

Appendix A: List of Acronyms and Definitions of Common Terms

ACB	-	Articulated Concrete Block
AG	-	Algiers Gate
CED	-	Comprehensive Environmental Document
CEMVN	-	United States Army Corps of Engineers, Mississippi Valley Division, New Orleans District
CEQ	-	Council on Environmental Quality
CERCLA	-	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	-	cubic feet per second
DNL	-	Day-Night Sound Level
dBA	-	Decibels
EA	-	Environmental Assessment
EIS	-	Environmental Impact Statement
EPA	-	Environmental Protection Agency
ER	-	Engineer Regulation
ESA	-	Environmental Site Assessment
FHWA	-	Federal Highway Administration
FONSI	-	Finding of No Significant Impact
FPPA	-	Farmland Protection Policy Act
FWCA	-	Fish and Wildlife Coordination Act
GIWW	-	Gulf Intracoastal Waterway
HSDRRS	-	Hurricane and Storm Damage Risk Reduction System
HTRW	-	Hazardous, Toxic, and Radioactive Waste
IER	-	Individual Environmental Report
JLNHPP	-	Jean Lafitte National Historical Park and Preserve
LA	-	Louisiana

LASHPO	-	Louisiana State Historic Preservation Officer
LCRP	-	Louisiana Coastal Resource Program
LADEQ	-	Louisiana Department of Environmental Quality
LADNR	-	Louisiana Department of Natural Resources
LNHP	-	Louisiana Natural Heritage Program
LORR	-	Level of risk reduction
LPV	-	Lake Pontchartrain Vicinity
NAAQS	-	National Ambient Air Quality Standards
NEPA	-	National Environmental Policy Act
NAVD 88	-	North American Vertical Datum of 1988
NMFS	-	National Marine Fisheries Service
O&M	-	Operation and Maintenance
OMRR&R	-	Operation, Maintenance, Repair, Replacement and Rehabilitation
PDT	-	Project Delivery Team
PM	-	Particulate Matter
PP	-	Parallel Protection
PPA	-	Project Partnering Agreement
RCRA	-	Resource Conservation and Recovery Act
REC	-	Recognized Environmental Conditions
ROD	-	Record of Decision
ROW	-	Right-of-Way
SPH	-	Standard Project Hurricane
T&E	-	Threatened and Endangered
TRM	-	Turf Reinforcement Mattress
US	-	Unites States of America
USACE	-	United States Army Corps of Engineers
USDA	-	United States Department of Agriculture

USFWS	-	United States Fish and Wildlife Service
USHUD	-	United States Department of Housing and Urban Development
WBV	-	West Bank and Vicinity of New Orleans
WCC	-	Gulf Intracoastal Waterway West Closure Complex
WRDA	-	Water Resources Development Act

Appendix C: Members of Interagency Environmental Team

Kyle Balkum	Louisiana Dept. of Wildlife and Fisheries
Elizabeth Behrens	U.S. Army Corps of Engineers, MVN
Catherine Breaux	U.S. Fish and Wildlife Service
Michael Brown	U.S. Army Corps of Engineers, MVN
David Castellanos	U.S. Fish and Wildlife Service
Mike Carloss	Louisiana Dept. of Wildlife and Fisheries
Frank Cole	Louisiana Department of Natural Resources
Getrisc Coulson	U.S. Army Corps of Engineers, MVN
Jennifer Darville	U.S. Army Corps of Engineers, MVN
Greg Ducote	Louisiana Department of Natural Resources
Robert Dubois	U.S. Fish and Wildlife Service
John Ettinger	U.S. Environmental Protection Agency
Michelle Fischer	U.S. Geologic Survey
Deborah Fuller	U.S. Fish and Wildlife Service
Mandy Green	LDNR Coastal Protection and Restoration Authority
Tom Griggs	Louisiana Dept. of Environmental Quality
Jeffrey Harris	Louisiana Department of Natural Resources
Richard Hartman	NOAA National Marine Fisheries Service
Brian Heinmann	Louisiana Dept. of Wildlife and Fisheries
Jeff Hill	NOAA National Marine Fisheries Service
Christina Hunnicutt	U.S. Geologic Survey
Barbara Keeler	U.S. Environmental Protection Agency
Kirk Kilgen	Louisiana Department of Natural Resources
Tim Killeen	Louisiana Department of Natural Resources
Patricia Leroux	U.S. Army Corps of Engineers, MVN
Brian Lezina	Louisiana Dept. of Wildlife and Fisheries
Lissa Lyncker	U.S. Army Corps of Engineers, MVN
Brian Marcks	Louisiana Department of Natural Resources
Ismail Merhi	LDNR Coastal Protection and Restoration Authority
David Muth	U.S. National Park Service
Beth Nord	U.S. Army Corps of Engineers, MVN
Bonnie Obiol	U.S. Army Corps of Engineers, MVN
Gib Owen	U.S. Army Corps of Engineers, MVN
Jamie Phillipe	Louisiana Dept. of Environmental Quality
Jim Rives	Louisiana Department of Natural Resources
Kevin Roy	U.S. Fish and Wildlife Service
Manuel Ruiz	Louisiana Dept. of Wildlife and Fisheries
Renee Sanders	LDNR Coastal Protection and Restoration Authority
Danielle Tommaso	U.S. Army Corps of Engineers, MVN
Angela Trahan	U.S. Fish and Wildlife Service
Lee Walker	U.S. Army Corps of Engineers, MVN
Nancy Walters	U.S. Fish and Wildlife Service
David Walther	U.S. Fish and Wildlife Service
Laura Lee Wilkinson	U.S. Army Corps of Engineers, MVN
Patrick Williams	NOAA National Marine Fisheries Service



United States Department of the Interior



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

June 25, 2008

Robert H. Boudet
Senior Project Manager
Aerostar Environmental Services
4640 S. Carrollton Ave
Suite 160
New Orleans, LA 70119

Subject: Individual Environmental Report (IER) – 12
United States Army Corps of Engineers (USACE)
Harvey-Algiers Canal and the GIWW
Jefferson, Orleans and Plaquemines Parish, Louisiana

Dear Mr. Boudet:

Please reference your June 6, 2008, letter requesting our review of the Harvey-Algiers Canal and the GIWW project located in Jefferson, Orleans, and Plaquemines Parishes, Louisiana. The U.S. Fish and Wildlife Service (Service) has reviewed the information you provided, and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Our records indicate that no federally listed threatened or endangered species presently occur within the proposed project area. Therefore, no further consultation will be required unless there are changes in the scope or location of the project, or construction has not been initiated within one year. If the proposed projects have not been initiated within one year, follow-up consultation should be accomplished with this office prior to making expenditures for construction. If the scope or location of the proposed work is changed, consultation should occur as soon as such changes are made.

The proposed project is not located within a wilderness area/preserve but in an area that was subject to an Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c) in 1985. According to the EPA Final Determination, the discharge of any dredged or fill material within the approximately 3200 acre site, referred to as the Bayou aux Carpes 404(c) area, is restricted. The EPA action allowed for three specific exceptions, none of which appears to apply to the Corps' current hurricane protection proposal. Previous requests which have



fallen outside those exceptions have been denied by EPA as being contrary to the CWA 404(c) determination. One such categorical denial prohibited the Corps from altering the alignment of the West Bank Hurricane Protection Levee such that it would encroach upon the Bayou aux Carpes 404(c) area.

The EPA 404(c) action was intended as an advance notification to the public and agencies of the government's determination under the CWA Section 404 for the area, in the sense of planning aid coordination. In light of this existing determination, we would expect the NEPA work on the portion of the levee forming the 404(c) boundary to thoroughly evaluate the range of feasible alternatives and their environmental impacts, as well as documenting the Corps' legal and regulatory authority for any alternative that would entail impacts to the Bayou aux Carpes 404(c) area.

The Bayou aux Carpes 404(c) is one of only 11 such actions ever completed by EPA. Approximately 2,800 acres within the site are in Federal ownership and Congress is considering legislation to adjust the boundary of the Barataria Preserve within the Jean Lafitte National Historical Park and Preserve to include the Bayou aux Carpes. In the meantime, the National Park Service (NPS) has constructive possession of the area. Therefore, the Corps should contact both the NPS (Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov)) and EPA (Ms. Barbara Keeler, 214/665-6698) regarding any proposed project feature that may impact that area.

The above findings and recommendations constitute the report of the Department of the Interior. Please contact David Walther (337/291-3122) or Angela Trahan (337/291-3137) of this office if additional information is needed.

Sincerely,



James F. Boggs
Supervisor
Louisiana Field Office

cc: EPA, Dallas, TX
LDWF, Baton Rouge, LA
Jean Lafitte National Historical Park



BOBBY JINDAL
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL RESTORATION AND MANAGEMENT

December 17, 2008

Elizabeth Wiggins
Chief, Environmental Planning and Compliance Branch
U. S. Army Corps of Engineers, New Orleans District
P. O. Box 60267
New Orleans, Louisiana 70160-0267

RE: **C20080483, Coastal Zone Consistency**
U. S. Army Corps of Engineers, New Orleans District
Direct Federal Action
IER #12, West Bank and Vicinity, GIWW, Algiers, and Harvey Canals Hurricane
Protection, **Jefferson and Plaquemines Parishes, Louisiana**

Dear Ms. Wiggins:

The above referenced project has been reviewed for consistency with the approved Louisiana Coastal Resource Program (LCRP) as required by Section 307 of the Coastal Zone Management Act of 1972, as amended. The project, as proposed in the application, is consistent with the LCRP. If you have any questions concerning this determination please contact Brian Marcks of the Consistency Section at (225) 342-7939 or 1-800-267-4019.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Jim Rives".

Jim Rives
Administrator

JR/JDH/bgm

cc: Dave Butler, LDWF
Getrise Coulson, COE-NOD
Albertine Kimble, Plaquemines Parish
Marnie Winter, Jefferson Parish
Barbara Keeler, USEPA, Dallas
Frank Cole, CMD FI
Ismail Mehri, LACPRA



BOBBY JINDAL
GOVERNOR

HAROLD LEGGETT, PH.D.
SECRETARY

State of Louisiana
DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

DEC 16 2008

U.S. Army Corps of Engineers- New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

Attention: Gigi Coulson

RE: Water Quality Certification (WQC 080825-02/AI 160206/CER 20080001)
Individual Environmental Report (IER) #12
West Bank & Vicinity, GIWW, Harvey & Algiers Canals
Jefferson & Plaquemines Parishes

Dear Ms. Coulson:

The Department has reviewed your application for a 401 Water Quality Certification for the construction of the GIWW, Harvey & Algiers Canals hurricane protection levee, in the vicinity of Belle Chasse, Louisiana in Jefferson & Plaquemines Parishes.

The requirements for Water Quality Certification have been met in accordance with LAC 33:IX.1507.A-E. Based on the information provided in your application, we have determined that the placement of the fill material will not violate the water quality standards of Louisiana provided for under LAC 33:IX.Chapter 11. Therefore, the Department has issued a Water Quality Certification.

Sincerely,

A handwritten signature in black ink, appearing to read "T. F. Harris".

Thomas F. Harris
Administrator
Waste Permits Division

TFH/jjp



MITCHELL J. LANDRIEU
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

PAM BREAU
SECRETARY

August 1, 2008

Ms. Elizabeth Wiggins
Chief, Environmental Planning and Compliance Branch
Department of the Army
New Orleans District, Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160-0276

Re: Reconnaissance CRM Management Summary
LA Division of Archaeology Report No. 22-3134
*Management Summary: Reconnaissance Survey
of the Belle Chasse to Harvey Westwego Segment
(IER #12), West Bank and Vicinity Hurricane
Protection Levee, Jefferson, Orleans, and Plaquemines
Parishes, Louisiana*
Coastal Environments, Inc.

Dear Ms. Wiggins:

We acknowledge the receipt of your letter dated July 7, 2008, and two copies of the above- referenced report. We have completed our review of the report and offer the following comments.

The management summary of this 6,000-acre (ac) reconnaissance survey is detailed in the description of the methodology and results for the identified high probability areas (134.5 ac). It is our understanding, based on the management summary, transmittal letter, and July 30, 2008, phone conversation with Mike Swanda that the majority of the APE was not subject to archaeological survey due to the disturbed nature of the landscape. The majority of the Area of Potential Effects (APE) has been subject to severe land disturbance activities including levee construction, canal and borrow excavation, residential and commercial development, and road construction. At this time, we concur with the management summary findings that within the identified high and low probability areas of the Area of Potential Effects (APE) no historic properties will be affected by the proposed project.

Please review the enclosed technical comments and photocopied pages with comments or corrections noted. We request that you make adjustments, as appropriate, in the subsequent report for this project. If you should have any questions please contact Stacie Palmer in the Division of Archaeology by email at spalmer@crt.state.la.us or by phone at (225) 342-5737.

Sincerely,

Robert Collins
Deputy State Historic Preservation Officer

Ms. Elizabeth Wiggins
August 1, 2008
Page 2

RC:SP:s

Enclosures: as stated

Cc: David Kelley
Coastal Environments, Inc.
1260 Main St.
Baton Rouge, LA 70802

Technical Comments:

1. Please include a title page, abstract, table of contents, list of figures, and list of tables.
2. Introduction – Please include a description of the disposition (temporary and final) of field notes, maps, photographs, etc.
3. Environmental Setting – Please discuss the potential for buried deposits within the APE.
4. Previous Investigations – Please clearly state which surveys have been conducted within the APE.
5. Previous Investigations – The Gagliano Survey (1975) conducted within the APE needs to be identified on the map.
6. Previous Investigations – Are all the surveys discussed located within 1 mile of this particular portion of IER 12 or are they for the entire IER 12?
7. Please include a copy of the Scope of Work referred to in the transmittal letter, as an appendix to the management summary.
8. It would be helpful if a large format map could be provided of the APE and the associated 27 items listed in Table 1 to see where these items are in relation to the high probability areas that were surveyed.
9. Methodology – Include a description of the bank line survey (including probing); auger testing and pedestrian survey carried out within the identified high probability areas.
10. Methodology – Clearly state why the low probability areas were not subject to archaeological survey.
11. Results – Clearly state the number of acres surveyed in each area (A, B, C and Gate Option) and the number of shovel test pits excavated in each area.

22-3134
Recon Survey (MS)
Noncirculating Copy
LA Division of Archaeology

CONTRACT NO. W91ZP8-U7-D-9041
DELIVERY ORDER No. 0001



U.S. Army Corps
of Engineers

New Orleans District

**MANAGEMENT SUMMARY:
RECONNAISSANCE SURVEY OF THE
BELLE CHASSE TO HARVEY-
WESTWEGO SEGMENT (IER 12),
WEST BANK AND VICINITY
HURRICANE PROTECTION LEVEE,
JEFFERSON, ORLEANS, AND PLAQUEMINES
PARISHES, LOUISIANA**

June 2008

Coastal Environments, Inc.
1260 Main Street
Baton Rouge, Louisiana

*6576 is the
author?
Please include
title page*

Prepared for:

New Orleans District
U. S. Army Corps of Engineers
New Orleans, Louisiana

None of
these are
shown on
Figure 1.

modifications to nine pump stations (Figure 1). This includes 27 items, listed in Table 1. CEMVN is undertaking these improvements in order to protect the portions of the Greater New Orleans Area situated on the Mississippi River's right descending bank from storm surges associated with tropical weather events. The scope of work for the Belle Chasse-Westwego Segment calls for a 500 ft (152 m) survey corridor on both the flood and protected sides of the levee centerline, for a total of 3757.6 ac (1520.6 ha) within the primary alternative route (Alternative 1). An Alternative 1B would fill in the Estelle Outfall Canal from the Old Estelle Pump Station east to Bayou Baratavia, building a levee over this fill, adding another 171.2 ac (69.2 ha) to the total. Three additional alternates, identified as Southern Closure Options 1 to 3, are found near the western terminus, covering an additional 1037.5 ac (419.9 ha) of wetlands. The so-called Gate Option is another alternate, consisting of a floodgate and levee/canal system at the southern end of the Belle Chasse-Westwego levee (Figure 2). This option, and three alternates associated with it, cover an additional 1019.4 ac (412.5 ha) of marsh, cypress swamp, and drained wetlands. The total Area of Potential Effects for the levee segment is 5985.7 ac (2422.3 ha).

Natural Setting

Located along the backslope of the Mississippi River's natural levee, the project corridor lies within the Baratavia Basin of southeast Louisiana, a broad, low region dominated by wetlands. This area was once characterized almost entirely by cypress swamps and freshwater marshes, but forced drainage and filling has drastically altered the environment of much of the protected side of the levee. Only the project corridor at the far eastern end of the Gulf Intracoastal Waterway Alternate (GIWW) approaches the modern Mississippi levee. The flood side of the levee is largely marsh and swamp, although subsidence has created areas of open water in the marsh. Man-made levees along the Mississippi have prevented fresh water and sediments from reaching the marsh, further accelerating its deterioration.

The near-surface geomorphology of the region has been mapped by the U.S. Army Corps of Engineers (USACE 1996a, b), and known channels are shown in Figures 3 and 4.

Table 1. Items within the Belle Chasse Westwego Survey Area.

