 10, 2008)

Twelve Requirements for a Compensatory Mitigation Plan

1. Objectives. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (restoration, establishment, preservation etc.), and how the anticipated functions of the mitigation project will address watershed needs.

2. Site selection. A description of the factors considered during the site selection process. This should include consideration of watershed needs, onsite alternatives where applicable, and practicability of accomplishing ecologically self-sustaining aquatic resource restoration, establishment, enhancement, and/or preservation at the mitigation project site.

3. Site protection instrument. A description of the legal arrangements and instrument including site ownership, that will be used to ensure the long-term protection of the mitigation project site.

4. Baseline information. A description of the ecological characteristics of the proposed mitigation project site, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other characteristics appropriate to the type of resource proposed as compensation. The baseline information should include a delineation of waters of the United States on the proposed mitigation project site. A prospective permittee planning to secure credits from an approved mitigation bank or in-lieu fee program only needs to provide baseline information about the impact site.

5. Determination of credits. A description of the number of credits to be provided including a brief explanation of the rationale for this determination.
    - For permittee-responsible mitigation, this should include an explanation of how the mitigation project will provide the required compensation for unavoidable impacts to aquatic resources resulting from the permitted activity.
    - For permittees intending to secure credits from an approved mitigation bank or in-lieu fee program, it should include the number and resource type of credits to be secured and how these

were determined.

6. Mitigation work plan. Detailed written specifications and work descriptions for the mitigation project, including: the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water; methods for establishing the desired plant community; plans to control invasive plant species; proposed grading plan; soil management; and erosion control measures. For stream mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.

7. Maintenance plan. A description and schedule of maintenance requirements to ensure the continued viability of the resource once initial construction is completed.

8. Performance standards. Ecologically-based standards that will be used to determine whether the mitigation project is achieving its objectives.

9. Monitoring requirements. A description of parameters monitored to determine whether the mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting monitoring results to the DE must be included.

10. Long-term management plan. A description of how the mitigation project will be managed after performance standards have been achieved to ensure the long-term sustainability of the resource, including long-term financing mechanisms and the party responsible for long-term management.

11. Adaptive management plan. A management strategy to address unforeseen changes in site conditions or other components of the mitigation project, including the party or parties responsible for implementing adaptive management measures.

12. Financial assurances. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

Other information. The DE may require additional information as necessary to determine the appropriateness, feasibility, and practicability of the mitigation project.

National Ambient Standards

Air Quality Standards

Use the following table to access information about the individual standards as well as the attainment status and ongoing efforts surrounding each pollutant.

Criteria Pollutant	Primary/ Secondary	Averaging Time	Level	Form	Attainment Status
Carbon Monoxide	Primary	8-hour 1-hour	9ppm 35ppm	Not to be exceeded more than once per year	**Attainment**
Lead	Primary and Secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded	**Attainment**
Nitrogen Dioxide	Primary Primary and Secondary	1-hour Annual	100 ppb 53 ppb (2)	98th percentile, averaged over 3 years Annual Mean	**Attainment**
Ozone	Primary and Secondary	8-hour	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years	**Attainment**
Particle Pollution PM2.5	Primary and Secondary	Annual 24-hour	12 µg/m^3 35 µg/m^3	Annual mean, averaged over 3 years	**Attainment**

	Primary/ Secondary	Averaging Time			
				98th percentile, averaged over 3 years	
Particle Pollution PM10	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years	**Attainment**
Sulfur Dioxide	Primary Secondary	1-hour 3-hour	75 ppb (4) 0.5 ppm	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years Not to be exceeded more than once per year	**Non-Attainment for St. Bernard Parish**

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Sulfur Dioxide Standard

On June 22, 2010, EPA promulgated a revised 1-hour, 75 ppm, sulfur oxide (SO2) primary standard. The SO2 primary standard was revised to provide requisite protection of public health. Under Section 110 (a) of the Federal Clean Air Act, States after promulgation of

a national primary ambient air quality standard (or any revision thereof), must implement plans to attain or maintain the standard. The State Implementation Plan (SIP) must demonstrate, through refined air quality modeling, that all sources contributing to or having the potential to contribute to monitored and modeled violations will be sufficiently controlled to ensure timely attainment and maintenance of the new SO2 standard.

The primary SO2 final rule (1) replaces the 24-hour and annual standard, (2) establishes a new 1-hour standard (3) utilizes the 3-year average of the 4thhighest daily maximum 1-hour concentration, (4) establishes new requirements for the SO2 monitoring network, and (5) finalizes conforming changes to the Air Quality Index (AQI).

JOHN BEL EDWARDS
GOVERNOR

CHUCK CARR BROWN, PH.D.
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

DEC 0 4 2020

Ms. Patricia Naquin
US Army Corps of Engineers, New Orleans District
Regional Planning and Environmental Division, South
CEMVN-PDN-CEP
7400 Leake Avenue
New Orleans, LA 70118

AI No.: 101235
Activity No.: CER20200007

RE: USACE-NOD – Upper Barataria Basin, Louisiana Feasibility Study, Louisiana
Water Quality Certification WQC 201203-02
Ascension, Assumption, Jefferson, Lafourche, St. Charles, St. James, and St. John the Baptist Parishes

Dear Ms. Naquin:

The Louisiana Department of Environmental Quality, Water Permits Division (LDEQ), has reviewed the application for construction of levees, floodwall, a barge gate and roller gate in the Upper Barataria Basin for the purposes of flood-risk reduction located in Ascension, Assumption, Jefferson, Lafourche, St. Charles, St. James, and St. John the Baptist Parishes.

The information provided in the application has been reviewed in terms of compliance with State Water Quality Standards, the approved Water Quality Management Plan and applicable state water laws, rules and regulations. LDEQ determined that the requirements for a Water Quality Certification have been met. LDEQ concludes that the deposit of spoil will not violate water quality standards as provided for in LAC 33:IX.Chapter 11. Therefore, LDEQ hereby issues USACE-NOD – Upper Barataria Basin, Louisiana Feasibility Study, Louisiana Water Quality Certification, WQC 201203-02.

Should you have any questions concerning any part of this certification, please contact Elizabeth Hill at (225) 219-3225 or by email at elizabeth.hill@la.gov. Please reference Agency Interest (AI) number 101235 and Water Quality Certification 201203-02 on all future correspondence to this Department to ensure all correspondence regarding this project is properly filed into the Department's Electronic Document Management System.

Sincerely,

Scott Guilliams
Administrator
Water Permits Division

c: IO-W

ec: Patricia Naquin
patricia.leroux@usace.army.mil
dnrocmintake@la.gov

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Custom House, Room 244
200 Chestnut Street
Philadelphia, Pennsylvania 19106-2904

IN REPLY REFER TO:

January 20, 2021

9043.1
ER 20/0561

Danielle A. Keller
New Orleans District
US Army Corps of Engineers
7400 Leake Avenue
New Orleans, LA 70118

RE: Revised Draft Environmental Impact Statement by the U.S. Army Corps of Engineers for the Upper Barataria Basin Coastal Feasibility Study - Assumption, Ascension, St James, Lafourche, St John the Baptist, Jefferson, and St. Charles Parishes, Louisiana

Dear Ms. Keller:

The U.S. Department of the Interior (Department) has reviewed the Revised Draft Environmental Impact Statement (DEIS) by the U.S. Army Corps of Engineers (USACE) for the Upper Barataria Basin Coastal Feasibility Study. These comments are provided pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S .C. 1531 et seq.), the Fish and Wildlife Coordination Act (FWCA) (48 Stat.401; 16 U.S.C. 661 et seq.), the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712), and Executive Order 13186 (E.O. 13186): Responsibilities of Federal Agencies to Protect Migratory Birds (January, 2001).

