ENVIRONMENTAL ASSESSMENT

Terrebonne Parish Non-Federal Levee System
Repairs, Replacements, Modifications, and Improvements
Terrebonne Parish, Louisiana

EA #450

INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (MVN), has prepared this Environmental Assessment #450 (EA #450) to evaluate the potential impacts associated with the proposed repairs, replacements, modifications, and improvements of about 6.1 miles of non-Federal levees (NFL) in Terrebonne Parish, Louisiana (Attachment, Figure 1). EA #450 has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2. The following sections include a discussion of the purpose and need for the proposed action, the authority for the proposed action, alternatives to the proposed action, important resources affected by the proposed action, and associated impacts of the proposed action.

PURPOSE AND NEED FOR THE PROPOSED ACTION

Terrebonne Parish, Louisiana contains approximately 100 miles of NFL which are associated with the parish forced drainage system. In late September of 2005, Hurricane Rita brought catastrophic tidal inundation from its storm surge to the communities of Terrebonne Parish. The storm surge and the resultant flooding overtopped and in some instances severely damaged existing NFL systems, causing millions of dollars in property damage. Hurricanes Gustav and Ike in 2008 also caused damage to the Terrebonne NFL system. Certain sections of the existing parish levee system are inadequate to provide future hurricane and storm damage risk reduction protection. This condition exposes residents and businesses in several parish communities and the hurricane evacuation routes, Louisiana Highways 56 and 57, to a higher potential for flooding in the event of a tropical storm or hurricane. The purpose of the proposed action is to repair, replace, modify and improve 6.1 miles of the NFL that were damaged by the storm surge. The work would be done with the appropriated monies made available by Congress, but would not federalize the existing levee systems, nor provide 100-year level of protection. The Federal improvements alone would not provide any additional flood protection since they will not result in a closed system. However, it would advance non-Federal plans for improved flood damage reduction measures.

AUTHORITY FOR THE PROPOSED ACTION

The proposed project is authorized under the Emergency Supplemental Appropriations Act for Defense and the Hurricane Recovery of 2006 (Public Law 109-234, Title II, Chapter 3, Flood Control and Coastal Emergencies). Generally, Public Law 109-234 provides funding "…for the necessary expenses relating to the consequences of Hurricane Katrina and other hurricanes." The public law included provisions for Terrebonne Parish, specifically $30 million in funding "…for repairs, replacements, modifications and improvements of non-Federal levees and associated protection measures in Terrebonne Parish at full Federal expense".

PRIOR REPORTS

The proposed levee construction project in Terrebonne Parish and assessed in this EA have no prior federal documentation for NEPA. The environmental impacts of utilizing earthen material from the J-1 borrow area was assessed in EA #406, "*Morganza, Louisiana to the Gulf of Mexico, Hurricane Protection Levee, Reach J, Segment 1, Terrebonne Parish, Louisiana*", with a Finding of No Significant Impacts (FONSI) signed on July 29, 2005. In 2006, TPCG prepared a Feasibility Study For Levee Enhancements in Terrebonne Parish (TPCG, 2006). In it they prioritized levee work for the next 10 years.

PUBLIC CONCERNS

The existing non-Federal levee system within Terrebonne Parish has been severely damaged in the aftermath of Hurricane Rita. Widespread public support exists within the parish to restore and improve the existing non-Federal levee system and the risk reduction provided. The public is also concerned about the continuing severe loss of coastal wetlands in Louisiana, especially because these wetlands can reduce storm surge.

DESCRIPTIONS OF THE PROPOSED ACTION

The MVN proposes to raise and repair, replace, modify and improve approximately 32,500 linear feet (6.1 miles) of existing levee near Dulac, Terrebonne Parish, LA approximately 8.5 miles south of Houma, LA (Attachment, Figure 1). The existing levee was built and is maintained by the Terrebonne Parish Consolidated Government (TPCG) and has never been the subject of Federal action. The existing levee is divided into two reaches, known as the Suzie Canal reach and the Orange Street reach. The existing Suzie Canal reach starts approximately 100 feet north of the Bobtown Bridge and follows in a southerly direction until approximately 100 feet north of the Combon Bridge (Attachment, Figure 2). The existing Orange St. reach starts approximately 50 feet north of the Combon Bridge and follows in a southerly direction until it intersects with end of Orange St. (Attachment, Figure 3). The existing levee continues south past Orange Street, however the segment south of Orange Street is not in need of repair, replacement, modification or improvement and is not included in this project.

This Suzie Canal portion of this project follows the existing alignment south before reaching a pipeline canal (Attachment, Figure 2). From this pipeline canal, the project alignment follows a new route, the "Suzie Canal Cutoff", before intersecting the existing alignment. A borrow canal would also be constructed along the protected side of the "cutoff". The portion of the existing alignment that is cutoff would be left in place, and an access method would be provided by TPCG to the property owner. The project alignment then follows the existing alignment until reaching Bayou Butler. The "Bayou Butler no-work" zone separates the two project segments (Attachment, Figures 2 and 3). The Orange Street portion of this project begins at the "Bayou Butler no-work zone" and follows the existing alignment in a southerly direction until reaching the end of Orange Street (Attachment, Figure 3). The Suzie Canal reach would be offset forward approximately 70 feet floodside from the centerline of the existing levee to the centerline of the proposed levee, requiring approximately 95 feet of additional right-of-way (ROW). The Orange Street reach would be offset forward approximately 85 feet floodside from the centerline of the existing levee to the centerline of the proposed levee, requiring approximately 111 feet of additional ROW.

Approximately 969,000 cubic yards of clay material would be required for the proposed levee project. If the material in the existing levee meets new COE criteria for levee soils, half of the borrow material would be obtained there (approx. 485,000 cubic yards). The rest would be obtained from 30 acres of the J-1 borrow area, a 100-acre, partially excavated site, owned by the Terrebonne Levee and Conservation District (TLCD). The J-1 borrow area is located off Aragon Road and adjacent to Bayou la Cache, near Montegut, LA (Attachment, Figure 1). If material in the existing levee is not suitable, all material would come from the J-1 site.

Both the Susie Canal and Orange Street levees would be raised to approximately +9.5 feet North American Vertical Datum 88 (NAVD88), with an approximately 10-foot wide crown and side slopes of 1-foot vertical on 3-feet horizontal (1V:3H). On the protected side, a stability berm would be retained under the existing levee footprint. The existing levee would be worked into the rehabilitated levee, and the existing borrow/drainage canal expanded. Where the rehabilitated levee fronts open water (Attachment, Figure 5), a "berm" would be constructed with the intent to create 74 acres of new marsh substrate as mitigation for unavoidable wetland impacts. Approximately 650,000 cubic yards of material would be hydraulically dredged from Lake Boudreaux and placed into the fill areas at an initial fill elevation expected to settle to a final target elevation of approximately +1.5 to +2.0 feet NAVD88. Containment dikes would be constructed to contain the dredged slurry within the marsh fill areas. The initial fill elevation to achieve the target post-settlement marsh elevation, as well as the geometry of the containment dikes, would be determined during engineering phase and would be specified in the project plans and specifications.

NO-WORK ZONES: Four pipelines intersect the alignment, two essentially adjacent to each other. A drainage siphon, crossing under Bayou Butler connects the existing borrow canals that parallel the levees. A TPCG pump station, known as the D-08 pump station, is located on the Orange Street reach (Attachment, Figure 3). To avoid impacting these structures, five no-work zones, including "Bayou Butler no-work zone" and "D-08 no-work zone", have been designated around these sites (Attachment, Figures 2 and 3). The no-work zones range from 200 feet to 600 feet wide. The United States will bear no responsibility in these no-work zones.

ACCESS ROADS: Access to the project vicinity would be from Hwy 57. Access to the Suzie Canal reach would be via a private driveway and Georgi Girl Lane. Access to the Orange Street reach would be via Panda Lane and Orange Street. All four access roads are less than a half of a mile long and all four provide a method of crossing the existing borrow canal. Where the crossings are deemed inadequate, the contractor would have the option of installing a temporary crossing, such as culverts and earthen fill. The contractor would also be given the option of installing a temporary crossing across Bayou Butler. All temporary crossings would be removed upon project completion.

ACCESS ROUTE: Material would be trucked to the site in either 14-20 cubic yard dump trucks or 24-30 cubic yard trailer bed trucks. The recommended haul is approximately 20 miles, and starts with the loaded haul truck at the J-1 borrow site. Upon leaving the borrow site, the route follows Aragon Road south to LA Hwy 58, then follows LA Hwy 58 west to LA Hwy 56. From there, the route follows LA Hwy 56 north to Woodlawn Ranch Road, and then follows Woodlawn Ranch Road west to LA Hwy 57, then south along LA Hwy 57 to the project site.

STAGING AREAS: There are two on site staging areas, the Bobtown Bridge staging area and the Orange Street staging area (Attachment, Figure 4). The Bob Town Bridge staging area is located in the southwest quadrant of the intersection of the Bobtown Bridge and Hwy 57. The site is currently cleared but undeveloped. The Orange Street staging area is located on either side of Orange Street before it intersects with the Orange Street levee drainage canal. The Orange Street staging area is also cleared and is occasionally used by TPCG as a staging area for levee repairs.

LEVEE EMBANKMENT: A silt fence would be placed along the proposed levee toe on both the protected and flood sides of the levee to contain runoff material during construction activities. Silt fences would also be utilized to prevent sediments from entering Bayou Butler. Earthen material from the proposed borrow area would be placed onto the levee in multiple lifts and then compacted. Upon completion of the levee rehabilitation, all levee embankments and areas disturbed by the construction activities would be seeded with Bermuda grass, fertilized, and mulched. The "marsh berm" would be planted with marsh species. Silt fences and other temporary features would also be removed.

BORROW AREAS: The 100-acre J-1 borrow site assessed in EA #406 was partially excavated in support of construction of a 2.7 mile reach of levee commonly referred to as Reach J-1. This levee could become a part of the larger Morganza to the Gulf federal project. The proposed project would utilize at maximum approximately 60 acres of the previously unexcavated portion of the site. If sufficient suitable materials are available in the existing Terrebonne NFL at the project site, then it is anticipated that approximately 30 acres of the previously unexcavated portion of the J-1 borrow site would be used for the subject project.

The area would be cleared and grubbed prior to excavation, and then excavated to a pit depth of approximately 20 feet with side slopes of 1V:3H. Bulldozers would be utilized to clear the proposed borrow area of trees, scrub brush, other vegetation, and earthen material deemed not suitable for the levee enlargement project. The vegetation and unsuitable earthen material removed would all be temporarily stockpiled on-site. Groundwater seeping into the pit would be pumped out into adjacent areas. Backhoes would remove the earthen material deemed suitable for the levee project, which would be processed within the borrow pits to reduce the moisture content within the soil. Moisture content processing would be performed by mechanical methods such as utilizing bulldozers to stockpile materials and disks to further reduce the moisture content of the soil.

Once the moisture content has been reduced to acceptable levels, haul trucks would be utilized to transport material to the levee. The borrow pit will be excavated in a systematic manner, achieving the -20 foot depth before moving to an adjacent area. A truck wash down station would be utilized at the borrow site to prevent excessive tracking on the roads. In addition, the trucks would be slightly light-loaded and fitted with a covering tarp to prevent loss of material onto the roads. After all suitable earthen material is removed from the pits, the stockpiled unsuitable material and the vegetation removed during clearing and grubbing would be placed into the pit to provide potential cover habitat for wildlife and fisheries. All construction activities for the proposed project would be contained within the predetermined construction right-of-way.

MITIGATION: After the levee work is completed, the second phase of the project is to create a marsh berm adjacent to portions of the levee as mitigation for the unavoidable loss of marsh caused by the project action. Mitigation for bottomland hardwoods would be achieved by the MVN

purchase of the appropriate number of mitigation bank credits or by planting young bottomland hardwood species on enough acreage to fully mitigate the impacts. As a means to mitigate for impacts to fresh, intermediate and brackish marsh and scrub-shrub, approximately 74 acres of marsh would be created in the open water areas adjacent to the newly constructed levee (Attachment, Figure 5). Scrub-shrub in this area has a significant marsh understory, so is counted as marsh for mitigation purposes.

Approximately 8,675 feet of earthen containment dikes would be constructed with dragline excavators using *in situ* material. The earthen containment dikes would be built to an approximate +4.0 feet NAVD88 elevation, and would tie into the new levee construction to create enclosed fill areas approximately 325 feet to 680 feet out from the toe of the levee. After the containment dikes are constructed, marsh buggy excavators or similar equipment would be used to transport and place the dredge pipelines into the containment areas. The dredge pipelines would be transported through open water areas to avoid impacts to marsh habitat, and be appropriately lighted and marked for navigation safety. Once the containment dikes are constructed and the pipelines are in place, a hydraulic dredge would be used to pump approximately 650,000 cubic yards of material from Lake Boudreaux into the fill areas at heights conducive for the creation of marsh. The final settlement height would be between +1.5 and +2.0 feet NAVD88).

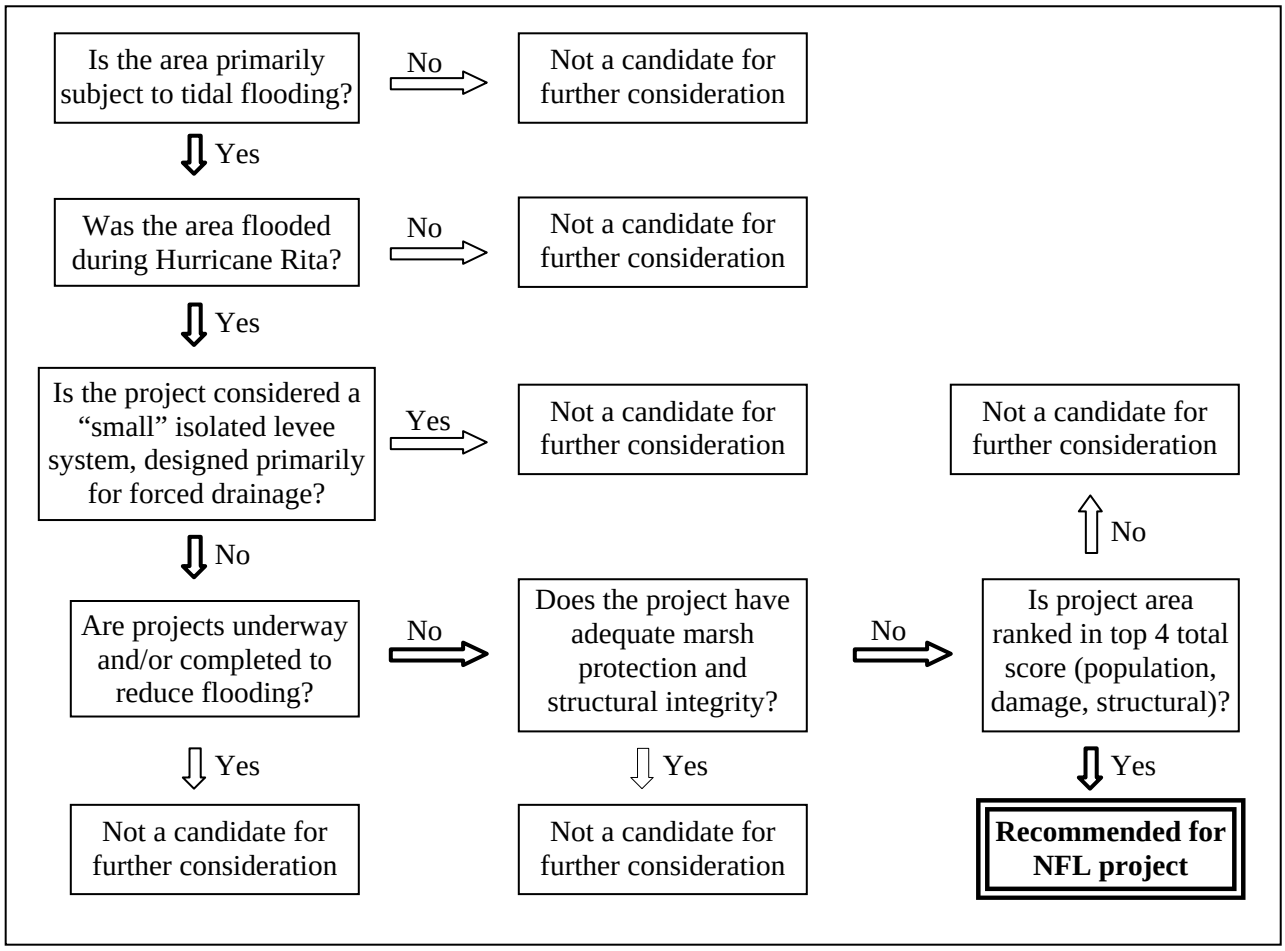
The dredged slurry would be allowed to settle within the containment areas naturally, or may be artificially dewatered utilizing spill boxes or similar structures placed in the containment dikes. If the dredged slurry is allowed to settle naturally, it is estimated to require 12 to 24 months for the process to occur. When the material is sufficiently settled, it would be planted with marsh species such as wiregrass (*Spartina patens)* and oyster grass (*Spartina alterniflora*). Then if necessary, the earthen containment dikes would be degraded to + 1 foot NAVD88 at three sites along the eastern side of each marsh berm cell. Each of the nine cuts would be 50 feet wide to allow tidal connection. The local sponsors, TLCD and TPCG would monitor and maintain the marsh berm. The TPCG would purchase a Conservation Easement over the marsh berm to prevent any potential future development.

ALTERNATIVES TO THE PROPOSED ACTION

There are a total 64 NFL in Terrebonne Parish which cover 100 miles, These NFL are maintained by the TPCG as forced (pumped) drainage areas. The drainage areas may be entirely surrounded by a levee, or may be surrounded by a combination of roads and spoil banks. In the aftermath of Hurricane Rita, the 34 tidal levees were overtopped or damaged, while those levees north of the GIWW suffered only minimal damage. With a limit of $30 million in Federal funding available, a selection process was developed. The TPCG used their 2006 Feasibility Study to select the reaches to be built by the Federal Government. The Government coordinated with the TPCG and accepted their selection recommendation as the proposed action for this EA.

Project Location Selection Process: A process of elimination was compiled to narrow the number of levee systems to be considered for the proposed project, to those areas having the greatest need. The 64 levee systems were prioritized based upon the degree of structural damage to the levee system and resultant property damage from flooding due to Hurricane Rita. The selection process is summarized in Table 1 and is detailed in the paragraphs following the table.

Table 1. Selection Process for the Non-Federal Levee project



Initial Elimination: The 30 levee systems and their protected structures that are located north of GIWW suffered only minimal damage due to Hurricane Rita. As such, these levees were eliminated from further consideration. The remaining 34 levees systems are subjected to tidal flooding and are considered as "tidal levees". These levees were either damaged or overtopped, and were considered further in the selection process.

Elimination of Drainage Levees: Many of the "tidal levee" systems in the parish serve only to isolate forced drainage areas. The parish considers these to be "drainage levees"; although they provide limited storm surge protection. Under this review, 17 levee systems that were utilized solely for drainage purposes were eliminated from further consideration: Bobtown, Boudreaux Canal, Cane Break, Crozier Drive, Falgout North East, Grand Bois, Highridge, Industrial, LeCompte Lane, Marmande Northeast, Texas Gulf Road, Tina Street, Ashland, Ashland Portable, Woodlawn Pump Station, Sara Road to Presque Isle, and East of Aragon Road systems. This screening step left 17 levee systems for further consideration.

Elimination of systems with recently completed or pending repairs, replacements or improvements: The following systems already being repaired by the Parish were eliminated from further consideration: The Lower Little Caillou Levee (Lower Ward 7-Project 1) was completely rebuilt in

2005 and 2006 following Hurricane Rita. The reconstruction of a portion of the Upper Little Caillou Levee (Upper Ward 7- Project 2) was completed.. After Hurricane Rita, the Natural Resources Conservation Service provided assistance in repairing the Reach 4-8 system. The final reach of the 4-3C system has been constructed to provide a complete ring levee around the community of Isle of Jean Charles, and to offer protection from tidal events. This step eliminated three levees, not including the Upper Ward 7 Project which is further discussed below. Fourteen levees remained for further analysis.

Elimination of systems that may be included in the Morganza to the Gulf of Mexico Federal Hurricane Protection System: The Morganza to the Gulf Levee Alignment would replace several levees that currently provide tidal protection. The 4-3B (Pointe Aux Chene and Middle Pointe Aux Chene) Levee System would be replaced by Reach J of the Morganza to the Gulf of Mexico Hurricane Protection System. The Lower Montegut, Bush Canal, Upper Dularge, and the Reach 8-2C (North Marmande) systems would also be replaced by sections of the Morganza to the Gulf alignment. This step eliminated six systems leaving eight for further consideration. The Morganza to the Gulf Hurricane Protection System would provide for 100-year level of protection and would be included in the Federal levee protection. It is scheduled to begin construction in 2010.

