

Appendix F: Agency Coordination



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-foot 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

Reach	Existing Levee	2026 Construction		Final Lift Construction	
	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 (*Borrchia frutescens*), gulf cordgrass (*Spartina spartinae*) and saltmeadow cordgrass (*S. patens*) and often interspersed with shrubs such as marsh elder (*Iva frutescens*) or saltbush (*Baccharis hamillifolia*). 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 where 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.



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.

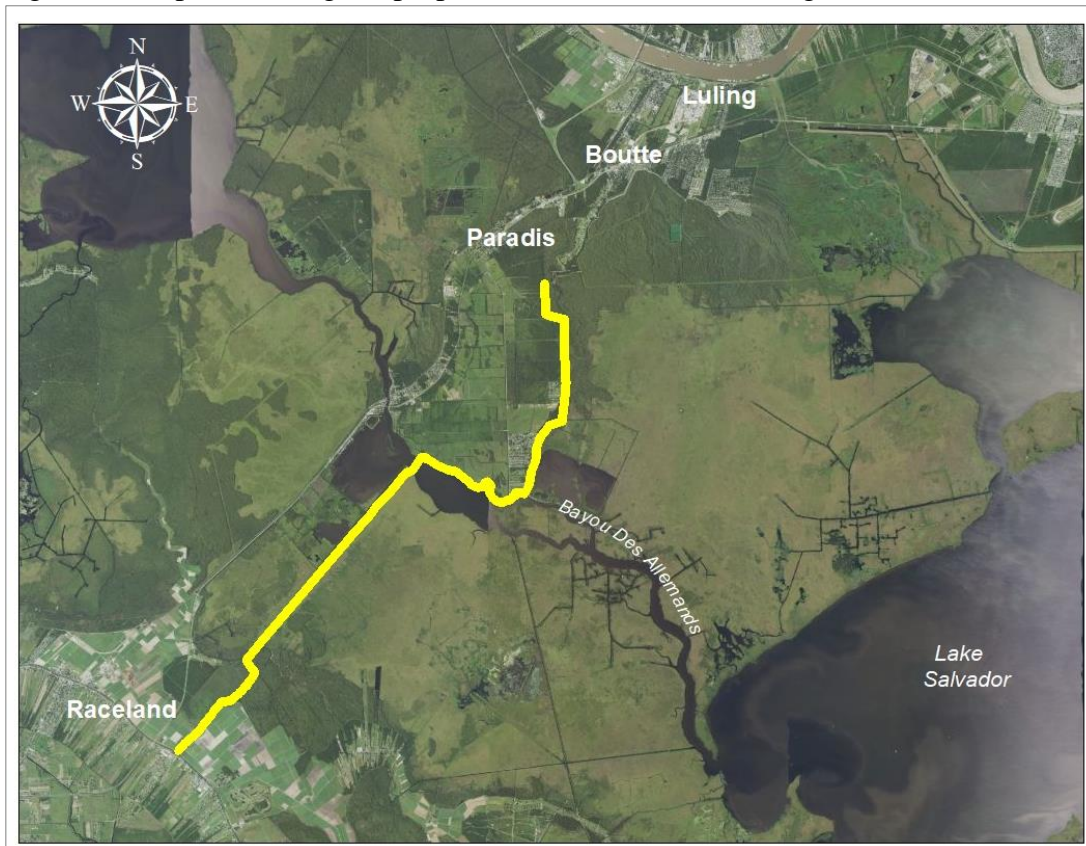


Figure 7. Map illustrating the proposed Alternative 2 levee alignment.



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 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 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:

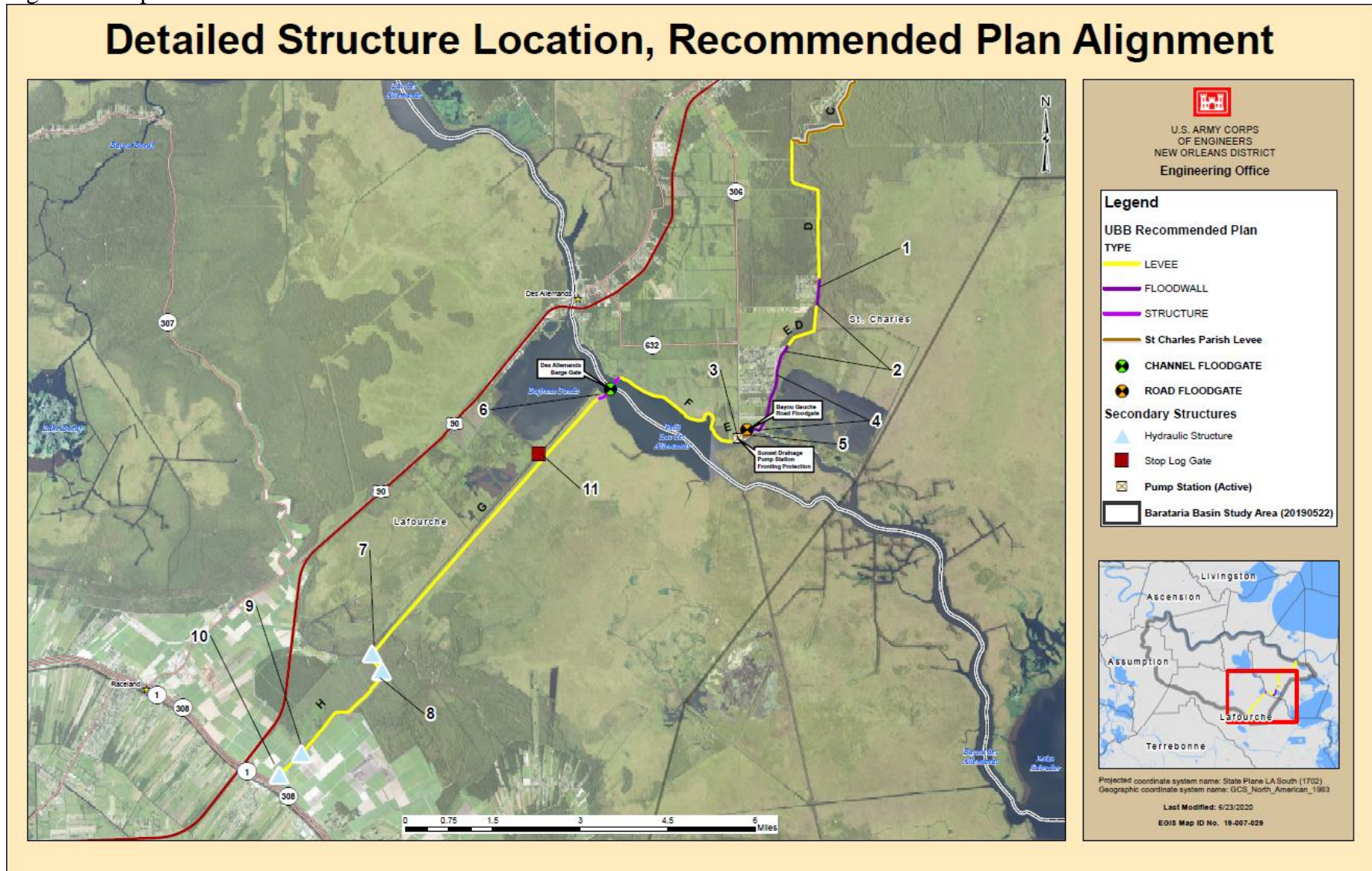
1. Floodwall section in Hydraulic Reach D
2. Floodwall section in Hydraulic Reach D and E
3. Crawford Canal P.S. Fronting Protection
4. Floodwall section in Hydraulic Reach E and F
5. 45 foot Bayou Gauche Roller Gate
6. 270 foot Barge Gate crossing Bayou Des Allemands
7. Drainage Structure – 4-6 X 6 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.

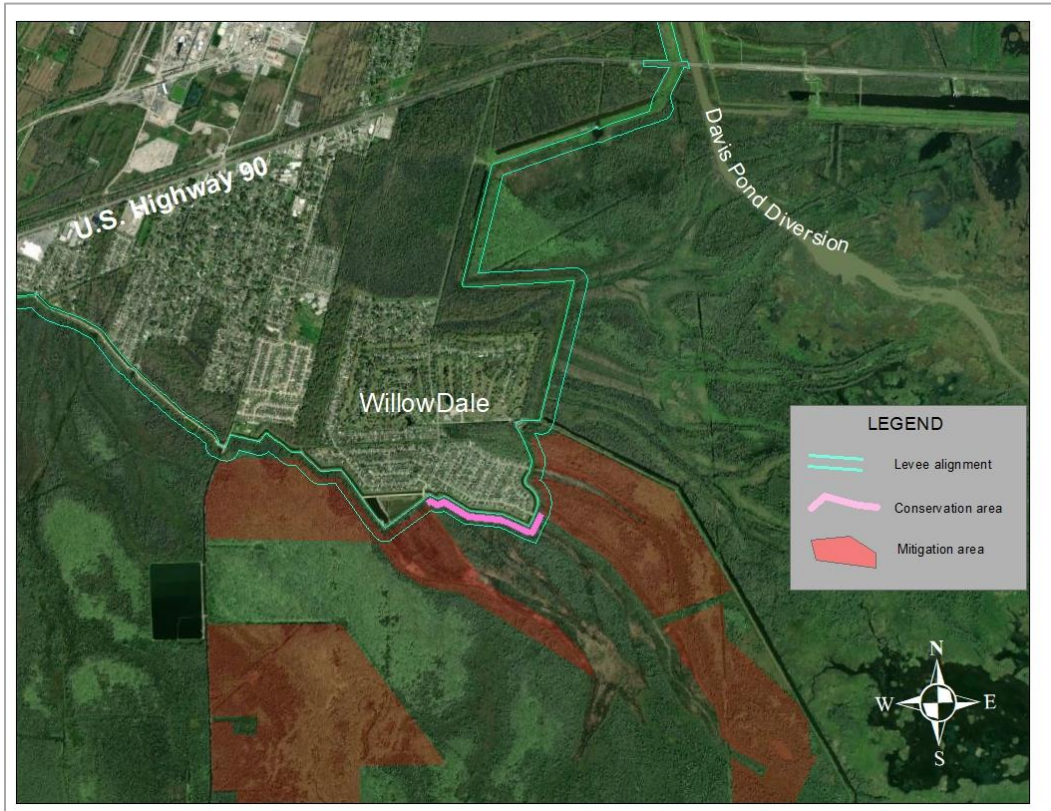


Table 4. Direct construction impacts on existing mitigation & conservation areas.