General Comments

The Department is committed to working collaboratively with USACE in the development of the Final Feasibility Study and Environmental Impact Statement (FEIS) for the subject project. The U.S. Fish and Wildlife Service (Service) previously provided comments on January 13, 2019 and offer the following comments on the Revised DEIS.

Page 93, first paragraph: The second to last sentence states that levee construction would result in a small impact to the Paradis Mitigation Bank. It should also be noted that levee construction would result in impacts to Mitigation and Conservation Areas on the flood side of the existing St. Charles levee reach. Impacts to all mitigation banks should be included in the analysis. Expand this discussion on mitigation bank and conservation area impacts.

Page 94, second paragraph: Without-project and with-project water velocities at the proposed Bayou des Allemands floodgate are reported as 5.7 and 5.4 feet per second, respectively. These values seem far greater than normally occurring velocities in Louisiana interior coastal marshes. Verify that actual values are 0.57 and 0.54 feet per second and replace figures as necessary. Additionally, the text references a small with-project velocity increase. However, the reported numbers illustrate a with-project velocity decrease. This discrepancy should be evaluated and modified with accurate information.

Page 100, Cumulative Effects Section, third paragraph: The paragraph contains a statement that the cumulative effects of converting degrading wetland habitats to grass-covered levees would "provide greater long-term positive benefits when considered within the context of ongoing extensive land loss . .. ". This statement conflicts with the sentence immediately succeeding it that mentions the alternative would result in a reduction in existing habitat used by various terrestrial and aquatic organisms. More explanation is needed in the analysis of the levees cumulative impacts in regards to both wildlife species and aquatic species along with any proposed mitigation measures that would lessen those impacts.

Page 100, Cumulative Effects, last paragraph: The last sentence states that "alterations to canals and their associated spoil banks" would have long-term indirect impacts. It is not clear if this refers to canal alterations under the with-project condition. More explanation is needed.

Page 139, Endangered Species Act of 1973 paragraph: The document should note that the ESA Section 7 consultation for construction impacts was completed when the Service concurred (via letter dated November 18, 2020) with the Corps' Not Likely to Adversely Affect determination. ESA Section 7 consultation for mitigation features has not yet begun given that those features have not yet been proposed.

The Department appreciates the opportunity to provide these comments. Should you have questions, please contact Ronald Paille, U. S. Fish and Wildlife Service, at ronald_paille@fws.gov or (337) 291-3117.

Sincerely,

JOHN NELSON Digitally signed by JOHN NELSON Date: 2021.01.20 14:18:07 -05'00'

John Nelson
Regional Environmental Officer

cc: USFWS

JOHN BEL EDWARDS
GOVERNOR

THOMAS F. HARRIS
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF COASTAL MANAGEMENT

December 17, 2020

Patricia S. Naquin
Biologist/Environmental Resource Specialist, Coastal Environmental Planning Section
US Army Corps of Engineers-New Orleans District CEMVN-PDS-C
7400 Leake Ave
New Orleans, LA 70118
Via email: Patricia.Leroux@usace.army.mil

RE: **C20200150,** Coastal Zone Consistency
New Orleans District, Corps of Engineers (COE)
Direct Federal Action
Upper Barataria Basin Draft Feasibility Study with Intergrated Environmental Impact Statement
St. Charles & St. James Parishes, Louisiana

Dear Ms. Naquin:

The above referenced project has been reviewed for consistency with the Louisiana Coastal Resources Program in accordance with Section 307 (c) of the Coastal Zone Management Act of 1972, as amended. The project, as proposed in this application, is consistent with the LCRP.

If you have any questions concerning this determination please contact Jim Bondy of the Consistency Section at (225) 342-3870 or james.bondy@la.gov.

Sincerely,

/S/ Charles Reulet
Administrator
Interagency Affairs/Field Services Division

CR/MH/jab

cc: Dave Butler, LDWF
Earl Matherne, St. Charles Parish
Amanda Voisin, Lafourche Parish
Kirk Kilgen, OCM FI

JOHN BEL EDWARDS
GOVERNOR

JACK MONTOUCET
SECRETARY

PO BOX 98000 | BATON ROUGE LA | 70898

January 26, 2021

Attn: Marshall K. Harper
Environmental Planning Branch Chief
United States Army Corps of Engineers
7400 Leake Avenue
New Orleans, LA 70118

RE: *Public Notice: Upper Barataria 2020 Second Draft Report and EIS*
Applicant: U.S. Army Corps of Engineers-New Orleans District
Notice Date: December 11, 2020

Dear Mr. Harper:

The professional staff of the Louisiana Department of Wildlife and Fisheries (LDWF) has reviewed the above referenced Public Notice. Based upon this review, the following has been determined:

Impacts to the Louisiana Natural and Scenic River system associated with Reach F, as well as possible minimization and mitigation of those impacts, were not adequately considered within the Environmental Impact Statement (EIS). The Louisiana Scenic Rivers Act of 1970 (the Act) extends beyond aesthetic resources. LDWF's Scenic Rivers Program preserves, protects, develops, reclaims, and enhances the wilderness qualities, scenic beauties, and ecological regimes of designated rivers, streams, and bayous. The system is further administered for the purpose of preserving aesthetic, scenic, recreational, fish, wildlife, ecological, archaeological, geological, botanical, and other natural and physical features and resources found along these streams or segments thereof.

In regard to aesthetic impacts to a Louisiana designated Scenic River (LASR), Section 5 of the document states the following: "The man-made structure may be considered obtrusive against a tranquil and entrancing shoreline. However, man-made structures currently occupy stretches of shoreline and multiple bridges cross Bayou Des Allemands just north of the proposed barge gate structure." Although structures do exist, the major crossings existed prior to the stream being designated and are essentially grandfathered in. Additionally, none are tantamount to the Tentatively Selected Plan's (TSP) proposed gate structure across Des Allemands, and none exist in the immediate vicinity of the proposed structure. Impacts to LASR associated with the TSP are significant and should be considered further within the EIS. Minimization and mitigation of those impacts should be provided to offset impacts to LASR.

LDWF understands that the mitigation plan/measures are currently being developed. We would be interested in working with the Project Development Team to select mitigation alternatives that

include LASR mitigation including rectifying or compensating impacts. Rectification of levee reaches might include the planting and maintenance of native grasses and forbs or other native vegetation on portions of the levee/toe in lieu of turf grasses to provide habitat value and lessen aesthetic and ecological impacts. The U.S. Fish and Wildlife Service (USFWS) has suggested similar measures on other recent levee projects (e.g. MRL). Compensation could include the creation or preservation of habitat along the banks of Bayou Des Allemands and improvements to public access.

Section 8 of the EIS did not include information regarding the Act. This section of the EIS should include information on the Act and how requirements of the Act will be addressed by project sponsors. Project sponsors should continue coordinate with staff to discuss LASR rules and regulations and how they apply to the TSP. If found permissible, the proposed structures in and within the vicinity of Bayou Des Allemands will require LDWF authorization prior to construction.

LDWF concurs with the USFWS Coordination Act Report's comments and recommendations. We look forward to continued coordination and review of the developing mitigation plan and other planning.

The Louisiana Department of Wildlife and Fisheries submits these recommendations to the U.S. Army Corps of Engineers in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). Please do not hesitate to contact Habitat Section biologist Chris Davis at 225-765-2642 should you need further assistance.