Final Ranking: The structural integrity of the remaining levees was characterized as either "good", "marginal" or by the type of damage to the levee (i.e. no berm, scour, etc). The degree of marsh protection of the flood side of the levees was characterized as either "open water", "broken marsh" or "marsh protection". Those levees with either "good" or "marginal" structural integrity and either "broken marsh" or "marsh protection" were eliminated from consideration. Two (2) levees were eliminated by this analysis. The remaining six levees were then ranked in order to establish a priority for the levee repair, replacement, modification or improvement by the following factors:

a. Total number of structures in the levee area,
b. Total property value in the levee area,
c. 2000 census count for the levee area, and
d. Federal Emergency Management Agency (FEMA) Residential Survey Damage Estimates (RSDE) for the levee area.

Based upon the aforementioned priority factors, four levee systems were selected for further consideration: the Orange Street Levee, the Suzie Canal Levee, the Falgout Canal (Lower Dularge) Levee, and the Upper Little Caillou Levee (Upper Ward 7 Levee-Project 3). The amount of funding available and the estimated costs for the proposed project (obtain borrow material, construction, and mitigation), would further reduced the consideration to two levee systems.

Final Selection: The Upper Little Caillou Levee (Upper Ward 7 Levee-Project 3) was removed from the final selection, as other non-Federal funding sources were provided to construct this levee system in phases, with the lower phase expected to be completed in December 2007. The upper phase has been permitted and funds are being allocated by the parish and being sought from the state for the repairs. A site visit was conducted by representatives of the MVN and TPCP on June 15, 2007. Upon inspection of the levee systems, it was determined the Orange Street Levee and Suzie Canal Levee suffered the most structural damage, and so should be repaired, replaced, modified or improved prior to the Falgout Canal (Lower Dularge) Levee. As such, the Orange Street Levee and Suzie Canal Levee were selected as the proposed project.

Preliminary Alternative Screening

Once the location of the reaches to be improved were selected, six alternatives were assessed. For the levee alternatives, two elevations were considered – 8 feet high and 9.6 feet high.

Alternative 1 – No action
Alternative 2 – Non-structural flood control measures/elevation
Alternative 3 – Levee replacement with a T-Wall
Alternative 4 – New levee alignment in marsh – set forward
Alternative 5 – New levee on protected side – set back
Alternative 6 – Straddle alignment

Alternative 1: No Action

With the No-Action alternative, the proposed project would not be implemented by the USACE. Without repair, replacement, modification or improvement, the Orange and Susie Canal Reaches of the NFL would be subject to additional damage and overtopping from future storm events. These levees, in conjunction with the rest of the Terrebonne Parish forced drainage system, function to keep the houses, structures, and roadways from flooding, when non-tropical storm fronts create higher than normal tides in the marsh. These reaches have been seriously damaged by storm events in recent years, and are exposed to further erosion and scouring from future events. No action will not cause any of the discussed environmental impacts and will not require any additional mitigation.

Alternative 2: Non-Structural Flood Protection Measures – Elevation

The non-structural flood protection measure considered for Terrebonne Parish is elevation of homes, businesses, and critical infrastructure. The existing NFL, as designed, provides some protection to houses and allows the roads to remain accessible during some storm events. To provide equivalent protection, the non-structural elevation alternative would require raising all roads and structures that are currently beneath eight feet in elevation. Because non-structural solutions are not endorsed under this authorization and construction costs would easily be in excess of $30 million to just raise the road, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 3: Levee Replacement with a T-wall

This alternative consists of replacing the existing non-Federal levee with an engineered T-wall, using the assumption that the T-wall would follow the existing levee alignment. The proposed flood protection inverted T-wall alternative is composed of a +10 ft NAVD cast-in-place reinforced concrete stem (wall) on a monolithic base slab, supported by pre-stressed concrete piles. A continuous steel sheet pile cut-off wall is provided beneath the base slab to cut off seepage under the wall. A pile foundation system supports the inverted T-wall concrete monoliths, and is designed to resist the design load cases and their combinations. The existing levee material would remain in place providing earthen protection to the T-wall. In developing the estimate for this alternative, no flood gates or special structures were assumed, and the existing pump station would remain as the T-wall would pass in front of the station. The cost for this design is estimated to be approximately $244 million, which greatly exceeds the authorized funding. Thus, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 4: New Levee Alignment in the Marsh (Set Forward) Proposed Action

A new levee alignment would be built in the marsh, offset from the existing levee by up to 85 feet. This alternative would impact the most wetlands. If material from the existing levee has suitable material, it would be used in the new levee. If it does not, all material would be hauled from off-site. This alternative with the 8-foot elevation, was the selected plan in the Project Information Report PIR) Since the cost estimate was $27.5 M, it is possible that the Federal Government could raise the levee higher than 8 feet. Thus, the proposed plan in this EA is the 9.6 levee height so any additional work that might be done has been environmentally analyzed.

Alternative 5: New Levee on Protected Side (Set-Back)

A set-back levee was considered to avoid or minimize impacts to the floodside wetlands. This alignment would involve rebuilding the levee toward the protected side beginning at the floodside toe. Site visits and a review of aerial photography indicate that this alternative would have direct negative impacts on local residents, as numerous residential properties would be within the levee right-of way for this design. Additionally, the existing drainage/borrow canal located between the levee and these properties would require filling in and a new canal would need be excavated for drainage, expanding the impacts further beyond the levee footprint towards the adjacent highway. Due to the substantial negative impacts to local residents and their properties, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 6: Straddle Alignment

A straddle levee design was evaluated incorporating the existing levee into a landside stability berm, as an attempt to minimize both the protected side and floodside impacts. This design alternative is minimally offset towards the floodside wetlands from the existing centerline. The existing levee would remain in place, with the new levee construction adjacent. Fill material would be entirely hauled-in. The advantage with this alternative is that the soil in the existing levee is more consolidated. This is considered as an option only if further geotechnical testing results indicate that on-site levee material is suitable for levees.

As compared to the other alignments, the total of fill material required is less, the existing levee may remain above the minimum levee design providing additional structural support, and the property acquisition is also minimal with this alternative design. However, the TPCG requires the government to stay a minimum of 25-30' from the existing drainage ditch. To accomplish this, the government would have to move the existing levee forward so the straddle is not really an option. Also, the minimum cost for this design was estimated to be $29.9 million, which is $2.4 million more than the $27.5 minimum estimated for the set-forward design. In addition, the proposed Terrebonne Parish non-Federal levee project has been under development for nearly two years, with cost expenditures required for project investigations, studies, data analysis, and developing a feasible project action. The cost of the straddle alignment alternative would already exceed the remaining funds available. Thus this alternative is considered as not feasible and so would not receive further consideration.

ENVIRONMENTAL SETTING

GENERAL

The project area contains an existing levee; borrow/drainage canal, private property, and wetlands within an approximately 6.1-mile corridor of the Suzie Canal and Orange Street forced

drainage systems. It is located east of Highway 57 in Sections 7, 8, and 9, Township 18 South, Range 17 East, and Sections 1, 2, 19, 85, and 86, Township 19 South, Range 17 East of Terrebonne Parish, Louisiana. Land use within the proposed levee project area varies and includes private property that contains maintained lawn areas and wooded thickets; a flood protection levee and borrow canal; and marshes and open water on the unprotected outside of the existing levee. The northern reaches of the project area are associated with the Suzie Canal Levee. The southern reaches of the site are associated with the Orange Street Levee.

The J-1 borrow site is located approximately 8.7 mile southeast of Houma, LA, near the community of Montegut, LA. The borrow site is located in Section 5 Township 18 South Range 19 East and Section 6 Township 18 South Range 18 East. The J-1 pit and the surrounding land have been used for agricultural purposes (sugarcane and currently pasturelands). Bayou LaCache borders the borrow site, to the west. A site visit to the J-1 site on November 5, 2008 found that an area adjacent to the 60-acre area has been previously excavated. An estimated 27-acre marsh-fringed borrow pond and an approximately 1-acre open borrow pit were found adjacent to the 60-acre area.

CLIMATE

The climate of the Terrebonne Parish area is humid subtropical. Warm, moist subtropical southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, continental cold fronts dominated by northeast high pressure systems. Average annual temperature in the area is 68^{o} F, with monthly temperatures varying from 82^{o} F in July to 53^{o} F in January. Average annual precipitation is 57.0 inches, varying from a monthly average of 8.3 inches in July, to an average of 3.4 inches in October. Summer tropical storms are common, and hurricanes infrequently occur.

GEOLOGY

The Natural Resources Conservation Service (NRCS) soil survey shows that the Site is underlain by several soil types – Allemands muck ; Aquents, dredged ; Bancker muck ; Cancienne silt loam ; Cancienne silt clay Fausse clay ; Harahan clay ; Rita muck ; Shriever clay ; Shriever clay, 0 to 1 percent slopes ; Shriever clay, frequently flooded . The following is a description of each of the soil series at the Site as described by the National Cooperative Soil Survey.

- The Allemands series consists of very deep, very poorly drained, soils that are rapidly permeable in the organic materials and very slowly permeable in the underlying clay horizons. These soils are on the landward side of low coastal freshwater marshes and formed in decomposed herbaceous material over alluvial sediments. Slope ranges from 0 to 0.2 percent.

- Aquents, dredged – permanently or usually wet soils formed on river banks, tidal mudflats etc. along the gulf coast and Mississippi River flood plains.

- The Bancker series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in very fluid clayey and organic sediments in intermediate or brackish coastal marshes. The sediments have been deposited under water and never air-dried and or consolidated. Slope ranges from 0 to 0.2 percent.

- The Cancienne series consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey

alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries. Slopes range from 0 to 3 percent.

- The Fausse series consists of very deep, very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low, ponded backswamp areas of the lower Mississippi River alluvial plain. Slopes are less than 1 percent.
- The Harahan series consist of very deep, poorly drained, very slowly permeable soils. They formed in moderately thick firm clayey alluvium overlying fluid clayey sediments. These soils are on broad backswamp positions on the lower Mississippi River flood plain. Slopes range from 0 to 1 percent. These soils are protected from flooding by levees, and are artificially drained by pumps.
- The Rita series consists of very deep, poorly drained, very slowly permeable soils in fresh water coastal marshes that have been protected from flooding by a system of levees and pumps. These soils formed in a thin layer of herbaceous organic material overlying semifluid clayey sediments that dried and consolidated in the upper part as the result of artificial drainage. Most of the organic material has oxidized since drainage. Slopes range from 0 to 0.5 percent.
- The Shriever series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain. Slope is dominantly less than 1 percent but ranges up to 3 percent.

The existing Suzie Canal levee overlays Aquents, Cancienne Silt Loam, Cancienne Silt clay, Cancienne Silt clay loam, Schriever and Fausse clay soil types. The existing Orange St. Levee overlays Cancienne Silt Loam, Cancienne Silty clay loam, Fausse and Schriever clays, and Rita Muck soil types. The soil types of Lake Boudreaux consist of Lafitte, Clovelly, and Bancker mucks, as well as Aquents, and Fausse clays. Analysis of the "Set Forward" alignment for the Suzie Canal levee indicates that Schriever and Fausse clays, Aquents, Cancienne silty clay loam, and Cancienne silt loam soil types would be located beneath this alignment. An analysis of the "Set Forward" alignment for the Orange St. levee confirms that Schriever clay, Cancienne silty clay loam, Rita Muck, Aquents, Bancker muck, and Fausse clay soil types would be beneath the levee alignment.

Soils in the J-1 borrow area are described as Mhoon and Sharkey series. The Mhoon soils are imperfectly drained soils of the bottomlands with stratified silt loam, silty clay loam, and silty clay sediments. They occur on sites well above the present normal overflow from streams. The stratified sediments were deposited on and near the crests of the natural levee ridges during the overflow from distributary streams and crevasse channels of the several delta systems of the Mississippi River. Mhoon soils commonly occur on level to nearly level relief, although small areas near stream channels have slopes of 3 percent. Mhoon soils are closely associated with lower lying Sharkey soils, which consist of dark-colored soils of the bottomlands that contain moderate amounts of organic matter as a result of repeated deposits of clays and organic residues. These fine-textured sediments were deposited in depressions, such as shallow lakes and bays, along the borders of the natural levee ridges. Runoff and internal drainage for both soil types is slow to very slow (NRCS, 2007).

IMPORTANT RESOURCES

This section contains a description of important resources and the impacts of the proposed action on these resources. Important resources described in this section are those recognized by: laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Important resources found within the proposed project area and assessed in this EA are: wetlands, marsh, water bodies, bottomland hardwoods, fisheries, essential fish habitat, wildlife, threatened and endangered species, cultural resources, socio-economics (transportation), recreational resources, aesthetics, and air quality.

WETLANDS

Four types of wetland habitat exist within the proposed borrow areas: marsh, scrub-shrub with a marsh understory, bottomland hardwoods and submerged aquatic vegetation (SAV). These wetland habitats are discussed as separate resources in the following paragraphs. The impacts to wetlands assessed in this EA include those wetlands within the ROW for the new levee construction. The following table (Table 2) shows the impacts within the ROWs.

Marshes in the project area are being lost at the rate of 2.33 percent per year according to data gathered for the West Lake Boudreaux Shoreline Protection and Marsh creation project. This loss is due to subsidence, sea level rise, salinity intrusion caused by navigation channels and oilfield canals, shoreline erosion, ponding of water, etc. These losses are expected to continue with or without the proposed project.

Table 2. Wetland Impacts Caused by the Proposed Action Within the Project Area

Suzie 9.5' w/Cutoff set forward		Orange 9.5 set forward		TOTAL
Wetland Type	Acres	Wetland Type	Acres	
Bottomland Hardwoods	11.5	Bottomland Hardwoods	0.6	12.1
Scrub-shrub (marsh understory)	10.5	Scrub-shrub (marsh understory)	0.0	10.5
Fresh Marsh	2.0	Fresh Marsh	0.0	2.0
Brackish Marsh	0.0	Brackish Marsh	25.7	25.7
Intermediate Marsh	13.4	Intermediate Marsh	0.0	13.4
Submerged Aquatic Vegetation	0.7	Submerged Aquatic Vegetation	0.0	0.7
TOTAL	38.1		26.3	64.4

MARSH

Existing Conditions

This resource is institutionally important because of: the Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968. Marsh habitat is technically important because they: provide necessary habitat for various species of plants, fish, and wildlife; serve as ground water recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; provide protection from wave action, erosion, and storm damage; and provide various consumptive and non-consumptive recreational opportunities. Marsh habitat is publicly

important because of the high value the public places on the functions and values that these wetlands provide.

No marsh or other wetland habitats are found at the J-1 borrow site, although the nearby existing borrow pond does have an established fringe marsh around the shoreline. The marsh habitats within the proposed project area are mainly located on the floodside of the existing non-federal levees, north of Lake Boudreaux and extending out into a pond west of that lake. These wetlands areas have a direct hydrological connection to the lake. Two types of marsh habitat have been classified to exist within the floodside areas of the existing levees: intermediate and brackish. This area was subject to flooding and storm surge from Hurricane Ike, which resulted in the loss of some marsh acreage and severely stressed much of the surviving vegetation.

Approximately 13.4 acres of intermediate marsh is found within the existing and proposed ROW on the flood side of the Susie Canal levee. The dominate marsh species found is wire grass, with alligator weed and torpedograss found in the shallow waters closer to the toe of the existing levee. There are 5.8 acres of scrub-shrub with a marsh understory on the floodside ROW at Susie Canal. Approximately 0.7 acres of submerged aquatic vegetation (SAV), mostly widgeon grass, is found within the floodside of the levee footprint, located south of the Susie Canal cutoff. Two acres of fresh marsh is located within the levee footprint of the Susie Cutoff. There are 4.7 acres of scrub-shrub with a marsh understory in the levee ROW in the cutoff. Approximately 25.7 acres of brackish marsh dominated by wiregrass is found within the existing and proposed ROW of the Orange Street levee along this reach.

Future Conditions with No Action

With the no action, the proposed project would not be constructed. The project area marsh would be lost at the rate of the rate of 2.33 percent per year which is the loss rate from the West Lake Boudreaux Shoreline Protection and Marsh Creation CWPPRA project. At the end of 50 years only 8 acres of brackish marsh would remain in the Orange Street ROW. There would be 2 acres remaining of the fresh marsh and scrub-shrub in the Susie Cutoff ROW. At the floodside of the Susie Canal reach, there would be six acres of intermediate marsh and scrub-shrub remaining. These without-project marsh losses are taken into account when calculating project impacts during the Wetland Value Assessment.

Future Conditions with the Proposed Action

The proposed action would cause the loss of 41.1 acres of marsh and 10.5 acres of scrub-shrub with a marsh understory. The Wetland Value Assessment Model was used to determine the amount of mitigation needed. The results determined that 74 acres of new marsh would mitigate for the loss. This marsh would be created in open water adjacent to the Orange Street levee as described on page EA-3 previously. A monitoring plan would be developed so the TLCD and the TPCG could verify the success of the mitigation. The 74 acres of new marsh habitat is expected to be utilized by a variety of wildlife and fish species, thus indirectly benefiting these species. Freshwater marsh species might colonize the bank edges and near shore areas of the 60-acre borrow pit, thus becoming a fringe marsh.

WATER BODIES -- REGIONAL HYDROLOGY

Existing Conditions

This resource is institutionally important because of the Clean Water Act of 1977, as amended. Water bodies are technically important because it provides habitat for various species of wildlife, finfish, and shellfish. Water bodies are publicly important because of the desire of the public for recreational use for boating, fishing, and bird watching.

The J-1 borrow area is dry site located within a fallow agricultural field, and contains no water bodies within the area proposed for excavation. Bayou LaCache is located just to the west of the borrow site, but is not expected to be impacted by the project. An approximately 27-acre borrow pond is located nearby, but is also not expected to be impacted by the project action.

Other water bodies within the proposed project area are located within the vicinity of the proposed levee construction. These water bodies include an unnamed borrow/drainage canal along the protected side of the existing non-Federal levees, and the tidally-influenced waters located adjacent to and in the vicinity of the floodside of the levees. Tidal influences within the floodside water bodies come from Terrebonne Bay and the Gulf of Mexico. Lake Boudreaux and Bayou Butler are the two primary named water bodies in or near the project area; several unnamed pipeline canals and other interconnecting waterways are found throughout the floodside marsh. Salinity and turbidity are important factors which can influence submerged and emergent plant communities in a given area. The floodside marshes and open water portions of the project area have intermediate and brackish salinities and non-turbid waters, while the open waters of Lake Boudreaux normally have brackish salinities and turbid waters. As mentioned in wetlands above, the western Lake Boudreaux area marsh is being lost at the rate of 2.33 percent per year which means that new water appears in the area yearly.

As part of its surface water quality monitoring program, the Louisiana Department of Environmental Quality (LADEQ) routinely monitors a number of sites on larger water bodies throughout the state, including Terrebonne Bay and Lake Boudreaux. Based upon this data and the use of less-continuous information, such as fish tissue contaminants data, complaint investigations, and spill reports, the LADEQ has assessed water quality fitness in Lake Boudreaux to be supportive of swimming, boating and fishing, but not supportive of fish and wildlife propagation, or oyster production (LDEQ 2006). Suspected causes are low dissolved oxygen, high nutrient load (nitrate/nitrite and phosphorus) and total fecal coliform bacteria, while the suspected sources were retention of domestic sewage, on-site treatment systems, and package plant or other permitted small flow discharges (LDEQ 2006).

Future Conditions with No Action

With the no action, the proposed project would not be constructed, and impacts to water bodies would not likely change from existing conditions. General marsh loss will continue and as the intermediate/brackish marsh is lost in what would become the levee ROW with the project, it is estimated that approximately 36 acres of new water will appear there over the next 50 years.