	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 auxiliary 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. Auxiliary 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.

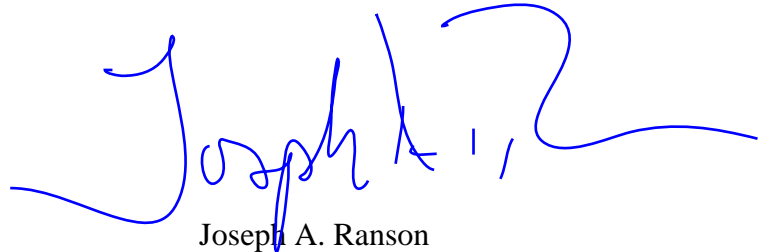
Sufficient funding should be provided for full Service participation in the post-authorization engineering and design studies, and to facilitate fulfillment of its responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act.

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,

A handwritten signature in blue ink, appearing to read "Joseph A. Ranson". The signature is fluid and cursive, with a large initial "J" and a long, sweeping underline.

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.

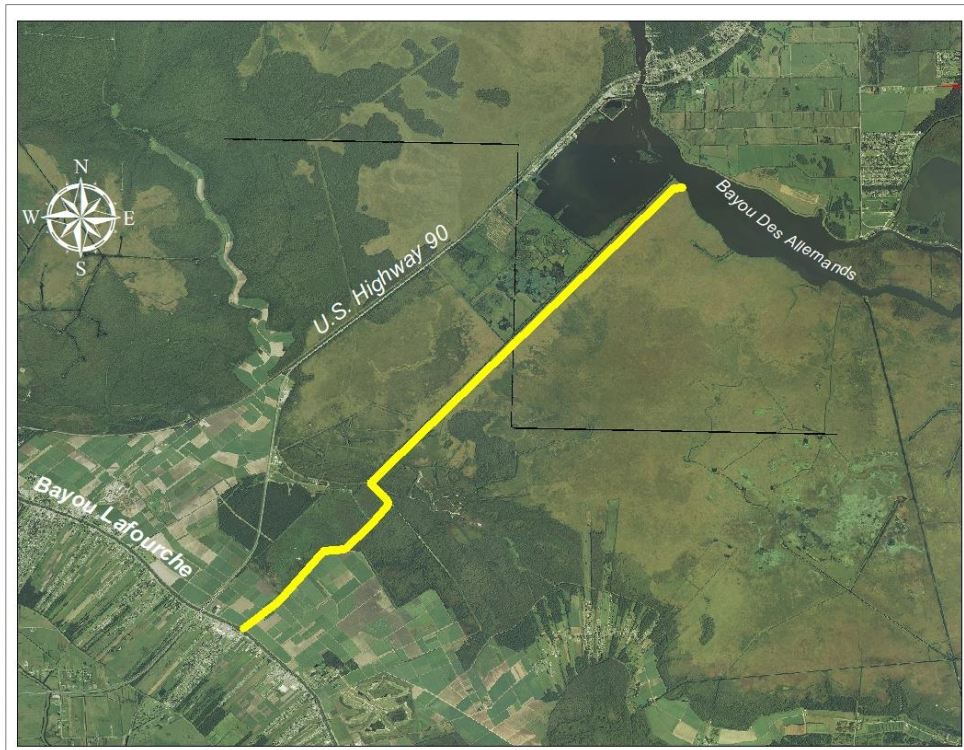


Figure A2. Map of the Sunset Drainage District region.