Vicinity Item #	Item Description
WBV 1	Sector Gate to Boomtown Floodwall
WBV 2a	Boomtown Floodwalls
WBV 2b	Boomtown to Hero PS Floodwalls
WBV 3	Hero PS to Algiers Canal Floodwall
WBV 4	Belle Chasse Hwy to Hero Cutoff-Reach 1
WBV 5	Belle Chasse Hwy to Hero Cutoff
WBV 6	Belle Chasse Hwy to Hero Cutoff-Reach 3 & 4
WBV 7	Planters PS Fronting Protection and Modifications
WBV 8	S&WB PS #13 Fronting Protection and Modifications
WBV 10	Belle Chasse PS #1 (Plaquemines PS) Fronting Protection and
WBV 11	Belle Chasse PS #2 Fronting Protection and Modifications
WBV 13	S&WB PS #11 Fronting Protection and Modifications
WBV 14a	Estelle PS to Vicinity of Lapalco Overpass
WBV 14g	Estelle PS Vicinity Floodwalls
WBV 14h	Old Estelle PS to V-line Levee
WBV 23	New Estelle PS Fronting Protection
WBV 33	Old Estelle PS Fronting Protection
WBV 38	Cousins Pump Station
WBV 39b	Cousins Discharge Channel Floodwalls
WBV 44	Whitney Barataria PS Fronting Protection and Modification
WBV 46	Sector Gate Complex
WBV 47	Algiers Lock to Belle Chasse Hwy (West)
WBV 48	Belle Chasse Hwy to Algiers Lock (East)
WBV 49	Hero Levee to Belle Chasse Hwy (East)

*Can you
provide
maps with
these items
shown.*

corridor. Other closely-related Plaquemine Delta distributaries are found within the confines of the Gate Option.

Soils

Soil types in the general vicinity of the project corridor vary depending upon the distance from the Mississippi River and its distributaries. In terms of elevation, the project area is located at or near sea level. The majority of the Belle Chasse-Westwego Segment is located in drained or undrained wetlands and the soils are indicative of this. Most of the soils within the area are classifiable as Westwego Clays, Schriever Clays, or Barbary, Rita and Allemands Mucks, (Figure 5), indicating formation in frequently flooded or permanently wet environments (NRCS WebSoilSurvey 2007). Barbary soils are classified as level, very poorly drained soils that have a mucky surface layer underlain by clayey materials, and are derived from flooded swamp environments. Soils of Allemands and Rita associations are

**MANAGEMENT SUMMARY:
RECONNAISSANCE SURVEY OF THE
BELLE CHASSE TO HARVEY-
WESTWEGO SEGMENT (IER 12),
WEST BANK AND VICINITY
HURRICANE PROTECTION LEVEE,
JEFFERSON, ORLEANS, AND PLAQUEMINES
PARISHES, LOUISIANA**

Introduction

other dates of survey - June 2007, initial Recon Survey P. 12

In January and May 2008, Coastal Environments, Inc. (CEI) undertook a cultural resources reconnaissance for the U.S. Army Corps of Engineers, Mississippi Valley Division, New Orleans District (CEMVN) of a portion of the West Bank and Vicinity Hurricane Protection Levee in Jefferson, Orleans, and Plaquemines Parish, Louisiana, in advance of proposed improvements. These improvements, comprising an undertaking by a Federal agency, are subject to the processes mandated by Section 106 of the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969. Under these laws and regulations, the CEMVN must take into account the effect of this proposed project on cultural resources within the project ~~right of way~~ *area of potential effects (APE)*.

The area in question, (hereafter, the Belle Chasse-Westwego Segment) under Interim Environmental Report (IER) 12, includes 31 mi (49.9 km) of levee, a proposed 18,800 ft (8730 m) of floodwalls, modifications to 18 existing gates, and fronting protection

ENLARGE to whole page and include gate/catchment survey AREA

Canal from Belle Chasse to Planters Canal on this map.

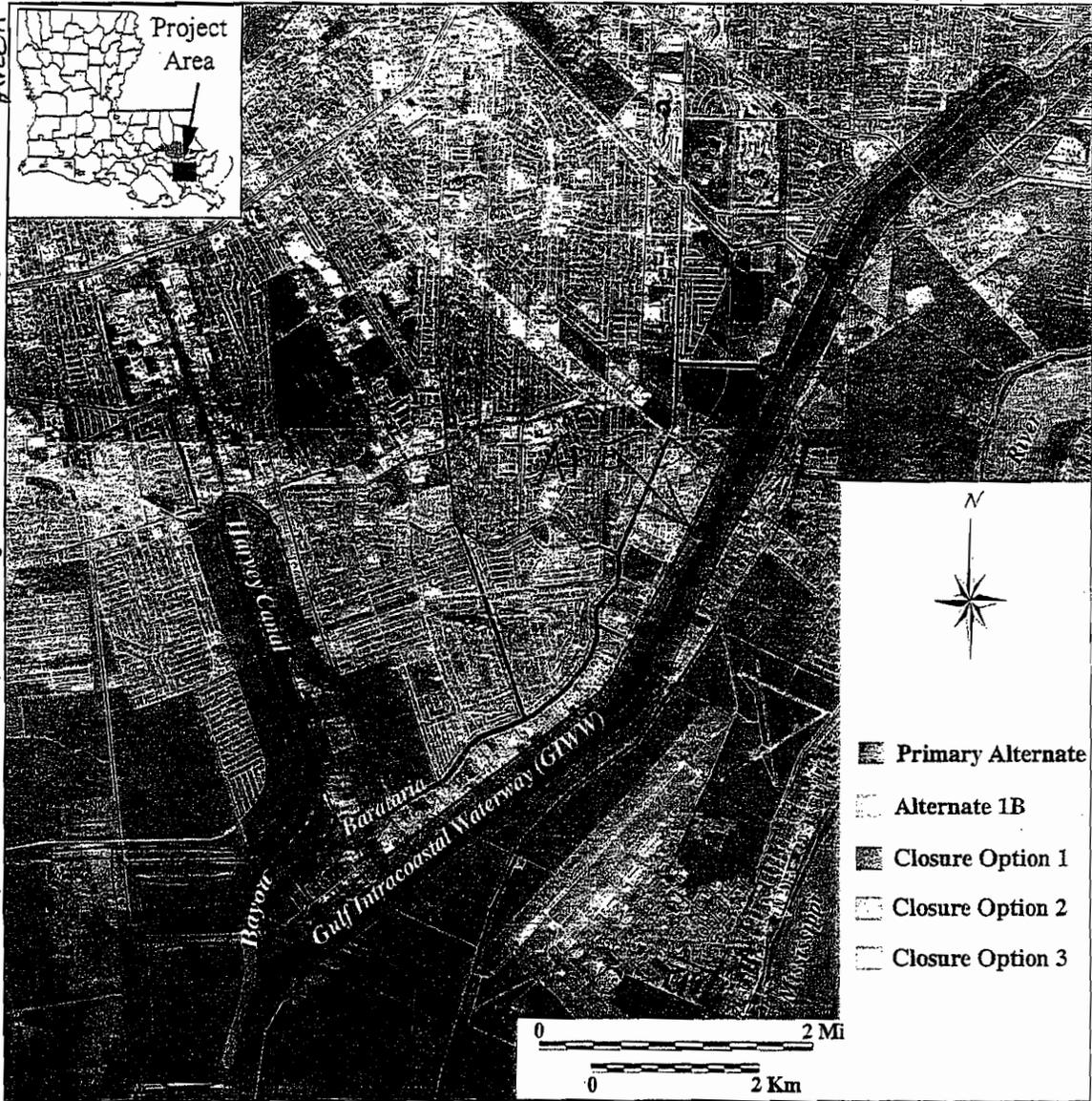


Figure 1. Aerial photograph showing the Belle Chasse-Westwego Segment (IER 12) for the West Bank Hurricane Protection Levee.

A single distributary, possibly marked on nineteenth century maps as Bayou Gazeland, crosses the GIWW alternate at the Planters Canal, and was mapped by Roger Saucier (1963,1994) as part of the Unknown Bayou distributary of the St. Bernard Delta. Other distributaries formed to the southeast of the project area as part of the Plaquemines Delta, and one of these is now occupied by Bayou Barataria at the southeastern terminus of the study

label on map Fig 3



United States Department of the Interior



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

December 24, 2008

Colonel Alvin B. Lee
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

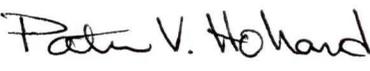
Dear Colonel Lee:

Enclosed is the Draft Fish and Wildlife Coordination Act Report for the Individual Environmental Report (IER) 12, Improved Protection from Harvey to Algiers, Jefferson, Orleans and Plaquemines Parishes, Louisiana. The preferred alternative was developed through proactive coordination between the U.S. Army Corps of Engineers and the natural resource agencies. The preferred alternative would include construction of navigable floodgate and ancillary structures on the GIWW south of the confluence of the Algiers and Harvey Canals and construction of approximately 4,200 linear feet of new floodwall along the north bank of the Gulf Intracoastal Waterway and within the Bayou aux Carpes 404 (c) designated area. The levees and floodwalls between the Old Estelle pumping station and the Harvey Canal, and south along the V-levee would be also raised to the 100-year level of protection.

This draft report is transmitted under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and is being coordinated with the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service. Comments by those agencies will be attached to our final report.

Should your staff have any questions regarding the enclosed draft report, please have them contact Angela Trahan of this office at 337/291-3137.

Sincerely,

for 
James F. Boggs
Supervisor
Louisiana Field Office

Enclosures



cc: EPA, Dallas, TX
FWS, Atlanta, GA (ES/HC)
Jean Lafitte National Historical Park and Preserve, New Orleans, LA
NMFS, Baton Rouge, LA
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA

Draft
Fish and Wildlife Coordination Act Report

Individual Environmental Report (IER) 12,
Harvey to Algiers



PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
ANGELA TRAHAN
FISH AND WILDLIFE BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA
DECEMBER 2008

U.S. FISH AND WILDLIFE SERVICE – SOUTHEAST REGION

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APPENDICES

APPENDIX A - WVA ANALYSIS	A-1
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FIGURES

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TABLES

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Executive Summary

The U.S. Fish and Wildlife Service (Service) has prepared the attached Fish and Wildlife Coordination Act Report for the proposed Westbank and Vicinity of New Orleans (WBV), Harvey to Algiers, 100-year level hurricane protection project, Individual Environmental Report 12 (IER 12). The Corps of Engineers, New Orleans District (Corps) is preparing, those IERs under the approval of the Council on Environmental Quality (CEQ). The IERs will partially fulfill the Corps compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in the IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., WBV and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana.

This report addresses IER 12 and contains a description of the existing fish and wildlife resources of the project area, discusses future with- and without-project habitat conditions, identifies fish and wildlife-related impacts of the proposed project, and provides recommendations for the proposed project. This report incorporates and supplements our Fish and Wildlife Coordination Act (FWCA) Reports that addressed impacts and mitigation features for the WBV (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) Hurricane Protection project, and the November 26, 2007, Draft Programmatic FWCA Report that addresses the hurricane protection improvements authorized in Supplemental 4. Impacts and mitigation needs resulting from government and contractor provided borrow areas are being addressed in separate IERs; therefore this report will not address those project features. This draft document does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This draft report has been provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Oceanic and Atmospheric Administration's, National Marine Fisheries Service (NOAA's NMFS), and their comments will be incorporated in the final report.

The IER 12 study area is located in the upper Barataria Basin and includes the Belle Chasse, Gretna-Algiers, and Harvey-Westwego sub-basins along the west bank of the Mississippi River in Jefferson, Orleans and Plaquemines Parishes, Louisiana. The Jean Lafitte National Historical Park and Preserve (JLNHPP) and the Bayou aux Carpes wetland complex are located to the south of the Harvey-Westwego sub-basin and are managed by the National Park Service (NPS). The Bayou aux Carpes wetland complex is subject to an Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c) invoked in 1985, and according to the EPA Final Determination, the discharge of any dredged or fill material within the approximately 3,200-acre site, referred to as the Bayou aux Carpes CWA Section 404(c) area [Bayou aux Carpes 404 (c) area], is restricted.

Study area wetlands support nationally important fish and wildlife resources including flotant marsh and cypress swamp. Factors that will strongly influence future fish and wildlife resource

conditions outside of the protection levees include freshwater and sediment input and loss of coastal wetlands. Regardless of which of the above factors ultimately has the greatest influence, emergent wetlands within, and adjacent to, the project area will probably experience losses due to subsidence, erosion, and relative sea-level rise.

During the alternatives analysis, the no-action alternative and the alternative to raise the existing Hurricane Protection System to a 100-year level of protection were considered. The no-action alternative would not be implemented because it fails to provide the authorized level of protection to the Belle Chasse, Gretna-Algiers, and Harvey-Westwego sub-basins. The Corps also considered a series of alternative gate locations within the project area that would minimize the need for parallel protection. One of these alternatives included constructing a sector gate across the Bayou aux Carpes 404 (c) area. That alternative was considered to have significant impacts to fish and wildlife resources and EPA CWA, Section 404 (c) designated wetlands.

Developed through proactive coordination between the EPA, NPS, and the Corps, the preferred alternative would include construction of navigable floodgate and ancillary structures on the Gulf Intracoastal Waterway (GIWW) south of the confluence of the Algiers and Harvey Canals and upstream of the Hero Canal. The levees and floodwalls between the Old Estelle pumping station and the Harvey Canal, and south along the V-levee would be raised to the 100-year level of protection [i.e., approximately 14 to 16 foot elevation North American Vertical Datum of 1988 (NAVD 88)]. Approximately 4,200 linear feet of floodwall would be constructed within a 100-foot-wide right-of-way along the periphery of the GIWW and the Bayou aux Carpes 404 (c) area to connect the proposed GIWW navigable floodgate with the existing flood protection system. Existing levees and floodwalls along Algiers and Harvey Canals will be incorporated into the protected side of the closure complex and would be integrated as features of the parallel protection system retention basin. Expansions of existing rights-of-way along several levee reaches would occur as a result of bringing those existing levees up to authorized levels of protection in order to provide necessary storm water retention during major storm events. To ensure habitat functions of the Bayou aux Carpes drainage area are maintained, the proposed action includes several environmental augmentations along the Old Estelle pump station outfall canal and within the Bayou aux Carpes drainage area which will provide sheet flow and hydrologic exchange into, and within, the Bayou aux Carpes 404(c) area.

Implementation of the preferred alternative would directly impact 252 acres of hydrologically-altered bottomland hardwood habitat, 2.4 acres of wet bottomland hardwood habitat, and approximately 75 acres of swamp habitat. Of those impacts approximately 2.4 acres of wet bottomland hardwood and 7.4 acres of swamp habitat (i.e., 9.8 acres) occur within the Bayou aux Carpes 404 (c) area along the GIWW interface. According to our Habitat Assessment Methodology (HAM) and Wetland Value Assessment (WVA) analyses the preferred alternative would result in the direct loss of 179.2 and 38.5 average annual habitat units (AAHUs), of bottomland hardwood forest and swamp, respectively. Mitigation for unavoidable losses of wet and non-wet bottomland hardwoods and swamp habitat, caused by project features will be evaluated through a complementary comprehensive mitigation IER. However, mitigation for unavoidable impacts to the Bayou aux Carpes 404 (c) area would be provided concurrently with flood protection features and within the Bayou aux Carpes 404 (c) area, provided that EPA grants

authorization to use the Bayou aux Carpes 404 (c) area. Aside from mitigation and flood protection features, environmental augmentation of the Bayou aux Carpes 404 (c) area may also be implemented as a project feature to ensure construction and maintenance of the flood protection features would not adversely impact the Bayou aux Carpes 404 (c) area. Proposed augmentations could supplement hydrologic exchange within approximately 3,000 acres of floatant marsh, cypress swamp, and wetland scrub-shrub habitat. To ensure that appropriate measures are implemented to maintain the quality of the area, the Corps' Engineer Research and Development Center (ERDC) will be conducting modeling of existing hydrologic conditions within the Bayou aux Carpes drainage area and the effects of directing additional flow and nutrients into the that wetland complex.

The Service does not object to providing improved hurricane protection to the greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. Flood protection and ancillary features such as staging areas and access roads should be designed and positioned so that destruction of wetlands and non-wet bottomland hardwoods are avoided or minimized to the greatest extent possible.
2. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
3. The enclosure of wetlands with new levee alignments should be minimized to the fullest extent. When enclosure of wetlands is unavoidable, non-development easements on enclosed wetlands should be acquired, or hydrologic connections with adjacent, un-enclosed wetlands should be maintained. Such actions will serve to minimize secondary impacts from development and hydrologic alteration.
4. Material removed during project construction (i.e., dredging Algiers Canal, repositioning the WBV, levee landward to accommodate the GIWW gate, and dredging along the GIWW bank line to install the flow control structure) should be tested to determine suitability as borrow material for levee construction and the presence of contaminants. The Corps should continue to coordinate with the natural resource agencies to determine the best use of that material.
5. A maintenance dredging management plan for material dredged from the Algiers Canal should be developed for the life of the project.
6. The Corps should avoid impacts to the Bayou aux Carpes 404 (c) area, if feasible. If not feasible the Corps should continue coordination with the NPS and EPA regarding any proposed project feature that may impact that area. Points of contacts for the agencies potentially impacted by project features are: National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov) and Ms. Barbara Keeler (214) 665-6698 with the EPA.