Sincerely,

/S/ Randell S. Myers

Randell S. Myers
Assistant Secretary, Wildlife Division

mw

JOHN BEL EDWARDS
GOVERNOR

JACK MONTOUCET
SECRETARY

PO BOX 98000 | BATON ROUGE LA | 70898

January 26, 2021

Attn: Marshall K. Harper
Environmental Planning Branch Chief
United States Army Corps of Engineers
7400 Leake Avenue
New Orleans, LA 70118

RE: *Public Notice: Upper Barataria 2020 Second Draft Report and EIS*
Applicant: U.S. Army Corps of Engineers-New Orleans District
Notice Date: December 11, 2020

Dear Mr. Harper:

The professional staff of the Louisiana Department of Wildlife and Fisheries (LDWF) has reviewed the above referenced Public Notice. Based upon this review, the following has been determined:

Impacts to the Louisiana Natural and Scenic River system associated with Reach F, as well as possible minimization and mitigation of those impacts, were not adequately considered within the Environmental Impact Statement (EIS). The Louisiana Scenic Rivers Act of 1970 (the Act) extends beyond aesthetic resources. LDWF's Scenic Rivers Program preserves, protects, develops, reclaims, and enhances the wilderness qualities, scenic beauties, and ecological regimes of designated rivers, streams, and bayous. The system is further administered for the purpose of preserving aesthetic, scenic, recreational, fish, wildlife, ecological, archaeological, geological, botanical, and other natural and physical features and resources found along these streams or segments thereof.

In regard to aesthetic impacts to a Louisiana designated Scenic River (LASR), Section 5 of the document states the following: "The man-made structure may be considered obtrusive against a tranquil and entrancing shoreline. However, man-made structures currently occupy stretches of shoreline and multiple bridges cross Bayou Des Allemands just north of the proposed barge gate structure." Although structures do exist, the major crossings existed prior to the stream being designated and are essentially grandfathered in. Additionally, none are tantamount to the Tentatively Selected Plan's (TSP) proposed gate structure across Des Allemands, and none exist in the immediate vicinity of the proposed structure. Impacts to LASR associated with the TSP are significant and should be considered further within the EIS. Minimization and mitigation of those impacts should be provided to offset impacts to LASR.

LDWF understands that the mitigation plan/measures are currently being developed. We would be interested in working with the Project Development Team to select mitigation alternatives that

include LASR mitigation including rectifying or compensating impacts. Rectification of levee reaches might include the planting and maintenance of native grasses and forbs or other native vegetation on portions of the levee/toe in lieu of turf grasses to provide habitat value and lessen aesthetic and ecological impacts. The U.S. Fish and Wildlife Service (USFWS) has suggested similar measures on other recent levee projects (e.g. MRL). Compensation could include the creation or preservation of habitat along the banks of Bayou Des Allemands and improvements to public access.

Section 8 of the EIS did not include information regarding the Act. This section of the EIS should include information on the Act and how requirements of the Act will be addressed by project sponsors. Project sponsors should continue coordinate with staff to discuss LASR rules and regulations and how they apply to the TSP. If found permissible, the proposed structures in and within the vicinity of Bayou Des Allemands will require LDWF authorization prior to construction.

LDWF concurs with the USFWS Coordination Act Report's comments and recommendations. We look forward to continued coordination and review of the developing mitigation plan and other planning.

The Louisiana Department of Wildlife and Fisheries submits these recommendations to the U.S. Army Corps of Engineers in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.). Please do not hesitate to contact Habitat Section biologist Chris Davis at 225-765-2642 should you need further assistance.

Sincerely,

/S/ Randell S. Myers

Randell S. Myers
Assistant Secretary, Wildlife Division

mw

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVE
NEW ORLEANS, LA 70118-3651

March 13, 2021

Regional Planning and Environment
Division South

Randall S. Myers
Assistant Director
Louisiana Department of Wildlife and Fisheries
2000 Quail Drive
Baton Rouge, LA 70808

Dear Mr. Myers:

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (MVN), Regional Planning and Environment Division South (RPEDS) has received your letter dated January 26, 2021 regarding the second draft of the Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS), for the Upper Barataria Basin (UBB) Louisiana Study.

This letter is in response to the recommendations the Louisiana Department of Wildlife and Fisheries submitted in accordance with provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et seq.).

1. Impacts to the Louisiana Natural and Scenic River system associated with Reach F, as well as possible minimization and mitigation of those impacts, were not adequately considered within the Environmental Impact Statement (EIS). The Louisiana Scenic Rivers Act of 1970 (the Act) extends beyond aesthetic resources. LDWF's Scenic Rivers Program preserves, protects, develops, reclaims, and enhances the wilderness qualities, scenic beauties, and ecological regimes of designated rivers, streams, and bayous. The system is further administered for the purpose of preserving aesthetic, scenic, recreational, fish, wildlife, ecological, archaeological, geological, botanical, and other natural and physical features and resources found along these streams or segments thereof.

RESPONSE: Acknowledged.

2. In regard to aesthetic impacts to a Louisiana designated Scenic River (LASR), Section 5 of the document states the following: "The man-made structure may be considered obtrusive against a tranquil and entrancing shoreline. However, man-made structures currently occupy stretches of shoreline and multiple bridges cross Bayou Des Allemands just north of the proposed barge gate structure." Although structures do exist, the major crossings existed prior to the stream being designated and are essentially grandfathered in. Additionally, none are tantamount to the Tentatively Selected Plan's (TSP) proposed gate structure across Des Allemands, and none exist

in the immediate vicinity of the proposed structure. Impacts to LASR associated with the TSP are significant and should be considered further within the EIS. Minimization and mitigation of those impacts should be provided to offset impacts to LASR.

RESPONSE: Acknowledged. USACE has initiated discussions with LDWF LASR staff and in an email dated 11/20/2020, Chris Davis confirmed since UBB is only a study and will likely change in many ways as the design proceeds, USACE does not need to obtain a permit until such time as we receive construction authorization and funding for the project. USACE will continue to coordinate with LDWF should the project move forward to construction.

3. LDWF understands that the mitigation plan/measures are currently being developed. We would be interested in working with the Project Development Team to select mitigation alternatives that include LASR mitigation including rectifying or compensating impacts. Rectification of levee reaches might include the planting and maintenance of native grasses and forbs or other native vegetation on portions of the levee/toe in lieu of turf grasses to provide habitat value and lessen aesthetic and ecological impacts. The U.S. Fish and Wildlife Service (USFWS) has suggested similar measures on other recent levee projects (e.g. MRL). Compensation could include the creation or preservation of habitat along the banks of Bayou Des Allemands and improvements to public access.

RESPONSE: Acknowledged. USACE currently has a general mitigation plan included in Appendix F of the IFR/EIS. As the UBB project is currently in the feasibility study phase and has yet to be authorized for construction, the project is likely to go through multiple design changes in the future, which could allow for additional refinement of the mitigation features. USACE welcomes LDWFs partnership with the Project Delivery in further refinement of these plans.

4. Section 8 of the EIS did not include information regarding the Act. This section of the EIS should include information on the Act and how requirements of the Act will be addressed by project sponsors. Project sponsors should continue coordinate with staff to discuss LASR rules and regulations and how they apply to the TSP. If found permissible, the proposed structures in and within the vicinity of Bayou Des Allemands will require LDWF authorization prior to construction.

RESPONSE: Acknowledged. The Louisiana Coastal Protection and Restoration Authority Board (CPRAB) is the cost sharing non-federal sponsor (NFS) of the study. USACE along with CPRAB recognizes LASR and will continue to work with LDWF concerning the rules and regulations as they might apply to UBB once the project is authorized for construction as mentioned in our earlier response.

We appreciate your comments and look forward to continued cooperation with the LDWF. Should you have any additional questions, please reach out to Mrs. Patricia S. Naquin; U.S. Army Corps of Engineers; Regional Planning and Environment Division South; New Orleans Environmental Branch; CEMVN-PDS-C; 7400 Leake Avenue, New Orleans,

Louisiana 70118. Mrs. Naquin may also be reached via email at patricia.s.leroux@usace.army.mil, by fax to (504) 862-2088 or by phone at (504) 862-1544 if questions arise.