Future Conditions with the Proposed Action

With the proposed action, best management practices would be incorporated to minimize impacts to local waters (i.e. silt fences would be placed along the levee toe on both the protected and flood sides to contain runoff material). Some runoff may seep through to the adjacent waters, but any resulting increase in turbidity would be minor and temporary. Project activities to mitigate

for the loss of marsh habitat would directly impact the hydrology and water quality within the project area. Approximately 74 acres of open water area would be filled with dredged slurry, displacing the existing aquatic habitat and increasing turbidity within the containment areas. Negative impacts from the loss of this habitat are minimized by the dedicated dredging from Lake Boudreaux to create conditions suitable for wetlands development. Waters within Lake Boudreaux are directly connected to the open waters adjacent to the existing levee. Any potential contaminants within waters or underlying sediments would be found throughout the waterways. Thus placing dredged material from the lake would not change these conditions. Project activities to transport the pipeline to the containment areas and the operation of the hydraulic dredge would directly impact water quality, as these actions would displace bottom sediments, thus increase turbidity within the vicinity of the dredging vessel and pipeline route. The impacts of increased turbidity within the lake would only be temporary, and water quality would return to existing conditions after the completion of project activities.

Project activities to excavate the J-1 borrow area is not expected to directly impact water bodies. The project action would have indirect impacts, as rainfall and flooding are expected to initially convert the borrow pit into a 60-acre deepwater borrow pond, thus increasing water bodies resources within the area. Over time, a thin fringe of marsh may develop around the edge of the pit. It is possible that crawfish and small fish such as mosquito fish may be eventually be found in the pit.

BOTTOMLAND HARDWOODS

Existing Conditions

This resource is institutionally important because of Section 906 of the Water Resources Development Act of 1986 and the Fish and Wildlife Coordination Act of 1958, as amended. Forested wetlands technically important because: it provides necessary habitat for a variety of species of plants, fish, and wildlife; it often provides a variety of wetland functions and values; it is an important source of lumber and other commercial forest products; and it provides various consumptive and non-consumptive recreational opportunities. Forested wetlands are publicly important because of the high priority that the public places on its esthetic, recreational, and commercial value.

Essentially no forested wetland habitats are found within the boundaries of the 60-acre J-1 borrow site. There is a fringe of trees along a drainage ditch. Of the approximately 12.1 acres of forested wetlands within the proposed project area, approximately 11.5 acres are found along the Susie Canal levee and within the cutoff. The remaining 0.6 acres are located along the Orange Street levee in the vicinity of the D-08 pumping station. Bottomland hardwood habitat is dominated by black willow (*Salix nigra*) and Drummond red maple (*Acer rubrum var. Drummondi*), with a few water oaks (*Quercus ngra*)is scattered along the levee toe. The 0.6 acres of bottomland hardwoods near the D-08 pump station along the Orange Street levee (Attachment, Figure 3) is dominated by water oaks, primarily located along the elevated ground that border the outflow canal from the pump station. A few water oaks are found along the floodside toe of the levee, just north of the station.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and impacts to forested wetland resources within the proposed project area would not likely change from current conditions.

Future Conditions with the Proposed Action

With the proposed action, project activities to construct the new levee would directly impact bottomland hardwoods within the proposed project area by removing approximately 12.1 acres of this habitat type. Indirect impacts would be the loss of habitat to area wildlife species. Mitigation for this loss would be achieved by the MVN purchase of mitigation bank credits to mitigate the loss of 10 AAHU's or by planting young bottomland hardwood species on enough acreage to fully mitigate these impacts.

FISHERIES

Existing Conditions

This resource is institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended. Fisheries resources are technically significant because: they are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of various freshwater and marine habitats; and many species are important recreational and commercial resources. Fisheries resources are publicly significant because of the high priority that the public places on their esthetic, recreational, and commercial value.

The J-1 borrow pit is located in an existing fallow agricultural field, thus there are no fisheries within the borrow site. Site visit observations have confirmed that there are some fish in the nearby borrow pond. Aquatic organisms within this water body are likely to be crawfish or small fish such as mosquito fish that could have migrated to the area from nearby waterways during flooding caused by excessive rain or tropical storm events.

The marsh and aquatic habitats found between the existing non-Federal levees and Lake Boudreaux contain emergent vegetation and submerged aquatic vegetation which serve as nursery, feeding, and cover habitat for several species of fishes and shellfishes. Resident fishes include the striped mullet, and several species of killifish. These habitats also support many commercially and recreationally important species including red drum, black drum, sheepshead, Atlantic croaker, southern flounder, Gulf menhaden, sand and spotted trout, blue crab, white shrimp, and brown shrimp.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and fisheries resources could decline slightly as the project area marsh is lost.

Future Conditions with the Proposed Action

With the proposed action, direct impacts to fisheries resources within the ROW for the new levee construction and the marsh berm include displacement of fisheries from these areas, potential mortality for some species, and the loss of existing marsh and aquatic habitat. Earthen material utilized for the levee construction and the dredged slurry pumped marsh berm would cover sessile (stationary) species and slow moving aquatic invertebrates, potentially causing mortality for these

species. Project activities would displace the existing aquatic habitat and most fisheries within the project area.

The adverse impacts of the proposed project action would be off-set by the creation of new wetland habitats through dedicated dredging. The newly created marsh berm would provide valuable habitat diversity for foraging, breeding, spawning, and cover for various life stages of fish species. Nutrients and detritus would be added to the existing food web, providing a positive benefit to local area fisheries.

Excessive rainfall, runoff, or storm events that would flood the excavated J-1 pit may also overtop banks of nearby water bodies and flood the surrounding areas. During periods of high water, small fish and crawfish from nearby waterways could potentially follow the floodwaters into the newly created borrow pond. As floodwaters recede, some fisheries would be expected to remain within the new pond. Various marsh species are expected to colonize the pond edges, creating a fringe marsh that would provide habitat for these species.

ESSENTIAL FISH HABITAT

Existing Conditions

This resource is institutionally important because of the Magnuson-Stevens Fishery Conservation and Management Act of 1996. Essential Fish Habitat (EFH) is technically important because, as stated by the Act, EFH are "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." EFH is publicly important because of the high value that the public places on the seafood, recreational, and commercial opportunities EFH provides. The floodside marsh and waters within the proposed project area does contain various types of EFH within the associated substrates (mud, sand, and associated biological communities) and adjacent inter-tidal vegetation (marshes).

Currently, the J-1 borrow site is in a fallow, non-wet agricultural field and the Susie Canal Cutoff is landlocked terrestrial habitat. Thus, no EFH is found within these areas. EFH has been designated throughout the project area. All intertidal-influenced and tidally-connected intermediate and brackish marsh has been included in the acreage designated as EFH. Approximately 59 acres of EFH have been identified within the ROW for the proposed levee construction (Table 3). Additionally, 74.1 acres of EFH would be impacted as a result of the proposed project feature to provide mitigation.

Table 3. EFH within the project area.*

	Suzie 9.5’ set forward Non-Cutoff Levee	Orange Street 9.5’ set forward Levee	Mitigation Area
Estuarine emergent wetlands	19.2	25.7	1
Submerged aquatic vegetation	0.7		
Open water	2.0	11.4	73.1
Total	21.9	37.1	74.1

* Due to tidal connection, an understory of marsh presently or before the 2008 hurricane damages, and low density and diversity of shrubs or trees, scrub-shrub habitat was included under emergent wetlands.

The project site is located in an area that has been identified as essential fish habitat (EFH) for various life stages of federally-managed species, including post-larval and juvenile stages of red drum, brown shrimp, and white shrimp. The EFH requirements vary depending upon species and life stage (Table 4). Categories of EFH in the project area include estuarine emergent wetlands, estuarine water column, submerged aquatic vegetation, and estuarine water bottoms consisting of mud and shell substrate. Detailed information on Federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council (GMFMC), which was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (P.L. 104-297)

Table 4. EFH Requirements for managed species in the proposed project area.

Species	Life Stage	EFH
brown shrimp	post-larvae	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
	juvenile	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
white shrimp	post-larvae	Soft bottom, emergent marsh
	juvenile	Soft bottom, emergent marsh
red drum	larval/ post-larvae	All estuaries planktonic SAV, sand/shell/soft bottom emergent marsh
	juvenile	SAV, sand/shell/soft/hard bottom, emergent marsh

In addition to being designated as EFH for shrimp and drum, the aquatic and marsh habitats within the project area may also provide nursery and foraging habitats for a variety of economically important fish species including Atlantic croaker, striped mullet, Gulf menhaden, and blue crab. These species serve as prey for other fisheries managed under the MSFCMA by the GMFMC (e.g., red drum, black drum, mackerel, snapper, and grouper) and highly migratory species (e.g., billfishes and sharks) managed by the NMFS.

Future Conditions with No Action

With the no action alternative, the proposed project would not be constructed. At the end of 50 years, there would be only 14 acres or marsh designated as EFH remaining within the project area due to loss of wetlands based on forecasting estimates. However, submerged aquatic vegetation is expected to remain and all open water remaining both of which are EFH.

Future Conditions with the Proposed Action

With the proposed action, project activities would directly impact EFH within the floodside marsh and shallow open water areas by the new levee construction. Approximately 59 acres tidal habitat designated as EFH would be filled with earthen material to construct the new levee. Additionally, about 74 acres of shallow open water and submerged aquatic vegetation would be filled to create marsh elevations as mitigation. Also, one acre of existing marsh designated as EFH would be nourished with thin layer disposal of dredged material as part of the mitigation.

A total of approximately 134 total acres of direct impacts to various types of EFH would result from both the levee and marsh mitigation. Additionally, temporary indirect impacts to water column designated as EFH would occur from increased turbidity during levee construction and marsh creation as compensatory mitigation. It is expected that the various types of all EFH impacted would be offset by the mitigation features to create tidal brackish marsh from dedicated dredging. The ability of the created marsh to provide adequate compensation is contingent upon the created elevations from dredged material settling sufficiently to become intertidal and support marsh plant colonization from existing adjacent vegetation. To further enhance the formation of new tidal marsh, the area would be intentionally planted with wiregrass and oyster grass (spacing and density will be determined in the Plans and Specifications). Further, containment dikes would be degraded to +1 foot NAVD88 at three sites along the eastern side of each marsh berm cell. Each of the nine cuts will be 50 feet wide to allow tidal connection. The new marsh habitat would provide adequate compensation for impacts to all types of EFH.

WILDLIFE

Existing Conditions

This resource is institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918. Wildlife is technically significant because: they are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources. Wildlife is publicly significant because of the high priority that the public places on their esthetic, recreational, and commercial value.

The areas within and adjacent to the proposed levee project provide important habitat opportunities for several species of wildlife, including waterfowl, wading birds, shorebirds, mammals, reptiles and amphibians. The coastal marshes provide wintering habitat for migratory ducks and geese. The resident mottled duck, which nests in fresh to brackish marshes along the coast, is found throughout the year within project area marshes. Besides migratory waterfowl, other game birds which occur within the area include rails, coots, and snipe. Several species of wading birds including of herons, egrets, and ibis utilize the marsh, mud flats, and shallow water habitats within the project area. The mudflats and shallow-water areas also attract a wide variety of shorebirds (killdeer, avocet, stilt, dowitchers, snipe, and sandpipers), while seabirds such as pelicans, gulls, and terns are found more often in deeper water areas. Other common bird species that can be found within the project areas include songbirds, raptors, kingfisher, and numerous seasonal neo-tropical migrants. Commercially and economically important wildlife species that occur or may occur within the project area include nutria, muskrat, mink, raccoon, and the American alligator. Other wildlife species known to have occurred within the project area include white-tailed deer, feral hogs, and rabbits.

The J-1 borrow site is located in an open fallow agricultural field that has been under pump and drain since the early 1950s. Vegetation found within the area is mostly various grass and weed species; trees and shrubs are found along the edges. In the past it was farmed for sugarcane, and presently it is farmed for hay, used as livestock pasture, and is being actively used as a TLCD borrow pit. Habitat use for wildlife species is limited to open fields, a line of trees along a drainage ditch and shrubs along boundary edges. Wildlife species most likely to utilize the J-1 site include

rabbits, armadillos, rats, mice, snakes, and songbirds. Potentially, coyotes, hawks, and owls would forage through the grass/weed field as predators to many of the aforementioned species.

Future Conditions with No Action

With no action, the proposed project would not be constructed, thus impacts to wildlife resources within the proposed project area would not likely change from current conditions as a result of the proposed project.

Future Conditions with the Proposed Action

With the proposed action, wildlife resources within and adjacent to the proposed project work sites would be directly impacted as approximately 60 acres of terrestrial habitat within the J-1 borrow area would be removed, and approximately 56.1 acres of marsh and scrub-shrub, 12.1 acres of bottomland hardwoods, and 15.0 acres of open water/SAV within the levee alignment for the non-Federal levees would be covered over by the excavated material. If the existing levees contain suitable material, only 30 acres of the J-1 pit would be used. A lesser impact would from the equipment noise and movements that would temporarily displace most wildlife species from the area. However, the loss of habitat and temporary disturbance is not expected to adversely impact the general population of wildlife species within the region since the marsh/scrub-shrub loss would be mitigated by the creation of 74 acres of marsh. Bottomland hardwood mitigation would be achieved by MVN purchase of bottomland hardwood credits from a mitigation bank, or by planting young bottomland hardwood species on enough acres to fully mitigate the impacts.

The proposed action would have indirect beneficial impacts, as the existing grass/weed agricultural fields within the area of the J-1 pit is expected to become a 60-acre borrow pond with a thin fringe of marsh that would provide a greater diversity of habitat for resident and migrant wildlife species.

THREATENED OR ENDANGERED SPECIES

Existing Conditions

This resource is institutionally significant because of: the Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940. Threatened or endangered species are technically significant because the status of such species provides an indication of the overall health of an ecosystem. These species are publicly significant because of the desire of the public to protect them and their habitats. Coordination with the U.S. Fish and Wildlife Service, Lafayette office, is currently on-going.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and there would be no impacts to threatened and endangered species, or their critical habitat.

Future Conditions with the Proposed Action

With the proposed action, there would be no impacts to threatened and endangered species, or their critical habitat.

SOCIOECONOMIC (Transportation)

Existing Conditions

The transportation sector is an important component of the economy impacting development and the welfare of populations. Transportation also carries an important social and environmental load, which cannot be neglected. The economic impacts of transportation can be direct and indirect: Direct impacts can include wear and/or damage of existing roadways, road debris from project vehicles, and change in accessibility for public and commercial traffic. Indirect impacts can include travel time and safety related issues. At the present time, the local roads and state highways do not have any traffic associated with the proposed project.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and impacts to area transportation and associated roadways would not likely change from current conditions.

Future Conditions with the Proposed Action

The recommended haul route is approximately 20 miles, and starts with the loaded haul truck at the J-1 borrow site. Upon leaving the borrow site, the route follows Aragon Road south to LA Hwy 58, then follows LA Hwy 58 west to LA Hwy 56. From there, the route follows LA Hwy 56 north to Woodlawn Ranch Road, then follows Woodlawn Ranch Road west to LA Hwy 57, then south along LA Hwy 57 to the project site. Aragon Road, Woodlawn Ranch Road, and Louisiana State Highways 56 and 57 are all two lane paved roads linking business, residents and farms of rural Terrebonne Parish with each other and to the larger business community of Houma. The state highways currently have a weight restriction of 80,000 pounds (40 tons). In addition, the haul trucks would have to utilize bridges to cross over waterways along the proposed haul routes, including bridges having a maximum weight restriction of 40,000 pounds (20 tons). Thus, the project specifications would include stipulations that the Contractor would comply with all federal and state permits and regulations for the transportation of all materials and equipment required for the proposed project action.

With the proposed action, haul trucks would utilize the public roadways previously noted to transport the material to the levees. Potential direct impacts to area transportation include increased traffic, associated access constraints, wear on the roads, and road debris (mud/dirt) falling from the trucks. These impacts could then potentially result in indirect impacts such as delays in travel time along the roadways, and traffic safety issues for public vehicles. Although the direct impacts of increased construction traffic and the associated delays in travel and access would most likely occur, the project action would not obstruct public access to area roadways, but rather would pose a temporary inconvenience to the public. The TPCG would be responsible for damages to roads, highways, bridges and other access routes, except for damages caused by unauthorized use of off-road vehicles.

Local street and lanes would be used by haul trucks and other construction related vehicles to access the levee sites from Highway 57. Access to the Suzie Canal reach would be via a private driveway and Georgi Girl Lane. Access to the Orange Street reach would be via Panda Lane and Orange Street. These streets would be very busy during construction and local traffic could be disrupted.

CULTURAL RESOURCES

Existing Conditions

This resource is institutionally significant because of: the National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979; as well as other statutes. Cultural resources are technically significant because of: their association or linkage to past events, to historically important persons, and to design and/or construction values; and for their ability to yield important information about prehistory and history. Cultural resources are publicly significant because preservation groups and private individuals support their protection, restoration, enhancement, or recovery.

Prehistory: the earliest evidence of human habitation in Louisiana dates to the Paleo-Indian period, which starts approximately 14,000 years BP (before present). There are no sites of this age in or near the proposed project area. The earliest sites near the project area date to the Poverty Point period (3500 to 2500 BP), which is named for the type of site located in northeast Louisiana. The Poverty Point site is known for its massive earthworks and its wide spread trade network. Important artifacts include baked clay balls, elaborate lapidary and microlith industries, the use of steatite vessels, and the importation and use of exotic non-local stone. Two sites in the area date to the Poverty Point period, Bois d'Arc No. 1 and Bois d'Arc No. 2. Both sites have been impacted by dredging. The next time period represented near the project area is the Tchefuncte period (2500 BP to 2000 BP). At this time there emerges the first occurrence of pottery in Louisiana. Three sites with Tchefuncte occupations are located in the marshes in western Terrebonne Parish. The Marksville Period (200 AD 400 AD) is seen as the local manifestation of the Hopewell tradition of the Ohio Valley. This time period is recognized by diagnostic pottery types, conical burial mounds and the importation of exotic raw materials. Substantial evidence for the Marksville period has been found in the Terrebonne marsh.

Following the Marksville period, there is an ill defined interval known as the Baytown Period or often as the Troyville period (400 AD to 700 AD). In south Louisiana the area of influence starts to shift away from the Mississippi Valley to the northern Gulf Coast. Very few sites dating to this time period have been investigated within or near the proposed project area. The following Coles Creek Period (700 AD to 1000 AD) is marked to changes in ceramic frequencies and to a lesser extent by the appearance of new types or varieties and the disappearance of others. Settlement patterns are not well understood at this time. There is a general sense that populations were organized into a relatively loosely arranged hierarch of site types. The best defined model comes from the Terrebonne marsh area. The transition from the Coles Creek Period to the Plaquemines period (1000 AD) is not well defined in the lower Mississippi Valley. The emergence of the Plaquemine came not from an intrusion of Mississippian period elements, as has been previously thought, but rather from a slow in situ series of changes in local cultures across the Mississippi Valley and the Gulf Coast. In recognition of the gradual pattern in the region archaeologist have adopted the term Transitional Coles Creek/Plaquemine to identify this interval.

The Mississippian Period is marked by the appearance of emergent Mississippian culture in the northern part of the Lower Mississippi Valley and throughout much of the interior Southeast. Mississippian culture characteristics did not penetrate into much of the central Lower Valley until

after 1200 AD. These identifiers are shell tempered ceramics, maize agriculture and the construction of large centers constructed around temple mounds with well defined plaza areas.

Historic Period: there is little documented presence of Native Americans during the era of European contact and settlement. However by 1840, the Houma Indians were well established in several locations within Terrebonne Parish, including in the vicinity of the towns of Houma and on lower Bayou Terrebonne. Because of the unsuitability of the area for agriculture, Terrebonne Parish remained sparsely settled until 1765, when several Acadian families settled in the area. The area continued to be sparsely populated until after 1785 when about 1,500 Acadians immigrants came to Louisiana via France. During the Antebellum period, the area continued to be sparsely populated by European settlers. There were some increases, most notably in the slave population, which totaled over 50 % of the population in the 1840's census. This was due to the amount of man-power necessary to produce sugar cane, the main crop at that time.

During the War Between the States, there was very little military activity in the Terrebonne area. Although the there was little devastation during the war the economic structure of the sugar industry was thrown into chaos. Eventually African-American wage laborers became the predominant workforce in the sugar growing and processing regions. After the war the lower channel of Bayou Terrebonne filled in preventing steamboat navigation. This caused the dredging of Bayou Terrebonne which started in 1881. A new canal between Bayou Lafourche and Bayou Terrebonne was constructed in the early 1880's, allowing steam navigation from New Orleans to Houma. The overall population of Terrebonne Parish grew almost 50% between 1860 and 1900. Most of this population growth was a reflection of white immigration into the area, as African-American population dropped below 50%.

Future Conditions with No Action

The No Action Alternative would have no affect on historic properties.

Future Conditions with the Proposed Action

Implementation of the proposed action would have no affect on historic properties. A letter form the MVN requesting concurrence with this determination was sent to the State Historic Preservation Officer (SHPO) on September 25, 2008. The SHPO concurred with this determination by fax stamped dated October 20, 2008.