7. Hydrologic, nutrient, and contaminant modeling should be conducted to determine the best arrangement of environmental augmentation features (i.e., location of gaps and water control structures), if any, in the Bayou aux Carpes 404 (c) area.
8. Environmental augmentation features developed through the EPA 404 (c) modification procedures should be incorporated as project features, and the IER should be supplemented to address any additional augmentation features proposed through that process.
9. If hydraulic modeling demonstrates that environmental augmentation features are beneficial, operational plans to maximize freshwater retention or redirect freshwater flows into the Bayou aux Carpes 404 (c) area should be coordinated with the natural resource agencies, especially EPA and NPS. To accommodate changing goals and restoration needs, water control structures should be designed to incorporate operational flexibility through an adaptive management program.
10. The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation and augmentation features. If the local project-sponsor is unable to fulfill the financial requirements for maintenance of the shoreline protection features, the Corps should provide the necessary funding to ensure maintenance obligations are met on behalf of the public interest.
11. To facilitate necessary adaptive management, the Corps in coordination with the natural resource agencies, should develop a monitoring plan. That monitoring plan should address hydrologic, nutrient, and contaminant changes throughout the system. The performance and funding of the monitoring of mitigation and augmentation features should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure that local cost share obligations are met on behalf of the public interest.
12. Because of the sensitivity and significance of the Bayou aux Carpes 404 (c) area every effort should be made to minimize impacts during construction of the floodwall and navigational gate. Construction activities within the Bayou aux Carpes 404 (c) area should adhere to the following guidelines to avoid adverse impacts to the Bayou aux Carpes 404 (c) area:
 - A. Construction should be performed from the water side (i.e., Bayou Baratavia/GIWW side) rather than from the 404(c) side;
 - B. Construction of the floodwall within the Bayou aux Carpes 404 (c) area should be constructed within a 100-foot corridor width from the GIWW into the 404(c) area. No additional area within the 404(c) site would be required for the floodwall or any other construction;
 - C. The Corps should investigate and utilize innovative techniques to design and build a structure with the narrowest footprint possible; and,

- D. Should existing oil and gas pipeline ROWs require relocation, impacts associated with those relocations should be avoided and minimized to the greatest extent possible.
13. If a proposed project feature is changed significantly or is not implemented within one year of the date of this report, the Corps should reinitiate coordination with each office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat.
 14. Adverse impacts to bald eagle nesting locations and wading bird colonies should be avoided through careful design of project features and timing of construction. A qualified biologist should inspect the proposed work site for the presence of undocumented wading bird nesting colonies and bald eagles during the nesting season (i.e., February 16 through October 31 for wading bird nesting colonies, and October through mid-May for bald eagles).
 15. To minimize disturbance to colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present). In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season.
 16. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation should be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary and those results should be forwarded to this office.
 17. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.
 18. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.
 19. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA, NPS, and the Louisiana Department of Natural Resources (LDNR). The Service should be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

20. If mitigation lands are purchased for inclusion within Federally of State managed lands, those lands must meet certain requirements; therefore the land manger of that management area should be contacted early in the planning phase regarding such requirements.
21. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.
22. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable.
23. Any flood protection water control structure sited in a canal, bayou, or navigation channel that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.
24. Flood protection water control structures should remain completely open except during storm events, unless otherwise determined by the natural resource agencies.
25. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered, and coordination should continue with the natural resource agencies to ensure fish passage features are incorporated to the fullest extent practicable.
26. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.
27. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.
28. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.
29. Any proposed change in mitigation or augmentation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.
30. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

INTRODUCTION

The U.S. Army Corps of Engineers, New Orleans District (Corps) is preparing an Individual Environmental Report (IER 12) for flood protection for the multi-basin area composed of Belle Chasse, Gretna-Algiers, Harvey-Westwego in Jefferson, Orleans, and Plaquemines Parishes, Louisiana. That IER is being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the Corps compliance with the National Environmental Policy Act (NEPA) of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4) and Public Law 110-28, U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental). Those laws authorized the Corps to upgrade two existing hurricane protection projects [i.e., Westbank and Vicinity of New Orleans (WBV) and Lake Pontchartrain and Vicinity (LPV)] in the Greater New Orleans area in southeast Louisiana.

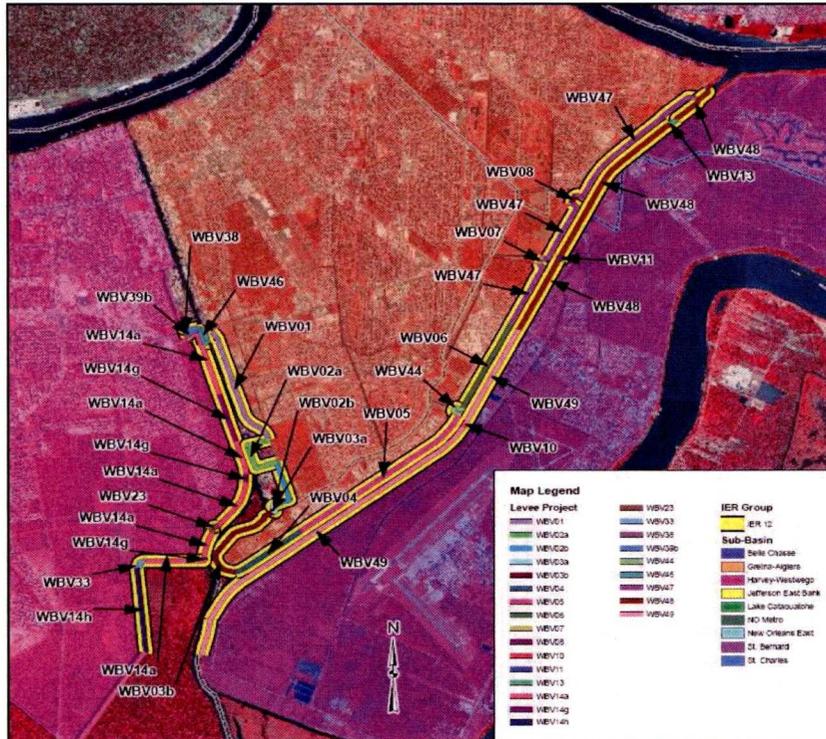
This report contains a description of the existing fish and wildlife resources of the project area, discusses future with- and without-project habitat conditions, identifies fish and wildlife-related impacts of the proposed project, and provides recommendations for the proposed project. This report incorporates and supplements our Fish and Wildlife Coordination Act (FWCA) Reports that addressed impacts and mitigation features for the WBV (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) and the Lake Pontchartrain and Vicinity (dated July 25, 1984, and January 17, 1992) Hurricane Protection projects, and the November 26, 2007, Draft Programmatic FWCA Report that addresses the hurricane protection improvements authorized in Supplemental 4. Impacts and mitigation needs resulting from government and contractor provided borrow areas have been addressed in an October 25, 2007, and a November 1, 2007, FWCA reports, respectively, therefore this report will not address those project features. This draft document does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This draft report has been provided to the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Oceanic and Atmospheric Administration's, National Marine Fisheries Service (NOAA's NMFS), and their comments will be incorporated in the final report.

DESCRIPTION OF THE STUDY AREA

The IER 12 study area is located in the upper Barataria Basin and includes the Belle Chasse, Gretna-Algiers, and Harvey-Westwego sub-basins along the west bank of the Mississippi River in Jefferson, Orleans and Plaquemines Parishes, Louisiana. Dividing the sub-basins are Harvey and Algiers Canals which drain into the Gulf Intracoastal Waterway (GIWW) at their confluence. Hero Canal defines the southern boundary of the Belle Chasse sub-basin and the southeastern boundary of the study area. The Old Estelle pump station (PS) outfall canal and the WBV

hurricane protection system's V-levee delineates the southeastern boundary of the Harvey-Westwego sub-basin. To the south of the V-levee are the Jean Lafitte National Historical Park and Preserve (NHPP) and the Bayou aux Carpes 404 (c) wetland complex. Within the existing WBV hurricane protection system, natural levees and lower lying wetlands have been leveed and drained to accommodate residential, commercial, and agricultural development.

Figure 1. IER 12 Study Area, WBV, Jefferson, Orleans and Plaquemines Parishes, Louisiana, and Existing Hurricane and Flood Protection Features).



FISH AND WILDLIFE RESOURCES

Habitat types in the project area include wet and non-wet bottomland hardwood habitat, cypress and tupelo swamp, scrub-shrub habitat, float marsh, open water, and developed areas. Open water areas are associated with the Harvey and Algiers Canals, Hero Canal, the GIWW (Bayou Barataria), the Old Estelle PS outfall canal, and interspersed open water areas within float marsh and swamp habitat. Due to urban development and a forced-drainage system, the hydrology of most of the forested habitat within the levee system has been altered. The forced-drainage system has been in operation for many years, and subsidence is evident throughout the areas enclosed by levees.

Wetlands (forested, marsh, and scrub-shrub) within the study area provide plant detritus to coastal waters downstream and thereby contribute to the production of commercially and recreationally important fishes and shellfishes. They also provide valuable water quality functions such as reduction of excessive dissolved nutrient levels, filtering of waterborne

contaminants, and removal of suspended sediment. In addition, coastal wetlands buffer storm surges reducing their damaging effect to man-made infrastructure within the coastal area. Factors that will strongly influence future fish and wildlife resource conditions outside of the protection levees include freshwater and sediment input and loss of coastal wetlands. Regardless of which of the above factors ultimately has the greatest influence, emergent wetlands within, and adjacent to, the project area will probably experience losses due to development, subsidence, erosion, and relative sea-level rise.

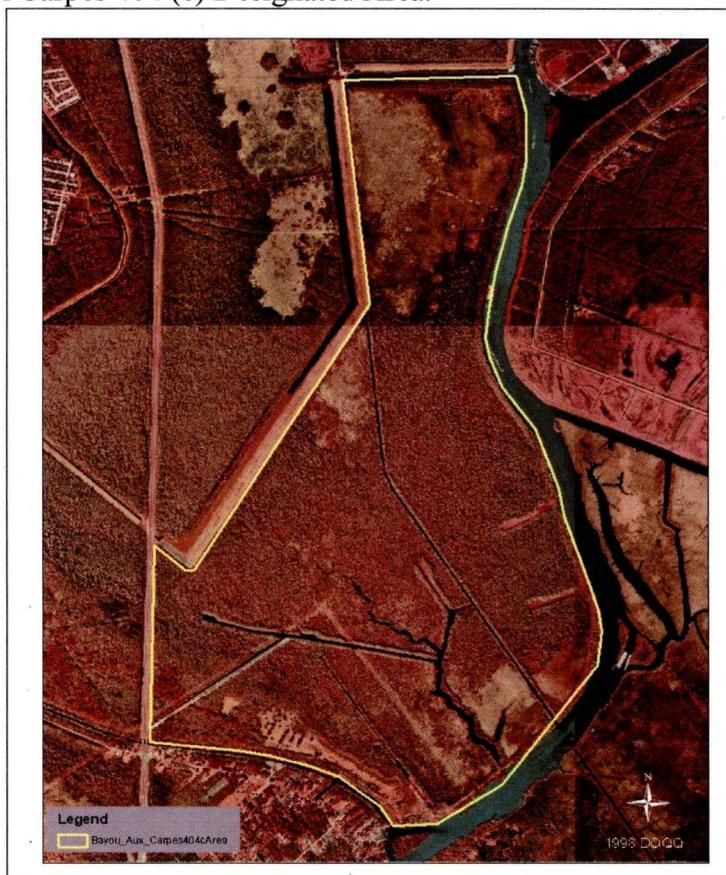
The Service has provided a FWCA Report for the authorized WBV hurricane protection project. That report contains a through discussion of the significant fish and wildlife resources (including habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following information is provided to update the previously mentioned reports and provide IER specific information and recommendations.

An area within the Bayou aux Carpes wetland complex (Figure 2) adjacent to the JLNHPP was subject to an Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c) in 1985. According to the EPA Final Determination, the discharge of any dredged or fill material within the approximately 3,200 acre site, referred to as the Bayou aux Carpes 404(c) area, is restricted. The EPA action allowed for three specific exceptions, none of which appears to apply to the Corps' current hurricane protection proposal. Previous requests which have fallen outside those exceptions have been denied by EPA as being contrary to the CWA 404(c) determination. One such categorical denial prohibited the Corps from altering the alignment of the West Bank Hurricane Protection Levee such that it would encroach upon the Bayou aux Carpes 404(c) area.

The EPA 404(c) action was intended as an advance notification to the public and agencies of the government's determination under the CWA Section 404 for the area, in the sense of planning aid coordination. In light of this existing determination, we would expect the NEPA work on the portion of the levee forming the 404(c) boundary to thoroughly evaluate the range of feasible alternatives and their environmental impacts, as well as documenting the Corps' legal and regulatory authority for any alternative that would entail impacts to the Bayou aux Carpes 404(c) area.

The Bayou aux Carpes 404(c) action is one of only 12 such actions ever completed by EPA. Approximately 2,800 acres within the site are in Federal ownership and Congress is considering legislation to adjust the boundary of the Jean Lafitte NHPP, Barataria Preserve Unit to include the Bayou aux Carpes area. In the meantime, the National Park Service (NPS) has constructive possession of the area. Therefore, the Corps should contact both the NPS and EPA regarding any proposed project feature that may impact that area. For the NPS please contact Superintendent, David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov), or Chief of Resource Management, David Muth, (504) 589-3882 extension 128 (david_muth@nps.gov). For the EPA please contact Ms. Barbara Keeler, 214/665-6698.

Figure 2. Bayou aux Carpes 404 (c) Designated Area.



The Bayou aux Carpes 404 (c) area is composed of two unique and critically important habitat types. Flotant marsh occurs along the northern portion of the area and transitions into cypress swamp habitat further to the south. The quality and health of these sensitive wetland habitats are greatly influenced by hydrologic parameters. Should water levels recede within flotant marsh, marsh vegetation could root into the soil drowning the vegetation when water levels rise again. Too much water flow can push flotant marsh vegetation out and create vast areas of open water. As flotant marsh vegetation thickens, new and larger plants (e.g., wax myrtle, red maple, and cypress) are supported by the mat of vegetation initiating the early successional stages of a cypress-tupelo swamp forest. Cypress and tupelo swamps also require hydrologic variations. Natural regeneration depends on periods of exceptionally long drought since cypress and tupelo seeds cannot germinate underwater. Cypress swamp habitat appears to be naturally regenerating as evident by saplings observed in the understory during recent field investigations. However, hydrologic stresses (e.g., spoil banks impeding water flow and producing ponding effects) may still be influencing sapling growth rates.

In 1985, the Service submitted a report to EPA detailing the value of the entire Bayou aux Carpes drainage area to fish and wildlife resources. The drainage area boundaries include the Harvey Canal/Bayou Barataria segment of the GIWW to the east and south, the Bayou des Familles ridge and Louisiana Highway 45 to the west, and the V-levee and Old Estelle PS outfall canal to the

north. The area was historically drained by Bayou aux Carpes, a natural waterway; however, this bayou was hydrologically disconnected when a plug was installed in the 1970s. Currently that plug may serve as a valuable function in keeping boat wakes from the GIWW from further eroding and widening the mouth of the bayou. The only flow exchange for this area is through the Southern Natural Gas (SNG) pipeline canal which runs north-south bisecting the Bayou aux Carpes drainage area. A few oil and gas canals branch off of the SNG pipeline canal connecting Bayou aux Carpes with the SNG pipeline canal. There are also several pipeline right-of-ways that traverse the area from east to west across the northern portion of the drainage area. It is highly probable that this system of canals and rights-of-way and their associated spoil banks influence the hydrology, impeding and directing flows throughout the area.

The Service's 1985 Habitat Evaluation Procedures (HEP) analysis determined that bottomland hardwood and wooded swamp habitats in the drainage area rated moderate to high value for all species evaluated (i.e., gray squirrel, pileated woodpecker, North American mink, wood duck, great egret, American alligator, and common muskrat). Upland forested habitat rated low for gray squirrel and pileated woodpecker and was found to be optimum for mink. Scrub-shrub wetlands in the study area were found to be of high quality as wood duck wintering habitat and alligator habitat, and were moderate quality for mink, great egret, and muskrat. Fresh marsh rated high to moderate as alligator, mink, and muskrat habitat (U.S. Fish and Wildlife Service 1985).

The Bayou aux Carpes wetland complex provides valuable habitat for resident waterfowl and migratory game species (i.e. wood ducks, mallards, and other waterfowl) and non-game species (i.e., great blue herons and great egrets). Bald eagles and osprey have been observed in the area as well. Several species of non-game, resident and migratory birds that are known or expected to utilize the project area (e.g., red-headed woodpecker, prothonotary warbler, and wood thrush) have exhibited substantial population declines over the last 30 years, primarily as the result of habitat loss and fragmentation, and are of particular concern to the Service. The Bayou aux Carpes drainage area and associated habitats provide valuable spawning, feeding, and nursery habitat for recreationally-important freshwater fish such as largemouth bass, and various sunfishes; crustaceans such as crawfish and grass shrimp; and estuarine species such as striped mullet and blue crab. Analysis of samples collected in 1985 indicated that forage species (e.g., mosquitofish, threadfin shad, and golden top minnow) were the most abundant fish species. This diverse assemblage of fisheries species is indicative of a stable fisheries community in a relatively unstressed environment (U.S. Fish and Wildlife Service 1985). The Bayou aux Carpes drainage basin provides plant detritus to adjacent coastal waters, and such detritus is essential to the maintenance of commercially and recreationally important fisheries. In addition to their habitat values, those wetlands provide floodwater storage, and aid in water quality maintenance by reducing excessive dissolved nutrient levels and removing suspended sediments.