HARPER.MARSHALL.KEVIN.1536114358

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Date: 2021.03.13 15:01:37 -06'00'

Marshall K. Harper
Chief, Environmental Planning Branch

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

January 13, 2020 F/SER46/JM:rs
225-380-0089

Mr. Marshall K. Harper, Chief
Environmental Planning Branch
Regional Planning and Environment Division South
U.S. Army Corps of Engineers
New Orleans Environmental Branch, CEMVN-PDS-C
7400 Leake Avenue
New Orleans, Louisiana 70118

Dear Mr. Harper:

NOAA's National Marine Fisheries Service (NMFS) has reviewed Upper Barataria Basin (UBB), Draft Feasibility Study with Integrated Environmental Impact Statement (EIS) transmitted by your letter dated November 29, 2019. The draft feasibility report and EIS have been prepared in response to the Bipartisan Budget Act of 2018, H. R. 1892 - 13, Title IV, Corps of Engineers - Civil, Department of the Army, Investigations, which authorized the expenditure of funds necessary for the completion, or initiation and completion, of flood and storm damage risk reduction projects or studies in multiple southeast Louisiana parishes. The NMFS has agreed to serve as a cooperating agency as part of the One Federal Decision process for this project under provisions of the National Environmental Policy Act.

The letter indicates the draft EIS represents the U.S. Army Corps of Engineers (USACE) initiation of essential fish habitat (EFH) consultation under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The Tentatively Selected Plan, Alternative 1 Highway 90 – Segment 1 Extension, proposes approximately 344.87 acres of impacts to EFH through the conversion of tidally influenced habitat to uplands via the construction of a 7.5-foot levee elevation, flood walls, access road and vehicle crossing, staging areas, and multiple water control structures to maintain existing water exchanges (e.g., 270-foot channel barge floodgate, 45-foot roller floodgate, stop log floodgate, and five culverts with sluice gates). The NMFS does not object to hurricane protection to reduce risk to life or property. However, the NMFS is concerned direct wetland losses from construction of project features and water control structures would adversely impact EFH and associated marine fishery resources by reducing fisheries access and water exchange in the Upper Barataria Basin.

The wetlands in the vicinity of the project consist of tidally influenced emergent fresh marsh. Water bottoms in the project area are composed of a mixture of sand and mud substrates. The proposed project is in an area potentially designated as EFH for various life stages of federally managed species, including red drum, brown shrimp, and white shrimp. The primary categories of EFH, which would be affected by project implementation, are estuarine emergent wetlands, estuarine water columns, and estuarine water bottoms. Detailed information on federally

managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council. The generic amendment was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; P.L. 104-297).

In addition to being designated as EFH for various federally managed fishery species, wetlands, and water bottoms in the project area provide nursery and foraging habitats for a variety of economically important marine fishery species such as blue crab, gulf menhaden, Atlantic croaker, southern flounder, bay anchovy, and striped mullet. Some of these species serve as prey for other fish species managed by the Gulf of Mexico Fishery Management Council (e.g., mackerels, snappers, and groupers) and highly migratory species managed by NMFS (e.g., billfishes and sharks). Wetlands in the project area also produce nutrients and detritus, important components of the aquatic food web, which contributes to the overall productivity of the Upper Barataria Basin.

The information provided in the draft EIS is insufficient for NMFS to complete an EFH consultation with the USACE. The draft EIS provides limited information on direct impacts to EFH. The quantity of EFH to be impacted should be clarified to inform determination of mitigation in the final Report and final EIS. In addition, avoidance and minimization of direct wetland impacts should be pursed to the greatest extent practicable. As required by the Magnuson-Stevens Act, a complete EFH assessment should be provided to the NMFS incorporating all activities associated with this project, including a description of measures to avoid, minimize, mitigate, or offset the adverse impacts of the proposed activities on EFH. Section 5.2.2.5 of the draft EIS states there are 344.87 acres of EFH impacts, whereas Table A-1 of the draft Fish and Wildlife Coordination Act report identifies there are 136.5 acres of impact. This issue should be reconciled for the final EIS. The EFH assessment should include updated details delineating and quantifying impacts to EFH by habitat type, as well as differentiating between the flood side EFH and the protected side of all structures. The NMFS recommends tabular format, maps, and KMZ files be provided to inform the EFH assessment.

The NMFS is concerned the proposed levee alignment and all gate structures may reduce tidal drainage and tidal exchange in the Upper Barataria Basin. Impediments to drainage may increase inundation stress of wetlands and could increase wetland loss. Similarly, impediments to tidal exchange could reduce fisheries access to habitat. We recognize these potential indirect and cumulative impacts would be limited because the project authority does not include protection from tidal flooding and therefore structures would only be closed with hurricanes and tropical storms. However, the draft EIS does not include a specific operational plan or plan and cross sectional views for all structures associated with this project (e.g., channel barge floodgate, stop log floodgate, roller floodgate, and culverts with sluice gates). The operational plan for these structures should include triggers for gate closures (e.g., named storm events in the Gulf of Mexico, fixed water level elevations, crest setting, estimated frequency of closures, etc.,). The USACE should also provide a reference to the specific flood protection authorization and hydrological modeling results for all structures justifying: (1) how particular locations were selected for each structure, (2) why each structure is needed, and (3) how the size and type of each structure was determined.

It is unclear why the stop log Godchaux Canal and the roller floodgate at Bayou Gauche are included as project features and remain consistent with the project authority. Neither gate is required for flood protection, as the roller floodgate is located on flood side of the proposed levee and the stop log floodgate is located on the protected side behind the proposed Bayou Des Allemands channel barge floodgate. In addition, the stop log floodgate would reduce the canal width from 125 feet to 15 feet (82 percent reduction when the structure is open), which may reduce estuarine fishery access to tidally influenced fresh marsh southwest of the structure. Additional channel cross-sectional information should be provided to fully assess impacts to EFH. If the USACE can justify the need and authorization for additional flood protection on the Godchaux Canal, then the NMFS recommends an open culvert system as the preferred option under the proposed access road across the Canal. Construction of the levee system could also potentially induce flooding internally and externally to the levee alignment due to heavy rainfall events and high tides. Therefore, NMFS recommends additional hydrologic modeling be conducted to assess the potential impacts and the project incorporate features to mitigate for any potential induced flooding. The final EIS should include the results of that assessment and associated mitigative measures.

Unavoidable impacts to EFH will require mitigation. The USACE should develop, in coordination with NMFS, mitigation which fully compensates for all EFH impacts prior to the release of the final Report and final EIS. To avoid additional mitigation for temporal impacts, NMFS recommends implementation of the mitigation plan concurrent with the construction of the development. The preliminary mitigation analysis and approximate total acres and AAHU's of impacts to fresh marsh provided in the draft EIS should be refined to verify: (1) the final assessment of acres of impacts to EFH, (2) the final WVA analysis, (3) the types of mitigation required, and (4) the final project design. Open water should also be included among the habitat types requiring mitigation. Estimates of all direct and indirect project related impacts to tidally influenced habitat should be refined for inclusion in the project's final Report and final EIS.

Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations for any federal action or permit which may result in adverse impacts to EFH. Therefore, NMFS recommends the following to ensure the conservation of EFH and associated marine fishery resources:

EFH Conservation Recommendations

1. A revised EFH assessment should be provided to the NMFS for review and included in the final EIS. The revised assessment should clarify, delineate, and quantify impacts to EFH by habitat type differentiating between the flood side and the protected side of all structures. Inconsistencies in acres within the draft EIS and the Fish and Wildlife Coordination Act Report should be reconciled.