RECREATIONAL RESOURCES

Existing Conditions

This resource is institutionally important because of the Federal Water Project Recreation Act of 1965, as amended and the Land and Water Conservation Fund Act of 1965, as amended. Recreational resources are technically important because of the high economic value of these recreational activities and their contribution to local, state, and national economies. Recreational resources are publicly important because of the high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana, and the large per-capita number of recreational boat registrations in Louisiana.

The J-1 borrow area is located within TLCD property, and public access is restricted. In accordance to Parish Ordinance #7307, Section IIIA, Statement of Policy, "The public is prohibited from use of the drainage levees, levee right of way, the collection canals and the borrow pits". Therefore, public access to the existing levees is not allowed. The adjacent marsh and open waters are accessible by boat, but there are no boat launches along Lake Boudreaux. Access to the lake is provided by boat launches along Highway 57 in Dulac, Louisiana, and along Highway 56 south of Chauvin, Louisiana both well outside of the project area.

Future Conditions with No Action

With no action, the continued overtopping of levee sections would threaten recreational infrastructure on the protected side of the levee. A levee overtopping would cause damage to local property, and would adversely impact recreational resources in the surrounding area. People who have camps, boat docks, marinas in the area would suffer some degree of property loss. In the future, fisheries resources could decline slightly as the project area marsh is lost, thereby affecting fishing opportunities.

Future Conditions with the Proposed Action

With implementation of the proposed action, increased traffic due to the haul trucks transporting the material to the levees may temporarily inconvenience the general public access to recreational areas along the recommended haul route. Project activities to rehabilitate the levees would expand the existing levee into the floodside marsh and waters, thus cause a loss of 56.1 acres of marsh and scrub and impact wildlife and fisheries. The habitat loss and impacts to wildlife and fisheries then indirectly impacts the recreational opportunities associated with these species. The mitigation feature to create new marsh habitat would displace approximately 74 acres of existing open water and any recreational opportunities provided. The new marsh would attract many of these species to the area, thus provide new recreational opportunities. Noise and disturbance by the presence of the construction equipment would also disrupt most recreational activities (mainly fishing and hunting) occurring within the area of work, and haul trucks transporting the material from the borrow area to the levee would cause a minor inconvenience for the public accessing the project area.

The negative impacts to recreational opportunities associated with the proposed project would mostly be a temporary disruption for the public. In addition, the mitigation phase of the proposed project would create new marsh habitats which are expected to attract various wildlife and fisheries, which then provide associated recreational opportunities for the public. Since the proposed project does not provide additional flood protection, recreational resources could be impacted as described in Future Conditions with No action above.

AESTHETIC (VISUAL) RESOURCES

Existing Conditions

This resource's institutional importance is derived from laws and policies that affect visual resources, most notably the 1969 National Environmental Policy Act. The 1988 U.S. Army Corps of Engineers Visual Resources Assessment Procedure provides a technical basis for identifying project impacts. Public importance is based on public perceptions and professional analysis of the projects visual impacts. The area within the J-1 borrow pit is located within TLCD property, and

public access is restricted. By Parish law, public access to the non-Federal levees is prohibited. Access to the floodside marsh and water areas is only available by boat.

Visually, the landscape within the area of the proposed levee improvements project is dominated by residential development protected by flood control measures that includes earthen levees, drainage canals and pumping stations. Also prevalent within the project area are maritime related industry and residential development occasionally broken up by undeveloped land. Viewpoints into the project area's natural landscape highlight coastal marsh, low lying natural levees, and small ponds and bayous. Then natural landscape is contrasted by unnaturally straight channels and related spoil banks, cutting through the coastal marsh. These were most likely caused by navigation for petroleum, fisheries or other related resources

Future Conditions with No Action

With the no action alternative, visual resources would either evolve from existing conditions in a natural process, or change as dictated by future Terrebonne Parish Levee or other land-use maintenance practices. Regardless of what the future holds for the project area, visual access to the proposed project sites is minimal, as the J-1 borrow area is inaccessible and the non-Federal levees are visually remote.

Future Conditions with the Proposed Action

With implementation of the proposed action, the negative impacts to visual resources would be minimal, as public access to the project areas is restricted or prohibited by law. Visually, the vast majority of the footprint of disturbance necessary to rehabilitate the existing non-Federal levees is in areas where risk reduction measures, navigation-related channel improvements, and other civil works projects exist. The proposed levee improvements and borrow project areas are remote and visually inaccessible to most. Therefore, the direct and indirect impacts to visual resources are insignificant. Cumulatively, the visual impacts caused by risk reduction measures throughout Coastal Louisiana and nationwide could be considered significant. Flood prone natural landscapes protected by levees similar to those to be generated by the proposed action may be increasingly converted to developable land.

AIR QUALITY

Existing Conditions

This resource is considered institutionally important because of the Louisiana Environmental Quality Act of 1983, as amended, and the Clean Air Act of 1963, as amended. Air quality is technically important because of the status of regional ambient air quality in relation to the National Ambient Air Quality Standards (NAAQS). It is publicly important because of the desire for clean air expressed by virtually all citizens. Terrebonne Parish is currently in attainment of all NAAQS, and operating under attainment status for the 8-hour ozone NAAQS, as per the Environmental Protection Agency's criteria for pollutant standards.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and the status of attainment of air quality for Terrebonne Parish would not change from current conditions.

Future Conditions with the Proposed Action

With the proposed action, the project activities are expected to have only minimal impacts to air quality, as the equipment to be used is estimated to produce less than 10 tons of volatile organic compound (VOC) and nitrogen oxide (NO_X) emissions. Therefore, the status of attainment for Terrebonne Parish would not be altered.

HAZARDOUS TOXIC AND RADIOACTIVE WASTE

The MVN is obligated under Engineer Regulation (ER) 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of the proposed action. ER 1165-2-132 identifies our HTRW policy to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation of wastes (e.g., Resource Conservation and Recovery Act [RCRA] regulated), pollutants and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), would be treated as project costs if the requirement is the result of a validly promulgated Federal, state or local regulation.

The Environmental Assessment Team performed an ASTME 1527-05 Phase I Environmental Site Assessment (ESA) of the proposed project area, in conformance with the scope and limitations of ASTM E 1527. The ESA report titled "*Terrebonne Parish Non-Federal Levee System Repairs, Replacements, Modifications, and Improvements, Terrebonne Parish, Louisiana (Susie Canal Levee, Orange Street Levee, and J-1 Borrow Pit)*" was completed on November 7, 2008. A copy of the report would be maintained on file at MVN. The ESA documented the Recognized Environmental Conditions (REC) for the project area. No RECs were found to be in the area of the proposed levee project or the J-1 borrow area.

The assessment has revealed four potential environmental conditions within this project area. However before tanks, structures, or large piles of debris are moved or demolished, they should be investigated for hazardous materials, such as lead-based paint, asbestos, petroleum containers and anything else that may be viewed as a concern.

1. Several gas stations within one-half mile of the project area. These gas stations are assumed to have underground storage tanks (USTs) in unknown condition. One abandoned gas station has maintained above ground storage tanks (ASTs).

2. Numerous abandoned homes within the residential vicinity of the site. Closer inspection would be necessary to indicate whether these sites contained lead paints and/or asbestos.

3. Vast amounts of debris are found throughout the area. The majority of the debris is construction material. Debris has washed up in many areas alongside the levee.

4. Temporary hurricane debris dumping site which contains huge mounds of debris and large construction equipment.

The local area has much debris and destruction due to past hurricanes and tropical storms. However, the majority of the problems are on the mainland and not in direct contact with the levees. The issues are small and removed from the project area. The debris washed up along the levee does

not present a significant risk to the area. It is the USACE MVN-ED Environmental Assessment Team's recommendation that no further investigation for environmental contamination be required in the area. In the event of an unplanned discovery of HTRW materials during construction, all work on the project would be stopped, and appropriate notification and coordination with the TPCG would be completed. Investigations would be conducted by the TPCG to characterize the nature and extent of the contamination and establish appropriate resolution. Should the project area change, additional HTRW investigations may required.

CUMULATIVE IMPACTS

NEPA defines cumulative effects as "The impact on the environment which results from the combined and incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). There has been no appreciable deltaic development in the Terrebonne Basin for the past 500 years. Data for the Terrebonne Basin (over 1 million acres), which includes the study area, shows that land was lost from 1956-1978 at a rate approximately 0.8 percent per year. From 1978-1990, the land loss rate was 1.2 percent per year (Reed et al. 1995). These losses occurred from a variety of reasons, including subsidence, erosion, sea level change, oil and gas development, navigation channels, etc. Such land losses are predicted to continue with or without the proposed project.

The proposed action involves the expansion of an existing levee alignment, and is not anticipated to have significant adverse cumulative impacts, but would produce only minor impacts on the resources addressed in this report. The loss of impacted acreage on the unprotected floodside side of the levee is considered minimal due to the extent of comparable habitat in the immediate project area. To mitigate for intermediate/brackish marsh and scrub-shrub impacts, the proposed project would create new marsh habitat extending outward from the toe of the completed levee in areas of open water. These emergent wetlands would provide protection to the new levee while producing valuable EFH. The proposed project would mitigate for bottomland hardwoods either by the purchase of mitigation bank credits or by planting young bottomland hardwood species on enough acreage to fully mitigate the impacts.

The potential exists for an increase in development of any wetland areas on the protected inside area of the levee system. However, impacts to these wetlands are under the jurisdictional regulations of the federal, state, and local natural resource agencies. Operations associated with project construction would produce localized and temporary impacts to air and water quality, and would be addressed by utilizing best management practices. Upon cessation of operations, these conditions would return to pre-project conditions. Therefore, no significant cumulative air/water quality impacts are expected.

The TPCG has a Feasibility Study that prioritizes future levee work (TPCD, 2006). They plan to raise 29.2 miles in nine levee reaches in the next 6-24 months. Within 25-60 months they plan to build three water control structures and raise 30.6 miles in 5 levee reaches. Five unmeasured levee reaches and 34.3 miles of six levee reaches would be built within 61 to 120 months. The USACE has been authorized by Congress to build the Morganza to the Gulf Hurricane Protection Project. One possible alignment of the project includes raising most of the NFLs in the area. The project

costs have risen significantly and the project may need to be reauthorized by Congress. There is no final NEPA analysis of the Morganza to the Gulf project at this time.

A report written by the Morganza-to-the-Gulf Technical Review Panel, formed by the Louisiana Coastal Protection and Restoration Authority in early 2008 to review the alignment of the Morganza to the Gulf hurricane protection system was released in early December 2008. The Technical Review Panel recommends significant investment be made by the state into building Morganza-to-the-Gulf along its current alignment, which utilizes existing parish levees and other structures such as road beds to minimize impacts on coastal wetlands. Recognizing the immediate need for hurricane protection for the area, the technical committee's report recommends the building of a minimum standard of protection throughout the system and then continuing to raise levee heights to meet new Corps requirements over the coming years.

Under the Fourth Supplemental, the Federal Government has been authorized to spend $90M to repair, replace, modify and improve the Federal LaRose to Golden Meadow Hurricane Protection levee system which is adjacent to the project area.

COORDINATION

Preparation of this EA and a draft Finding of No Significant Impact (FONSI) has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, are receiving copies of this EA and draft FONSI:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality, PER-REGC
Louisiana Department of Environmental Quality, EP-SIP
Louisiana State Historic Preservation Officer
Terrebonne Parish Levee Board District

Coordination is still on-going with the U.S. Fish and Wildlife Service in accordance with the Fish and Wildlife Coordination Act.

MITIGATION

After the levee work is completed, the second phase of the proposed project is to mitigate for unavoidable impacts to wetland habitats. The project would create brackish marsh as mitigation for the loss of the fresh, intermediate and brackish marsh and scrub-shrub with a marsh understory caused by the project action. Mitigation for bottomland hardwoods would be achieved by the MVN

purchase of mitigation bank credits or by planting young bottomland hardwood species on enough acreage to fully mitigate the impacts.

The Wetland Value Assessment Model was used to determine the amount of mitigation needed. The results of the model are expressed in Average Annual Habitat Units (AAHU's) which are a combination of the habitat value to fish and wildlife and acreage. At the Orange Street Reach, 6.8 AAHU's would be lost. On the Susie Canal Floodside, 11.1 AAHU's would be lost and in the Susie Canal Cutoff, 0.5 AAHU's. Thus, at total of 18.4 AAHU's would be destroyed by the levee work. It was determined that 74 acres of new marsh would provide 19.3 AAHU's and thus mitigate for the loss. This marsh would be created in open water adjacent to the Orange Street levee as previously described in this report, on page EA-4. A monitoring plan will be developed so the TLCD and the TPCG can verify the success of the mitigation. A total of approximately 10 AAHU of bottomland hardwoods would be lost due to the proposed action, but these unavoidable losses would be mitigated.

COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Disposal of fill material into waters or wetlands requires an evaluation under Section 404(b)1 of the Clean Water Act (CWA). A Section 404(b)1 evaluation has been prepared for the proposed project, and will be signed before work begins. A Public Notice was mailed out on December 12, 2008. In addition, a state water quality certification application under CWA Section 401 was submitted to the State of Louisiana, Department of Environmental Quality (LADEQ) on October 27, 2008. The proposed action is located within the Louisiana Coastal Zone, and the MVN considers that the proposed action is consistent, to the maximum extent practicable, with the state program. A letter requesting concurrence with this determination was mailed to the Louisiana Department of Natural Resources, Coastal Management Division on October 27, 2008. Implementation of the proposed action would have no affect on historic properties. The SHPO concurred with this determination by fax stamped dated October 20, 2008.

Environmental compliance for the proposed action would be achieved upon: coordination of this EA and draft Finding of No Significant Impact (FONSI) with appropriate agencies, organizations, and individuals for their review and comments; National Marine Fisheries Services confirmation that the proposed action would not be likely to adversely affect any endangered or threatened species or essential fish habitat; Louisiana Department of Natural Resources concurrence with the determination that the proposed action is consistent, to the maximum extent practicable, with the state program; signature of the Section 404(b)(1) Evaluation; receipt and acceptance or resolution of all USFWS Fish and Wildlife Coordination Act recommendations; receipt and acceptance or resolution of all LADEQ comments on the air quality impact analysis documented in the EA. The draft FONSI would not be signed until the proposed action achieves environmental compliance with applicable laws and regulations, as described above.

CONCLUSION

This office has assessed the environmental impacts of the proposed action, and has determined that the proposed action would have no impact upon cultural resources, and once mitigated, no significant impact on water bodies, marsh, fisheries, EFH, wildlife, bottomland hardwoods,

endangered or threatened species, public recreation, aesthetics, or air quality. The proposed action consists of repairing, replacing, modifying and improving approximately 6.1 miles of a non-federal levee near Dulac, Terrebonne Parish, Louisiana utilizing material from 60-acres of an offsite borrow area located near Montegut, Terrebonne Parish, Louisiana if the existing levee material is not suitable under the new Corps of engineers specifications. If the levee soil is suitable, then only 30 acres of offsite borrow would be needed. Five no-work zones have been designated around four pipeline crossings, Bayou Butler and the DO-08 Pumping Station. The United States will bear no responsibility for addressing protection in these no-work zones. The risk of encountering HTRW on this project is low. Mitigation of unavoidable impacts to marsh and scrub-shrub with a marsh understory would be achieved through the creation of 74 acres of new marsh habitat in open water areas adjacent to the newly constructed levee. Mitigation for bottomland hardwoods would be achieved by either MVN purchase of mitigation bank credits, or by planting young bottomland hardwood species on enough acreage to fully mitigate the impacts.

PREPARED BY

EA #450 and the associated draft FONSI were prepared by Alan Bennett, Biologist, and Sue Hawes, Biologist, in cooperation with Tyler Ortego, Matthew Sevier and Gary Jacob of SHAW Coastal Inc. Relevant sections prepared by: Christopher Brown (HTRW), Gary DeMarcay (Cultural Resources), Andrew Perez (Recreational Resources), and Richard Radford (Aesthetics Resources).

The address of the preparers is: U.S. Army Corps of Engineers, New Orleans District; Planning, Programs, and Project Management Division, Environmental Compliance Branch, CEMVN-PM-R; P.O. Box 60267; New Orleans, Louisiana 70160-0267.

LITERATURE CITED

Boesch, D.F., M.N. Josselyn, A.J. Mehta, J.T. Morris, W.K. Nuttle, C.A. Simenstad, D.J.P Swift. 1994. *Scientific assessment of coastal wetland loss, restoration and management in Louisiana*. Journal of Coastal Research. Special Issue No. 20.

Gosselink, J.G. 1984. *The ecology of delta marshes of coastal Louisiana: a community profile*. FWS/OBS-84/09. U.S. Fish and Wildlife Service, Washington, D.C.

Reed, D.J., E.M. Swenson, and J.G. Gosselink. 1995. Physical Setting. D.J. Reed (ed.) pp. 9-23 in: *Current Status and Historical Trends of Hydrological Modification, Reduction in the Sediment Availability, and Habitat Loss/Modification in the Barataria-Terrebonne Estuarine System*. BTNEP No. 20. Barataria Terrebonne National Estuary Program, Thibodaux, LA.

Terrebonne Parish Consolidated Government, 2006. *Feasibility Study for Levee Enhancement Projects, Terrebonne Parish, Louisiana.*

U.S. Department of Agriculture, Soil Conservation Service. 2007. *Soil Survey of Terrebonne Parish, Louisiana*.

ENVIRONMENTAL ASSESSMENT

Terrebonne Parish Non-Federal Levee System
Repairs, Replacements, Modifications, and Improvements
Terrebonne Parish, Louisiana

EA #450

INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (MVN), has prepared this Environmental Assessment #450 (EA #450) to evaluate the potential impacts associated with the proposed repairs, replacements, modifications, and improvements of about 6.1 miles of non-Federal levees (NFL) in Terrebonne Parish, Louisiana (Figure 1). EA #450 has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2. The following sections include a discussion of the purpose and need for the proposed action, the authority for the proposed action, alternatives to the proposed action, important resources affected by the proposed action, and associated impacts of the proposed action.

PURPOSE AND NEED FOR THE PROPOSED ACTION

Terrebonne Parish, Louisiana contains approximately 100 miles of NFL which are associated with the parish forced drainage system. In late September of 2005, Hurricane Rita brought catastrophic tidal inundation from its storm surge to the communities of Terrebonne Parish . The storm surge and the resultant flooding overtopped and in some instances severely damaged existing NFL systems, causing millions of dollars in property damage. Hurricanes Gustav and Ike in 2008 also caused damage to the Terrebonne NFL system. Certain sections of the existing parish levee system are inadequate to provide future hurricane and storm damage risk reduction protection. This condition exposes residents and businesses in several parish communities and the hurricane evacuation routes, Louisiana Highways 56 and 57, to a higher potential for flooding in the event of a tropical storm or hurricane. The purpose of the proposed action is to repair, replace, modify and improve 6.1 miles of the NFL that were damaged by the storm surge. The work would be done with the appropriated monies made available by Congress, but would not federalize the existing levee systems, nor provide 100-year level of protection. The Federal improvements alone would not provide any additional flood protection since they will not result in a closed system. However, it would advance non-Federal plans for improved flood damage reduction measures.

AUTHORITY FOR THE PROPOSED ACTION

The proposed project is authorized under the Emergency Supplemental Appropriations Act for Defense and the Hurricane Recovery of 2006 (Public Law 109-234, Title II, Chapter 3, Flood Control and Coastal Emergencies). Generally, Public Law 109-234 provides funding "…for the necessary expenses relating to the consequences of Hurricane Katrina and other hurricanes." The public law included provisions for Terrebonne Parish, specifically $30 million in funding "…for repairs, replacements, modifications and improvements of non-Federal levees and associated protection measures in Terrebonne Parish at full Federal expense."

PRIOR REPORTS

The proposed levee construction project in Terrebonne Parish and assessed in this EA have no prior federal documentation for NEPA. The environmental impacts of utilizing earthen material from the J-1 borrow area was assessed in EA #406, "*Morganza, Louisiana to the Gulf of Mexico, Hurricane Protection Levee, Reach J, Segment 1, Terrebonne Parish, Louisiana*", with a Finding of No Significant Impacts (FONSI) signed on July 29, 2005. In 2006, TPCG prepared a Feasibility Study For Levee Enhancements in Terrebonne Parish (TPCG, 2006). In it they prioritized levee work for the next 120 months.