At this time, the Service is unaware of any threatened or endangered species or their critical habitat within the project area. However, the project-area forested wetlands provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), and a bald eagle nest was documented within the Bayou aux Carpes drainage area in 2007. The bald eagle was officially removed from the List of Endangered and Threatened Species on August 8, 2007. Bald eagles nest in Louisiana

from October through mid-May. Eagles typically nest in mature trees (e.g., bald cypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water in the southeastern Parishes. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead).

Breeding bald eagles occupy "territories" that they will typically defend against intrusion by other eagles, and that they likely return to each year. A territory may include one or more alternate nests that are built and maintained by the eagles, but which may not be used for nesting in a given year. Potential nest trees within a nesting territory may, therefore, provide important alternative bald eagle nest sites. Nest sites typically include at least one perch with a clear view of the water or area where the eagles usually forage. Shoreline trees or snags located near large water bodies provide the visibility and accessibility needed to locate aquatic prey. Bald eagles are vulnerable to disturbance during courtship, nest building, egg laying, incubation, and brooding. Disturbance during this critical period may lead to nest abandonment, cracked and chilled eggs, and exposure of small young to the elements. Human activity near a nest late in the nesting cycle may also cause flightless birds to jump from the nest tree, thus reducing their chance of survival.

Although the bald eagle has been removed from the List of Endangered and Threatened Species, it continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

<<http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf>>.

Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Service's Division of Migratory Birds for the Southeast Region (phone: 404/679-7051, e-mail: SEMigratorybirds@fws.gov) has the lead role in conducting such consultations. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

The proposed study area is known to support colonial nesting waterbirds. Colonies may be present that are not currently listed in the database maintained by the LDWF. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work

site for the presence of undocumented nesting colonies during the nesting season. To minimize disturbance to colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present). In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season.

Future Fish and Wildlife Resources

The combination of subsidence and sea level rise is called submergence or land sinking. As the land sinks the wetlands become inundated with higher water levels stressing wetland vegetation. Even cypress-tupelo swamps can be stressed by prolonged inundation, thus leading to plant death and conversion to open water. Other major causes of wetland losses within the study area include altered hydrology, storms, saltwater intrusion (caused by marine processes invading fresher wetlands), shoreline erosion, herbivory, and development activities including the direct and indirect impacts of dredge and fill (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). The continued conversion of wetlands and forested habitat to open water or developed land represent the most serious fish and wildlife-related problems in the study area. Those losses could be expected to cause significant declines in coastal fish and shellfish production and in the study area's carrying capacity for numerous migratory waterfowl, wading birds, other migratory birds, alligators, furbearers, and game mammals. Wetland losses will also reduce storm surge protection of developed lands, and will likely contribute to water quality degradation associated with excessive nutrient inputs.

ALTERNATIVES UNDER CONSIDERATION

During the alternatives analysis, the no-action alternative and the alternative to raise the existing Hurricane Protection System to a 100-year level of protection were considered. The no-action alternative would not be implemented because it fails to provide the authorized level of protection to the Belle Chasse, Gretna-Algiers, and Harvey-Westwego sub-basins. The Corps also considered a series of alternative gate locations within the project area that would reduce the length of parallel levee protection. One of these alternatives included constructing a sector gate across the Bayou aux Carpes 404 (c) area. That alternative would have significant impacts to fish and wildlife resources and EPA 404 (c) designated wetlands. The following are brief descriptions of the alternatives:

Alternative 1:

A floodgate and permanent by-pass channel in the GIWW below the confluence of the Algiers and Harvey Canals with the flood wall bisecting the Bayou aux Carpes 404 (c) designated area;

Alternative 2 [Gulf Intracoastal Waterway- West Closure Complex (GIWW WCC)]:

Floodgate and permanent by-pass channel in the GIWW below the confluence of the Algiers and Harvey Canals with 100-year floodwall protection proposed along the periphery of the Bayou aux

Carpes 404 (c) area and the GIWW and continuing around to the V-levee;

Alternative 3:

Sector floodgate in the Algiers Canal with 100-year floodwall protection along the Harvey Canal to the Lapalco floodgate continuing along the existing WBV flood protection levee alignment;

Alternative 4:

Parallel levee protection to raise the existing levees and floodwalls along Algiers and Harvey Canals to the 100-year level of protection. The Lapalco floodgate and the Cousins PS discharge channel walls would also be raised to the 100-year level of protection.

Proposed Action

The GIWW WCC alternative (Alternative 2) was developed through proactive coordination primarily between the EPA, NPS, and the Corps. The GIWW WCC alternative would include construction of a navigable floodgate on the GIWW south of the confluence of the Algiers and Harvey Canals and upstream of the Hero Canal. A pumping station and a secondary by-pass canal/flow control structure would be constructed adjacent to the navigable floodgate. The levees and floodwalls between the Old Estelle pumping station and the Harvey Canal, and south along the WBV, V-levee would be raised to the 100-year level of protection [i.e., approximately 14 to 16 foot elevation North American Vertical Datum of 1988(NAVD 88)]. Approximately 4,200 linear feet of floodwall would be constructed within a 100-foot-wide new right-of-way along the periphery of the GIWW and the Bayou aux Carpes 404 (c) area to connect the proposed GIWW navigable floodgate with the existing flood protection system. Armoring of the floodwall along the GIWW is anticipated for protection against barge collisions and wave erosion.

Existing levees and floodwalls along Algiers and Harvey Canals will be incorporated into the protected side of the closure complex and would be integrated as features of the parallel protection system retention basin. Those levees would be lifted to the former authorized level of protection, and existing pump stations within the proposed detention basin would receive fronting protection and back flow prevention which would required additional right-of-way impacts. Approximately 700,000 cubic yards of material in the Algiers Canal would be dredged in order to maintain a still water level of less than 6 feet (NAVD 88) in the retention basin. Material dredged would be placed within the Jean Lafitte NHPP for marsh restoration along Lake Salvador.

Features of the structure that would cross the GIWW include a 150-to-300-foot-wide navigation channel closure gate and a 100-to-200-foot-wide bypass channel closure gate built to a protection elevation of 16 feet (NAVD 88), or greater, and tied into the nearest flood protection levee. A pumping station would provide positive backwater prevention. The bypass channel would be constructed to allow navigation on the GIWW during construction of the retaining structure, pumps and gates and will be used in the event of the closure of the primary channel structure. A water control structure is also proposed on the Old Estelle PS outfall canal.

In addition to levee and floodwall construction the proposed action includes several environmental augmentations to ensure that adverse impacts to the Bayou aux Carpes 404 (c)

area are avoided. The southern side of the Old Estelle pump station outfall canal would be gapped to provide evenly distributed sheet flow into the Bayou aux Carpes 404(c) area. After analysis of hydrologic modeling, existing obstructions (e.g., spoil banks, access roads) within the Bayou aux Carpes 404 (c) area may also be augmented, including modifying the shell plug at Bayou aux Carpes where it historically connected to Bayou Barataria to provide hydrological exchange. Long-term monitoring of the affects of the proposed flood protection system and augmentation features on the Bayou aux Carpes wetland complex would be conducted. Should monitoring indicate that augmentation features have an adverse affect on the Bayou aux Carpes 404 (c) area, flow from the Old Estelle pump station would be redirected away from the 404 (c) area and through the proposed water control structure at the end of the Old Estelle outfall canal and into the GIWW.

In the GIWW adjacent to the Bayou aux Carpes 404 (c) area and south of the navigation channel closure gate, 2,000 linear feet of foreshore dike protection would be constructed in front of the channel bank to prevent scouring or bank erosion within the Bayou aux Carpes 404 (c) area associated with discharge from the pump station.

The GIWW WCC alternative provides 100-year protection based upon improvements, enhancements, and construction confined to the GIWW reach in concert with tie-ins to improvements to the Hero Canal Levee (IER #13) and the V-line Levee (IER #14).

EVALUATION METHOD

Direct impacts to bottomland hardwood and swamp habitat were quantified by acreage and habitat quality (i.e., average annual habitat units or AAHUs) and are presented in Table 1. The Service used the Louisiana Department of Natural Resources Habitat Assessment Methodology (HAM) to quantify the impacts of proposed project features on upland and wetland bottomland hardwood habitat and used the Wetland Value Assessment (WVA) methodology to quantify the impacts on swamp habitat. The habitat assessment models for bottomland hardwoods within the Louisiana Coastal Zone utilized in this evaluation were modified from those developed in the Service's Habitat Evaluation Procedures (HEP). For each habitat type, those models define an assemblage of variables considered important to the suitability of an area to support a diversity of fish and wildlife species. The HAM, however, is a community-level evaluation instead of the species-based approach used with HEP. The WVA is used to evaluate coastal restoration projects, and is similar to the Service's HEP, in that habitat quality and quantity (acreage) are measured for baseline conditions, and predicted for future without-project and future with-project conditions. As with HEP, the WVA provides a quantitative estimate of project-related impacts to fish and wildlife resources; however, the WVA is based on separate models for fresh/intermediate marsh, brackish marsh, and saline marsh. Further explanation of how impacts/benefits are assessed with the HAM and WVA and an explanation of the assumptions affecting habitat suitability (i.e., quality) index (HSI) values for each target year for impacts to bottomland hardwood and swamp habitat are available for review at the Service's Lafayette, Louisiana, field office.

Table 1: Potential Impacts from Algiers-Harvey 100-year Hurricane Protection Project

	protected side (hydrologically altered)				floodside (hydrologically connected)		
	pasture (acres)	early successional BLH (PFO1Ad)	mid-late successional BLH (PFO1Ad)	mid-late successional (temporary impacts) (PFO1Ad)	riparian swamp (PFO2)	404c BLH (PFO1r)	404c Swamp (PFO2)
Algiers Eastbank Levee Expansion	----	1.2	23.7	----	43.0	----	----
Algiers Westbank Levee Exp	----	6.7	13.8	----	3.8	----	----
East Bank Nav Structure	----	7.8	126.2	----	8.3	----	----
EBNS- staging areas	63.6	----	----	6.9	----	----	----
Levee Exp N of Estelle O/F canal	----	----	3.1	----	2.7	----	----
Levee Exp W of 404c	----	23.5	4.0	----	----	----	----
Levee Exp W of Harvey	----	----	34.8	----	9.7	----	----
Floodwall construction 404c	----	----	----	----	----	2.4	7.4
Total Acres (392.6)	63.6	39.2	205.6	6.9	67.5	2.4	7.4
Total AAHUs lost	0.0	22.3	150.2	4.8	34.3	1.9	4.2
Total BLH protected side = 252 ac, 177.3 AAHUs							
Total BLH flood side (404c) = 2.4 ac, 1.9 AAHUs							
Total swamp flood side = 67.5 ac + 7.4 ac in 404c = 74.9 ac, 38.5 AAHUs							

Acreeage values estimated from 2005 aerial photography and LIDAR data in ArcGIS.

As indicated in Table 1, based on our HAM and WVA analyses (Appendix A) project implementation would result in the direct loss of 255 and 75 acres, and 179.2 and 38.5 AAHUs, of bottomland hardwood forest and swamp, respectively. Implementation of the preferred alternative would directly impact 252 acres of hydrologically-altered bottomland hardwood habitat, 2.4 acres of wet bottomland hardwood habitat, and approximately 75 acres of swamp habitat. Of those impacts approximately 2.4 acres of wet bottomland hardwood and 7.4 acres of swamp habitat (i.e., 9.8 acres) occur within the Bayou aux Carpes 404 (c) area along the GIWW interface.

PROJECT IMPACTS

Proposed project impacts associated with the GIWW WCC alternative would result primarily from construction of new levees, expansion of levee rights-of-way and associated features. Although some construction will occur in cleared areas and on existing levees, project implementation will directly impact wet and non-wet bottomland hardwoods and tupelo swamp that provide medium to high habitat value for diverse fish and wildlife resources. While some construction staging and processing areas are located in open, non-forested areas, approximately

7 acres of bottomland hardwood forest associated with one staging location would be impacted.

Direct impacts to 252 acres of hydrologically-altered (i.e., non-wet) bottomland hardwood habitat would occur as a result of the GIWW WCC alternative. Impacts would be associated with expanding the existing flood protection levee right-of-way to bring it to the authorized level of protection and with realigning and expanding the levee on the south bank of the GIWW to accommodate the proposed bypass channel, navigable floodgate, pump station and a current reduction flow structure. The footprint of the proposed pump station would also impact non-wet bottomland hardwood habitat; however, by repositioning the levee landward an undetermined amount of previously-altered bottomland hardwood habitat would be returned to a natural overbank flooding regime.

Direct impacts to 2.4 acres of bottomland hardwood habitat and 7.4 acres of swamp habitat would occur as a result of constructing a new floodwall within a 100-foot right-of-way along the Bayou aux Carpes 404 (c) area and the GIWW interface. Impacts are also associated with floodside armoring of the proposed floodwall. Construction of this floodwall and armoring would impact riparian habitat and disrupt wildlife passage between the Bayou aux Carpes wetland complex and adjacent habitats. Riparian habitats are particularly valuable to wildlife as transition zones between aquatic and forested habitats, and contribute vital elements to fishery resources in the form of detritus, shade, and in-stream cover.

Although proposed impacts to the Bayou aux Carpes 404 (c) area have been minimized, the discharges of any dredged or fill material within the Bayou aux Carpes 404(c) area is currently restricted and would require the EPA to modify the CWA Section 404 (c) determination. To ensure that potential impacts resulting from the construction of a flood protection structure/barrier do not compromise the value of this nationally-significant wetland ecosystem, the Corps is proposing to incorporate features into the proposed hurricane protection project to maintain the integrity Bayou aux Carpe 404 (c) area habitat (i.e., flotant marsh and cypress swamp). Storm water discharge from the Old Estelle pump station would be directed into the Bayou aux Carpes 404 (c) area by strategically gapping along the southern edge of the canal spoil bank. The Corps also proposes to modify interior hydrologic obstructions and the Bayou aux Carpes shell plug to provide additional hydrological exchange, if deemed necessary. To ensure that appropriate measures are implemented to maintain the function and quality of the wetland complex, the Corps' Engineer Research and Development Center (ERDC) will be conducting modeling of existing hydrologic conditions within the Bayou aux Carpes drainage area and the effects of directing additional flow and nutrients into the that wetland complex.

On the protected side of the navigation structure the Algiers and Harvey Canals would be integrated as features of the parallel protection system retention basin. Approximately 700,000 cubic yards in the Algiers Canal would be dredged in order to maintain a still water level of less than 6 feet (NAVD 88) in the retention basin. Existing tidal fluctuations within the retention basin would not be affected during normal conditions. That material would be used beneficially to create marsh along the Lake Salvador shoreline within the Jean Lafitte NHPP.

Development is ongoing within the hurricane protection levees; therefore, the Service has assumed that, for this specific IER, project-induced development within enclosed wetlands would be insignificant. However, project impacts to non-wet bottomland hardwoods and swamp habitat as a result of flood protection improvements should be mitigated.

FISH AND WILDLIFE CONSERVATION AND MITIGATION MEASURES

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include:

(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments.

The Service supports and adopts this definition of mitigation and considers its specific elements to represent the desirable sequence of steps in the mitigation planning process. Based on current and expected future without-project conditions, the planning goal of the Service is to develop a balanced project, i.e., one that is responsive to demonstrated hurricane protection needs while addressing the co-equal need for fish and wildlife resource conservation.

The Service's Mitigation Policy (Federal Register, Volume 46, No. 15, January 23, 1981) identifies four resource categories that are used to ensure that the level of mitigation recommended by Service biologists will be consistent with the fish and wildlife resource values involved. Considering the high value of forested wetlands and marsh for fish and wildlife and the relative scarcity of that habitat type, those wetlands are usually designated as Resource Category 2 habitats, the mitigation goal for which is no net loss of in-kind habitat value. Potential direct and indirect impacts to floatant marsh have been avoided by aligning the floodwall along the periphery of the Bayou aux Carpes wetland complex. While the preferred alignment has resulted in greater impacts to forested wetlands, the proposed flood protection structure would enclose fewer wetland acres, and the damaging hydrologic effects associated with bisecting the Bayou aux Carpes floatant marsh with a structural barrier would be avoided. Therefore, remaining direct project impacts to forested wetlands should be mitigated via in-kind compensatory replacement of the habitat values lost. Degraded (i.e., non-wet) bottomland hardwood forest and any wet pastures that may be impacted, however, are placed in Resource Category 3 due to their reduced value to wildlife, fisheries and lost/degraded wetland functions. Project impacts to wetlands will be minimized to some extent by hauling in material for the levee. The mitigation goal for Resource Category 3 habitats is no net loss of habitat value.

Mitigation for unavoidable losses of wet and non-wet bottomland hardwoods and swamp habitat, caused by project features will be evaluated through a complementary comprehensive mitigation

IER. However, mitigation for unavoidable impacts to the Bayou aux Carpes 404 (c) area should be provided concurrently with flood protection features and within the Bayou aux Carpes 404 (c) area, provided EPA determines that modification of the 404 (c) designation is warranted.