2. Cross sectional views for all structures (e.g., channel barge floodgate, stop log floodgate, roller floodgate, and culverts with sluice gates) and operation plans should be provided and be assessed to determine if construction of levees and water control structures would impact fisheries access and water exchange in the Upper Barataria Basin. Sufficient information should be provided to assess the change in cross sectional area under the with and without project action for any water control

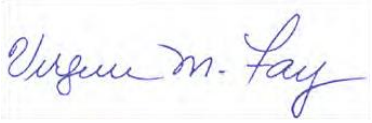
structure in Godchaux Canal to fully assess potential impacts to EFH. Any structure installed under the access road in the Canal should be comprised of open culverts and maximize maintaining the existing cross sectional area.

3. A mitigation and monitoring plan should be developed which fully compensates for all EFH impacts. We also request the EFH mitigation plan be coordinated with NMFS. To avoid additional mitigation for temporal impacts, the NMFS recommends implementation of the mitigation plan concurrent with the construction of the development.

Consistent with Section 305(b)(4)(B) of the Magnuson-Stevens Act and NMFS' implementing regulation at 50 CFR 600.920(k), your office is required to provide a written response to our EFH conservation recommendations within 30 days of receipt. Your response must include a description of measures to be required to avoid, mitigate, or offset the adverse impacts of the proposed activity. If your response is inconsistent with our EFH conservation recommendations, you must provide a substantive discussion justifying the reasons for not implementing the recommendations. If it is not possible to provide a substantive response within 30 days, the New Orleans District should provide an interim response to NMFS, to be followed by the detailed response. The detailed response should be provided in a manner to ensure that it is received by NMFS at least 10 days prior to the final approval of the action.

We appreciate your consideration of our comments. If you wish to discuss this project further or have questions concerning our recommendations, please contact January Murray at (225) 380-0089, or by email at January.Murray@noaa.gov.

Sincerely,



Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

c:
USACE, New Orleans, Naquin
USFWS, Lafayette, Paille
EPA, Gutierrez
LDWF, Balkum
LA DNR, Reulet
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F/SER4, Dale
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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

January 28, 2021 F/SER46/JM:rs
225-380-0089

Mr. Marshall K. Harper, Chief
Environmental Planning Branch
Regional Planning and Environment Division South
U.S. Army Corps of Engineers
New Orleans Environmental Branch, CEMVN-PDS-C
7400 Leake Avenue
New Orleans, Louisiana 70118

Dear Mr. Harper:

NOAA's National Marine Fisheries Service (NMFS) has reviewed a second draft of the Integrated Feasibility Report and Environmental Impact Statement (EIS), for the Upper Barataria Basin (UBB) Louisiana Study, transmitted by your letter dated December 11, 2020. Upon review of the engineering design, the U.S. Army Corps of Engineers (USACE) determined there was a need to undergo a second public review due to an estimated 725 acres of additional environmental impacts associated with the project. Your letter indicates the second draft EIS represents the USACE's initiation of essential fish habitat (EFH) consultation under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The second draft of the EIS states 725 acres of direct impacts will occur through implementation of the Tentatively Selected Plan (TSP). The TSP includes 267 acres of EFH impacts to fresh marsh through construction of a 14-foot to 16-foot levee elevation, and 95 acres of EFH impacts to estuarine water bottoms and estuarine water columns associated with dredging activities for barge gate construction. The TSP also proposes multiple water control structures to maintain existing water exchanges, including a 270-foot barge gate crossing Bayou Des Allemands channel and six screenless culverts with sluice gates positioned on either side of the gate, a 45-foot roller floodgate at Highway 306-Bayou Gauche, and seven culverts with sluice gates at multiple locations.

In a letter to USACE dated January 13, 2020, the NMFS provided three conservation recommendations under provisions of the Magnuson-Stevens Act in response to the first draft EIS. Based on the limited information provided in the second draft of the EIS, revisions to the EFH assessment will be required to further refine and quantify EFH impacts to determine the mitigation required for the final EFH assessment and EIS. A complete final EFH assessment should be provided to the NMFS incorporating all activities associated with this project, including a description of measures to avoid, minimize, mitigate, or offset the adverse impacts of the proposed activities on EFH. Avoidance and minimization of direct wetland impacts should be pursed to the greatest extent practicable. The EFH assessment should also include updated details delineating and quantifying impacts to EFH by habitat type, as well as differentiating

between the flood side EFH and the protected side of all structures. The NMFS recommends tabular format, maps, and KMZ files be provided to inform the EFH assessment.

The NMFS recognizes the USACE's efforts to avoid and minimize proposed impacts to EFH in the Godchaux Canal by removing the stop log floodgate as a project feature. Alternatively, the USACE proposes construction of a bridge over the Godchaux Canal to significantly reduce impacts to EFH in this area. The NMFS continues to be concerned the proposed levee alignment and all remaining gate structures may reduce tidal drainage/exchange in the UBB. Impediments to drainage may increase inundation stress of wetlands and could increase wetland loss. To assess potential structure related fisheries access impacts in the UBB, the NMFS recommends operation plans should be provided, including triggers for gate closures (e.g., named storm events in the Gulf of Mexico, fixed water level elevations, crest setting, estimated frequency of closures, etc.). The USACE should provide an alternatives analysis and hydrological modeling results for all structures justifying: (1) how particular locations were selected for each structure, (2) why each structure is needed, and (3) how the size and type of each structure was determined. Additionally, it is unclear why the roller floodgate at Bayou Gauche is included as a project feature and remains consistent with the project authority. The roller floodgate does not appear to be required for flood protection since it is located on the flood side of the proposed levee.

Construction of the levee system could also potentially induce flooding internally and externally to the levee alignment due to heavy rainfall events and high tides. Therefore, NMFS recommends conducting additional hydrologic modeling to assess the potential for large-scale indirect impacts on wetlands and the project incorporate features to mitigate for any potential to reduce water exchange and increased hydroperiod of the UBB. The final EFH assessment should include the results of the assessment and associated mitigative measures.

Unavoidable impacts to EFH will require mitigation. The second draft of the EIS states mitigation measures will be considered in the following order: (1) purchase of mitigation bank credits to offset impacts to fresh marsh, and/or (2) potential USACE constructed marsh mitigation sites in approximately 367 acres of open water. If the purchase of wetland credits from an USACE approved mitigation bank within the appropriate watersheds is not available then the USACE should develop, in coordination with NMFS, a mitigation and monitoring plan which fully compensates for all EFH impacts. This robust mitigation and monitoring plan should be presented to NMFS for review prior to release of the final EFH assessment and EIS. To avoid additional mitigation for temporal impacts, NMFS recommends implementation of the mitigation plan concurrent with the construction of the development. The preliminary mitigation analysis, approximate total acres, and Average Annual Habitat Units of impacts to fresh marsh provided in the second draft of the EIS should be refined to verify: (1) the final assessment of acres of impacts to EFH, (2) the final WVA analysis, (3) the types of mitigation required, and (4) the final project design. Open water should also be included among the habitat types requiring mitigation. Estimates of all direct and indirect project related impacts to tidally influenced habitat should be refined for inclusion in the project's final EFH assessment and EIS. The NMFS looks forward to USACE providing the final EFH assessment including final quantities of EFH impacts and a final mitigation and monitoring plan. We anticipate continued coordination

with your office on the EFH consultation and we appreciate your consideration of our comments. If you wish to discuss this project, further or have questions concerning our recommendations, please contact January Murray at (225) 380-0089 or by email at January.Murray@noaa.gov.