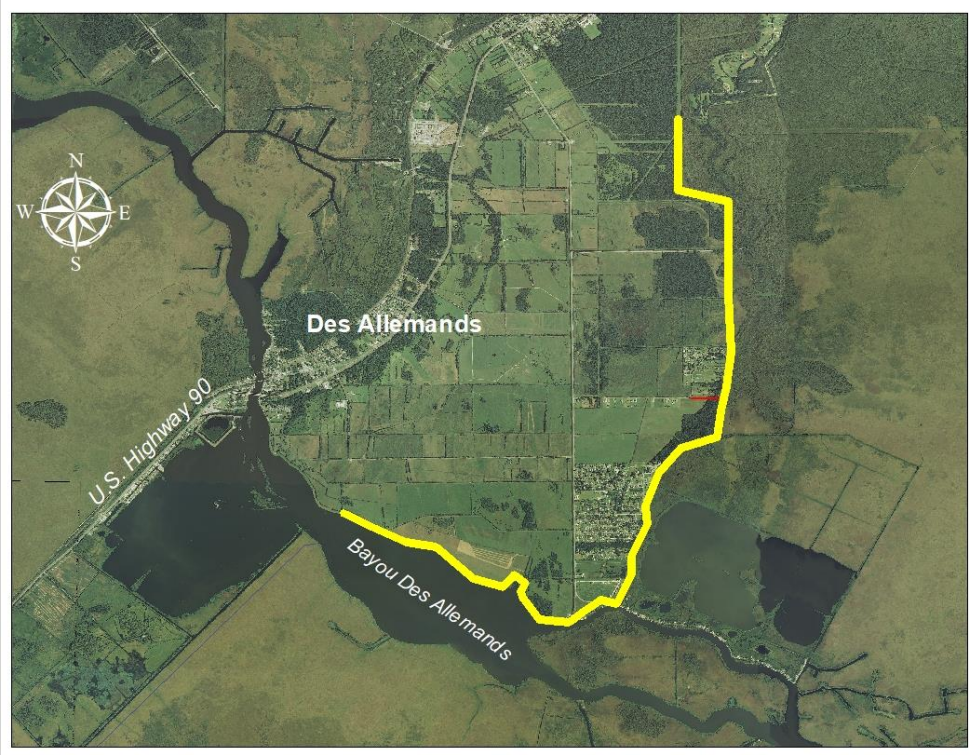


Figure A3. Map of the St. Charles Levee region.

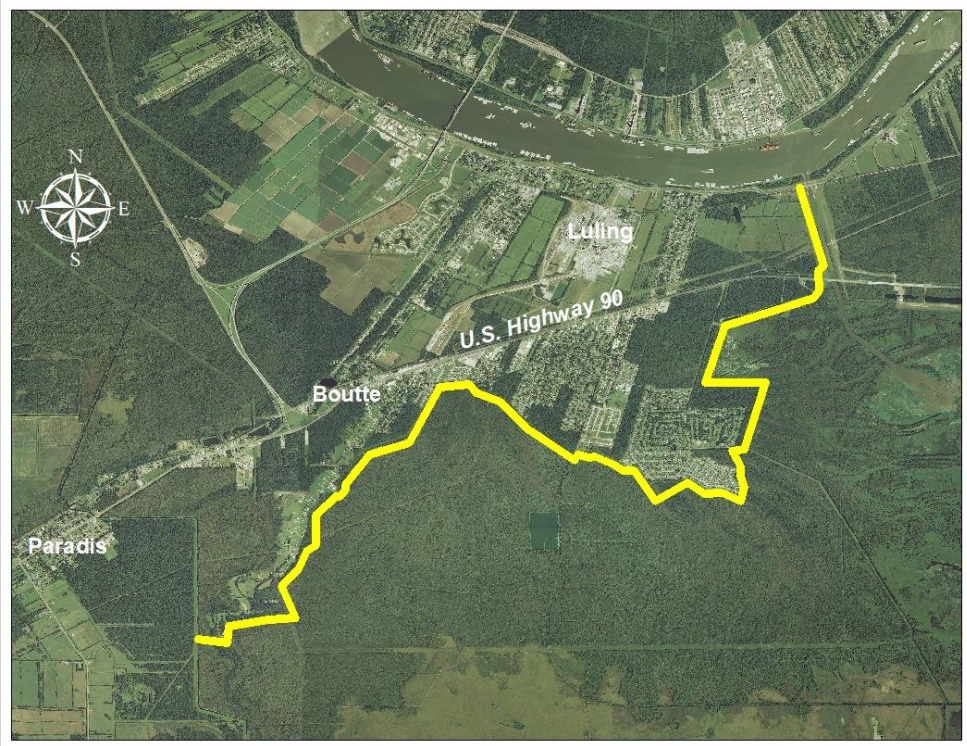


Table A-1. Acres of direct construction impacts by region, habitat type, and alternative.

BLH Impact & Location	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 quality 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 quality 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 quality BLH	na	6.94	19.07
Low quality BLH	na	<u>36.00</u>	<u>136.82</u>
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	<u>35.35</u>	<u>164.33</u>
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	<u>5.32</u>	<u>57.68</u>
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			Alt 2			TSP		
		Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	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			Alt 2			TSP		
		Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	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			Alt 2			TSP		
		Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	High SLR (AAHUs)	Low SLR (AAHUs)	Int SLR (AAHUs)	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 exist, 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 complements 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 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. Topography¹

- 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 range².
- There are no additional monitoring or attainment requirements for topography beyond meeting the Intermediate Success Criteria for topography.

Notes:

¹Elevation 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.

²The “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 Criteria³ (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:

¹Fresh 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 Criteria³ (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:

¹There 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-term¹ 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:

¹Yearly 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 interspersed 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 interspersed 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 interspersed features within restored marshes; observations regarding general surface water flow characteristics within marsh interspersed 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 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.



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



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 70118-3651

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.