We commend the Corps efforts to ensure fish and wildlife habitats within the Bayou aux Carpes 404 (c) area are maintained by augmenting the proposed hurricane protection project. Because of the hydrologically sensitive nature of the flotant marsh and cypress swamp habitat, the implementation and design of proposed augmentations to the Bayou aux Carpes 404 (c) area should be closely coordinated with the results ERDC hydrologic investigations. The natural resource agencies, particularly the NPS and EPA, should be intimately involved in determining what hydrologic parameters should be investigated, reviewing the results of the investigations, and developing the best solution to maintaining and improving the hydrology of the flotant marsh and cypress swamp habitats. Depending on the results of those investigations, a plan should be designed and implemented to modify hydrologic and nutrient inflow effects to the Bayou aux Carpes area (e.g., gapping the Estelle Pump Station Outfall Canal, gapping or grading down interior canal banks such as the Southern Natural Gas and Shell pipeline canals, and/or modifying the shell plug at Bayou aux Carpes). Should proposed long-term monitoring efforts reveal that any of the proposed augmentation features would result in adverse impacts, the Corps should restore those features to pre-project conditions in coordination with the natural resource agencies.

To minimize impacts associated with removing additional borrow from forested areas, material dredged from the Algiers Canal and removed during project construction (i.e., repositioning the WBV, levee landward to accommodate the GIWW gate, and dredging along the GIWW bankline to install the flow control structure) should be tested to determine its suitability for levee construction. According to 2005 sediment sampling conducted for maintenance of the Inner Harbor Navigation Canal (IHNC) project in Orleans Parish, Louisiana, some sediment collected from GIWW and IHNC was considered unsuitable for open water disposal, and other options for disposal were necessary. Material dredged from the GIWW/Algiers Canal should be tested for contaminants, and the Corps should continue to coordinate with the natural resource agencies to determine the best use of that material.

SERVICE POSITION AND RECOMMENDATIONS

Construction of the increased flood protection would result in direct impacts to 179.2 and 38.5 AAHUs, of bottomland hardwood forest and swamp, respectively. The Service does not object to providing improved hurricane protection to the greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. Flood protection and ancillary features such as staging areas and access roads should be designed and positioned so that destruction of wetlands and non-wet bottomland hardwoods are avoided or minimized to the greatest extent possible.

2. The Corps should fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
3. The enclosure of wetlands with new levee alignments should be minimized to the fullest extent. When enclosure of wetlands is unavoidable, non-development easements on enclosed wetlands should be acquired, or hydrologic connections with adjacent, un-enclosed wetlands should be maintained. Such actions will serve to minimize secondary impacts from development and hydrologic alteration.
4. Material removed during project construction (i.e., dredging Algiers Canal, repositioning the WBV, levee landward to accommodate the GIWW gate, and dredging along the GIWW bank line to install the flow control structure) should be tested to determine suitability as borrow material for levee construction and the presence of contaminants. The Corps should continue to coordinate with the natural resource agencies to determine the best use of that material.
5. A maintenance dredging management plan for material dredged from the Algiers Canal should be developed for the life of the project.
6. The Corps should avoid impacts to the Bayou aux Carpes 404 (c) area, if feasible. If not feasible the Corps should continue coordination with the NPS and EPA regarding any proposed project feature that may impact that area. Points of contacts for the agencies potentially impacted by project features are: National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov) and Ms. Barbara Keeler (214) 665-6698 with the EPA.
7. Hydrologic, nutrient, and contaminant modeling should be conducted to determine the best arrangement of environmental augmentation features (i.e., location of gaps and water control structures), if any, in the Bayou aux Carpes 404 (c) area.
8. Environmental augmentation features developed through the EPA 404 (c) modification procedures should be incorporated as project features, and the IER should be supplemented to address any additional augmentation features proposed through that process.
9. If hydraulic modeling demonstrates that environmental augmentation features are beneficial, operational plans to maximize freshwater retention or redirect freshwater flows into the Bayou aux Carpes 404 (c) area should be coordinated with the natural resource agencies, especially EPA and NPS. To accommodate changing goals and restoration needs, water control structures should be designed to incorporate operational flexibility through an adaptive management program.
10. The project's first Project Cooperation Agreement (or similar document) should include

language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation and augmentation features. If the local project-sponsor is unable to fulfill the financial requirements for maintenance of the shoreline protection features, the Corps should provide the necessary funding to ensure maintenance obligations are met on behalf of the public interest.

11. To facilitate necessary adaptive management, the Corps in coordination with the natural resource agencies, should develop a monitoring plan. That monitoring plan should address hydrologic, nutrient, and contaminant changes throughout the system. The performance and funding of the monitoring of mitigation and augmentation features should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure that local cost share obligations are met on behalf of the public interest.
12. Because of the sensitivity and significance of the Bayou aux Carpes 404 (c) area every effort should be made to minimize impacts during construction of the floodwall and navigational gate. Construction activities within the Bayou aux Carpes 404 (c) area should adhere to the following guidelines to avoid adverse impacts to the Bayou aux Carpes 404 (c) area:
 - A. Construction should be preformed from the water side (i.e., Bayou Barataria/GIWW side) rather than from the 404(c) side;
 - B. Construction of the floodwall within the Bayou aux Carpes 404 (c) area should be constructed within a 100-foot corridor width from the GIWW into the 404(c) area. No additional area within the 404(c) site would be required for the floodwall or any other construction;
 - C. The Corps should investigate and utilize innovative techniques to design and build a structure with the narrowest footprint possible; and,
 - D. Should existing oil and gas pipeline ROWs require relocation, impacts associated with those relocations should be avoided and minimized to the greatest extent possible.
13. If a proposed project feature is changed significantly or is not implemented within one year of the date of this report, the Corps should reinitiate coordination with each office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat.
14. Adverse impacts to bald eagle nesting locations and wading bird colonies should be avoided through careful design of project features and timing of construction. A qualified biologist should inspect the proposed work site for the presence of undocumented wading bird nesting colonies and bald eagles during the nesting season (i.e., February 16 through October 31 for wading bird nesting colonies, and October through mid-May for bald eagles).

15. To minimize disturbance to colonies containing nesting wading birds (i.e., herons, egrets, night-herons, ibis, and roseate spoonbills), anhingas, and/or cormorants, all activity occurring within 1,000 feet of a rookery should be restricted to the non-nesting period (i.e., September 1 through February 15, exact dates may vary within this window depending on species present). In addition, we recommend that on-site contract personnel be informed of the need to identify colonial nesting birds and their nests, and should avoid affecting them during the breeding season.
16. If a bald eagle nest is discovered within or adjacent to the proposed project area, then an evaluation should be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: <http://www.fws.gov/southeast/es/baldeagle>. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary and those results should be forwarded to this office.
17. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.
18. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.
19. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA, NPS, and the Louisiana Department of Natural Resources (LDNR). The Service should be provided an opportunity to review and submit recommendations on the all work addressed in those reports.
20. If mitigation lands are purchased for inclusion within Federally or State managed lands, those lands must meet certain requirements; therefore the land manager of that management area should be contacted early in the planning phase regarding such requirements.
21. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.
22. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable.
23. Any flood protection water control structure sited in a canal, bayou, or navigation channel that does not maintain the pre-project cross section should be designed and operated with

multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

24. Flood protection water control structures should remain completely open except during storm events, unless otherwise determined by the natural resource agencies.
25. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered, and coordination should continue with the natural resource agencies to ensure fish passage features are incorporated to the fullest extent practicable.
26. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.
27. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.
28. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.
29. Any proposed change in mitigation or augmentation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.
30. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

LITERATURE CITED

Louisiana Coastal Wetland Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority. 1998. Coastal 2050: Toward a Sustainable Coastal Louisiana. Louisiana Department of Natural Resources. Baton Rouge, LA. 70898.

U.S. Fish and Wildlife Service 1985. "Fish and Wildlife Resources of the Bayou aux Carpes Drainage Area, Jefferson Parish, Louisiana." U.S. Fish and Wildlife Service - Division of Ecological Services, Lafayette, Louisiana.

Appendix A

WVA Analysis

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, BLH east staging area Acres: 6.9

Condition: Future With Project

Variable		TY 0		TY 1		TY 3				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class 1		Class 1				
V2	Maturity (input age or dbh, not both)	Age dbh 17.8	0.85	Age dbh 0.1	0.00	Age dbh 0.1	0.00			
V3	Understory / Midstory	Understory % 80 Midstory % 17	0.83	Understory % 0 Midstory % 0		Understory % 0 Midstory % 0		0.80 0.10 0.10		
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class 2	0.50			
V5	Forest Size	Class 5	1.00	Class 0		Class 0				
V6	Surrounding Land Use	Values %		Values %		Values %				
	Forest / marsh	60	0.72	60	0.72	60	0.72			
	Abandoned Ag Pasture / Hay	29		29		29				
	Active Ag Development	11		11		11				
V7	Disturbance	Class 2	0.26	Class 1	0.01	Class 1	0.01			
	Type	Class 1		Class 1		Class 1				
	Distance	1		1		1				
		HSI = 0.72		HSI = 0.01		HSI = 0.01				

Project..... IER 12, Alt 2, BLH east staging area
FWP

Variable		TY 4		TY 50		TY				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 2		Class 4	0.80	Class				
V2	Maturity (input age or dbh, not both)	Age dbh 1	0.00	Age dbh 46	0.92	Age dbh				
V3	Understory / Midstory	Understory % 80 Midstory % 80		Understory % 20 Midstory % 60	0.80	Understory % Midstory %		0.80 0.70		
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class				
V5	Forest Size	Class 1		Class 1	0.20	Class				
V6	Surrounding Land Use	Values %		Values %		Values %				
	Forest / marsh	60	0.72	60	0.72					
	Abandoned Ag Pasture / Hay	29		29						
	Active Ag Development	11		11						
V7	Disturbance	Class 2	0.26	Class 2	0.26	Class				
	Type	Class 1		Class 1		Class				
	Distance	1		1		Class				
		HSI = 0.04		HSI = 0.65		HSI =				

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, BLH east staging area

Acres: 6.9

Condition: Future Without Project

Variable		TY 0		TY 1		TY 20				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class 4	0.80	Class 4	0.80			
V2	Maturity (input age or dbh, not both)	Age dbh 17.8	0.85	Age dbh 18.08	0.87	Age dbh 18.27	0.89			
V3	Understory / Midstory	Understory % 80 Midstory % 17	0.83	Understory % 80 Midstory % 17	0.83	Understory % 30 Midstory % 60	0.95	0.80	0.80	1.00
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class 2	0.50			
V5	Forest Size	Class 4	0.80	Class 4	0.80	Class 4	0.80			
V6	Surrounding Land Use	Values % 60 29 11	0.72	Values % 60 29 11	0.72	Values % 60 29 11	0.72			
V7	Disturbance Type Distance	Class 2 Class 1	0.26	Class 2 Class 1	0.26	Class 2 Class 1	0.26			
		HSI = 0.71		HSI = 0.71		HSI = 0.73				

Project..... IER 12, Alt 2, BLH east staging area
 FWP

Variable		TY 50		TY		TY				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 5	1.00	Class		Class				
V2	Maturity (input age or dbh, not both)	Age dbh 21.19	1.00	Age dbh		Age dbh				
V3	Understory / Midstory	Understory % 45 Midstory % 40	1.00	Understory % Midstory %		Understory % Midstory %		1.00		1.00
V4	Hydrology	Class 1	0.10	Class		Class				
V5	Forest Size	Class 4	0.80	Class		Class				
V6	Surrounding Land Use	Values % 60 29 11	0.72	Values %		Values %				
V7	Disturbance Type Distance	Class 2 Class 1	0.26	Class Class		Class Class				
		HSI = 0.65		HSI =		HSI =				

WETLAND VALUE ASSESSMENT COMMUNITY MODEL Swamp

Project..... IER 12, Riparian BLH & Swamp

Project Area.....

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Condition: Future Without Project

Variable		TY 0		TY 1		TY 10		
		Class/Value	SI	Class/Value	SI	Class/Value	SI	
V1	Stand Structure	% Cover Overstory		% Cover Overstory		% Cover Overstory		
		Scrub-shrub		Scrub-shrub		Scrub-shrub		
		Herbaceous		Herbaceous		Herbaceous		
		Class 3	0.40	Class 3	0.40	Class 3	0.40	
V2	Stand Maturity	Cypress % 30		Cypress % 30		Cypress % 30		0
		Cypress dbh 18		Cypress dbh 18		Cypress dbh 21		1
		Tupelo et al. % 70		Tupelo et al. % 70		Tupelo et al. % 70		
		Tupelo et al dbh 12.8	1.00	Tupelo et al dbh 13.07	1.00	Tupelo et al dbh 14.18	1.00	1
		Basal Area 25.15	0.20	Basal Area 25	0.20	Basal Area 38	0.20	
V3	Water Regime	Flow/Exchange high Flooding Duration seasonally	1.00	Flow/Exchange high Flooding Duration seasonally	1.00	Flow/Exchange high Flooding Duration seasonally	1.00	
V4	Mean High Salinity	2.5	0.325	2.5	0.325	2.5	0.325	
		HSI =	0.43	HSI =	0.43	HSI =	0.43	

Project..... IER 12, Riparian BLH & Swamp
FWOP

Variable		TY 20		TY 50		TY		
		Class/Value	SI	Class/Value	SI	Class/Value	SI	
V1	Stand Structure	% Cover Overstory		% Cover Overstory		% Cover Overstory		
		Scrub-shrub		Scrub-shrub		Scrub-shrub		
		Herbaceous		Herbaceous		Herbaceous		
		Class 4	0.60	Class 4	0.60	Class		
V2	Stand Maturity	Cypress % 30		Cypress % 30		Cypress % 0		0
		Cypress dbh 24		Cypress dbh 30		Cypress dbh 0		1
		Tupelo et al. % 70		Tupelo et al. % 60		Tupelo et al. % 0		
		Tupelo et al dbh 11.6	0.97	Tupelo et al dbh 19.39	0.90	Tupelo et al dbh 0	0.00	0.96
		Basal Area 38.94	0.19	Basal Area 106.56	0.54	Basal Area 0	0.00	
V3	Water Regime	Flow/Exchange high Flooding Duration seasonally	1.00	Flow/Exchange high Flooding Duration seasonally	1.00	Flow/Exchange Flooding Duration		
V4	Mean High Salinity	2.5	0.325	2.5	0.325			
		HSI =	0.48	HSI =	0.62	HSI =		

WETLAND VALUE ASSESSMENT COMMUNITY MODEL Swamp

Project.....

Project Area.....

68

Condition: Future With Project

Variable		TY 0		TY 1		TY 50	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory		% Cover Overstory		% Cover Overstory	
		Scrub-shrub		Scrub-shrub		Scrub-shrub	
		Herbaceous		Herbaceous		Herbaceous	
		Class 3	0.40	Class 1	0.10	Class 1	0.10
V2	Stand Maturity	Cypress %	30	Cypress %	0	Cypress %	0
		Cypress dbh	18	Cypress dbh	0	Cypress dbh	0
		Tupelo et al. %	70	Tupelo et al. %	0	Tupelo et al. %	0
		Tupelo et al dbh	12.8	Tupelo et al dbh	0	Tupelo et al dbh	0
		Basal Area	25.15	Basal Area	0	Basal Area	0
			1.00		0.00		0.00
V3	Water Regime	Flow/Exchange high		Flow/Exchange None		Flow/Exchange none	
		Flooding Duration seasonal	1.00	Flooding Duration None	0.10	Flooding Duration none	0.10
V4	Mean High Salinity	2.5	0.325	2.5	0.325	2.5	0.325
		HSI =	0.43	HSI =	0.00	HSI =	0.00

0
1
1

Project..... IER 12, Riparian BLH & Swamp
FWP

Variable		TY		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory		% Cover Overstory		% Cover Overstory	
		Scrub-shrub		Scrub-shrub		Scrub-shrub	
		Herbaceous		Herbaceous		Herbaceous	
		Class		Class		Class	
V2	Stand Maturity	Cypress %	0	Cypress %	0	Cypress %	0
		Cypress dbh	0	Cypress dbh	0	Cypress dbh	0
		Tupelo et al. %	0	Tupelo et al. %	0	Tupelo et al. %	0
		Tupelo et al dbh	0	Tupelo et al dbh	0	Tupelo et al dbh	0
		Basal Area	0	Basal Area	0.00	Basal Area	0.00
			0		0.00		0.00
V3	Water Regime	Flow/Exchange Moderate		Flow/Exchange Moderate		Flow/Exchange Moderate	
		Flooding Duration Semi-Permanent		Flooding Duration Semi-Permanent	0.65	Flooding Duration Semi-Permanent	0.65
V4	Mean High Salinity					3.0	0.1
		HSI =		HSI =		HSI =	