Sincerely,

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

c:
USACE, New Orleans, Naquin
USFWS, Lafayette, Paille
EPA, Gutierrez
LDWF, Balkum
F/SER46, Swafford
F/SER4, Dale
Files

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVE
NEW ORLEANS, LA 70118-3651

March 13, 2021

Regional Planning and Environment
Division South

Virginia Fay
National Marine Fisheries Service
Southeast Division
263 13th Avenue South
St. Petersburg, FL 33701-5505

Dear Ms. Fay:

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (MVN), Regional Planning and Environment Division South (RPEDS) has received your letter dated January 28, 2021 regarding the second draft of the Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS), for the Upper Barataria Basin (UBB) Louisiana Study.

In a previous letter to USACE dated January 13, 2020, the National Marine Fisheries Service (NMFS) provided three conservation recommendations under provisions of the Magnuson-Stevens Act in response to the first draft EIS. This letter is in response to the concerns NMFS mentioned in both letters.

Letter dated January 13, 2020:

EFH Conservation Recommendations

1. A revised EFH assessment should be provided to the NMFS for review and included in the final EIS. The revised assessment should clarify, delineate, and quantify impacts to EFH by habitat type differentiating between the flood side and the protected side of all structures. Inconsistencies in acres within the draft EIS and the Fish and Wildlife Coordination Act Report should be reconciled.

Response: An updated EFH assessment has been placed in the most recent draft version of the UBB IFR/EIS. Current impacts to EFH are identified as approximately, 267 acres of fresh marsh (95 AAHUs), and 95 acres (6.85 AAHUs) of water bottom. Additional information on the impacts to EFH may be found in Section 5 of the IFR/EIS.

2. Cross sectional views for all structures (e.g., channel barge floodgate, stop log floodgate, roller floodgate, and culverts with sluice gates) and operation plans should be provided and be assessed to determine if construction of levees and water control structures would impact fisheries access and water exchange in the Upper Barataria Basin. Sufficient information should be provided to assess the change in cross

sectional area under the with and without project action for any water control structure in Godchaux Canal to fully assess potential impacts to EFH. Any structure installed under the access road in the Canal should be comprised of open culverts and maximize maintaining the existing cross-sectional area.

Response: During the pre-construction project engineering and design phase (PED) detailed designs and operations plans would be completed as well as additional H&H modeling to verify the impacts analysis in the EIS. If modeling identifies unavoidable impacts not addressed in the EIS, additional NEPA documentation would be completed and the plan to fully mitigate these impacts presented. Coordination with the resource agencies would continue during advanced design to ensure impacts are avoided to the maximum extent practicable before mitigation is pursued.

3. A mitigation and monitoring plan should be developed which fully compensates for all EFH impacts. We also request the EFH mitigation plan be coordinated with NMFS. To avoid additional mitigation for temporal impacts, the NMFS recommends implementation of the mitigation plan concurrent with the construction of the development.

Response: Section 7 includes a plan to fully mitigate all impacts. The purchase of mitigation bank credits does not require a mitigation/monitoring plan. If at the time of implementation, sufficient in-kind mitigation bank credits are not available or not cost efficient, Corps constructed sites would be developed to fully mitigate impacts to EFH in coordination with NMFS and a supplemental NEPA document would be prepared. Mitigation and monitoring plans would be created in coordination with the resource agencies at this time and be included in this documentation. Every effort to mitigate concurrent with construction will be made to avoid temporal impacts that would require additional mitigation.

<u>Letter dated January 28, 2021:</u>

1- A complete final EFH assessment should be provided to the NMFS incorporating all activities associated with this project, including a description of measures to avoid, minimize, mitigate, or offset the adverse impacts of the proposed activities on EFH.

Response: An assessment of potential impacts to EFH can be found in response 1 above and in Section 5 of the UBB IFR/EIS. Measures currently outlined to mitigate for the adverse impacts associated with the proposed action may be found below. Additional information may be found in Section 7 of the IFR/EIS

Mitigation measures:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments

2- Avoidance and minimization of direct wetland impacts should be pursed to the greatest extent practicable. The EFH assessment should also include updated details delineating and quantifying impacts to EFH by habitat type, as well as differentiating between the flood side EFH and the protected side of all structures. The NMFS recommends tabular format, maps, and KMZ files be provided to inform the EFH assessment.

Response: An assessment of potential impacts to EFH impacts can be found in response 1 above and in Section 5 of the UBB IFR/EIS. Wetland Value Assessments have been run in coordination with the resource agencies using shapefiles/KMZs to identify where impacts to EFH are project to occur. During PED, impacts would be reassessed to include any changes in design and results of modeling efforts. Coordination with the resource agencies would continue during PED to ensure impacts are avoided to the maximum extent practicable before mitigation is pursued.

3- The NMFS continues to be concerned the proposed levee alignment and all remaining gate structures may reduce tidal drainage/exchange in the UBB. Impediments to drainage may increase inundation stress of wetlands and could increase wetland loss. To assess potential structure related fisheries access impacts in the UBB, the NMFS recommends operation plans should be provided, including triggers for gate closures (e.g., named storm events in the Gulf of Mexico, fixed water level elevations, crest setting, estimated frequency of closures, etc.).

Response: During PED detailed designs and operations plans would be completed as well as additional H&H modeling to verify the impacts analysis in the EIS. If modeling identifies unavoidable impacts not addressed in the EIS, additional NEPA documentation would be completed and the plan to fully mitigate these impacts presented. Coordination with NMFS would continue through advanced design and the development of the operation and maintenance plan.

4- The USACE should provide an alternatives analysis and hydrological modeling results for all structures justifying:

(1) how particular locations were selected for each structure,
(2) why each structure is needed, and
(3) how the size and type of each structure was determined.

Response: The alternative analysis detailing the need and selection of structures may be found in Section 4 – Formulate Alternative Plans of the IFR/EIS. Additionally, during

PED, designs would be advanced and further informed by H&H modeling. If changes to structure location, size, or type is warranted, this information would be shared with the resource agencies and may be addressed in additional NEPA documentation, if necessary. Coordination with the resource agencies would continue during advanced design to ensure impacts are avoided to the maximum extent practicable.

5- Additionally, it is unclear why the roller floodgate at Bayou Gauche is included as a project feature and remains consistent with the project authority. The roller floodgate does not appear to be required for flood protection since it is located on the flood side of the proposed levee.

Response: The roller gate at Bayou Gauche is located across a roadway and would be along the alignment, allowing access to the flood side of the system.

,

6- Construction of the levee system could also potentially induce flooding internally and externally to the levee alignment due to heavy rainfall events and high tides. Therefore, NMFS recommends conducting additional hydrologic modeling to assess the potential for large-scale indirect impacts on wetlands and the project incorporate features to mitigate for any potential to reduce water exchange and increased hydroperiod of the UBB. The final EFH assessment should include the results of the assessment and associated mitigative measures.

Response: During PED detailed designs would be completed as well as additional H&H modeling to verify the impacts analysis in the EIS. If modeling identifies unavoidable impacts not addressed in the EIS, supplemental NEPA documentation would be completed and the plan to fully mitigate these impacts presented. Coordination with the resource agencies would continue during advanced design to ensure impacts are avoided to the maximum extent practicable before mitigation is pursued. If necessary, mitigation and monitoring plans would be created in coordination with the resource agencies and be included in the supplemental NEPA documentation.

7- Unavoidable impacts to EFH will require mitigation. The second draft of the EIS states mitigation measures will be considered in the following order:

(1) purchase of mitigation bank credits to offset impacts to fresh marsh, and/or
(2) potential USACE constructed marsh mitigation sites in approximately 367 acres of open water.