PUBLIC CONCERNS

The existing non-Federal levee system within Terrebonne Parish has been severely damaged in the aftermath of Hurricane Rita. Widespread public support exists within the parish to restore and improve the existing non-Federal levee system and the risk reduction provided. The public is also concerned about the continuing severe loss of coastal wetlands in Louisiana, especially because these wetlands can reduce storm surge.

DESCRIPTIONS OF THE PROPOSED ACTION

The MVN proposes to repair, replace, modify and improve approximately 32,500 linear feet (6.1 miles) of existing levee near Dulac, Terrebonne Parish, LA approximately 8.5 miles south of Houma, LA (Figure 1). The existing levee was built and is maintained by the Terrebonne Parish Consolidated Government (TPCG) and has never been the subject of Federal action. The existing levee is divided into two reaches, known as the Suzie Canal reach and the Orange Street reach. The existing Suzie Canal reach starts approximately 100 feet north of the Bobtown Bridge and follows in a southerly direction until approximately 100 feet north of the Combon Bridge (Figure 2). The existing Orange St. reach starts approximately 50 feet north of the Combon Bridge and follows in a southerly direction until it intersects with end of Orange St. (Figure 3). The existing levee continues south past Orange Street, however the segment south of Orange Street is not in need of repair, replacement, modification or improvement and is not included in this project.

This Suzie Canal portion of this project follows the existing alignment in a southerly direction before reaching a pipeline canal (Figure 2). From this pipeline canal, the project alignment follows a new route, the "Suzie Canal Cutoff", before intersecting the existing alignment. A borrow canal would also be constructed along the protected side of the "Suzie Canal Cutoff". The portion of the existing alignment that is cutoff would be left in place, and an access method would be provided by TPCG to the property owner. The project alignment then follows the existing alignment until reaching Bayou Butler. The "Bayou Butler no-work" zone separates the two project segments (Figures 2 and 3). The Orange Street portion of this project begins at the "Bayou Butler no-work zone" and follows the existing alignment in a southerly direction until reaching the end of Orange Street (Figure 3). The Suzie Canal reach would be offset forward approximately 70 feet floodside from the centerline of the existing levee to the centerline of the proposed levee, requiring approximately 95 feet of additional right-of-way (ROW). The Orange Street reach would be offset forward approximately 85 feet floodside from the centerline of the existing levee to the centerline of the proposed levee, requiring approximately 111 feet of additional ROW.

Approximately 969,000 cubic yards of clay material would be required for the proposed levee project. If the material in the existing levee

meets new COE criteria for levee soils, half the borrow (485,000) would be obtained there. The rest would be obtained from 30 acres of the J-1 borrow area, a 100-acre, partially excavated site, owned by the Terrebonne Levee and Conservation District (TLCD), located off Aragon Road and adjacent to Bayou la Cache, near Montegut, LA (Figure 1). If material in the existing levee is not suitable, all material would come from the J-1 site.

Both the Susie Canal and Orange Street levees would be raised to approximately +9.5 feet North American Vertical Datum 88 (NAVD88), with an approximately 10-foot wide crown and side slopes of 1-foot vertical on 3-feet horizontal (1V:3H). On the protected side, a stability berm would be retained under the existing levee footprint. The existing levee would be worked into the rehabilitated levee, and the existing borrow/drainage canal expanded.

Where the rehabilitated levee fronts open water (Figure 5), a "berm" would be constructed with the intent to create 74 acres of new marsh substrate as mitigation for unavoidable wetland impacts. Approximately 650,000 cubic yards of material would be hydraulically dredged from Lake Boudreaux and placed into the fill areas at an initial fill elevation expected to settle to a final target elevation of approximately +1.5 to +2.0 feet NAVD88. Containment dikes would be constructed to contain the dredged slurry within the marsh fill areas. The initial fill elevation to achieve the target post-settlement marsh elevation, as well as the geometry of the containment dikes, would be determined during engineering phase and would be specified in the project plans and specifications.

NO-WORK ZONES: Four pipelines intersect the alignment, two essentially adjacent to each other. A drainage siphon, crossing under Bayou Butler connects the existing borrow canals that parallel the levees. A TPCG pump station, known as the D-08 pump station, is located on the Orange Street reach (Figure 3). To avoid impacting these structures, five no-work zones, including "Bayou Butler no-work zone" and "D-08 no-work zone", have been designated around these sites (Figures 2 and 3). The no-work zones range from 200 feet to 600 feet wide. The United States will bear no responsibility in these no-work zones.

ACCESS ROADS: Access to the project vicinity would be from Hwy 57. Access to the Suzie Canal reach would be via a private driveway and Georgi Girl Lane. Access to the Orange Street reach would be via Panda Lane and Orange Street. All four access roads are less than a half of a mile long and all four provide a method of crossing the existing borrow canal. Where the crossings are deemed inadequate, the contractor would have the option of installing a temporary crossing, such as culverts and earthen fill. The contractor would also be given the option of installing a temporary crossing across Bayou Butler. All temporary crossings would be removed upon project completion.

ACCESS ROUTE: Material would be trucked to the site in either 14-20 cubic yard dump trucks or 24-30 cubic yard trailer bed trucks. The recommended haul is approximately 20 miles, and starts with the loaded haul truck at the J-1 borrow site. Upon leaving the borrow site, the route follows Aragon Road south to LA Hwy 58, then follows LA Hwy 58 west to LA Hwy 56. From there, the route follows LA Hwy 56 north to Woodlawn Ranch Road, and then follows Woodlawn Ranch Road west to LA Hwy 57, then south along LA Hwy 57 to the project site.

STAGING AREAS: There are two on site staging areas, the Bobtown Bridge staging area and the Orange Street staging area (Figure 4). The Bob Town Bridge staging area is located in the southwest quadrant of the intersection of the Bobtown Bridge and Hwy 57. The site is currently cleared but undeveloped. The Orange Street staging area is located on either side of Orange Street before it

intersects with the Orange Street levee drainage canal. The Orange Street staging area is also cleared and is occasionally used by TPCG as a staging area for levee repairs.

LEVEE EMBANKMENT: A silt fence would be placed along the proposed levee toe on both the protected and flood sides of the levee to contain runoff material during construction activities. Silt fences would also be utilized to prevent sediments from entering Bayou Butler. Earthen material from the proposed borrow area would be placed onto the levee in multiple lifts and then compacted. Upon completion of the levee rehabilitation, all levee embankments and areas disturbed by the construction activities would be seeded with Bermuda grass, fertilized, and mulched. The "marsh berm" would be planted with marsh species. Silt fences and other temporary features would also be removed.

BORROW AREAS: The 100-acre J-1 borrow site assessed in EA #406 was partially excavated in support of construction of a 2.7 mile reach of levee commonly referred to as Reach J-1. This levee could become a part of the larger Morganza to the Gulf federal project. The proposed project would utilize at maximum approximately 60 acres of the previously unexcavated portion of the site. If sufficient suitable materials are available in the existing Terrebonne non-Federal levees at the project site, then it is anticipated that approximately 30 acres of the previously unexcavated portion of the J-1 borrow site would be used for the subject project.

The area would be cleared and grubbed prior to excavation, and then excavated to a pit depth of approximately 20 feet with side slopes of 1V:3H. Bulldozers would be utilized to clear the proposed borrow area of trees, scrub brush, other vegetation, and earthen material deemed not suitable for the levee enlargement project. The vegetation and unsuitable earthen material removed would all be temporarily stockpiled on-site. Groundwater seeping into the pit would be pumped out into adjacent areas. Backhoes would remove the earthen material deemed suitable for the levee project, which would be processed within the borrow pits to reduce the moisture content within the soil. Moisture content processing would be performed by mechanical methods such as utilizing bulldozers to stockpile materials and disks to further reduce the moisture content of the soil. Once the moisture content has been reduced to acceptable levels, haul trucks would be utilized to transport material to the levee. The borrow pit will be excavated in a systematic manner, achieving the -20 foot depth before moving to an adjacent area. A truck wash down station would be utilized at the borrow site to prevent excessive tracking on the roads. In addition, the trucks would be slightly light-loaded and fitted with a covering tarp to prevent loss of material onto the roads.

After all suitable earthen material is removed from the pits, the stockpiled unsuitable material and the vegetation removed during clearing and grubbing would be placed into the pit to provide potential cover habitat for wildlife and fisheries. All construction activities for the proposed project would be contained within the predetermined construction right-of-way.

MITIGATION: After the levee work is completed, the second phase of the project is to create a marsh berm adjacent to portions of the levee as mitigation for the unavoidable loss of marsh caused by the project action. Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

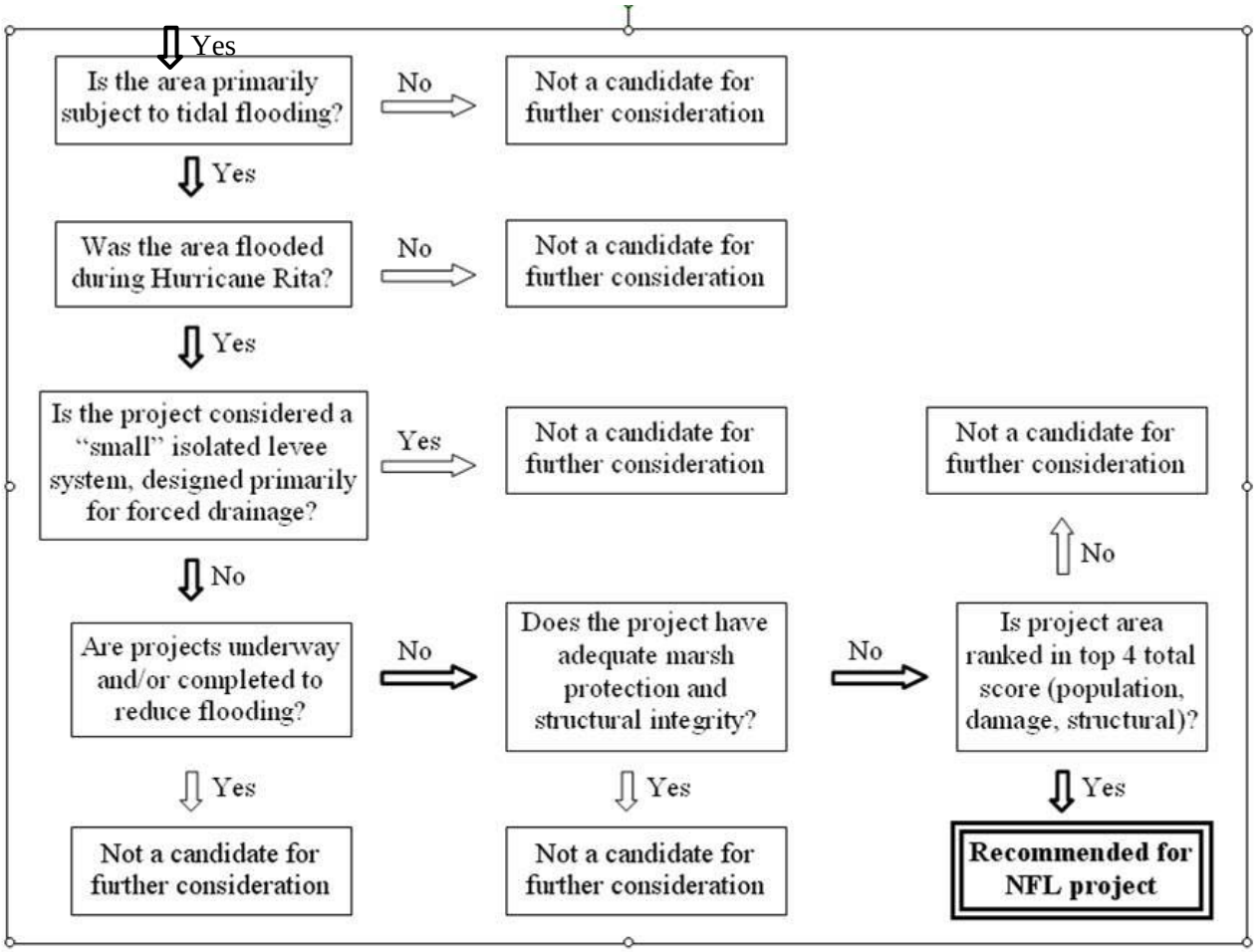
As a means to mitigate for impacts to fresh, intermediate and brackish marsh and scrub shrub, approximately 74 acres of marsh would be created in the open water areas adjacent to the newly constructed levee (Figure 5). Scrub shrub in this area has a significant marsh understory, so is counted as marsh for mitigation purposes.

Approximately 8,675 feet of earthen containment dikes would be constructed with dragline excavators using *in situ* material. The earthen containment dikes would be built to an approximate +4.0 feet NAVD88 elevation, and would tie into the new levee construction to create enclosed fill areas approximately 325 feet to 680 feet out from the toe of the levee. After the containment dikes are constructed, marsh buggy excavators or similar equipment would be used to transport and place the dredge pipelines into the containment areas. The dredge pipelines would be transported through open water areas to avoid impacts to marsh habitat, and be appropriately lighted and marked for navigation safety. Once the containment dikes are constructed and the pipelines are in place, a hydraulic dredge would be used to pump approximately 650,000 cubic yards of material from Lake Boudreaux into the fill areas at heights conducive for the creation of marsh The final settlement height would be between +1.5 and +2.0 feet NAVD88). The dredged slurry would be allowed to settle within the containment areas naturally, or may be artificially dewatered utilizing spill boxes or similar structures placed in the containment dikes. If the dredged slurry is allowed to settle naturally, it is estimated to require 12 to 24 months for the process to occur. When the material is sufficiently settled, it would be planted with marsh species such as wiregrass (*Spartina patens)* and oyster grass (*Spartina alterniflora*). Then if necessary, the earthen containment dikes would be degraded to + 1 foot NAVD88 at three sites along the eastern side of each marsh berm cell. Each of the nine cuts would be 50 feet wide to allow tidal connection. . The local sponsors, TLCD and TPCG would monitor and maintain the marsh berm. A Conservation Easement would be purchased by TPCG over the marsh berm to prevent any development.

ALTERNATIVES TO THE PROPOSED ACTION

There are a total 64 NFL in Terrebonne Parish which cover 100 miles, These NFL are maintained by the TPCG as forced (pumped) drainage areas. The drainage areas may be entirely surrounded by a levee, or in some cases surrounded by a combination of roads and spoil banks. In the aftermath of Hurricane Rita, the 34 tidal levees were overtopped or damaged, while those levees north of the GIWW suffered only minimal damage. With a limit of $30 million in Federal funding available, a selection process was developed. The TPCG used their 2006 Feasibility Study to select the reaches to be built by the Federal Government, as described below. The Government coordinated with the TPCG and accepted their selection recommendation as the proposed action for this EA.

Project Location Selection Process: A process of elimination was compiled to narrow the number of levee systems to be considered for the proposed project, to those areas having the greatest need. The 64 levee systems were prioritized based upon the degree of structural damage to the levee system and resultant property damage from flooding due to Hurricane Rita. The selection process is summarized in Table 1 and is detailed in the paragraphs following.



Is the project considered a "small" isolated levee system, designed primarily for forced drainage?
Yes
Not a candidate for further consideration
Not a candidate for further consideration
No
No
Are projects underway and/or completed to reduce flooding?
No
Does the project have adequate marsh protection and structural integrity?
No
Is project area ranked in top 4 total score (population, damage, structural)?
Yes
Yes
Yes
Not a candidate for further consideration
Not a candidate for further consideration
Recommended for NFL project

Initial Elimination: The 30 levee systems and their protected structures that are located south of GIWW suffered only minimal damage due to Hurricane Rita. As such, these levees were eliminated from further consideration. The remaining 34 levees systems are subjected to tidal flooding and are

considered as "tidal levees". These levees were either damaged or overtopped, and were considered further in the selection process.

Elimination of Drainage Levees: Many of the "tidal levee" systems in the parish serve only to isolate forced drainage areas. The parish considers these to be "drainage levees"; although they provide limited storm surge protection. Under this review, 17 levee systems that were utilized solely for drainage purposes were eliminated from further consideration: Bobtown, Boudreaux Canal, Cane Break, Crozier Drive, Falgout North East, Grand Bois, Highridge, Industrial, LeCompte Lane, Marmande Northeast, Texas Gulf Road, Tina Street, Ashland, Ashland Portable, Woodlawn Pump Station, Sara Road to Presque Isle, and East of Aragon Road systems. This screening step left 17 levee systems for further consideration.

Elimination of systems with recently completed or pending repairs, replacements or improvements: The following systems already being repaired by the Parish were eliminated from further consideration: The Lower Little Caillou Levee (Lower Ward 7-Project 1) was completely rebuilt in 2005 and 2006 following Hurricane Rita. The reconstruction of a portion of the Upper Little Caillou Levee (Upper Ward 7- Project 2) was completed.. After Hurricane Rita, the Natural Resources Conservation Service provided assistance in repairing the Reach 4-8 system. The final reach of the 4-3C system has been constructed to provide a complete ring levee around the community of Isle of Jean Charles, and to offer protection from tidal events. This step eliminated three levees, not including the Upper Ward 7 Project which is further discussed below. Fourteen levees remained for further analysis.

Elimination of systems that may be included in the Morganza to the Gulf of Mexico Federal Hurricane Protection System: The Morganza to the Gulf Levee Alignment would replace several levees that currently provide tidal protection. The 4-3B (Pointe Aux Chene and Middle Pointe Aux Chene) Levee System would be replaced by Reach J of the Morganza to the Gulf of Mexico Hurricane Protection System. The Lower Montegut, Bush Canal, Upper Dularge, and the Reach 8-2C (North Marmande) systems would also be replaced by sections of the Morganza to the Gulf alignment. This step eliminated six systems leaving eight for further consideration. The Morganza to the Gulf Hurricane Protection System would provide for 100-year level of protection and would be included in the Federal levee protection. It is scheduled to begin construction in 2010.

Final Ranking: The structural integrity of the remaining levees was characterized as either "good", "marginal" or by the type of damage to the levee (i.e. no berm, scour, etc). The degree of marsh protection of the flood side of the levees was characterized as either "open water", "broken marsh" or "marsh protection". Those levees with either "good" or "marginal" structural integrity and either "broken marsh" or "marsh protection" were eliminated from consideration. Two (2) levees were eliminated by this analysis. The remaining six levees were then ranked in order to establish a priority for the levee repair, replacement, modification or improvement by the following factors:

a. Total number of structures in the levee area,
b. Total property value in the levee area,
c. 2000 census count for the levee area, and
d. Federal Emergency Management Agency (FEMA) Residential Survey Damage Estimates (RSDE) for the levee area.

Based upon the aforementioned priority factors, four levee systems were selected for further consideration: the Orange Street Levee, the Suzie Canal Levee, the Falgout Canal (Lower Dularge) Levee, and the Upper Little Caillou Levee (Upper Ward 7 Levee-Project 3). The amount of funding

available and the estimated costs for the proposed project (obtain borrow material, construction, and mitigation), would further reduced the consideration to two levee systems.

Final Selection: The Upper Little Caillou Levee (Upper Ward 7 Levee-Project 3) was removed from the final selection, as other non-Federal funding sources were provided to construct this levee system in phases, with the lower phase expected to be completed in December 2007. The upper phase has been permitted and funds are being allocated by the parish and being sought from the state for the repairs. A site visit was conducted by representatives of the MVN and TPCP on June 15, 2007. Upon inspection of the levee systems, it was determined the Orange Street Levee and Suzie Canal Levee suffered the most structural damage, and so should be repaired, replaced, modified or improved prior to the Falgout Canal (Lower Dularge) Levee. As such, the Orange Street Levee and Suzie Canal Levee were selected as the proposed project.

Preliminary Alternative Screening
Once the location of the reaches to be improved were selected, six alternatives were assessed:

For the levee alternatives, two elevations were considered – 8 feet high and 9.6 feet high.

Alternative 1 – No action
Alternative 2 – Non-structural flood control measures/elevation
Alternative 3 – Levee replacement with a T-Wall
Alternative 4 – New levee alignment in marsh – set forward
Alternative 5 – New levee on protected side – set back
Alternative 6 – Straddle alignment

Alternative 1: No Action

With the No-Action alternative, the proposed project would not be implemented by the USACE. Without repair, replacement, modification or improvement, the Orange and Susie Canal Reaches of the NFL would be subject to additional damage and overtopping from future storm events. These levees, in conjunction with the rest of the Terrebonne Parish forced drainage system, function to keep the houses, structures, and roadways from flooding, when non-tropical storm fronts create higher than normal tides in the marsh. These reaches have been seriously damaged by storm events in recent years, and are exposed to further erosion and scouring from future events. No action will not cause any of the discussed environmental impacts and will not require any additional mitigation.