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, 404c BLH

Acres: 2.4

Condition: Future With Project

Variable		TY 0		TY 1		TY 50				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class 1		Class 1				
V2	Maturity (input age or dbh, not both)	Age 35 dbh	0.70	Age dbh 0.1	0.00	Age dbh 0.1	0.00			
V3	Understory / Midstory	Understory % 48 Midstory % 65	0.93	Understory % 0 Midstory % 0		Understory % 0 Midstory % 0		1.00	0.10	0.10
V4	Hydrology	Class 3	1.00	Class 1	0.10	Class 1	0.10			
V5	Forest Size	Class 5	1.00	Class 1		Class 1				
V6	Surrounding Land Use	Values % 73 24 3	0.83	Values % 73 24 3	0.83	Values % 73 24 3	0.83			
V7	Disturbance Type Distance	Class 2 Class 1	0.26	Class 2 Class 1	0.26	Class 2 Class 1	0.26			
		HSI = 0.77		HSI = 0.01		HSI = 0.01				

Project..... IER 12, Alt 2, 404c BLH
FWP

Variable		TY		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class		Class		Class	
V2	Maturity (input age or dbh, not both)	Age dbh		Age dbh		Age dbh	
V3	Understory / Midstory	Understory % Midstory %		Understory % Midstory %		Understory % Midstory %	
V4	Hydrology	Class		Class		Class	
V5	Forest Size	Class		Class		Class	
V6	Surrounding Land Use	Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development		Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development		Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development	
V7	Disturbance Type Distance	Class Class		Class Class		Class Class	
		HSI =		HSI =		HSI =	

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, 404c BLH

Acres: 2.4

Condition: Future Without Project

Variable		TY 0		TY 1		TY 20				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class 4	0.80	Class 4	0.80			
V2	Maturity (input age or dbh, not both)	Age 35 dbh	0.70	Age 36 dbh	0.72	Age 56 dbh	1.00			
V3	Understory / Midstory	Understory % 48 Midstory % 65	0.93	Understory % 48 Midstory % 65	0.93	Understory % 35 Midstory % 50	1.00	1.00	1.00	1.00
V4	Hydrology	Class 3	1.00	Class 3	1.00	Class 3	1.00			
V5	Forest Size	Class 5	1.00	Class 5	1.00	Class 5	1.00			
V6	Surrounding Land Use	Values %		Values %		Values %				
	Forest / marsh	73	0.83	73	0.83	73	0.83			
	Abandoned Ag Pasture / Hay	24		24		24				
	Active Ag Development	3		3		3				
V7	Disturbance Type	Class 2	0.26	Class 2	0.26	Class 2	0.26			
	Distance	Class 1		Class 1		Class 1				
		HSI = 0.77		HSI = 0.77		HSI = 0.85				

Project..... IER 12, Alt 2, 404c BLH
 FWP

Variable		TY 50		TY		TY				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class		Class				
V2	Maturity (input age or dbh, not both)	Age 75 dbh	1.00	Age		Age				
V3	Understory / Midstory	Understory % 35 Midstory % 35	1.00	Understory %		Understory %		1.00		1.00
V4	Hydrology	Class 3	1.00	Class		Class				
V5	Forest Size	Class 5	1.00	Class		Class				
V6	Surrounding Land Use	Values %		Values %		Values %				
	Forest / marsh	73	0.83							
	Abandoned Ag Pasture / Hay	24								
	Active Ag Development	3								
V7	Disturbance Type	Class 2	0.26	Class		Class				
	Distance	Class 1		Class		Class				
		HSI = 0.85		HSI =		HSI =				

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, BLH early successional Acres: 39

Condition: Future With Project

Variable		TY 0		TY 1		TY 50	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class 1	0.20	Class 1		Class 1	
V2	Maturity (input age or dbh, not both)	Age 10 dbh	0.10	Age 0 dbh	0.00	Age 0 dbh	0.00
V3	Understory / Midstory	Understory % 60 Midstory % 50	1.00	Understory % 0 Midstory % 0		Understory % 0 Midstory % 0	1.00 1.00
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class 2	0.50
V5	Forest Size	Class 4	0.80	Class 1		Class 1	
V6	Surrounding Land Use	Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development	0.90	Values % 84 16	0.90	Values % 84 16	0.90
V7	Disturbance	Class 2	1.00	Class 2	1.00	Class 2	1.00
	Type	Class 3		Class 3		Class 3	
	Distance						
		HSI = 0.31		HSI =		HSI =	

Project..... IER 12, Alt 2, BLH early successional
FWP

Variable		TY		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class		Class		Class	
V2	Maturity (input age or dbh, not both)	Age dbh		Age dbh		Age dbh	
V3	Understory / Midstory	Understory % Midstory %		Understory % Midstory %		Understory % Midstory %	
V4	Hydrology	Class		Class		Class	
V5	Forest Size	Class		Class		Class	
V6	Surrounding Land Use	Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development		Values % 		Values % 	
V7	Disturbance	Class		Class		Class	
	Type	Class		Class		Class	
	Distance						
		HSI =		HSI =		HSI =	

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, BLH early successional Acres: 39

Condition: Future Without Project

Variable		TY 0		TY 1		TY 20	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class 1	0.20	Class 1	0.20	Class 2	0.40
V2	Maturity (input age or dbh, not both)	Age 10 dbh	0.10	Age 11 dbh	0.12	Age 31 dbh	0.62
V3	Understory / Midstory	Understory % 60 Midstory % 40	1.00	Understory % 60 Midstory % 50	1.00	Understory % 50 Midstory % 70	1.00 1.00
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class 2	0.50
V5	Forest Size	Class 4	0.80	Class 4	0.80	Class 4	0.80
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	84	0.90	84	0.90	82	0.88
	Abandoned Ag Pasture / Hay	16		16		16	
	Active Ag Development					2	
V7	Disturbance Type	Class 2	1.00	Class 2	1.00	Class 2	1.00
	Distance	Class 3		Class 3		Class 3	
		HSI = 0.31		HSI = 0.33		HSI = 0.61	

Project..... IER 12, Alt 2, BLH early successional
FWP

Variable		TY 50		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class 2	0.40	Class		Class	
V2	Maturity (input age or dbh, not both)	Age 61 dbh	1.00	Age dbh		Age dbh	
V3	Understory / Midstory	Understory % 30 Midstory % 60	0.95	Understory % Midstory %		Understory % Midstory %	1.00 0.90
V4	Hydrology	Class 2	0.50	Class		Class	
V5	Forest Size	Class 4	0.80	Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	82	0.88				
	Abandoned Ag Pasture / Hay	16					
	Active Ag Development	2					
V7	Disturbance Type	Class 2	1.00	Class		Class	
	Distance	Class 3		Class		Class	
		HSI = 0.69		HSI =		HSI =	

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, Mid-Late Succ. BLH

Acres: 206

Condition: Future With Project

Variable		TY 0		TY 1		TY 50	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class 4	0.80	Class 1		Class 1	
V2	Maturity (input age or dbh, not both)	Age dbh 14.94	0.66	Age dbh 0		Age dbh 0	
V3	Understory / Midstory	Understory % 45 Midstory % 55	0.98	Understory % 0 Midstory % 0		Understory % 0 Midstory % 0	1.00 0.10 0.10 0.95 0.10 0.10
V4	Hydrology	Class 2	0.50	Class 1	0.10	Class 1	0.10
V5	Forest Size	Class 4	0.80	Class 1		Class 1	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh	33	0.43	73	0.83	73	0.83
	Abandoned Ag Pasture / Hay	25		24		24	
	Active Ag Development	42		3		3	
V7	Disturbance	Class 2	0.50	Class 1	0.01	Class 1	0.01
	Type	Class 2		Class 1		Class 1	
	Distance	Class 2		Class 1		Class 1	
		HSI = 0.68		HSI =		HSI =	

Project..... IER 12, Alt 2, Mid-Late Succ. BLH
FWP

Variable		TY		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Species Assoc.	Class		Class		Class	
V2	Maturity (input age or dbh, not both)	Age dbh		Age dbh		Age dbh	
V3	Understory / Midstory	Understory % Midstory %		Understory % Midstory %		Understory % Midstory %	
V4	Hydrology	Class		Class		Class	
V5	Forest Size	Class		Class		Class	
V6	Surrounding Land Use	Values %		Values %		Values %	
	Forest / marsh						
	Abandoned Ag Pasture / Hay						
	Active Ag Development						
V7	Disturbance	Class		Class		Class	
	Type	Class		Class		Class	
	Distance	Class		Class		Class	
		HSI =		HSI =		HSI =	

IER # 12 - Appendix I
COMMUNITY HABITAT SUITABILITY MODEL
Bottomland Hardwoods

Project..... IER 12, Alt 2, Mid-Late Succ. BLH

Acres:

206

Condition: Future Without Project

Variable		TY 0		TY 1		TY 20				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class 4	0.80	Class 4	0.80			
V2	Maturity (input age or dbh, not both)	Age dbh 14.94	0.66	Age dbh 15.22	0.68	Age dbh 18.27	0.89			
V3	Understory / Midstory	Understory % 45 Midstory % 55	0.98	Understory % 45 Midstory % 55	0.98	Understory % 30 Midstory % 60	0.95	1.00	1.00	1.00
V4	Hydrology	Class 2	0.50	Class 2	0.50	Class 2	0.50			
V5	Forest Size	Class 4	0.80	Class 4	0.80	Class 4	0.80			
V6	Surrounding Land Use	Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development	0.43	Values % 33 25 42	0.43	Values % 33 25 42	0.43			
V7	Disturbance Type	Class 2	0.50	Class 2	0.50	Class 2	0.50			
	Distance	Class 2		Class 2		Class 2				
		HSI = 0.68		HSI = 0.69		HSI = 0.73				

Project..... IER 12, Alt 2, Mid-Late Succ. BLH
FWP

Variable		TY 50		TY		TY				
		Class/Value	SI	Class/Value	SI	Class/Value	SI			
V1	Species Assoc.	Class 4	0.80	Class		Class				
V2	Maturity (input age or dbh, not both)	Age dbh 21.19	1.00	Age dbh		Age dbh				
V3	Understory / Midstory	Understory % 30 Midstory % 30	1.00	Understory % Midstory %		Understory % Midstory %		1.00	1.00	
V4	Hydrology	Class 2	0.50	Class		Class				
V5	Forest Size	Class 4	0.80	Class		Class				
V6	Surrounding Land Use	Values % Forest / marsh Abandoned Ag Pasture / Hay Active Ag Development	0.43	Values % 33 25 42		Values % 33 25 42				
V7	Disturbance Type	Class 2	0.50	Class		Class				
	Distance	Class 2		Class		Class				
		HSI = 0.76		HSI =		HSI =				

WETLAND VALUE ASSESSMENT COMMUNITY MODEL Swamp

Project..... IER 12, 404c Tupelo Swamp

Project Area.....

7.4

Condition: Future Without Project

Variable		TY 0		TY 1		TY 10	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory 35 Scrub-shrub 50 Herbaceous 70 Class 5	0.80	% Cover Overstory 35 Scrub-shrub 50 Herbaceous 70 Class 5	0.80	% Cover Overstory 40 Scrub-shrub 50 Herbaceous 55 Class 5	0.80
V2	Stand Maturity	Cypress % 0 Cypress dbh 0 Tupelo et al. % 100 Tupelo et al dbh 12.8 Basal Area 25.15	1.00 0.20	Cypress % 0 Cypress dbh 0 Tupelo et al. % 100 Tupelo et al dbh 13.07 Basal Area 25	1.00 0.20	Cypress % 0 Cypress dbh 0 Tupelo et al. % 100 Tupelo et al dbh 14.18 Basal Area 38	1.00 0.20
V3	Water Regime	Flow/Exchange High Flooding Duration Semi-Permanent	0.75	Flow/Exchange High Flooding Duration Semi-Permanent	0.75	Flow/Exchange High Flooding Duration Semi-Permanent	0.75
V4	Mean High Salinity	2.5	0.325	2.5	0.325	2.5	0.325
		HSI =	0.48	HSI =	0.48	HSI =	0.48

Project..... IER 12, 404c Tupelo Swamp
FWOP

Variable		TY 20		TY 50		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory 45 Scrub-shrub 40 Herbaceous 60 Class 5	0.80	% Cover Overstory 60 Scrub-shrub 35 Herbaceous 35 Class 6	1.00	% Cover Overstory Scrub-shrub Herbaceous Class	
V2	Stand Maturity	Cypress % 10 Cypress dbh 6 Tupelo et al. % 90 Tupelo et al dbh 11.6 Basal Area 44	0.87 0.35	Cypress % 20 Cypress dbh 15 Tupelo et al. % 80 Tupelo et al dbh 19.39 Basal Area 106.56	0.99 0.59	Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0	0.00 0.00
V3	Water Regime	Flow/Exchange High Flooding Duration Semi-Permanent	0.75	Flow/Exchange High Flooding Duration Semi-Permanent	0.75	Flow/Exchange Flooding Duration	
V4	Mean High Salinity	2.5	0.325	2.5	0.325		
		HSI =	0.56	HSI =	0.68	HSI =	

WETLAND VALUE ASSESSMENT COMMUNITY MODEL Swamp

Project..... IER 12, 404c Tupelo Swamp

Project Area.....

7.4

Condition: Future With Project

Variable		TY 0		TY 1		TY 50	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory 35 Scrub-shrub 50 Herbaceous 70 Class 5	0.80	% Cover Overstory Scrub-shrub Herbaceous Class 1	0.10	% Cover Overstory Scrub-shrub Herbaceous Class 1	0.10
V2	Stand Maturity	Cypress % 0 Cypress dbh 0 Tupelo et al. % 100 Tupelo et al dbh 12.8 Basal Area 25.15	1.00	Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0	0.00	Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0	0.00
V3	Water Regime	Flow/Exchange High Flooding Duration Semi-Permanent	0.75	Flow/Exchange None Flooding Duration None	0.10	Flow/Exchange none Flooding Duration none	0.10
V4	Mean High Salinity	2.5	0.325	2.5	0.325	2.5	0.325
		HSI =	0.48	HSI =	0.00	HSI =	0.00

Project..... IER 12, 404c Tupelo Swamp
FWP

Variable		TY		TY		TY	
		Class/Value	SI	Class/Value	SI	Class/Value	SI
V1	Stand Structure	% Cover Overstory Scrub-shrub Herbaceous Class		% Cover Overstory Scrub-shrub Herbaceous Class		% Cover Overstory Scrub-shrub Herbaceous Class	
V2	Stand Maturity	Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0		Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0	0.00	Cypress % 0 Cypress dbh 0 Tupelo et al. % 0 Tupelo et al dbh 0 Basal Area 0	0.00
V3	Water Regime	Flow/Exchange Moderate Flooding Duration Semi-Permanent		Flow/Exchange Moderate Flooding Duration Semi-Permanent	0.65	Flow/Exchange Moderate Flooding Duration Semi-Permanent	0.65
V4	Mean High Salinity					3.0	0.1
		HSI =		HSI =		HSI =	



United States Department of the Interior

FISH AND WILDLIFE SERVICE

646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

November 26, 2007

Colonel Alvin B. Lee
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Lee

Please reference the Individual Environmental Reports (IER) being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the U.S. Army Corps of Engineers (Corps) compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in those IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. This draft report contains a description of resources in the project area and provides planning objectives and recommendations to minimize project impacts on those resources.

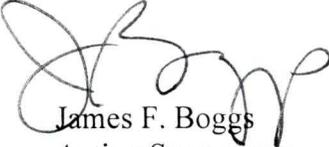
The proposed protection was authorized by Supplemental 4 which directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity and the West Bank and Vicinity Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction has been authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). In this case, the authorization process has prevented our agencies from following the normal procedures for fully complying with the FWCA. The FWCA requires that our Section 2(b) report be made an integral part of any report supporting further project authorization or administrative approval.

Because of the uncertainties regarding the project design, the project's impacts are undetermined at the current stage of planning, therefore, we cannot complete our evaluation of the IER's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phase of each IER, along with more-definitive

project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER. Therefore, this report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This report has not been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) or the National Marine Fisheries Service (NMFS) but their comments on this report will be provided under separate cover.

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

Sincerely,



James F. Boggs
Acting Supervisor
Louisiana Field Office

Attachment

cc: National Marine Fisheries Service, Baton Rouge, LA
EPA, Dallas, TX
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**Draft Fish and Wildlife Coordination Act Report
for the
Individual Environmental Reports (IER)**

Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the
Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4)



PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

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U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA
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U.S. FISH AND WILDLIFE SERVICE – SOUTHEAST REGION

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EXECUTIVE SUMMARY

The Corps of Engineers New Orleans District (Corps) is preparing Individual Environmental Reports (IER) under the approval of the Council on Environmental Quality (CEQ). Those IERs will partially fulfill the Corps compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in those IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. This draft report contains a description of resources in the project area and provides planning objectives and recommendations to minimize project impacts on those resources.

The proposed protection was authorized by Supplemental 4 which directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity and the West Bank and Vicinity Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction has been authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). In this case, the authorization process has prevented our agencies from following the normal procedures for fully complying with the FWCA. The FWCA requires that our Section 2(b) report be made an integral part of any report supporting further project authorization or administrative approval.

Because of the uncertainties regarding the project design, the project's impacts are undetermined at the current stage of planning, therefore, we cannot complete our evaluation of the IER's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phased of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER. Therefore, this report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This report has not been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) or the National Marine Fisheries Service (NMFS) but their comments on this report will be provided under separate cover.