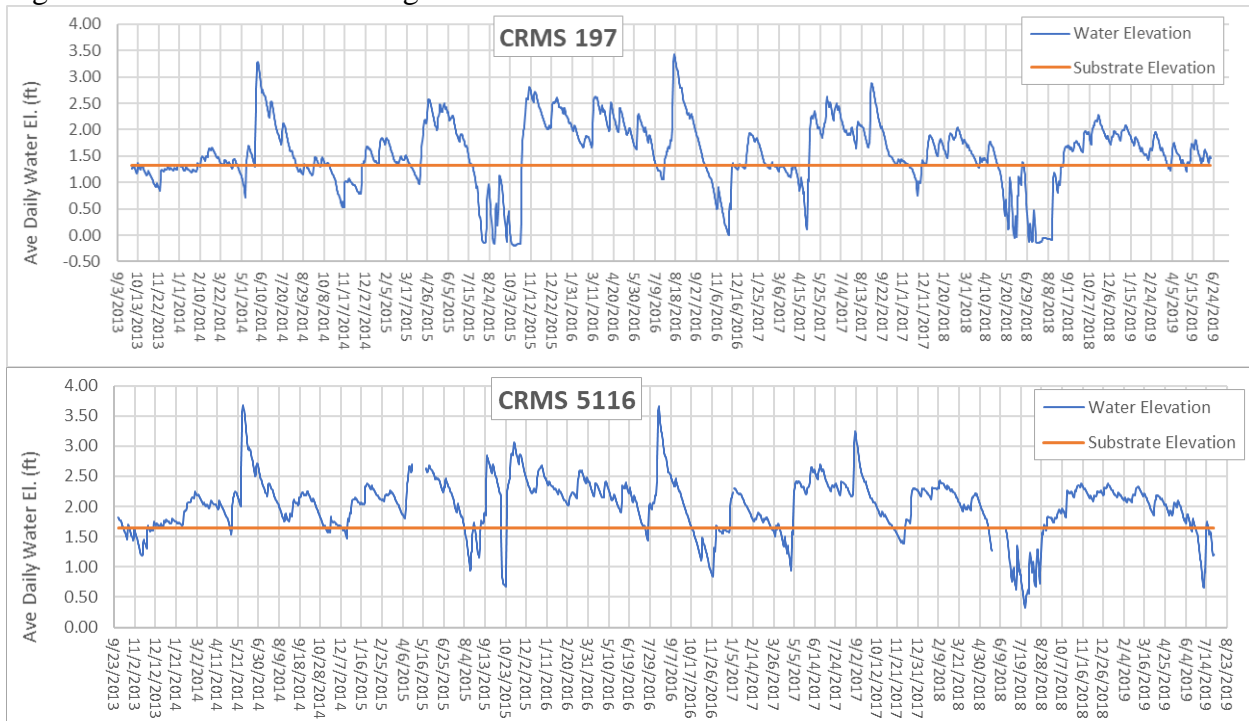
CRMS BLH Stations					CRMS Swamp Stations						
Scientific Name	Comon Name	Basal Area (M ² /ha)				Scientific Name	Comon Name	Basal Area (M ² /ha)			
		CRMS 194	CRMS 200	CRMS 5116	CRMS 197			CRMS 217	CRMS 5672	CRMS 206	CRMS 218
<i>Taxodium distichum</i>	Bald Cypress	5.69	1.82	5.14	4.69	<i>Taxodium distichum</i>	Bald Cypress	17.41	22.53	31.61	27.15
<i>Nyssa aquatica</i>	Water Tupelo					<i>Nyssa aquatica</i>	Water Tupelo	19.66	22.44	18.86	20.06
<i>Nyssa sylvatica</i>	Black Tupelo					<i>Nyssa sylvatica</i>	Black Tupelo				
<i>Acer rubrum</i>	Red Maple	5.76	3.31	14.3	4.26	<i>Acer rubrum</i>	Red Maple	11.83	2.28	3.63	0.84
<i>Acer negundo</i>	Boxelder	2.07	0.92			<i>Acer negundo</i>	Boxelder				
<i>Carya aquatica</i>	Water Hickory		4.46			<i>Carya aquatica</i>	Water Hickory				
<i>Fraxinus pennsylvanica</i>	Green Ash		0.34		1.52	<i>Fraxinus pennsylvanica</i>	Green Ash		0.15	0.62	
<i>Fraxinus profunda</i>	Pumpkin Ash	9.05	9.72	9.98	3.94	<i>Fraxinus profunda</i>	Pumpkin Ash	5.34	6.93	0.53	0.38
<i>Fraxinus carolinana</i>	Carolina Ash	1.6	3.72	0.86	1.22	<i>Fraxinus carolinana</i>	Carolina Ash		0.15		
<i>Ulmus americana</i>	American Elm	1.55	1.03			<i>Ulmus americana</i>	American Elm				
<i>Ulmus rubra</i>	Slippery Elm	1.72		0.33	3.75	<i>Ulmus rubra</i>	Slippery Elm				
<i>Celtis laevigata</i>	Sugarberry	0.24				<i>Celtis laevigata</i>	Sugarberry				
<i>Quercus texana</i>	Nuttall Oak	0.9		0.02	5.52	<i>Quercus texana</i>	Nuttall Oak	0.35			
<i>Quercus nigra</i>	Water Oak	0.24	5.18	0.22		<i>Quercus nigra</i>	Water Oak				
<i>Quercus laurifolia</i>	Laurel Oak			0.44		<i>Quercus laurifolia</i>	Laurel Oak				
<i>Quercus lyrata</i>	Overcup Oak					<i>Quercus lyrata</i>	Overcup Oak				
<i>Liquidambar styraciflua</i>	Sweetgum					<i>Morella cerifera</i>	Wax Myrtle			0.04	
<i>Gleditsia tricanthos</i>	Honey locust					<i>Cephalanthus occidentalis</i>	Buttonbush			0.02	0.12
<i>Cornus foemina</i>	Swamp dogwood					<i>Cornus foemina</i>	Swamp dogwood				
<i>Malus angustifolia</i>	Southern crabapple	0.03				<i>Malus angustifolia</i>	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.