Alternative 2: Non-Structural Flood Protection Measures – Elevation

The non-structural flood protection measure considered for Terrebonne Parish is elevation of homes, businesses, and critical infrastructure. The existing NFL, as designed, provides some protection to houses and allows the roads to remain accessible during some storm events. To provide equivalent protection, the non-structural elevation alternative would require raising all roads and structures that are currently beneath eight feet in elevation. Because non-structural solutions are not endorsed under this authorization and construction costs would easily be in excess of $30 million to just raise the road, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 3: Levee Replacement with a T-wall

This alternative consists of replacing the existing non-Federal levee with an engineered T-wall, using the assumption that the T-wall would follow the existing levee alignment. The proposed flood protection inverted T-wall alternative is composed of a +10 ft NAVD cast-in-place reinforced concrete stem (wall) on a monolithic base slab, supported by pre-stressed concrete piles. A continuous steel sheet pile cut-off wall is provided beneath the base slab to cut off seepage under the wall. A pile foundation system supports the inverted T-wall concrete monoliths, and is designed to resist the design load cases and their combinations. The existing levee material would remain in place providing earthen protection to the T-wall. In developing the estimate for this alternative, no flood gates or special structures were assumed, and the existing pump station would remain as the T-wall would pass in front of the station. The cost for this design is estimated to be approximately $244 million, which greatly exceeds the authorized funding. Thus, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 4: New Levee Alignment in the Marsh (Set Forward) Proposed Action

A new levee alignment would be built in the marsh, offset from the existing levee by up to 85 feet. This alternative would impact the most wetlands. If material from the existing levee has suitable material, it would be used in the new levee. If it does not, all material would be hauled from off-site. This alternative with the 8-foot elevation, was the selected plan in the Project Information Report PIR) Since the cost estimate was $27.5 M, it is possible that the Federal Government could raise the levee higher than 8 feet. Thus, the proposed plan in this EA is the 9.6 levee height so any additional work that might be done has been environmentally analyzed.

Alternative 5: New Levee on Protected Side (Set-Back)

A set-back levee was considered to avoid or minimize impacts to the floodside wetlands. This alignment would involve rebuilding the levee toward the protected side beginning at the floodside toe. Site visits and a review of aerial photography indicate that this alternative would have direct negative impacts on local residents, as numerous residential properties would be within the levee right-of way for this design. Additionally, the existing drainage/borrow canal located between the levee and these properties would require filling in and a new canal would need be excavated for drainage, expanding the impacts further beyond the levee footprint towards the adjacent highway. Due to the substantial negative impacts to local residents and their properties, this alternative is considered as impracticable and so would not receive further consideration.

Alternative 6: Straddle Alignment

A straddle levee design was evaluated incorporating the existing levee into a landside stability berm, as an attempt to minimize both the protected side and floodside impacts. This design alternative is minimally offset towards the floodside wetlands from the existing centerline. The existing levee would remain in place, with the new levee construction adjacent. Fill material would be entirely hauled-in. The advantage with this alternative is that the soil in the existing levee is more consolidated. This is considered as an option only if further geotechnical testing results indicate that on-site levee material is suitable for levees.

As compared to the other alignments, the total of fill material required is less, the existing levee may remain above the minimum levee design providing additional structural support, and the property acquisition is also minimal with this alternative design. However, the TPCG requires the government to stay a minimum of 25-30' from the existing drainage ditch. To accomplish this, the government would have to move the existing levee forward so the straddle is not really an option. Also, the minimum cost for this design was estimated to be $29.9 million, which is $2.4 million more than the

$27.5 minimum estimated for the set-forward design. In addition, the proposed Terrebonne Parish non-Federal levee project has been under development for nearly two years, with cost expenditures required for project investigations, studies, data analysis, and developing a feasible project action. The cost of the straddle alignment alternative would already exceed the remaining funds available. Thus this alternative is considered as not feasible and so would not receive further consideration.

ENVIRONMENTAL SETTING

GENERAL

The project area contains an existing levee; borrow/drainage canal, private property, and wetlands within an approximately 6.1-mile corridor of the Suzie Canal and Orange Street forced drainage systems. It is located east of Highway 57 in Sections 7, 8, and 9, Township 18 South, Range 17 East, and Sections 1, 2, 19, 85, and 86, Township 19 South, Range 17 East of Terrebonne Parish, Louisiana. Land use within the proposed levee project area varies and includes private property that contains maintained lawn areas and wooded thickets; a flood protection levee and borrow canal; and marshes and open water on the unprotected outside of the existing levee. The northern reaches of the project area are associated with the Suzie Canal Levee. The southern reaches of the site are associated with the Orange Street Levee.

The J-1 borrow site is located approximately 8.7 mile southeast of Houma, LA, near the community of Montegut, LA. The borrow site is located in Section 5 Township 18 South Range 19 East and Section 6 Township 18 South Range 18 East. The J-1 pit and the surrounding land have been used for agricultural purposes (sugarcane and currently pasturelands). Bayou LaCache borders the borrow site, to the west. A site visit to the J-1 site on November 5, 2008 found that an area adjacent to the 60-acre area has been previously excavated. An estimated 27-acre marsh-fringed borrow pond and an approximately 1-acre open borrow pit were found adjacent to the 60-acre area.

CLIMATE

The climate of the Terrebonne Parish area is humid subtropical. Warm, moist subtropical southeasterly winds from the Gulf of Mexico prevail throughout most of the year, with occasional cool, continental cold fronts dominated by northeast high pressure systems. Average annual temperature in the area is 68^{o} F, with monthly temperatures varying from 82^{o} F in July to 53º F in January. Average annual precipitation is 57.0 inches, varying from a monthly average of 8.3 inches in July, to an average of 3.4 inches in October. Summer tropical storms are common, and hurricanes infrequently occur.

GEOLOGY

The Natural Resources Conservation Service (NRCS) soil survey shows that the Site is underlain by several soil types – Allemands muck ; Aquents, dredged ; Bancker muck ; Cancienne silt loam ; Cancienne silt clay Fausse clay ; Harahan clay ; Rita muck ; Shriever clay ; Shriever clay, 0 to 1 percent slopes ; Shriever clay, frequently flooded . The following is a description of each of the soil series at the Site as described by the National Cooperative Soil Survey.

- The Allemands series consists of very deep, very poorly drained, soils that are rapidly permeable in the organic materials and very slowly permeable in the underlying clay horizons. These soils are on the landward side of low coastal freshwater marshes and formed in decomposed herbaceous material over alluvial sediments. Slope ranges from 0 to 0.2 percent.

- Aquents, dredged – permanently or usually wet soils formed on river banks, tidal mudflats etc. along the gulf coast and Mississippi River flood plains.

- The Bancker series consists of very deep, very poorly drained, very slowly permeable soils. These soils formed in very fluid clayey and organic sediments in intermediate or brackish coastal marshes. The sediments have been deposited under water and never air-dried and or consolidated. Slope ranges from 0 to 0.2 percent.

- The Cancienne series consists of very deep, level to gently undulating, somewhat poorly drained mineral soils that are moderately slowly permeable. These soils formed in loamy and clayey alluvium. They are on high and intermediate positions on natural levees and deltaic fans of the Mississippi River and its distributaries. Slopes range from 0 to 3 percent.

- The Fausse series consists of very deep, very poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are in low, ponded backswamp areas of the lower Mississippi River alluvial plain. Slopes are less than 1 percent.

- The Harahan series consist of very deep, poorly drained, very slowly permeable soils. They formed in moderately thick firm clayey alluvium overlying fluid clayey sediments. These soils are on broad backswamp positions on the lower Mississippi River flood plain. Slopes range from 0 to 1 percent. These soils are protected from flooding by levees, and are artificially drained by pumps.

- The Rita series consists of very deep, poorly drained, very slowly permeable soils in fresh water coastal marshes that have been protected from flooding by a system of levees and pumps. These soils formed in a thin layer of herbaceous organic material overlying semifluid clayey sediments that dried and consolidated in the upper part as the result of artificial drainage. Most of the organic material has oxidized since drainage. Slopes range from 0 to 0.5 percent.

- The Shriever series consists of very deep, poorly drained, very slowly permeable soils that formed in clayey alluvium. These soils are on the lower parts of natural levees and in backswamp positions on the lower Mississippi River alluvial plain. Slope is dominantly less than 1 percent but ranges up to 3 percent.

The existing Suzie Canal levee overlays Aquents, Cancienne Silt Loam, Cancienne Silt clay, Cancienne Silt clay loam, Schriever and Fausse clay soil types. The existing Orange St. Levee overlays Cancienne Silt Loam, Cancienne Silty clay loam, Fausse and Schriever clays, and Rita Muck soil types. The soil types of Lake Boudreaux consist of Lafitte, Clovelly, and Bancker mucks, as well as Aquents, and Fausse clays. Analysis of the "Set Forward" alignment for the Suzie Canal levee indicates that Schriever and Fausse clays, Aquents, Cancienne silty clay loam, and Cancienne silt loam soil types would be located beneath this alignment. An analysis of the "Set Forward" alignment for the Orange St. levee confirms that Schriever clay, Cancienne silty clay loam, Rita Muck, Aquents, Bancker muck, and Fausse clay soil types would be beneath the levee alignment.

Soils in the J-1 borrow area are described as Mhoon and Sharkey series. The Mhoon soils are imperfectly drained soils of the bottomlands with stratified silt loam, silty clay loam, and silty clay sediments. They occur on sites well above the present normal overflow from streams. The stratified sediments were deposited on and near the crests of the natural levee ridges during the overflow from distributary streams and crevasse channels of the several delta systems of the Mississippi River. Mhoon soils commonly occur on level to nearly level relief, although small areas near stream channels have slopes of 3 percent. Mhoon soils are closely associated with lower lying Sharkey soils, which

consist of dark-colored soils of the bottomlands that contain moderate amounts of organic matter as a result of repeated deposits of clays and organic residues. These fine-textured sediments were deposited in depressions, such as shallow lakes and bays, along the borders of the natural levee ridges. Runoff and internal drainage for both soil types is slow to very slow (NRCS, 2007).

IMPORTANT RESOURCES

This section contains a description of important resources and the impacts of the proposed action on these resources. Important resources described in this section are those recognized by: laws, executive orders, regulations, and other standards of national, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. Important resources found within the proposed project area and assessed in this EA are: wetlands, marsh, water bodies, bottomland hardwoods, fisheries, essential fish habitat, wildlife, threatened and endangered species, cultural resources, socio-economics (transportation), recreational resources, aesthetics, and air quality.

WETLANDS

Four types of wetland habitat exist within the proposed borrow areas: marsh, scrub shrub with a marsh understory, bottomland hardwoods and submerged aquatic vegetation (SAV). These wetland habitats are discussed as separate resources in the following paragraphs. The impacts to wetlands assessed in this EA include those wetlands within the ROW for the new levee construction. The following table (Table 2) shows the impacts within the ROWs.

Marshes in the project area are being lost at the rate of 2.33 percent per year according to data gathered for the West Lake Boudreaux Shoreline Protection and Marsh creation project. This loss is due to subsidence, sea level rise, salinity intrusion caused by navigation channels and oilfield canals, shoreline erosion, ponding of water, etc. These losses are expected to continue with or without the proposed project.

Table 2. Wetland Impacts Caused by the Proposed Action Within the Project Area

Suzie 9.5' w/Cutoff set forward		Orange 9.5 set forward		TOTAL
Wetland Type	Acres	Wetland Type	Acres	
Bottomland Hardwoods	11.5	Bottomland Hardwoods	0.6	12.1
Scrub-shrub (marsh understory)	10.5	Scrub-shrub (marsh understory)	0.0	10.5
Fresh Marsh	2.0	Fresh Marsh	0.0	2.0
Brackish Marsh	0.0	Brackish Marsh	25.7	25.7
Intermediate Marsh	13.4	Intermediate Marsh	0.0	13.4
Submerged Aquatic Vegetation	0.7	Submerged Aquatic Vegetation	0.0	0.7
TOTAL	38.1		26.3	64.4

MARSH

Existing Conditions

This resource is institutionally important because of: the Clean Water Act of 1977, as amended; Executive Order 11990 of 1977, Protection of Wetlands; Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968. Marsh habitat is technically important because they: provide necessary habitat for various species of plants, fish, and wildlife; serve as ground water

recharge areas; provide storage areas for storm and flood waters; serve as natural water filtration areas; provide protection from wave action, erosion, and storm damage; and provide various consumptive and non-consumptive recreational opportunities. Marsh habitat is publicly important because of the high value the public places on the functions and values that these wetlands provide.

No marsh or other wetland habitats are found at the J-1 borrow site, although the nearby existing borrow pond does have an established fringe marsh around the shoreline. The marsh habitats within the proposed project area are mainly located on the floodside of the existing non-federal levees, north of Lake Boudreaux and extending out into a pond west of that lake. These wetlands areas have a direct hydrological connection to the lake. Two types of marsh habitat have been classified to exist within the floodside areas of the existing levees: intermediate and brackish. This area was subject to flooding and storm surge from Hurricane Ike, which resulted in the loss of some marsh acreage and severely stressed much of the surviving vegetation.

Approximately 13.4 acres of intermediate marsh is found within the existing and proposed ROW on the flood side of the Susie Canal levee. The dominate marsh species found is wire grass, with alligator weed and torpedograss found in the shallow waters closer to the toe of the existing levee. There are 5.8 acres of scrub shrub with a marsh understory on the floodside ROW at Susie Canal. Approximately 0.7 acres of submerged aquatic vegetation (SAV), mostly widgeon grass, is found within the floodside of the levee footprint, located south of the Susie Canal cutoff. Two acres of fresh marsh is located within the levee footprint of the Susie Cutoff. There are 4.7 acres of scrub shrub with a marsh understory in the levee ROW in the cutoff. Approximately 25.7 acres of brackish marsh is found within the existing and proposed ROW of the Orange Street levee along this reach. Wiregrass is the predominant species.

Future Conditions with No Action

With the no action, the proposed project would not be constructed. The project area marsh would be lost at the rate of the rate of 2.33 percent per year which is the loss rate from the West Lake Boudreaux Shoreline Protection and Marsh Creation CWPPRA project. At the end of 50 years only 8 acres of brackish marsh would remain in the Orange Street ROW. There would be 2 acres remaining of the fresh marsh and scrub shrub in the Susie Cutoff ROW. At the floodside of the Susie Canal reach, there would be six acres of intermediate marsh and scrub shrub remaining. These without-project marsh losses are taken into account when calculating project impacts during the Wetland Value Assessment.

Future Conditions with the Proposed Action

The proposed action would cause the loss of 41.1 acres of marsh and 10.5 acres of scrub shrub with a marsh understory. The Wetland Value Assessment Model was used to determine the amount of mitigation needed. The results determined that 74 acres of new marsh would mitigate for the loss. This marsh would be created in open water adjacent to the Orange Street levee as described on page EA-3 previously. A monitoring plan would be developed so the TLCD and the TPCG could verify the success of the mitigation.

The 74 acres of new marsh habitat is expected to be utilized by a variety of wildlife and fish species, thus indirectly benefiting these species. Freshwater marsh species might colonize the bank edges and near shore areas of the 60-acre borrow pit, thus becoming a fringe marsh. .

WATER BODIES -- REGIONAL HYDROLOGY

Existing Conditions

This resource is institutionally important because of the Clean Water Act of 1977, as amended. Water bodies are technically important because it provides habitat for various species of wildlife, finfish, and shellfish. Water bodies are publicly important because of the desire of the public for recreational use for boating, fishing, and bird watching.

The J-1 borrow area is dry site located within a fallow agricultural field, and contains no water bodies within the area proposed for excavation. Bayou LaCache is located just to the west of the borrow site, but is not expected to be impacted by the project. An approximately 27-acre borrow pond is located nearby, but is also not expected to be impacted by the project action.

Other water bodies within the proposed project area are located within the vicinity of the proposed levee construction. These water bodies include an unnamed borrow/drainage canal along the protected side of the existing non-Federal levees, and the tidally-influenced waters located adjacent to and in the vicinity of the floodside of the levees. Tidal influences within the floodside water bodies come from Terrebonne Bay and the Gulf of Mexico. Lake Boudreaux and Bayou Butler are the two primary named water bodies in or near the project area; several unnamed pipeline canals and other interconnecting waterways are found throughout the floodside marsh. Salinity and turbidity are important factors which can influence submerged and emergent plant communities in a given area. The floodside marshes and open water portions of the project area have intermediate and brackish salinities and non-turbid waters, while the open waters of Lake Boudreaux normally have brackish salinities and turbid waters. As mentioned in wetlands above, the western Lake Boudreaux area marsh is being lost at the rate of 2.33 percent per year which means that new water appears in the area yearly.

As part of its surface water quality monitoring program, the Louisiana Department of Environmental Quality (LADEQ) routinely monitors a number of sites on larger water bodies throughout the state, including Terrebonne Bay and Lake Boudreaux. Based upon this data and the use of less-continuous information, such as fish tissue contaminants data, complaint investigations, and spill reports, the LADEQ has assessed water quality fitness in Lake Boudreaux to be supportive of swimming, boating and fishing, but not supportive of fish and wildlife propagation, or oyster production (LDEQ 2006). Suspected causes are low dissolved oxygen, high nutrient load (nitrate/nitrite and phosphorus) and total fecal coliform bacteria, while the suspected sources were retention of domestic sewage, on-site treatment systems, and package plant or other permitted small flow discharges (LDEQ 2006).

Future Conditions with No Action

With the no action, the proposed project would not be constructed, and impacts to water bodies would not likely change from existing conditions. General marsh loss will continue and as the intermediate/brackish marsh is lost in what would become the levee ROW with the project, it is estimated that approximately 36 acres of new water will appear there over the next 50 years.

Future Conditions with the Proposed Action

With the proposed action, best management practices would be incorporated to minimize impacts to local waters (i.e.: silt fences would be placed along the levee toe on both the protected and flood sides to contain runoff material). Some runoff may seep through to the adjacent waters, but any resulting increase in turbidity would be minor and temporary. Project activities to mitigate for the loss of marsh habitat would directly impact the hydrology and water quality within the project area.

Approximately 74 acres of open water area would be filled with dredged slurry, displacing the existing aquatic habitat and increasing turbidity within the containment areas. Negative impacts from the loss of this habitat are minimized by the dedicated dredging from Lake Boudreaux to create conditions suitable for wetlands development. Waters within Lake Boudreaux are directly connected to the open waters adjacent to the existing levee. Any potential contaminants within waters or underlying sediments would be found throughout the waterways. Thus placing dredged material from the lake would not change these conditions. Project activities to transport the pipeline to the containment areas and the operation of the hydraulic dredge would directly impact water quality, as these actions would displace bottom sediments, thus increase turbidity within the vicinity of the dredging vessel and pipeline route. The impacts of increased turbidity within the lake would only be temporary, and water quality would return to existing conditions after the completion of project activities.

Project activities to excavate the J-1 borrow area is not expected to directly impact water bodies . The project action would have indirect impacts, as rainfall and flooding are expected to initially convert the borrow pit into a 60-acre deepwater borrow pond, thus increasing water bodies resources within the area. Over time, a thin fringe of marsh may develop around the edge of the pit. It is possible that crawfish and small fish such as mosquito fish may be eventually be found in the pit.

BOTTOMLAND HARDWOODS)

Existing Conditions

This resource is institutionally important because of Section 906 of the Water Resources Development Act of 1986 and the Fish and Wildlife Coordination Act of 1958, as amended. Forested wetlands technically important because: it provides necessary habitat for a variety of species of plants, fish, and wildlife; it often provides a variety of wetland functions and values; it is an important source of lumber and other commercial forest products; and it provides various consumptive and non-consumptive recreational opportunities. Forested wetlands are publicly important because of the high priority that the public places on its esthetic, recreational, and commercial value.

Essentially no forested wetland habitats are found within the boundaries of the 60-acre J-1 borrow site. There is a fringe of trees along a drainage ditch. Of the approximately 12.1 acres of forested wetlands within the proposed project area, approximately 11.5 acres are found along the Susie Canal levee and within the cutoff. The remaining 0.6 acres are located along the Orange Street levee in the vicinity of the D-08 pumping station. Bottomland hardwood habitat is dominated by black willow (*Salix nigra*) and Drummond red maple (*Acer rubrum var. Drummondi*), with a few water oaks (*Quercus ngra*)is scattered along the levee toe. The 0.6 acres of bottomland hardwoods near the D-08 pump station along the Orange Street levee (Figure 3) is dominated by water oaks, primarily located along the elevated ground that border the outflow canal from the pump station. A few water oaks are found along the floodside toe of the levee, just north of the station.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and impacts to forested wetland resources within the proposed project area would not likely change from current conditions.