If the purchase of wetland credits from an USACE approved mitigation bank within the appropriate watersheds is not available then the USACE should develop, in coordination with NMFS, a mitigation and monitoring plan which fully compensates for all EFH impacts. This robust mitigation and monitoring plan should be presented to NMFS for review prior to release of the final EFH assessment and EIS.

Response: Concur. In the event mitigation bank credits are not available, USACE will coordinate with NMFS on the selection of Corps constructed mitigation projects to ensure all impacts to EFH are fully mitigated for.

8. If the purchase of wetland credits from an USACE approved mitigation bank within the appropriate watersheds is not available then the USACE should develop, in coordination with NMFS, a mitigation and monitoring plan which fully compensates for all EFH impacts. This robust mitigation and monitoring plan should be presented to NMFS for review prior to release of the final EFH assessment and EIS.

Response: If at the time of implementation, sufficient in-kind mitigation bank credits are not available, Corps constructed sites would be developed to fully mitigate impacts to EFH in coordination with NMFS and a supplemental NEPA document prepared. Mitigation and monitoring plans would be created in coordination with the resource agencies at this time and would be included in the supplemental NEPA document.

9- To avoid additional mitigation for temporal impacts, NMFS recommends implementation of the mitigation plan concurrent with the construction of the development.

Response: Every effort to mitigate concurrent with construction will be made to avoid temporal impacts that would require additional mitigation.

10- The preliminary mitigation analysis, approximate total acres, and Average Annual Habitat Units of impacts to fresh marsh provided in the second draft of the EIS should be refined to verify:

(1) the final assessment of acres of impacts to EFH,
(2) the final WVA analysis,
(3) the types of mitigation required, and
(4) the final project design.

Response: During PED, verification of the acres impacted by final design would be conducted. WVAs for all impacted habitat types would be rerun and the mitigation plan verified/adjusted in coordination with the resource agencies, if necessary, to ensure full satisfaction of the mitigation requirement. Supplemental NEPA documentation would be prepared if warranted.

11- Open water should also be included among the habitat types requiring mitigation.

Response: Open water impacts have been assessed and included in the EIS along with the other habitat types requiring mitigation.

12- Estimates of all direct and indirect project related impacts to tidally influenced habitat should be refined for inclusion in the project's final EFH assessment and EIS.

Response: During PED if the H&H modeling identifies impacts not addressed in the EIS, additional NEPA documentation would be completed identifying these impacts and the plan to fully mitigate them.

We appreciate your comments and look forward to continued cooperation with the NMFS. Should you have any additional questions, please reach out to Mrs. Patricia S. Naquin; U.S. Army Corps of Engineers; Regional Planning and Environment Division South; New Orleans Environmental Branch; CEMVN-PDS-C; 7400 Leake Avenue, New Orleans, Louisiana 70118. Mrs. Naquin may also be reached via email at patricia.s.leroux@usace.army.mil, by fax to (504) 862-2088 or by phone at (504) 862-1544 if questions arise.

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Marshall K. Harper
Chief, Environmental Planning Branch

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1201 ELM STREET, SUITE 500
DALLAS, TEXAS 75270-2102

January 20, 2021

Ms. Patricia Naquin
U.S. Army Corps of Engineers
Attention: Program Management
CEMVN–PMR
7400 Leake Avenue
New Orleans, Louisiana 70118

Dear Ms. Naquin:

The Region 6 office of the U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers (USACE) Revised Draft Environmental Impact Statement (EIS) CEQ Number 20200256 for the Upper Barataria Basin (UBB) Louisiana Study. The Revised Draft EIS was reviewed pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 – 1508), and by our NEPA review authority under Section 309 of the Clean Air Act.

The USACE, Mississippi River Valley Division, New Orleans District (MVN), Regional Planning and Environment Division South (RPEDS), prepared this Revised Draft EIS for the UBB Louisiana Study. This EIS supersedes the previously issued Draft EIS and represents the most current and complete findings of this study effort. After careful review of the engineering design, the USACE determined that there was a need for additional public review because a significant increase in environmental impacts were identified. This document includes input from the non-Federal sponsor, natural resource agencies, Federally recognized Indian Tribes, and the public. The UBB Louisiana Feasibility Study is a Coastal Storm Risk Management (CSRM) study that evaluates impacts to people, cultural resources, and the environment.

The following comments are offered for consideration:

Compensatory Mitigation for Wetland Impacts

The Revised Draft EIS now includes a preliminary compensatory mitigation plan for impacts to wetlands. EPA recommends that the USACE continue to collaborate with Dr. Raul Gutierrez (gutierrez.raul@epa.gov) of the Region 6 Wetlands Review Section to continue development of a compensatory mitigation plan that will fully offset adverse impacts to wetlands. The plan should identify within the watershed where impacts will occur and should be implemented in a timely manner to minimize potential temporal impacts.

Water Quality

According to the Revised Draft EIS, sediment disturbance during construction will occur but only temporarily. During construction, the project will include installing a 270 foot floodgate across Bayou des Allemands below US 90, which, according to Louisiana's 2018 303(d) list and draft 2020 list, is

impaired due to excessive turbidity and fecal coliform. No total maximum daily load has been developed for this reach at present. While EPA agrees that impacts on turbidity levels during construction for both the levee and floodgate will be temporary, EPA recommends that the USACE provide assurances that best management practices will be followed in and around Bayou des Allemands and its tributaries to minimize impacts.

Air Quality

EPA asks that all Non-Road Engines be certified as in compliance with the EPA Tier 4 regulations found at 40 CFR Parts 89 and 1039, which includes new and in-use nonroad compression-ignition engines. Also, we ask that land-clearing activities using open burning for woody debris disposal be coordinated with the Louisiana Department of Environmental Quality to determine air quality conditions such as atmospheric inversions prior to open burning activities. This will allow consideration of any expected air quality/visibility impacts to Class I Federal Areas identified in 40 CFR Part 81, Subpart D.

Furthermore, the statement has identified that construction can cause elevated Particulate Matter (PM) 2.5 levels due to earthen material dust generated from borrow area excavation and transport loading. Mitigation measures such as watering applications to unpaved roads and loading areas should be addressed and included into the project mitigation plan.

Environmental Justice

The UBB Louisiana Feasibility Study is a CSRM study which evaluates impacts to people, cultural resources and the environment. Only the Boutte and Raceland of the seven Census of Designated Places were identified as Environmental Justive (EJ) communities based on the poverty threshold criteria. Boutte is both a minority and low-income EJ community, with percentages well above the reference community of St. Charles Parish. Special attention to impacts associated with levee alignments, staging areas and stockpile sites affecting the Boutte community is to be provided in the Environmental Consequences section of the Revised Draft EIS.

To assure that adequate EJ impact mitigation is considered, EPA offers the following recommendations:

The USACE should ensure that the improvements to be implemented will not adversely impact minority and low-income communities or populations residing in towns or areas that are not identified in the study area as EJ.

The USACE should document and identify the mitigation measures for any minority or low-income areas or populations that will be adversely impacted, especially in towns or areas not designated as having an EJ community.

The USACE should address and identify the outreach and coordination provided to the minority and low-income populations in Boutte, Raceland and any segmented areas minority or low-income populations in the study area.

Thank you for the opportunity to review the Revised Draft EIS. EPA looks forward to the receipt and review of the Final EIS. If you have any questions, please contact Michael Jansky, the project review lead, at 214-665-7451 or jansky.michael@epa.gov.