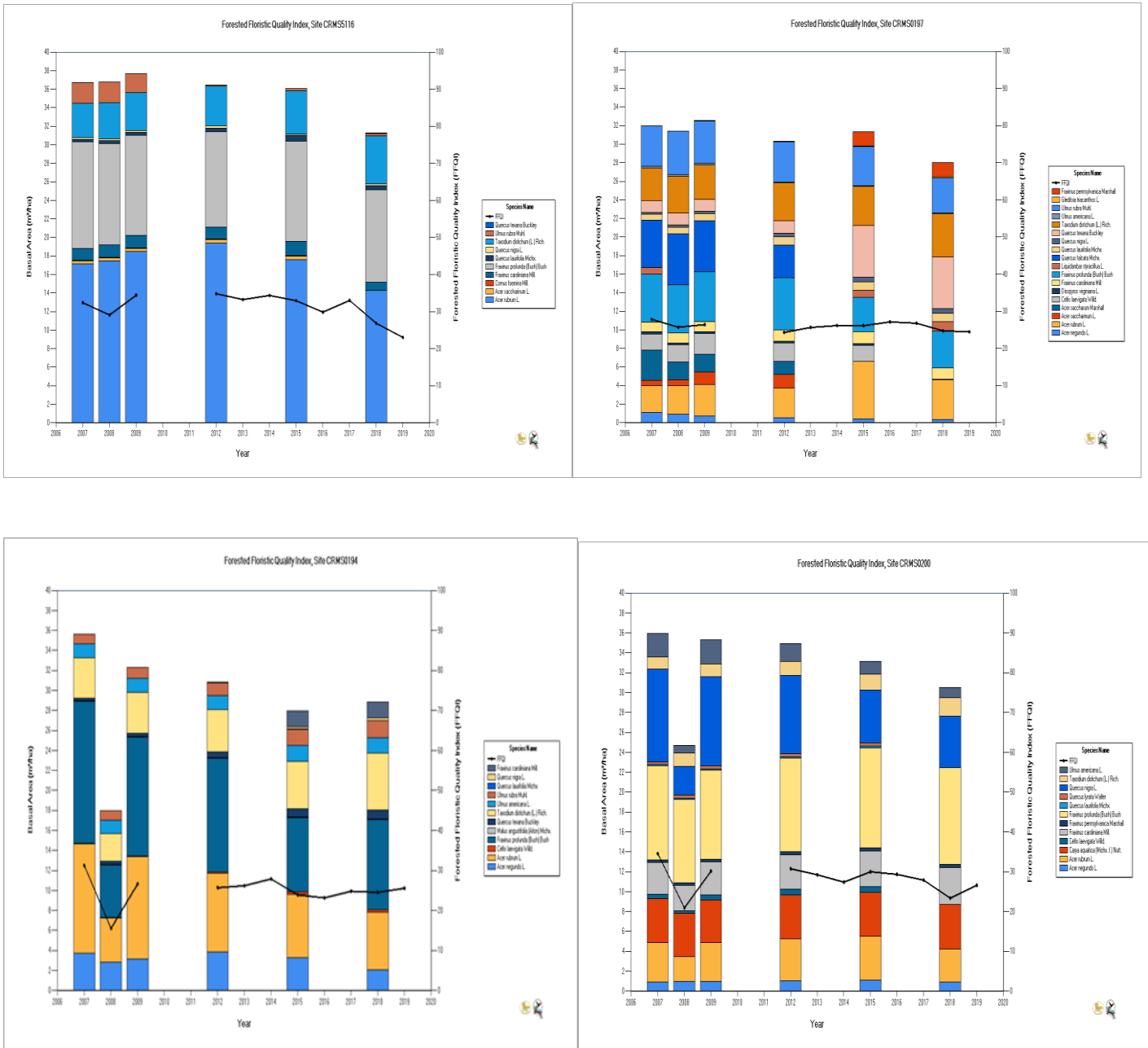


Figure 4. CRMS canopy cover data for BLH stations (2007-2019).