This report incorporates and supplements our FWCA Reports that addressed impacts and mitigation features for the Westbank and Vicinity of New Orleans (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) and the Lake Pontchartrain and Vicinity Hurricane (dated July 25, 1984, and January 17, 1992) Protection projects. Impacts and

mitigation needs resulting from government and contractor provided borrow areas have been addressed in an October 25, 2007, and a November 1, 2007, FWCA reports, respectively. Therefore, this report will not address those borrow impacts and future impacts will be addressed in FWCA supplements to those FWCA reports. In addition, specific recommendations for mitigation will be addressed in separate FWCA reports because mitigation is still within early planning phases and lacks sufficient details to be adequately addressed.

Construction of the increased flood protection would result in un-quantified habitat losses. The Service does not object to providing improved hurricane protection to the Greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. To the greatest extent possible, situate flood protection features so that destruction of wetlands and non-wet bottomland hardwoods are avoided or minimized.
2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.
3. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction.
4. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.
5. The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation features.
6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, Environmental Protection Agency (EPA) and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.
7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannon (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. John Lavin at 1-888-677-1400, National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504)

589-3882 extension 128, (david_muth@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.
9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.
10. If a proposed project feature is changed significantly or is not implemented within one year of the date of our Endangered Species Act consultation letter, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.
11. In general, larger and more numerous openings in a protection levee better maintain estuarine dependent fishery migration. Therefore, as much opening as practicable, in number, size, and diversity of locations should be incorporated into project levees.
12. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.
13. Flood protection water control structures should remain completely open except during storm events. Management of those structures should be developed in coordination with the Service, NMFS, LDWF, and LDNR.
14. Any flood protection water control structure sited in canals, bayous, or navigation channels that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.
15. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.
16. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.
17. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet

per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.

18. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

19. Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and one at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.

20. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.

21. Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

22. Operational plans for water control structures should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

23. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

24. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

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

26. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

INTRODUCTION

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Because of the uncertainties regarding the project design, the project's impacts are undetermined at the current stage of planning, therefore, we cannot complete our evaluation of the IER's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Therefore, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phases of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER.

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DESCRIPTION OF THE STUDY AREA

The study area is located within the Mississippi River Deltaic Plain of the Lower Mississippi River Ecosystem. Portions of Jefferson, Orleans, St. Charles, St. Bernard and Plaquemines Parishes are included in the study area. Higher elevations occur on the natural levees of the

Mississippi River and its distributaries. Developed lands are primarily associated with natural levees, but extensive wetlands have been leveed and drained to accommodate residential, commercial, and agricultural development. Federal, State, and local levees have been installed for flood protection purposes, often with negative effects on adjacent wetlands. Navigation channels such as the Gulf Intracoastal Waterway and the Mississippi River – Gulf Outlet are also prominent landscape features, as are extensive oil and gas industry access channels and pipeline canals. Extensive wetlands and associated shallow open waters dominate the landscape outside the flood control levees. Major waterbodies include Lake Pontchartrain located north of the project area, the Mississippi River which bisects the project area, and Lake Borgne which is located on the eastern edge of the project area.

FISH AND WILDLIFE RESOURCES

Description of Habitats

Habitat types in the project area include forested wetlands (i.e., bottomland hardwoods and/or swamps), non-wet bottomland hardwoods, marsh, open water, and developed areas. Due to urban development and a forced-drainage system, the hydrology of most of the forested habitat has been altered. The forced-drainage system has been in operation for many years, and subsidence is evident throughout the areas enclosed by levees.

Wetlands (forested, marsh, and scrub-shrub) within the study area provide plant detritus to adjacent coastal waters and thereby contribute to the production of commercially and recreationally important fishes and shellfishes. Wetlands in the project area also provide valuable water quality functions such as reduction of excessive dissolved nutrient levels, filtering of waterborne contaminants, and removal of suspended sediment. In addition, coastal wetlands buffer storm surges reducing their damaging effect to man-made infrastructure within the coastal area.

Factors that will strongly influence future fish and wildlife resource conditions outside of the protection levees include freshwater input and loss of coastal wetlands. Depending upon the deterioration rate of marshes, the frequency of occasional short-term saltwater events may increase. Under that scenario, tidal action in the project area may increase gradually as the buffering effect of marshes is lost, and use of that area by estuarine-dependent fishes and shellfish tolerant of saltwater conditions would likely increase. Regardless of which of the above factors ultimately has the greatest influence, freshwater wetlands within and adjacent to the project area will probably experience losses due to development, subsidence, and erosion.

The ongoing loss of coastal Louisiana wetlands (approximately 1,149 square miles between 1956 and 2004; average loss rate of 24 square miles per year) was recently exacerbated by Hurricanes Katrina and Rita in 2005. Those hurricanes caused an initial loss of wetlands equivalent to 9 years (approximately 217 square miles) of mean annual losses. Louisiana wetlands provide 26 percent of the seafood landed in the conterminous United States and over 5 million migratory waterfowl utilize those wetlands every year. In addition, those wetlands provide protection to coastal towns, cities and their infrastructure, as well as important infrastructure for the nation's

oil and gas industry.

Non-wet bottomland hardwoods within the project area also provide habitat for wildlife resources. Between 1932 and 1984, the acreage of bottomland hardwoods in Louisiana declined by 45 percent (Rudis and Birdsey 1986). By 1970, Jefferson Parish was classified as entirely urban or nonforested in the U.S. Forest Service's forest inventory with most of this loss resulting from development within non-wet areas inside the hurricane protection levees. A large percentage of the original bottomland hardwoods within the Mississippi River floodplain in the Deltaic Plain are located within levees. However, losses of that habitat type are not regulated or mitigated with the exception of impacts resulting from Corps projects as required by Section 906(b) of the Water Resources Development Act of 1986.

As previously mentioned, the Service has provided FWCA Reports for the two-subject protection projects. Those reports contain a through discussion of the significant fish and wildlife resources (including those habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following brief descriptions are provided to update the previously mentioned information.

Forested Habitats

Forested habitats in the study area are divided into two major types; bottomland hardwood forests and cypress-tupelo swamps. Bottomland hardwood forests found in the project area occur primarily on the natural levees of the Mississippi River or former distributary channels. Dominant vegetation may include sugarberry, water oak, live oak, bitter pecan, black willow, American elm, Drummond red maple, Chinese tallow-tree, boxelder, green ash and elderberry. Most bottomland hardwoods that are located within the constructed hurricane protection projects have been degraded by forced drainage and resultant subsidence. Those areas are also often fragmented by development. Conversely, those bottomland hardwoods located outside the protection levees or in areas where structures through the levees maintain a hydrologic connection, still retain many wetland functions and values.

Cypress-tupelo swamps are located along the flanks of larger distributary ridges as a transition zone between bottomland hardwoods and lower-elevation marsh or scrub-shrub habitats. Cypress-tupelo swamps exist where there is little or no salinity, usually minimal daily tidal action and are usually flooded throughout most of the growing season. Bald cypress-tupelogram are the dominant vegetation within this habitat type, however, Drummond red maple, green ash, and black willow are also common. Cypress swamps that are within the levee system and under forced drainage are often dominated by bald cypress, but vegetative species more typical of bottomland hardwoods will dominate the under- and mid-story vegetation. These sites will often have ecological functions closer to those of a bottomland hardwood. Because of their altered hydrology, these areas can potentially convert to sites dominated by bottomland hardwood species.

Marshes

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

Intermediate marshes are a transitional zone between fresh and brackish marshes and are often characterized by organic, semi-floating soils. Typically, intermediate marshes experience low levels of daily tidal action. Salinities are negligible or low throughout much of the year, with salinity peaks occurring during late summer and fall. Vegetation includes saltmeadow cordgrass, deer pea, three-cornered grass, cattail, bulltongue, seashore paspalum, wild millet, fall panicum, and bacopa. Ponds and lakes within the intermediate marsh zone often support extensive submerged aquatic vegetation including southern naiad, Eurasian milfoil, and wigeongrass.

Brackish marshes are characterized by low to moderate daily tidal energy and by soils ranging from firm mineral soils to organic semi-floating soils. Freshwater conditions may prevail for several months during early spring; however, low to moderate salinities occur during much of the year, with peak salinities in the late summer or fall. Vegetation is usually dominated by saltmeadow cordgrass, but also includes saltgrass, three-cornered grass, leafy three-square, and deer pea. Shallow brackish marsh ponds occasionally support abundant beds of wigeongrass.

Saline marshes occur along the fringe of the coastal wetlands. Those marshes usually exhibit fairly firm mineral soils and experience moderate to high daily tidal energy. Vegetation is dominated by saltmarsh cordgrass but may also include saltgrass, saltmeadow cordgrass, black needlerush, and leafy three-square. Submerged aquatic vegetation is rare. Within the study area, intertidal mud flats are most common in saline marshes.

Scrub-Shrub Habitats

Scrub-shrub habitat is often found along the flanks of distributary ridges and in marshes altered by spoil deposition or drainage projects. Typically it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry, wax myrtle, buttonbush, black willow, Drummond red maple, Chinese tallow-tree, and groundselbush. Some scrub-shrub habitat is an early successional stage of bottomland hardwood forests.

Open-Water Habitats

Open-water habitat within the project area consists of ponds, lakes, canals, bays, and bayous. Natural marsh ponds and lakes are typically shallow, ranging in depth from 6 inches to over 2

feet. Typically, the smaller ponds are shallow and the larger lakes and bays are deeper. In fresh and low-salinity areas, ponds and lakes may support varying amounts of submerged and/or floating-leaved aquatic vegetation. Brackish and, much less frequently, saline marsh ponds and lakes may support wigeongrass beds.

Canals and larger bayous typically range in depth from 4 or 5 feet, to over 15 feet. Strong tidal flows may occur at times through those waterways, especially where they provide hydrologic connections to other large waterbodies. Such canals and bayous may have mud or clay bottoms that range from soft to firm. Dead-end canals and small bayous are typically shallow and their bottoms may be filled in to varying degrees with semi-fluid organic material. Erosion due to wave action and boat wakes, together with shading from overhanging woody vegetation, tends to retard the amount of intertidal marsh vegetation growing along the edges of those waterways.

Drainage canals enclosed within the hurricane protection project are stagnant except when pumps are operating to remove water. Runoff from developed areas has likely reduced the habitat value of that aquatic habitat by introducing various urban pollutants, such as oil, grease, and excessive nutrients. Clearing and development has eliminated much of the riparian habitat that would normally provide shade and structure for many aquatic species.

Developed Areas

Developed habitats in the study area include residential and commercial areas, as well as roads and existing levees. Those habitats do not support significant wildlife use. Most of the development is located on higher elevations of the Mississippi River natural levees and former distributary channels; however, vast acreages of swamp and marsh have been placed under forced drainage systems and developed. Limited amounts of agricultural lands occur through out the area; agriculture includes sugarcane farming, cattle production, and haying. Some development in wetlands is also occurring as result of permitted fill activities.

Fishery/Aquatic Resources

Drainage canals in the study area do not support significant fishery resources because of dense vegetation, poor water quality, and inadequate depth. Freshwater sport fishes present in the project area, but outside of the levees, include largemouth bass, crappie, bluegill, redear sunfish, warmouth, channel catfish, and blue catfish. Other fishes likely to be present include yellow bullhead, freshwater drum, bowfin, carp, buffalo, and gar. Estuarine-dependent fishes and shellfishes such as Atlantic croaker, red drum, spot, sand seatrout, spotted seatrout, southern flounder, Gulf menhaden, striped mullet, brown shrimp, white shrimp, and blue crab are found in the intermediate to saline marshes.

Some of the waterbodies in the project area meet criteria for primary and secondary contact recreation and partially meets criteria for fish and wildlife propagation, while others do not meet the criteria for fish and wildlife propagation. Causes for not fully meeting fish and wildlife propagation criteria include excessive nutrients, organic enrichment, low dissolved oxygen levels, flow and habitat alteration, pathogens and noxious aquatic plants. Indicated sources of

those problems include hydromodification, habitat modification, recreational activities, and unspecified upstream sources. Municipal point sources, urban runoff, storm sewers, and onsite wastewater treatment systems are also known contributors to poor water quality in the area.

Deteriorating water quality in the Barataria Basin, at least partially correlated to wetlands loss and a commensurate reduction in the area's waste assimilation capacity, is a major problem affecting fish and wildlife in that portion of the study area. According to Bahr et al. (1983), factors that currently adversely affect water quality in the Barataria Basin are those generally related to urban development and associated urban pollution, altered land-use patterns, and hydrologic modifications (drainage, etc.) within the watershed. Two major human-related causes of water quality degradation include eutrophication and increased levels of toxic substances.

Essential Fish Habitat

Estuarine wetlands and associated shallow waters within the project area have been identified as Essential Fish Habitat (EFH) for both postlarval, juvenile and sub-adult stages of brown shrimp, white shrimp, and red drum, as well as the adult stages of those species in the nearshore and offshore reaches. EFH has also been designated for various life stages of Spanish mackerel, bluefish, cobia, and mangrove snapper in the nearshore, marine-portion of the project area and in the lower portions of the estuary. EFH requirements vary depending upon species and life stage. Categories of EFH in the project area include estuarine emergent wetlands, estuarine water column, submerged aquatic vegetation, and estuarine water bottoms. Detailed information on Federally managed fisheries and their EFH is provided in the 1998 generic amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council (GMFMC). That generic amendment was prepared in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA); (P.L. 104-297). Estuarine-dependent species such as those listed above also serve as prey for other species managed under the MSFCMA by the GMFMC (e.g., red drum, mackerels, snappers, and groupers) and highly migratory species (e.g., billfishes and sharks) managed by the NMFS. Recommendations to minimize and/or avoid impacts to estuarine fishery species were developed by NMFS along with supporting literature and are included in Appendix B.

Wildlife Resources

Mammals known to occur in the project-area bottomland hardwoods and marshes include mink, raccoon, swamp rabbit, nutria, river otter, and muskrat. Those habitats also support a variety of birds including herons, egrets, ibises, least bittern, rails, gallinules, olivaceous cormorant, white pelican, pied-billed grebe, black-necked stilt, sandpipers, gulls, and terns. Forested and scrub-shrub habitats within the study area also provide habitat for many resident passerine birds and essential resting areas for many migratory songbirds including warblers, orioles, thrushes, vireos, tanagers, grosbeaks, buntings, flycatchers, and cuckoos. Many of these and other passerine birds have undergone a decline in population primarily due to habitat loss.

Given the extent of development and drainage, waterfowl use within the hurricane protection system is likely minimal, except in the adjacent wetlands outside the levees. Swamps, fresh and

intermediate marshes usually receive greater waterfowl utilization than brackish and saline marshes because they generally provide more waterfowl food. Migratory species expected to occur in the project area include gadwall, green-winged teal, blue-winged teal, northern shoveler, mallard, pintail, American widgeon, lesser scaup, ring-necked duck, redhead, and canvasback. Resident species expected to occur in that area include mottled duck and wood duck.

The study area also supports resident hawks and owls including the red-shouldered hawk, barn owl, common screech owl, great horned owl, and barred owl. The red-tailed hawk, marsh hawk, and American kestrel are seasonal residents which utilize habitats within the study area.

Amphibians such as the pig frog, bullfrog, leopard frog, cricket frog, and Gulf coast toad are expected to occur in the fresh and low salinity wetlands of the project area. Reptiles such as the American alligator, snapping turtle, softshell turtle, red-eared turtle, and diamond backed terrapin are also expected to occur in the project-area wetlands and waterbodies.

Endangered and Threatened Species

To aid the Corps in complying with their proactive consultation responsibilities under the Endangered Species Act (ESA), the Service provided a list of threatened and endangered species and their critical habitats within the coastal parishes of the New Orleans District in an August 7, 2006, letter to the Corps. The Service recommends that the Corps conduct ESA consultation on each IER as soon as plans are developed and impact locations are identified. If the plans are changed significantly or relocated, or work is not implemented within 1 year following that coordination, we recommend that the Corps reinstate coordination with this office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat.

Protected Species

The Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) offer additional protection to many bird species within the project area including colonial nesting birds and the bald eagle (*Haliaeetus leucocephalus*).

The project area is located where colonial nesting waterbirds may be present. LDWF currently maintains a database of these colonies locations. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work sites for the presence of undocumented nesting colonies during the nesting season (e.g. February through September depending on the species). If colonies exist work should not be conducted within 1,000 feet of the colony during the nesting season

Forested habitat in the project-area may provide nesting habitat for the bald eagle, which has officially been removed from the List of Endangered and Threatened Species as of August 8,

2007. Although the bald eagle has been removed from the threatened and endangered species list, it continues to be protected under the MBTA and the BGEPA. The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. Those guidelines recommend maintaining: (1) a specified distance between the activity and the nest (buffer area); (2) natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. A copy of the NBEM Guidelines is available at:

<http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>. If after consulting those guidelines you need further assistance in determining the appropriate size and configuration of buffers or the timing of activities in the vicinity of a bald eagle nest, the please contact this office.

National Wildlife Refuges, Parks, 404(c) area

Located within the study area are the Bayou Segnette and the St. Bernard State Parks, which are operated by the Louisiana Department of Culture, Recreation and Tourism, Office of State Parks. Please contact Mr. John Lavin at 1-888-677-1400 regarding work on those areas.

The Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve (JLNHPP) is located on the west bank of the Mississippi River and managed by the National Park Service (NPS). NPS has no authority to enter into agreements with others to allow uses which adversely affect park lands. Therefore, NPS lands cannot be directly utilized or adversely impacted by any flood control project feature unless authorized explicitly by congress. For additional information concerning NPS lands within the area please contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov).