Future Conditions with the Proposed Action

With the proposed action, project activities to construct the new levee would directly impact bottomland hardwoods within the proposed project area by removing approximately 12.1 acres of this habitat type. Indirect impacts would be the loss of habitat to area wildlife species. Mitigation for this

loss would be achieved by the MVN purchase of mitigation bank credits to mitigate the loss of 10 AAHU's or by planting young bottomland hardwood species on enough acreage to fully mitigate these impacts.

FISHERIES

Existing Conditions

This resource is institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended. Fisheries resources are technically significant because: they are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of various freshwater and marine habitats; and many species are important recreational and commercial resources. Fisheries resources are publicly significant because of the high priority that the public places on their esthetic, recreational, and commercial value.

The J-1 borrow pit is located in an existing fallow agricultural field, thus there are no fisheries within the borrow site. Site visit observations have confirmed that there are some fish in the nearby borrow pond. Aquatic organisms within this water body are likely to be crawfish or small fish such as mosquito fish that could have migrated to the area from nearby waterways during flooding caused by excessive rain or tropical storm events.

The marsh and aquatic habitats found between the existing non-Federal levees and Lake Boudreaux contain emergent vegetation and submerged aquatic vegetation which serve as nursery, feeding, and cover habitat for several species of fishes and shellfishes. Resident fishes include the striped mullet, and several species of killifish. These habitats also support many commercially and recreationally important species including red drum, black drum, sheepshead, Atlantic croaker, southern flounder, Gulf menhaden, sand and spotted trout, blue crab, white shrimp, and brown shrimp.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and fisheries resources could decline slightly as the project area marsh is lost.

Future Conditions with the Proposed Action

With the proposed action, direct impacts to fisheries resources within the ROW for the new levee construction and the marsh berm include displacement of fisheries from these areas, potential mortality for some species, and the loss of existing marsh and aquatic habitat. Earthen material utilized for the levee construction and the dredged slurry pumped marsh berm would cover sessile (stationary) species and slow moving aquatic invertebrates, potentially causing mortality for these species. Project activities would displace the existing aquatic habitat and most fisheries within the project area.

The adverse impacts of the proposed project action would be off-set by the creation of new wetland habitats through dedicated dredging. The newly created marsh berm would provide valuable habitat diversity for foraging, breeding, spawning, and cover for various life stages of fish species. Nutrients and detritus would be added to the existing food web, providing a positive benefit to local area fisheries.

Excessive rainfall, runoff, or storm events that would flood the excavated J-1 pit may also overtop banks of nearby water bodies and flood the surrounding areas. During periods of high water, small fish and crawfish from nearby waterways could potentially follow the floodwaters into the newly created borrow pond. As floodwaters recede, some fisheries would be expected to remain within the

new pond. Various marsh species are expected to colonize the pond edges, creating a fringe marsh that would provide habitat for these species.

ESSENTIAL FISH HABITAT

Existing Conditions

This resource is institutionally important because of the Magnuson-Stevens Fishery Conservation and Management Act of 1996. Essential Fish Habitat (EFH) is technically important because, as stated by the Act, EFH are "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." EFH is publicly important because of the high value that the public places on the seafood, recreational, and commercial opportunities EFH provides. The floodside marsh and waters within the proposed project area does contain various types of EFH within the associated substrates (mud, sand, and associated biological communities) and adjacent inter-tidal vegetation (marshes).

Currently, the J-1 borrow site is in a fallow, , non-wet agricultural field and the Susie Canal Cutoff is landlocked terrestrial habitat. Thus, no EFH is found within these areas. EFH has been designated throughout the project area. All intertidally-influenced and tidally-connected intermediate and brackish marsh has been included in the acreage designated as EFH. Approximately 59 acres of EFH have been identified within the ROW for the proposed levee construction (Table 3).

Table 3. EFH within the project area.*

	Suzie 9.5' set forward Non-Cutoff Levee	Orange Street 9.5' set forward Levee	Mitigation Area
Estuarine emergent wetlands	19.2	25.7	1
Submerged aquatic vegetation	0.7		
Open water	1.99	11.4	73.1
Total	21.9	37.1	74.1

* Due to tidal connection, an understory of marsh presently or before the 2008 hurricane damages, and low density and diversity of shrubs or trees, scrub shrub habitat was included under emergent wetlands.

The project site is located in an area that has been identified as essential fish habitat (EFH) for various life stages of federally-managed species, including postlarval and juvenile stages of red drum, brown shrimp, and white shrimp. The EFH requirements vary depending upon species and life stage (Table 4). Categories of EFH in the project area include estuarine emergent wetlands, estuarine water column, submerged aquatic vegetation, and estuarine water bottoms consisting of mud and shell substrate. Detailed information on Federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico prepared by the Gulf of Mexico Fishery Management Council (GMFMC), which was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (P.L. 104-297)

Table 4. EFH Requirements for managed species in the proposed project area.

Species	Life Stage[1]	EFH
brown shrimp	postlarvae	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
	juvenile	Sand/shell/soft bottom, SAV, emergent marsh, oyster reef
white shrimp	postlarvae	Soft bottom, emergent marsh
	juvenile	Soft bottom, emergent marsh
red drum	larval/post larvae	All estuaries planktonic SAV, sand/shell/soft bottom, emergent marsh
	juvenile	SAV, sand/shell/soft/hard bottom, emergent marsh

[1] These life stages all utilize the estuarine system.

In addition to being designated as EFH for shrimp and drum, the aquatic and marsh habitats within the project area may also provide nursery and foraging habitats for a variety of economically important fish species including Atlantic croaker, striped mullet, Gulf menhaden, and blue crab. These species serve as prey for other fisheries managed under the MSFCMA by the GMFMC (e.g., red drum, black drum, mackerel, snapper, and grouper) and highly migratory species (e.g., billfishes and sharks) managed by the NMFS.

Future Conditions with No Action

With the no action alternative, the proposed project would not be constructed. At the end of 50 years, there would be only 14 acres or marsh designated as EFH remaining within the project area due to loss of wetlands based on forecasting estimates. However, submerged aquatic vegetation is expected to remain and all open water remaining both of which is EFH.

Future Conditions with the Proposed Action

With the proposed action, project activities would directly impact EFH within the floodside marsh and shallow open water areas by the new levee construction. Approximately 59 acres tidal habitat designated as EFH would be filled with earthen material to construct the new levee. Additionally, about 74 acres of shallow open water and submerged aquatic vegetation would be filled to create marsh elevations as mitigation. Also, one acre of existing marsh designated as EFH would be nourished with thin layer disposal of dredged material as part of the mitigation.

Approximately 134 total acres of direct impacts to various types of EFH would result from both the levee and marsh mitigation. Additionally, temporary indirect impacts to water column designated as EFH would occur from increased turbidity during levee construction and marsh creation as compensatory mitigation. It is expected that the various types of all EFH impacted would be offset

by the mitigation features to create tidal brackish marsh from dedicated dredging. The ability of the created marsh to provide adequate compensation is contingent upon the created elevations from dredged material settling sufficiently to become intertidal and support marsh plant colonization from existing adjacent vegetation. To further enhance the formation of new tidal marsh, the area would be intentionally planted with wiregrass and oyster grass (spacing and density will be determined in the Plans and Specifications). Further, containment dikes would be degraded to + 1 foot NAVD88 at three sites along the eastern side of each marsh berm cell. Each of the nine cuts will be 50 feet wide to allow tidal connection. The new marsh habitat would provide adequate compensation for impacts to all types of EFH.

WILDLIFE

Existing Conditions

This resource is institutionally significant because of the Fish and Wildlife Coordination Act of 1958, as amended and the Migratory Bird Treaty Act of 1918. Wildlife is technically significant because: they are a critical element of many valuable aquatic and terrestrial habitats; they are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources. Wildlife is publicly significant because of the high priority that the public places on their esthetic, recreational, and commercial value.

The areas within and adjacent to the proposed levee project provide important habitat opportunities for several species of wildlife, including waterfowl, wading birds, shorebirds, mammals, reptiles and amphibians. The coastal marshes provide wintering habitat for migratory ducks and geese. The resident mottled duck, which nests in fresh to brackish marshes along the coast, is found throughout the year within project area marshes. Besides migratory waterfowl, other game birds which occur within the area include rails, coots, and snipe. Several species of wading birds including of herons, egrets, and ibis utilize the marsh, mud flats, and shallow water habitats within the project area. The mudflats and shallow-water areas also attract a wide variety of shorebirds (killdeer, avocet, stilt, dowitchers, snipe, and sandpipers), while seabirds such as pelicans, gulls, and terns are found more often in deeper water areas. Other common bird species that can be found within the project areas include songbirds, raptors, kingfisher, and numerous seasonal neo-tropical migrants. Commercially and economically important wildlife species that occur or may occur within the project area include nutria, muskrat, mink, raccoon, and the American alligator. Other wildlife species known to have occurred within the project area include white-tailed deer, feral hogs, and rabbits.

The J-1 borrow site is located in an open fallow agricultural field that has been under pump and drain since the early 1950s. Vegetation found within the area is mostly various grass and weed species; trees and shrubs are found along the edges. In the past it was farmed for sugarcane, and presently it is farmed for hay, used as livestock pasture, and is being actively used as a TLCD borrow pit. Habitat use for wildlife species is limited to open fields, a line of trees along a drainage ditch and shrubs along boundary edges. Wildlife species most likely to utilize the J-1 site include rabbits, armadillos, rats, mice, snakes, and songbirds. Potentially, coyotes, hawks, and owls would forage through the grass/weed field as predators to many of the aforementioned species.

Future Conditions with No Action

With no action, the proposed project would not be constructed, thus impacts to wildlife resources within the proposed project area would not likely change from current conditions as a result of the proposed project.

Future Conditions with the Proposed Action

With the proposed action, wildlife resources within and adjacent to the proposed project work sites would be directly impacted as approximately 60 acres of terrestrial habitat within the J-1 borrow area would be removed, and approximately 56.1 acres of marsh and scrub shrub, 12.1 acres of bottomland hardwoods, and 15.0 acres of open water/SAV within the levee alignment for the non-Federal levees would be covered over by the excavated material. If the existing levees contain suitable material, only 30 acres of the J-1 pit would be used. A lesser impact would from the equipment noise and movements that would temporarily displace most wildlife species from the area. However, the loss of habitat and temporary disturbance is not expected to adversely impact the general population of wildlife species within the region since the marsh/scrub shrub loss would be mitigated by the creation of 74 acres of marsh. Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

The proposed action would have indirect beneficial impacts, as the existing grass/weed agricultural fields within the area of the J-1 pit is expected to become a 60-acre borrow pond with a thin fringe of marsh that would provide a greater diversity of habitat for resident and migrant wildlife species.

THREATENED OR ENDANGERED SPECIES

Existing Conditions

This resource is institutionally significant because of: the Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald Eagle Protection Act of 1940. Threatened or endangered species are technically significant because the status of such species provides an indication of the overall health of an ecosystem. These species are publicly significant because of the desire of the public to protect them and their habitats. The U.S. Fish and Wildlife Service, Lafayette office, by letter dated December xx, 2008, has concluded that there are no threatened or endangered species, or their critical habitat, within the project area.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and there would be no impacts to threatened and endangered species, or their critical habitat.

Future Conditions with the Proposed Action

With the proposed action, there would be no impacts to threatened and endangered species, or their critical habitat.

SOCIOECONOMIC (Transportation)

Existing Conditions

The transportation sector is an important component of the economy impacting development and the welfare of populations. Transportation also carries an important social and environmental load, which cannot be neglected. The economic impacts of transportation can be direct and indirect: Direct

impacts can include wear and/or damage of existing roadways, road debris from project vehicles, and change in accessibility for public and commercial traffic. Indirect impacts can include travel time and safety related issues.

At the present time, the local roads and state highways do not have any traffic associated with the proposed project.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and impacts to area transportation and associated roadways would not likely change from current conditions.

Future Conditions with the Proposed Action

The recommended haul is approximately 20 miles, and starts with the loaded haul truck at the J-1 borrow site. Upon leaving the borrow site, the route follows Aragon Road south to LA Hwy 58, then follows LA Hwy 58 west to LA Hwy 56. From there, the route follows LA Hwy 56 north to Woodlawn Ranch Road, then follows Woodlawn Ranch Road west to LA Hwy 57, then south along LA Hwy 57 to the project site. Aragon Road, Woodlawn Ranch Road, and Louisiana State Highways 56 and 57 are all two lane paved roads linking business, residents and farms of rural Terrebonne Parish with each other and to the larger business community of Houma. The state highways currently have a weight restriction of 80,000 pounds. In addition, the haul trucks would have to utilize bridges to cross over waterways along the proposed haul routes, including bridges having a maximum weight restriction of 40,000 pounds (20 tons). Thus, the project specifications would include stipulations that the Contractor would comply with all federal and state permits and regulations for the transportation of all materials and equipment required for the proposed project action.

With the proposed action, haul trucks would utilize the public roadways previously noted to transport the material to the levees. Potential direct impacts to area transportation include increased traffic, associated access constraints, wear on the roads, and road debris (mud/dirt) falling from the trucks. These impacts could then potentially result in indirect impacts such as delays in travel time along the roadways, and traffic safety issues for public vehicles. Although the direct impacts of increased construction traffic and the associated delays in travel and access would most likely occur, the project action would not obstruct public access to area roadways, but rather would pose a temporary inconvenience to the public. The TPCG would be responsible for damages to roads, highways, bridges and other access routes, except for damages caused by unauthorized use of off-road vehicles.

Local street and lanes would be used by haul trucks and other construction related vehicles to access the levee sites from Highway 57. Access to the Suzie Canal reach would be via a private driveway and Georgi Girl Lane. Access to the Orange Street reach would be via Panda Lane and Orange Street. These streets would be very busy during construction and local traffic could be disrupted.

CULTURAL RESOURCES

Existing Conditions

This resource is institutionally significant because of: the National Historic Preservation Act of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979; as well as other statutes. Cultural resources are technically significant because of: their association or linkage to past events, to historically important persons, and to design and/or construction values; and for their ability to yield important information

about prehistory and history. Cultural resources are publicly significant because preservation groups and private individuals support their protection, restoration, enhancement, or recovery.

Prehistory: the earliest evidence of human habitation in Louisiana dates to the Paleo-Indian period, which starts approximately 14,000 years BP (before present). There are no sites of this age in or near the proposed project area. The earliest sites near the project area date to the Poverty Point period (3500 to 2500 BP), which is named for the type of site located in northeast Louisiana. The Poverty Point site is known for its massive earthworks and its wide spread trade network. Important artifacts include baked clay balls, elaborate lapidary and microlith industries, the use of steatite vessels, and the importation and use of exotic non-local stone. Two sites in the area date to the Poverty Point period, Bois d'Arc No. 1 and Bois d'Arc No. 2. Both sites have been impacted by dredging. The next time period represented near the project area is the Tchefuncte period (2500 BP to 2000 BP). At this time there emerges the first occurrence of pottery in Louisiana. Three sites with Tchefuncte occupations are located in the marshes in western Terrebonne Parish. The Marksville Period (200 AD 400 AD) is seen as the local manifestation of the Hopewell tradition of the Ohio Valley. This time period is recognized by diagnostic pottery types, conical burial mounds and the importation of exotic raw materials. Substantial evidence for the Marksville period has been found in the Terrebonne marsh.

Following the Marksville period, there is an ill defined interval known as the Baytown Period or often as the Troyville period (400 AD to 700 AD). In south Louisiana the area of influence starts to shift away from the Mississippi Valley to the northern Gulf Coast. Very few sites dating to this time period have been investigated within or near the proposed project area. The following Coles Creek Period (700 AD to 1000 AD) is marked to changes in ceramic frequencies and to a lesser extent by the appearance of new types or varieties and the disappearance of others. Settlement patterns are not well understood at this time. There is a general sense that populations were organized into a relatively loosely arranged hierarch of site types. The best defined model comes from the Terrebonne marsh area. The transition from the Coles Creek Period to the Plaquemines period (1000 AD) is not well defined in the lower Mississippi Valley. The emergence of the Plaquemine came not from an intrusion of Mississippian period elements, as has been previously thought, but rather from a slow in situ series of changes in local cultures across the Mississippi Valley and the Gulf Coast. In recognition of the gradual pattern in the region archaeologist have adopted the term Transitional Coles Creek/Plaquemine to identify this interval.

The Mississippian Period is marked by the appearance of emergent Mississippian culture in the northern part of the Lower Mississippi Valley and throughout much of the interior Southeast. Mississippian culture characteristics did not penetrate into much of the central Lower Valley until after 1200 AD. These identifiers are shell tempered ceramics, maize agriculture and the construction of large centers constructed around temple mounds with well defined plaza areas.

Historic Period: there is little documented presence of Native Americans during the era of European contact and settlement. However by 1840, the Houma Indians were well established in several locations within Terrebonne Parish, including in the vicinity of the towns of Houma and on lower Bayou Terrebonne. Because of the unsuitability of the area for agriculture, Terrebonne Parish remained sparsely settled until 1765, when several Acadian families settled in the area. The area continued to be sparsely populated until after 1785 when about 1,500 Acadians immigrants came to Louisiana via France. During the Antebellum period, the area continued to be sparsely populated by European settlers. There were some increases, most notably in the slave population, which totaled over 50 % of the population in the 1840's census. This was due to the amount of man-power necessary to produce sugar cane, the main crop at that time.

During the War Between the States, there was very little military activity in the Terrebonne area. Although the there was little devastation during the war the economic structure of the sugar industry was thrown into chaos. Eventually African-American wage laborers became the predominant workforce in the sugar growing and processing regions. After the war the lower channel of Bayou Terrebonne filled in preventing steamboat navigation. This caused the dredging of Bayou Terrebonne which started in 1881. A new canal between Bayou Lafourche and Bayou Terrebonne was constructed in the early 1880's, allowing steam navigation from New Orleans to Houma. The overall population of Terrebonne Parish grew almost 50% between 1860 and 1900. Most of this population growth was a reflection of white immigration into the area, as African-American population dropped below 50%.

Future Conditions with No Action

The No Action Alternative would have no affect on historic properties.

Future Conditions with the Proposed Action

Implementation of the proposed action would have no affect on historic properties. A letter form the MVN requesting concurrence with this determination was sent to the State Historic Preservation Officer (SHPO) on September 25, 2008. The SHPO concurred with this determination by fax stamped dated October 20, 2008.

RECREATIONAL RESOURCES

Existing Conditions

This resource is institutionally important because of the Federal Water Project Recreation Act of 1965, as amended and the Land and Water Conservation Fund Act of 1965, as amended. Recreational resources are technically important because of the high economic value of these recreational activities and their contribution to local, state, and national economies. Recreational resources are publicly important because of the high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold in Louisiana, and the large per-capita number of recreational boat registrations in Louisiana.

The J-1 borrow area is located within TLCD property, and public access is restricted. In accordance to Parish Ordinance #7307, Section IIIA, Statement of Policy, "The public is prohibited from use of the drainage levees, levee right of way, the collection canals and the borrow pits". Therefore, public access to the existing levees is not allowed. The adjacent marsh and open waters are accessible by boat, but there are no boat launches along Lake Boudreaux. Access to the lake is provided by boat launches along Highway 57 in Dulac, Louisiana, and along Highway 56 south of Chauvin, Louisiana both well outside of the project area.

Future Conditions with No Action

With no action, the continued overtopping of levee sections would threaten recreational infrastructure on the protected side of the levee. A levee overtopping would cause damage to local property, and would adversely impact recreational resources in the surrounding area. People who have camps, boat docks, marinas in the area would suffer some degree of property loss. In the future, fisheries resources could decline slightly as the project area marsh is lost, thereby affecting fishing opportunities.

Future Conditions with the Proposed Action

With implementation of the proposed action, increased traffic due to the haul trucks transporting the material to the levees may temporarily inconvenience the general public access to recreational areas along the recommended haul route. Project activities to rehabilitate the levees would expand the existing levee into the floodside marsh and waters, thus cause a loss of 56.1 acres of marsh and scrub and impact wildlife and fisheries. The habitat loss and impacts to wildlife and fisheries then indirectly impacts the recreational opportunities associated with these species. The mitigation feature to create new marsh habitat would displace approximately 74 acres of existing open water and any recreational opportunities provided. The new marsh would attract many of these species to the area, thus provide new recreational opportunities. Noise and disturbance by the presence of the construction equipment would also disrupt most recreational activities (mainly fishing and hunting) occurring within the area of work, and haul trucks transporting the material from the borrow area to the levee would cause a minor inconvenience for the public accessing the project area.