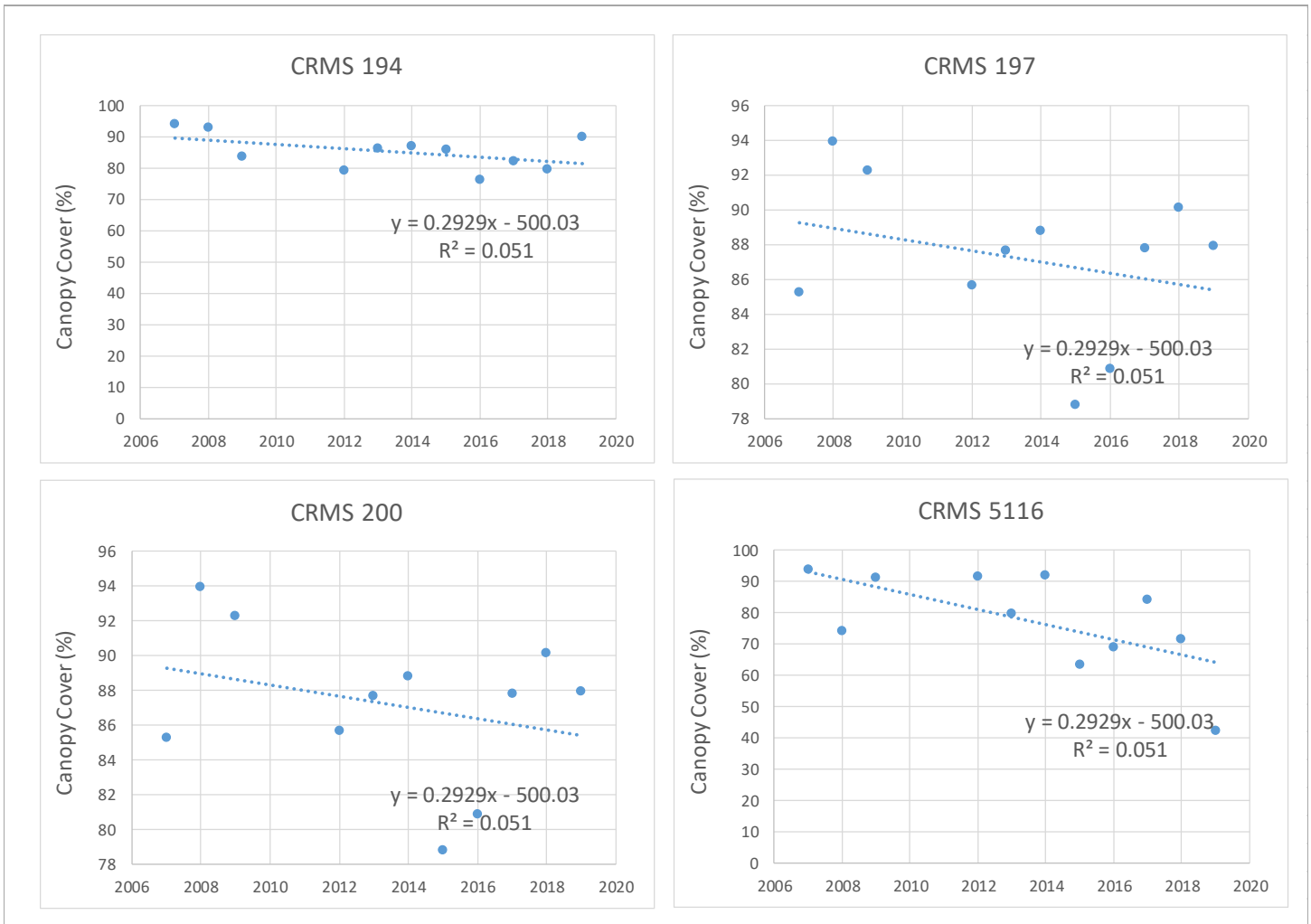
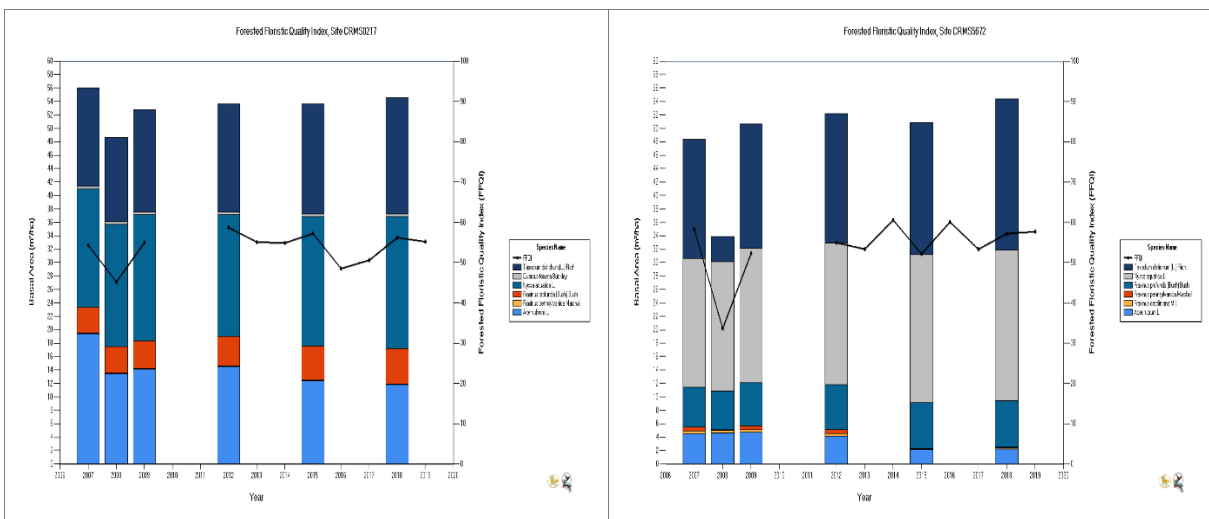


Figure 5. CMRS basal area data by species for swamp stations.