Sincerely,

ROBERT HOUSTON

Digitally signed by ROBERT HOUSTON
DN: c=US, o=U.S. Government, ou=Environmental Protection Agency, cn=ROBERT HOUSTON, 0.9.2342.19200300.100.1.1=68001003655693
Date: 2021.01.20 11:02:36 -06'00'

Robert Houston
Acting Director
Office of Communities, Tribes and Environmental assessment

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ORLEANS DISTRICT
7400 LEAKE AVE
NEW ORLEANS, LA 70118-3651

March 15, 2021

Regional Planning and Environment
Division South

Robert Houston
Acting Director
Office of Communities, Tribes and
Environmental assessment
EPA, Region 6
1201 Elm Street, Suite 500
Dallas, TX 75270

Dear Mr. Houston:

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), New Orleans District (MVN), Regional Planning and Environment Division South (RPEDS) has received your letter dated January 20, 2021 regarding the second draft of the Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS), for the Upper Barataria Basin (UBB) Louisiana Study.

This letter is in response to the comments submitted by the Environmental Protection Agency pursuant to the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 – 1508), and by our NEPA review authority under Section 309 of the Clean Air Act).

EPA Comment:

Compensatory Mitigation for Wetland Impacts
The Revised Draft EIS now includes a preliminary compensatory mitigation plan for impacts to wetlands. EPA recommends that the USACE continue to collaborate with Dr. Raul Gutierrez (gutierrez.raul@epa.gov) of the Region 6 Wetlands Review Section to continue development of a compensatory mitigation plan that will fully offset adverse impacts to wetlands. The plan should identify within the watershed where impacts will occur and should be implemented in a timely manner to minimize potential temporal impacts.

Corps Response:

Acknowledged. USACE currently has a general mitigation plan included in Appendix F of the IFR/EIS. As the UBB project is currently in the feasibility study phase and has yet to be authorized for construction, the project is likely to go through multiple design changes in the future, which could allow for additional refinement of the mitigation features. USACE welcomes EPA's partnership with the Project Delivery in further refinement of these plans.

EPA Comment:

Water Quality
According to the Revised Draft EIS, sediment disturbance during construction will occur but only temporarily. During construction, the project will include installing a 270 foot floodgate across Bayou des Allemands below US 90, which, according to Louisiana's 2018 303(d) list and draft 2020 list, is impaired due to excessive turbidity and fecal coliform. No total maximum daily load has been developed for this reach at present. While EPA agrees that impacts on turbidity levels during construction for both the levee and floodgate will be temporary, EPA recommends that the USACE provide assurances that best management practices will be followed in and around Bayou des Allemands and its tributaries to minimize impacts.

Corps Response:

Concur. The project would be monitored during construction activities. Best management practices during construction of the project would be utilized to minimize impacts to Bayou des Allemands and its tributaries as well as adjacent habitats.
EPA Comment:

Air Quality
EPA asks that all Non-Road Engines be certified as in compliance with the EPA Tier 4 regulations found at 40 CFR Parts 89 and 1039, which includes new and in-use nonroad compression-ignition engines. Also, we ask that land-clearing activities using open burning for woody debris disposal be coordinated with the Louisiana Department of Environmental Quality to determine air quality conditions such as atmospheric inversions prior to open burning activities. This will allow consideration of any expected air quality/visibility impacts to Class I Federal Areas identified in 40 CFR Part 81, Subpart D.

Furthermore, the statement has identified that construction can cause elevated Particulate Matter (PM) 2.5 levels due to earthen material dust generated from borrow area excavation and transport loading. Mitigation measures such as watering applications to unpaved roads and loading areas should be addressed and included into the project mitigation plan.

Corps Response:

Acknowledged. The UBB project is currently in the feasibility stage and not authorized for construction. Should the project be authorized for construction, details will be refined to include Best Management Practices with respect to minimizing impacts during construction.

EPA UBB EJ Comment Responses:

EPA Comment:

Boutte is both a minority and low-income EJ community, with percentages well above the reference community of St. Charles Parish. Special attention to impacts associated with levee alignments, staging areas and stockpile sites affecting the Boutte community is to be provided in the Environmental Consequences section of the Revised Draft EIS.

Corps Response:

Added an EJ Environmental Consequences section to Chapter 5 that discusses EJ impacts from the Federal Action. This includes discussion regarding the levee construction, the borrow and staging areas and the potential for induced flooding.
Also added language regarding mitigation of impacts:
Short-term noise impacts will be avoided, minimized or mitigated by use of the following best management practices:

1. Placement of temporary noise barriers adjacent to construction activities.
2. Inclusion of the following noise and vibration monitoring language in the contract specifications for specific Work Items: monitoring of noise levels to verify adherence to contract specifications; limiting pile driving activities associated with pile founded T-walls to daylight hours; and vibration monitoring equipment measure surface velocity waves caused by equipment and monitor vibration up to a threshold value established and approved in writing by USACE. Such measurements would only be taken near residences and occupied buildings that could be adversely affected by excessive ground vibrations.
3. Construction equipment noise would be minimized during construction by muffling and shielding intakes and exhaust on construction equipment (per the manufacturer's specifications), and by shrouding or shielding impact tools.
4. All equipment, haul trucks, and worker vehicles would be turned off when not in use for more than 30 minutes.
5. Equipment warm up areas, water tanks, equipment storage areas, and staging areas would be located as far from existing residences as is feasible.

Several impact avoidance features are included as integral components of the proposed action to minimize impacts to vehicular transportation. Specific routes would be designated for construction-related traffic to minimize residential disturbance and traffic congestion. USACE contracts would designate specific routes for construction-related traffic to avoid residential areas, to the maximum extent practicable, and staging areas for construction equipment and personnel would be located away from heavily populated areas. Streets that would serve construction-related traffic would be resurfaced, if needed and as appropriate, prior to initiation of construction activities, and maintenance of those streets would be provided during the construction period. Appropriate detour signage would be placed in order to preserve access to local streets during construction activities. Off-street parking would be provided for construction workers, and shuttle vans would be

used to transport construction workers to the work sites, if necessary. Streets that are damaged by any and all construction activities would be repaired.

EPA Comment:

The USACE should ensure that the improvements to be implemented will not adversely impact minority and low-income communities or populations residing in towns or areas that are not identified in the study area as EJ.

Corps Response:

Added language saying that impacts outside of those associated with construction activities are expected to be positive to minority and low-income communities or populations residing in towns or areas that are not identified in the study area as EJ. Also added a discussion of potential induced flooding which may be further evaluated at PED once local government plans for local levels are implemented which could change the hydrology and reduce induced flooding. And provided language regarding the areas that may see induced flooding will again be evaluated at PED and these areas are mostly white and not low-income households. Additionally, if induced flooding is identified during PED, mitigation measures would be implemented.

EPA Comment:

The USACE should document and identify the mitigation measures for any minority or low-income areas or populations that will be adversely impacted, especially in towns or areas not designated as having an EJ community.

Corps Response:

See mitigation through Best Management Practices, above, that will be used to avoid or minimize adverse impacts.

EPA Comment:

The USACE should address and identify the outreach and coordination provided to the minority and low-income populations in Boutte, Raceland and any segmented areas minority or low-income populations in the study area.

Corps Response:

Public meetings were held earlier this month on 1/12 and 1/13/21. If future high, adverse disproportionate impacts are found at PED, further outreach will take place and discussion with affected EJ communities will occur, including discussion of mitigation measures.

We appreciate your comments and look forward to continued cooperation with the EPA. Should you have any additional questions, please reach out to Mrs. Patricia S. Naquin; U.S. Army Corps of Engineers; Regional Planning and Environment Division South; New Orleans Environmental Branch; CEMVN-PDS-C; 7400 Leake Avenue, New Orleans, Louisiana 70118. Mrs. Naquin may also be reached via email at patricia.s.leroux@usace.army.mil, by fax to (504) 862-2088 or by phone at (504) 862-1544 if questions arise.

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Marshall K. Harper
Chief, Environmental Planning Branch