The negative impacts to recreational opportunities associated with the proposed project would mostly be a temporary disruption for the public. In addition, the mitigation phase of the proposed project would create new marsh habitats which are expected to attract various wildlife and fisheries, which then provide associated recreational opportunities for the public.

Since the proposed project does not provide additional flood protection, recreational resources could be impacted as described in Future Conditions with No action above.

AESTHETIC (VISUAL) RESOURCES

Existing Conditions

This resource's institutional importance is derived from laws and policies that affect visual resources, most notably the 1969 National Environmental Policy Act. The 1988 U.S. Army Corps of Engineers Visual Resources Assessment Procedure provides a technical basis for identifying project impacts. Public importance is based on public perceptions and professional analysis of the projects visual impacts. The area within the J-1 borrow pit is located within TLCD property, and public access is restricted. By Parish law, public access to the non-Federal levees is prohibited. Access to the floodside marsh and water areas is only available by boat.

Visually, the landscape within the area of the proposed levee improvements project is dominated by residential development protected by flood control measures that includes earthen levees, drainage canals and pumping stations. Also prevalent within the project area are maritime related industry and residential development occasionally broken up by undeveloped land. Viewpoints into the project area's natural landscape highlight coastal marsh, low lying natural levees, and small ponds and bayous. Then natural landscape is contrasted by unnaturally straight channels and related spoil banks, cutting through the coastal marsh. These were most likely caused by navigation for petroleum, fisheries or other related resources

Future Conditions with No Action

With the no action alternative, visual resources would either evolve from existing conditions in a natural process, or change as dictated by future Terrebonne Parish Levee or other land-use

maintenance practices. Regardless of what the future holds for the project area, visual access to the proposed project sites is minimal, as the J-1 borrow area is inaccessible and the non-Federal levees are visually remote.

Future Conditions with the Proposed Action

With implementation of the proposed action, the negative impacts to visual resources would be minimal, as public access to the project areas is restricted or prohibited by law. Visually, the vast majority of the footprint of disturbance necessary to rehabilitate the existing non-Federal levees is in areas where risk reduction measures, navigation-related channel improvements, and other civil works projects exist. The proposed levee improvements and borrow project areas are remote and visually inaccessible to most. Therefore, the direct and indirect impacts to visual resources are insignificant. Cumulatively, the visual impacts caused by risk reduction measures throughout Coastal Louisiana and nationwide could be considered significant. Flood prone natural landscapes protected by levees similar to those to be generated by the proposed action may be increasingly converted to developable land.

AIR QUALITY

Existing Conditions

This resource is considered institutionally important because of the Louisiana Environmental Quality Act of 1983, as amended, and the Clean Air Act of 1963, as amended. Air quality is technically important because of the status of regional ambient air quality in relation to the National Ambient Air Quality Standards (NAAQS). It is publicly important because of the desire for clean air expressed by virtually all citizens. Terrebonne Parish is currently in attainment of all NAAQS, and operating under attainment status for the 8-hour ozone NAAQS, as per the Environmental Protection Agency's criteria for pollutant standards.

Future Conditions with No Action

With no action, the proposed project would not be constructed, and the status of attainment of air quality for Terrebonne Parish would not change from current conditions.

Future Conditions with the Proposed Action

With the proposed action, the project activities are expected to have only minimal impacts to air quality, as the equipment to be used is estimated to produce less than 10 tons of volatile organic compound (VOC) and nitrogen oxide (NO_X) emissions. Therefore, the status of attainment for Terrebonne Parish would not be altered.

HAZARDOUS TOXIC AND RADIOACTIVE WASTE

The MVN is obligated under Engineer Regulation (ER) 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of the proposed action. ER 1165-2-132 identifies our HTRW policy to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation of wastes (e.g., Resource Conservation and Recovery Act [RCRA] regulated), pollutants and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), would be treated as project costs if the requirement is the result of a validly promulgated Federal, state or local regulation.

The Environmental Assessment Team performed an ASTME 1527-05 Phase I Environmental Site Assessment (ESA) of the proposed project area, in conformance with the scope and limitations of ASTM E 1527. The ESA report titled "*Terrebonne Parish Non-Federal Levee System Repairs, Replacements, Modifications, and Improvements, Terrebonne Parish, Louisiana (Susie Canal Levee, Orange Street Levee, and J-1 Borrow Pit)*" was completed on November 7, 2008. A copy of the report would be maintained on file at MVN. The ESA documented the Recognized Environmental Conditions (REC) for the project area. No RECs were found to be in the area of the proposed levee project or the J-1 borrow area.

The assessment has revealed four potential environmental conditions within this project area. However before tanks, structures, or large piles of debris are moved or demolished, they should be investigated for hazardous materials, such as lead-based paint, asbestos, petroleum containers and anything else that may be viewed as a concern.

1. Several gas stations within one-half mile of the project area. These gas stations are assumed to have underground storage tanks (USTs) in unknown condition. One abandoned gas station has maintained above ground storage tanks (ASTs).

2. Numerous abandoned homes within the residential vicinity of the site. Closer inspection would be necessary to indicate whether these sites contained lead paints and/or asbestos.

3. Vast amounts of debris are found throughout the area. The majority of the debris is construction material. Debris has washed up in many areas alongside the levee.

4. Temporary hurricane debris dumping site which contains huge mounds of debris and large construction equipment.

The local area has much debris and destruction due to past hurricanes and tropical storms. However, the majority of the problems are on the mainland and not in direct contact with the levees. The majority of the possible issues on the mainland are only probable with no current acknowledgement from the EDR searches as known environmental issues. The issues are small and removed from the project area. The debris washed up along the levee does not present a significant risk to the area. It is the USACE MVN-ED Environmental Assessment Team's recommendation that no further investigation for environmental contamination be required in the area. In the event of an unplanned discovery of HTRW materials during construction, all work on the project would be stopped, and appropriate notification and coordination with the TPCG would be completed. Investigations would be conducted by the TPCG to characterize the nature and extent of the contamination and establish appropriate resolution. Should the project area change, additional HTRW investigations may required.

CUMULATIVE IMPACTS

NEPA defines cumulative effects as "The impact on the environment which results from the combined and incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

There has been no appreciable deltaic development in the Terrebonne Basin for the past 500 years. Data for the Terrebonne Basin (over 1 million acres), which includes the study area, shows that land was lost from 1956-1978 at a rate approximately 0.8 percent per year. From 1978-1990, the land loss

rate was 1.2 percent per year (Reed et al. 1995). These losses occurred from a variety of reasons, including subsidence, erosion, sea level change, oil and gas development, navigation channels, etc. Such land losses are predicted to continue with or without the proposed project.

The proposed action involves the expansion of an existing levee alignment, and is not anticipated to have significant adverse cumulative impacts, but would produce only minor impacts on the resources addressed in this report. The loss of impacted acreage on the unprotected floodside side of the levee is considered minimal due to the extent of comparable habitat in the immediate project area. To mitigate for intermediate/brackish marsh and scrub shrub impacts, the proposed project would create new marsh habitat extending outward from the toe of the completed levee in areas of open water. These emergent wetlands would provide protection to the new levee while producing valuable EFH, Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

The potential exists for an increase in development of any wetland areas on the protected inside area of the levee system. However, impacts to these wetlands are under the jurisdictional regulations of the federal, state, and local natural resource agencies.

Operations associated with project construction would produce localized and temporary impacts to air and water quality, and would be addressed by utilizing best management practices. Upon cessation of operations, these conditions would return to pre-project conditions. Therefore, no significant cumulative air/water quality impacts are expected.

The TPCG has a Feasibility Study that prioritizes future levee work (TPCD, 2006). They plan to raise 29.2 miles in 9 levee reaches in the next 6-24 months. Within 25-60 months they plan to build 3 water control structures and raise 30.6 miles in 5 levee reaches. Five unmeasured levee reaches and 34.3 miles of 6 levee reaches would be built within 61 to 120 months.

The Corps of Engineers has been authorized by Congress to build the Morganza to the Gulf Hurricane Protection Project which would raise most of the NFLs in the area. The project costs have risen significantly and the project may need to be reauthorized by Congress. There is no final NEPA analysis of the Morganza to the Gulf project at this time..

A report written by the Morganza-to-the-Gulf Technical Review Panel, formed by the Louisiana Coastal Protection and Restoration Authority in early 2008 to review the alignment of the Morganza to the Gulf hurricane protection system was released in early December 2008. The Technical Review Panel recommends significant investment be made by the state into building Morganza-to-the-Gulf along its current alignment, which utilizes existing parish levees and other structures such as road beds to minimize impacts on coastal wetlands. Recognizing the immediate need for hurricane protection for the area, the technical committee's report recommends the building of a minimum standard of protection throughout the system and then continuing to raise levee heights to meet new Corps requirements over the coming years.

Under the Fourth Supplemental, the Federal Government has been authorized to spend $90M to repair, replace, modify and improve the Federal LaRose to Golden Meadow Hurricane Protection levee system which is adjacent to the project area.

COORDINATION

Preparation of this EA and a draft Finding of No Significant Impact (FONSI) has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, are receiving copies of this EA and draft FONSI:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality, PER-REGC
Louisiana Department of Environmental Quality, EP-SIP
Louisiana State Historic Preservation Officer
Terrebonne Parish Levee Board District

Recommendations of the U.S. Fish and Wildlife Service (USFWS) in accordance with the Fish and Wildlife Coordination Act.

MITIGATION

After the levee work is completed, the second phase of the proposed project is to mitigate for unavoidable impacts to wetland habitats. The project would create brackish marsh as mitigation for the loss of the fresh, intermediate and brackish marsh and scrub shrub with a marsh understory caused by the project action. Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

The Wetland Value Assessment Model was used to determine the amount of mitigation needed. The results of the model are expressed in Average Annual Habitat Units (AAHU's) which are a combination of the habitat value to fish and wildlife and acreage over time. At the Orange Street Reach, 6.8 AAHU's of marsh habitat would be lost. On the Susie Canal Floodside, 11.1 AAHU's of marsh habitat would be lost and in the Susie Canal Cutoff, 0.5 AAHU's.. Thus, at total of 18.4 AAHU's of marsh habitat would be destroyed by the levee work. It was determined that 74 acres of new marsh would provide 19.3 AAHU's and thus mitigate for the loss. This marsh would be created in open water adjacent to the Orange Street levee as described on page EA-4 previously. . A monitoring plan will be developed so the TLCD and the TPCG can verify the success of the mitigation.

A draft WVA indicated that 10 AAHU's of bottomland hardwoods would be lost due to the proposed action. Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Disposal of fill material into waters or wetlands requires an evaluation under Section 404(b)1 of the Clean Water Act (CWA). A Section 404(b)1 evaluation has been prepared for the proposed project, and will be signed before work begins. A Public Notice was mailed out on _____. In addition, a state water quality certification application under CWA Section 401 was submitted to the State of Louisiana, Department of Environmental Quality (LADEQ) on October 27, 2008. The proposed action is located within the Louisiana Coastal Zone, and the MVN considers that the proposed action is consistent, to the maximum extent practicable, with the state program. A letter requesting concurrence with this determination was mailed to the Louisiana Department of Natural Resources, Coastal Management Division on October 27, 2008. Implementation of the proposed action would have no affect on historic properties. The SHPO concurred with this determination by fax stamped dated October 20, 2008.

Environmental compliance for the proposed action would be achieved upon: coordination of this EA and draft Finding of No Significant Impact (FONSI) with appropriate agencies, organizations, and individuals for their review and comments; National Marine Fisheries Services confirmation that the proposed action would not be likely to adversely affect any endangered or threatened species or essential fish habitat; Louisiana Department of Natural Resources concurrence with the determination that the proposed action is consistent, to the maximum extent practicable, with the state program; signature of the Section 404(b)(1) Evaluation; receipt and acceptance or resolution of all USFWS Fish and Wildlife Coordination Act recommendations; receipt and acceptance or resolution of all LADEQ comments on the air quality impact analysis documented in the EA. The draft FONSI would not be signed until the proposed action achieves environmental compliance with applicable laws and regulations, as described above.

CONCLUSION

This office has assessed the environmental impacts of the proposed action, and has determined that the proposed action would have no impact upon cultural resources, and once mitigated, no significant impact on water bodies, marsh, fisheries, EFH, wildlife, bottomland hardwoods, endangered or threatened species, public recreation, aesthetics, or air quality. The proposed action consists of repairing, replacing, modifying and improving approximately 6.1 miles of a non-federal levee near Dulac, Terrebonne Parish, Louisiana utilizing material from 60-acres of an offsite borrow area located near Montegut, Terrebonne Parish, Louisiana if the existing levee material is not suitable under the new Corps of engineers specifications. If the levee soil is suitable, then only 30 acres of offsite borrow would be needed. Five no-work zones have been designated around four pipeline crossings, Bayou Butler and the DO-08 Pumping Station. The United States will bear no responsibility for addressing protection in these no-work zones. The risk of encountering HTRW on this project is low. Mitigation of unavoidable impacts to marsh and scrub shrub with a marsh understory would be achieved through the creation of 74 acres of new marsh habitat in open water areas adjacent to the newly constructed levee. Bottomland hardwood mitigation would be achieved by MVN purchase of enough credits from a mitigation bank to mitigate for the loss of 10 AAHU's of bottomland hardwoods or by planting young bottomland hardwood species on enough acres to fully mitigate these impacts.

PREPARED BY

EA #450 and the associated draft FONSI were prepared by Alan Bennett, Biologist, in cooperation with Tyler Ortego, Matthew Sevier and Gary Jacob of SHAW Coastal Inc. Relevant sections prepared

by: Christopher Brown (HTRW), Gary DeMarcay (Cultural Resources), Andrew Perez (Recreational Resources), and Richard Radford (Aesthetics Resources).

The address of the preparers is: U.S. Army Corps of Engineers, New Orleans District; Planning, Programs, and Project Management Division, Environmental Compliance Branch, CEMVN-PM-R; P.O. Box 60267; New Orleans, Louisiana 70160-0267.

LITERATURE CITED

Boesch, D.F., M.N. Josselyn, A.J. Mehta, J.T. Morris, W.K. Nuttle, C.A. Simenstad, D.J.P Swift. 1994. *Scientific assessment of coastal wetland loss, restoration and management in Louisiana*. Journal of Coastal Research. Special Issue No. 20.

Gosselink, J.G. 1984. *The ecology of delta marshes of coastal Louisiana: a community profile*. FWS/OBS-84/09. U.S. Fish and Wildlife Service, Washington, D.C.

Reed, D.J., E.M. Swenson, and J.G. Gosselink. 1995. Physical Setting. D.J. Reed (ed.) pp. 9-23 in: *Current Status and Historical Trends of Hydrological Modification, Reduction in the Sediment Availability, and Habitat Loss/Modification in the Barataria-Terrebonne Estuarine System*. BTNEP No. 20. Barataria Terrebonne National Estuary Program, Thibodaux, LA.

Terrebonne Parish Consolidated Government, 2006. *Feasibility Study for Levee Enhancement Projects, Terrebonne Parish, Louisiana.*

U.S. Department of Agriculture, Soil Conservation Service. 2007. *Soil Survey of Terrebonne Parish, Louisiana*.

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Bobtown Bridge
Suzie Canal Cutoff
Bayou Butler No Work Zone
Combon Bridge
D-08 No Work Zone
PROJECT VICINITY
La. Hwy. 57
Orange Street
LAKE BOUDREAUX
4,000 2,000 0 4,000 8,000 Feet

PROJECT VICINITY
J1 Borrow Site
Houma
Crozier
Ashland
La. Hwy. 57
La. Hwy. 55
La. Hwy. 56
La. Hwy. 58
Klondyke
LAFOURCHE PARISH
TERREBONNE PARISH
SOUTH HOUMA OIL AND GAS FIELD
Radio Tower
Montegut
Chauvin
Point Barre
Hog Point
Lake Boudreaux
Bayou Petit Caillou
Bayou Terrebonne
Lake Gero
Boudreaux
Lapeyrouse
1.5 0.75 0 1.5 3 Miles

Legend

- No Work Zones
- Orange Street Levee
- Suzie Canal Levee

N W E S

REFERENCE/PROJECTION: USGS QUADRANGLE MAPS, TERREBONNE PARISH

U. S. ARMY CORPS
OF ENGINEERS
NEW ORLEANS DISTRICT

FIGURE 1. PROJECT VICINITY

TERREBONNE NON-FEDERAL LEVEES PROJECT AND MTG REACH J-1 BORROW SITE

Terrebonne Parish
Non-Federal Levee Reconstruction

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OFFICE BTR

10" Gas - La. Intrastate Gas Corp.

10" Gas - La. Intrastate Gas Corp.

30" Gas - Columbia Gulf

12" Gas - United Gas

Bayou Butler No Work Zone

Proposed Access Route (Privately Owned)

Gas Station and Dollar General Store

Proposed Access Route

Suzie Canal Cutoff

Note: Footprint includes New Levee and Borrow Canal

Proposed Access Route Georgi Girl Lane

Bobtown Bridge

Bobtown Bridge Staging Area

Legend

- Pipeline
- Road
- Staging Area
- No Work Zones
- Bottomland Hardwoods
- Developed/Existing Levee
- Fresh Marsh
- Intermediate Marsh
- Open Water
- Shrub-Scrub
- Submerged Aq. Veg.

N E S W

1,000 500 0 1,000 2,000 Feet

REFERENCE: 2007 NAIP Ortho Imagery

U. S. ARMY CORPS OF ENGINEERS NEW ORLEANS, LA

FIGURE 2. SUZIE CANAL ALIGNMENT

TERREBONNE NON-FEDERAL LEVEES SUZIE CANAL ALIGNMENT IMPACTS

Terrebonne Parish
Non-Federal Levee Reconstruction

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DRAWING NUMBER: v:cad\129355\gis\EA Figures\ Figure 3. mxd

12" Gas - United Gas

10" Gas - La. Intrastate Gas Corp.

Bayou Butler No Work Zone

D-08 Pumping Station

Orange Street Staging Area

Proposed Access Route Panda Lane

Combon Bridge

Grand Caillou Elementary School

Legend

- Pipeline
- Road
- Staging Area
- No Work Zones
- Bottomland Hardwoods
- Brackish Marsh
- Developed
- Water

N E S W

1,000 500 0 1,000 Feet

REFERENCE: 2007 NAIP Ortho Imagery

U. S. ARMY CORPS
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NEW ORLEANS, LA

FIGURE 3. ORANGE STREET ALIGNMENT

TERREBONNE NON-FEDERAL LEVEES
ORANGE STREET ALIGNMENT IMPACTS

Terrebonne Parish
Non-Federal Levee Reconstruction

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10" Gas - La. Intrastate Gas Corp.

10" Gas - La. Intrastate Gas Corp.

30" Gas - Columbia Gulf

12" Gas - United Gas

Proposed Access Route

Proposed Access Route (Privately Owned)

Gas Station and Dollar General Store

Bayou Butler No Work Zone

Proposed Access Route Panda Lane

D-08 Pumping Station

Orange Street Staging Area

Not Included in this Project

Bayou Grand Caillou

Orange Street

La. Hwy. 57

Shrimper's Row

Bobtown Bridge

Bobtown Bridge Staging Area

Suzie Canal Cutoff

Proposed Access Route Georgi Girl Lane

Combon Bridge

Grand Caillou Elementary School

Proposed Access Route Orange Street

Houma Navigation Canal

Legend

- Pipeline
- Road
- Staging Area
- No Work Zones
- Orange Street Levee
- Suzie Canal Levee

N E S W

2,000 1,000 0 2,000 4,000 Feet

REFERENCE/PROJECTION: USGS QUADRANGLE MAPS, TERREBONNE PARISH

U. S. ARMY CORPS
OF ENGINEERS
NEW ORLEANS DISTRICT

FIGURE 4. ACCESS AND STAGING AREAS

TERREBONNE NON-FEDERAL LEVEES PROJECT LOCATION MAP

Terrebonne Parish
Non-Federal Levee Reconstruction

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HOUMA	C.Liner	12/08/08

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Legend

- Proposed Earthen Containment Dike (8,675 ft)
- Proposed Marsh Berm (74 ac)
- Proposed Suzie Canal ROW
- Proposed Orange Street ROW

REFERENCE/PROJECTION: 2007 NAIP IMAGE

N E S W

1,000 500 0 1,000 Feet

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FIGURE 5. PROPOSED MITIGATION

TERREBONNE NON-FEDERAL LEVEES

Terrebonne Parish
Non-Federal Levees Reconstruction