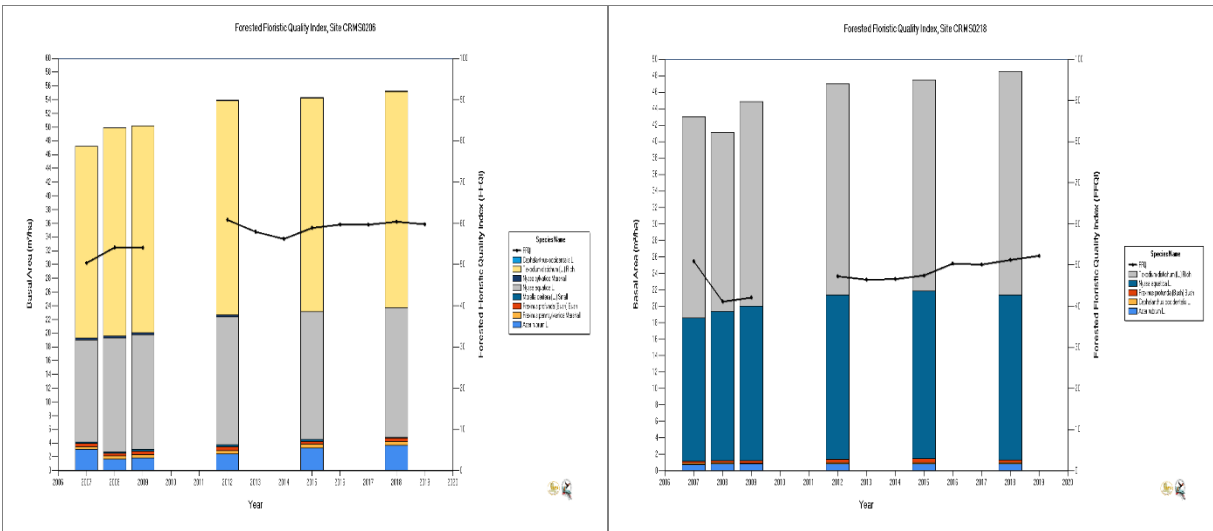
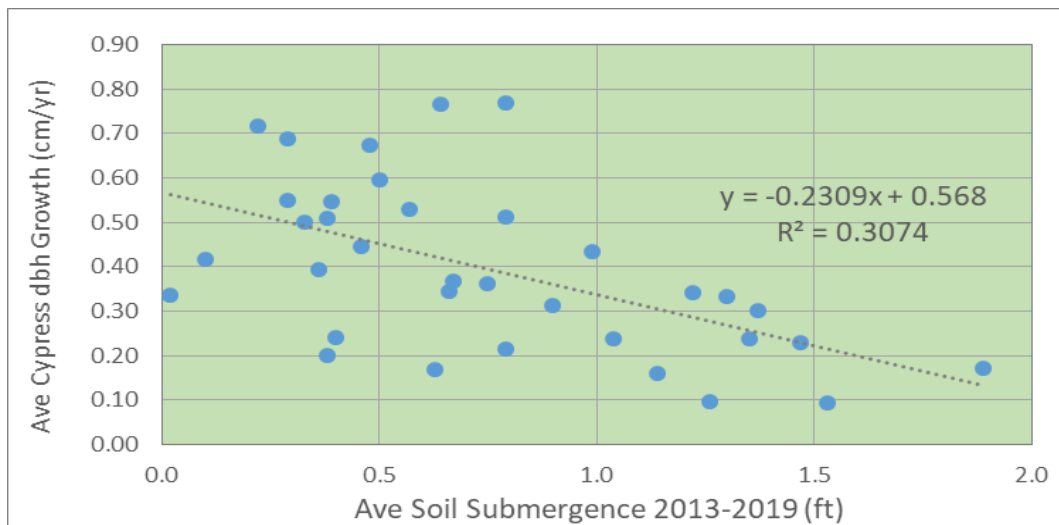


Figure 6. CRMS canopy cover data for swamp stations (2007-2019).



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 Wetland 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,

A handwritten signature in blue ink that reads "Joseph A. Ranson". The signature is fluid and cursive, with the first name "Joseph" being the most prominent part.

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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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	9ppm	Not to be exceeded more than once per year	Attainment
		1-hour	35ppm		
Lead	Primary and Secondary	Rolling 3-month average	0.15 $\mu\text{g}/\text{m}^3$ ⁽¹⁾	Not to be exceeded	Attainment
Nitrogen Dioxide	Primary	1-hour	100 ppb	98 th percentile, averaged over 3 years	Attainment
	Primary and Secondary	Annual	53 ppb ⁽²⁾	Annual Mean	
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	12 $\mu\text{g}/\text{m}^3$	Annual mean, averaged over 3 years	Attainment
		24-hour	35 $\mu\text{g}/\text{m}^3$		

Criteria Pollutant	Primary/ Secondary	Averaging Time	Level	Form	Attainment Status
				98 th 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	1-hour	75 ppb ⁽⁴⁾	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years	Non-Attainment for St. Bernard Parish
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year	

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ 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 NO₂ 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 SO₂ 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 4th highest 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).