An area adjacent to the Jean Lafitte National Historic Park and Preserve (JLNHPP) was subject to an Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c) in 1985. According to the EPA Final Determination, the discharge of any dredged or fill material within the approximately 3200 acre site, referred to as the Bayou aux Carpes 404(c) area, is restricted. The EPA action allowed for three specific exceptions, none of which appears to apply to the Corps' current hurricane protection proposal. Previous requests which have fallen outside those exceptions have been denied by EPA as being contrary to the CWA 404(c) determination. One such categorical denial prohibited the Corps from altering the alignment of the West Bank Hurricane Protection Levee such that it would encroach upon the Bayou aux Carpes 404(c) area.

The EPA 404(c) action was intended as an advance notification to the public and agencies of the government's determination under the CWA Section 404 for the area, in the sense of planning aid coordination. In light of this existing determination, we would expect the NEPA work on the portion of the levee forming the 404(c) boundary to thoroughly evaluate the range of feasible alternatives and their environmental impacts, as well as documenting the Corps' legal and regulatory authority for any alternative that would entail impacts to the Bayou aux Carpes 404(c) area.

The Bayou aux Carpes 404(c) is one of only 11 such actions ever completed by EPA. Approximately 2,800 acres within the site are in Federal ownership and Congress is considering legislation to adjust the boundary of the Barataria Preserve to include the Bayou aux Carpes within the JLNHPP. In the meantime, the National Park Service (NPS) has constructive possession of the area. Therefore, the Corps should contact both the NPS (see contacts above) and EPA (Ms. Barbara Keeler, 214/665-6698) regarding any proposed project feature that may impact that area.

The NPS also has constructive possession of additional Federal lands located adjacent to WBV14c. Congress is considering legislation to adjust the boundary of the Barataria Preserve to also include those lands (i.e., CIT tract) within the JLNHPP.

The Service's Bayou Sauvage National Wildlife Refuge is located in the eastern portion of the project area. The National Wildlife Refuge System Improvement Act of 1997 authorized that no new or expanded use of a refuge may be allowed unless it is first determined to be compatible. A compatibility determination is a written determination signed and dated by the Refuge Manager and Regional Refuge Chief, signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. A compatible use is defined as a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge. A compatibility determination is only required when the Service has jurisdiction over the use. For example, proposed uses that deal exclusively with air space, navigable waters or overly refuges where another Federal agency has primary jurisdiction over the area, would not be subject to compatibility.

Federal agencies proposing a project that includes features on a national wildlife refuge are encouraged to contact the Refuge Manager early in the planning process. The Refuge Manager will work with the project proponent to determine if the proposed project constitutes a "refuge use" subject to a compatibility determination. If the proposed project requires a compatibility determination, a concise description of the project (refuge use) including who, what, where, when, how and why will be needed to prepare the compatibility determination. In order to determine the anticipated impacts of use, the project proponent may be required to provide sufficient data and information sources to document any short-term, long-term, direct, indirect or cumulative impacts on refuge resources. Compatibility determinations will include a public review and comment before issuing a final determination.

All construction or maintenance activities (e.g., surveys, land clearing, etc.) on a National Wildlife Refuge (NWR) will require the Corps to obtain a Special Use Permit from the Refuge Manager; furthermore, all activities on that NWR must be coordinated with the Refuge Manager.

Therefore, we recommend that the Corps request issuance of a Special Use Permit well in advance of conducting any work on the refuge. Please contact Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannon (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge for further information on compatibility of flood control features, and for assistance in obtaining a Special Use Permit. Close coordination by both the Corps and its contractor must be maintained with the Refuge Manager to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit issued by the NWR.

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

Future Fish and Wildlife Resources

The combination of subsidence and sea level rise is called submergence or land sinking. As the land sinks the wetlands become inundated with higher water levels, stressing most non-fresh marsh plants, bottomland hardwood plants and even cypress-tupelo swamps leading to plant death and conversion to open water. Other major causes of wetland losses within the study area include altered hydrology, storms, saltwater intrusion (caused by marine processes invading fresher wetlands), shoreline erosion, herbivory, and development activities including the direct and indirect impacts of dredge and fill (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). The continued conversion of wetlands and forested habitat to open water or developed land represent the most serious fish and wildlife-related problems in the study area. Those losses could be expected to cause significant declines in coastal fish and shellfish production and in the study area's carrying capacity for numerous migratory waterfowl, wading birds, other migratory birds, alligators, furbearers, and game mammals. Wetland losses will also reduce storm surge protection of developed lands, and will likely contribute to water quality degradation associated with excessive nutrient inputs.

ALTERNATIVES UNDER CONSIDERATION

The proposed plan involves upgrading the existing flood protection levees, floodwalls, and floodgates around the Greater New Orleans area. Most improvements will be constructed partially, sometimes entirely, within the existing right-of-way (ROW). However, some proposed closures, i.e., the Inner Harbor Navigation Canal and the Gulf Intracoastal Waterway, would require new construction ROWs and may impact high quality habitats. Some alternatives that have been examined include expanding ROWs into the lower quality habitat side of a levee, utilizing floodwalls so that minimal expansion of ROWs would occur and incorporating subsoil

mixing that would also reduce the expansion of a levee ROW.

PROJECT IMPACTS

The Corps has not yet selected a recommended plan but is continuing to evaluate plans at several levels of protection for each IER. Although some construction will occur in developed areas and on existing levees, project implementation will also directly impact marshes, bottomland hardwoods, swamps, and shrub-scrub areas that provide low to high habitat values for diverse fish and wildlife resources. Project impacts would result primarily from levee rights-of-way (ROW) expansion and construction of levees, borrow pits, floodwalls, navigable floodgates, and associated features.

Development is ongoing within the hurricane protection levees; therefore, the Service has assumed that, for this specific project, project-induced development within enclosed wetlands will be insignificant. However, project impacts to non-wet bottomland hardwoods as a result of flood protection improvements should be mitigated.

To quantify anticipated project impacts to fish and wildlife resources, the Service will use the Wetland Value Assessment (WVA) methodology. The WVA was developed to evaluate restoration projects proposed for funding under Section 303 of the Coastal Wetlands Planning, Protection and Restoration Act. The WVA version utilized in this evaluation was modified by the Louisiana Department of Natural Resources to better determine impacts and mitigation needs in forested wetlands. Further explanation of how impacts/benefits are assessed with WVA and an explanation of the assumptions affecting HSI values for each target year will be available for review at the Fish and Wildlife Service's (Service) Lafayette, Louisiana, field office. For tidally influenced marshes the National Marine Fisheries Service will have copies of those WVAs at their Baton Rouge, Louisiana office.

FISH AND WILDLIFE CONSERVATION MEASURES

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include:

(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments.

The Service supports and adopts this definition of mitigation and considers its specific elements to represent the desirable sequence of steps in the mitigation planning process. Based on current and expected future without-project conditions, the planning goal of the Service is to develop a balanced project, i.e., one that is responsive to demonstrated hurricane protection needs while addressing the co-equal need for fish and wildlife resource conservation.

The Service's Mitigation Policy (Federal Register, Volume 46, No. 15, January 23, 1981) identifies four resource categories that are used to ensure that the level of mitigation recommended by Service biologists will be consistent with the fish and wildlife resource values involved. Considering the high value of forested wetlands and marsh for fish and wildlife and the relative scarcity of that habitat type, those wetlands are usually designated as Resource Category 2 habitats, the mitigation goal for which is no net loss of in-kind habitat value. The degraded (i.e., non-wet) bottomland hardwood forest and any wet pastures that may be impacted, however, are placed in Resource Category 3 due to their reduced value to wildlife, fisheries and lost/degraded wetland functions. The mitigation goal for Resource Category 3 habitats is no net loss of habitat value. Project impacts to wetlands will be minimized to some extent by hauling in material for the levee. Because the project is already, avoiding the project impacts altogether (i.e., the "no action" alternative) is not feasible. Therefore, remaining project impacts should be mitigated via compensatory replacement of the habitat values lost.

Toward that end, the Service recommends that the following planning objectives be adopted to guide future project studies.

1. Conserve important fish and wildlife habitat (i.e., bottomland hardwoods, cypress swamps, fresh and estuarine marsh and associated shallow open water habitats) by minimizing the acreage of those habitats directly affected by flood control features.
2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.
3. Operate water control structures in levees to allow for (or maintain) fish and shellfish access into enclosed wetland areas.
4. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of levees, other project features and timing of construction.
5. Fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

SERVICE POSITION AND RECOMMENDATIONS

Construction of the increased flood protection would result in un-quantified habitat losses. The Service does not object to providing improved hurricane protection to the Greater new Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. To the greatest extent possible, situate flood protection features so that destruction of

wetlands and non-wet bottomland hardwoods are avoided or minimized.

2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.
3. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction.
4. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.
5. The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation features.
6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, Environmental Protection Agency (EPA) and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.
7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannon (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. John Lavin at 1-888-677-1400, National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.
8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.
9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

10. If a proposed project feature is changed significantly or is not implemented within one year of the date of our Endangered Species Act consultation letter, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.

11. In general, larger and more numerous openings in a protection levee better maintain estuarine dependent fishery migration. Therefore, as much opening as practicable, in number, size, and diversity of locations should be incorporated into project levees.

12. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.

13. Flood protection water control structures should remain completely open except during storm events. Management of those structures should be developed in coordination with the Service, NMFS, LDWF, and LDNR.

14. Any flood protection water control structure sited in canals, bayous, or navigation channels that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

15. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

16. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

17. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.

18. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

19. Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and one at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.

20. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.
21. Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.
22. Operational plans for water control structures should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.
23. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.
24. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.
25. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.
26. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

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APPENDIX A

Summary of basic mitigation land requirements before land is transferred to the U.S. Fish and Wildlife Service

SUBJECT: Revised Summary of basic mitigation land requirements before land is transferred over to the Service.

The following represents a summary of basic mitigation land requirements before land is transferred over to the Service. This does not necessarily represent a comprehensive list, but does represent our best effort to identify all land requirements within reason.

1. For inclusion into the National Wildlife Refuge (NWR) system the lands must be located within a refuge's acquisition boundary.
2. The Service must be provided copies of any easements/agreements for right-of-way on the property especially as it pertains to maintenance of such right-of-way, frequency of maintenance and costs associated with that maintenance if the maintenance is to be preformed by the landowner.
3. The area must be surveyed prior to acquisition by the United States or transfer to the Fish and Wildlife Service. The survey will be conducted by the Corps of Engineers (Corps) or an approved contractor. Boundaries must be marked and permanent monuments set at all corners. Copies of the surveyor notes, plats, etc. resulting from such survey must be provided to Service.
4. Language must be placed in the deed dedicating the mitigation land to fish and wildlife conservation in perpetuity.
5. When possible any restrictive covenants or liens shall be removed, especially if they could interfere with mitigation implementation, operation and/or maintenance.
6. Completion of a Level 1 survey for hazardous, toxic, and/or radioactive wastes with a copy being provided to the Service. If the Level 1 survey indicates the need for further investigations/surveys, those investigations/surveys must be completed and a copy provided to the Service. Lands having unremediated hazardous, toxic, and/or radioactive wastes present may not be accepted into a NWR. Remediated sites will be assessed for inclusion on a case-by-case basis. Documentation of the level of remediation is to be provided to the Service.
7. Funding mechanism for operation and maintenance of the mitigation lands and mitigation features (e.g., water control structures, timber stand improvements, etc.).
8. Documentation must be provided to the Service describing the mitigation goals and objectives in addition to a description of necessary operation and maintenance activities needed to accomplish the stated goals and objectives.

9. Mineral rights should be purchased. If it is not possible to purchase, then protection of surface rights via the following language:

"The vendors reserve for themselves, their successors and assigns, the right to explore, for, operate, produce, remove and transport, oil and gas from the lands herein described. The vendors reserve unto themselves, their successors and assigns, the right of ingress and egress over the said lands in pursuance of the reservations set forth above.

The land is now subject to oil and gas lease in favor of _____, as per lease of record in the records of _____, _____, pages _____ of Book _____, and the conveyance is subject to the rights of the lessee in said lease.

The oil and gas reservations made by the vendors herein in favor of themselves, their successors and assigns, shall be subject to the following stipulations, and any lease made by the vendors, their successors or assigns, subsequent to the date of this deed, shall contain the following stipulations for the protection of the vendee.

The vendors, their successors and assigns, agree that prior to entry upon the land for purposes of exploration, development or production of, oil and/or gas, they shall obtain a Special Use Permit from the U.S. Fish and Wildlife Service, which permit is for the purpose of providing for access and protecting the natural resources of the area for which the land was acquired, and whose terms and conditions will not unreasonably restrain the activities of the vendors, and their successors and assigns.

It is mutually understood between the parties that the intention of the Government in acquiring this area is to create a refuge for, and the protection of, wildlife in the area herein acquired, and the vendors will conform to, and be governed by, and the vendors herein bind themselves, their successors and assigns, agents and employees, to conform to, and be governed by, the rules and regulations pertaining to the protection of wildlife and refuge administration prescribed from time to time by the Secretary of the Interior or his/her authorized agent, the Director of Fish and Wildlife Service, except that such regulations shall not unreasonably restrain the exercise and use by the vendors, their successors and assigns, of the reservation set out in this agreement."

10. The Service would need a title commitment and policy in favor of United States of America that is in the American Land Title Association (ALTA) U.S. Policy 9/28/91 format as provided in Title Standards 2001.

If the title remains with the local-sharer or the Corps a General Plan as provided for under Section 3 of the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 et seq.) must be written. However, the Service may chose to not manage lands for which it does not have title.

APPENDIX B

National Marine Fisheries Service Baton Rouge Field Office

Recommendations for Fisheries Friendly Design and Operation of Hurricane and Flood Protection Water Control Structures and Supporting Appendices

SUMMARY

The purpose of this document is to: 1) identify design and operational guiding principles that would optimize passage of estuarine dependent marine fisheries species, or at least, minimize adverse impacts to their passage through hurricane and flood protection water control structures planned for the New Orleans District of the U.S. Army Corps of Engineers; and, 2) provide background literature for environmental justification and documentation. Specific projects for which this guidance should be considered include the Mississippi River and Tributaries, Morganza to the Gulf of Mexico Hurricane Protection Project; Donaldsonville to the Gulf Project; Supplemental Appropriations Projects, and the Louisiana Coastal Protection and Restoration Project (LACPR). However, these guiding principles would also pertain to any civil works projects that could include combinations of levees and/or water control structures. Project delivery teams should remain flexible to adapt these design principles on a case-by-case basis as new fishery resource information and project-specific hydraulics data become available.

In general, the ability of estuarine dependent marine fishery organisms to migrate to and from coastal habitats decreases as structural restrictions increase, thereby reducing fishery production. The physical ability (i.e., swimming speed) to navigate through a structure is not the only factor influencing fish passage. Both behavioral and physical responses govern migration and affect passage of fishery organisms through structures. These responses may vary by species and life stage. In addition, most marine fishery species are relatively planktonic in early life stages and are dependent on tidal movement to access coastal marsh nursery areas. For this reason, in general, the greater the flow through a structure into a hydrologically affected wetland area, the greater the marine fishery production functions provided by that area.

Data on marine fishery species migrations in the Gulf of Mexico are too limited to allow the development of definitive design and operational considerations for water control structures that would guarantee the protection of marine fishery production. Anecdotal comparisons can be made with data from water intake and fish passage studies from the west and east coasts. It should not be assumed that structures that have been determined to provide sufficient drainage capacity also optimize or provide adequate fishery passage. More investigation is warranted to refine and adaptively manage water control structure design and operations to minimize adverse impacts to fishery passage. Case specific recommendations for some features under the Mississippi Tributaries, Morganza to the Gulf of Mexico Hurricane Protection Project and LACPR are provided in the appendices. In addition, biological background information is provided in the appendices to assist in preparation of environmental documents required by the National Environmental Policy Act (NEPA).

Summary of guiding principles for designing and operating flood protection water control structures to maintain marine fishery passage:

- Generally, bigger and more numerous openings in hurricane and flood protection levees better maintain estuarine dependent fishery migration. As much opening as practicable, in number, size, and diversity of location should be considered.
- Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.
- Flood protection water control structures should remain completely open except during storm events.
- Any flood protection water control structure sited in canals, bayous, or navigation channels that do not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.
- The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.
- Structures should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.
- To the maximum extent practicable, structures should be designed and/or culverts selected such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet/second. This may not necessarily be applicable to tidal passes or other similar major exchange points.
- To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.
- Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.
- Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.
- Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.
- Operational plans should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

INTRODUCTION

Various flood protection and environmental water control structures in hurricane protection levees are being designed and considered for inclusion with ongoing local and federal civil works projects within the boundaries of the New Orleans District. Design purposes of the structures vary and may include maintaining safe navigation and optimizing drainage and passage of fishery organisms. For the Morganza to the Gulf of Mexico hurricane protection project, an interagency Habitat Evaluation Team (HET) and NOAA's National Marine Fisheries Service (NMFS) identified economically important fishery species that should be considered when assessing structure impacts on estuarine fisheries migration. Both the federal and state governments manage some of these species. Primary species that could be affected by flood protection structures in Louisiana include brown shrimp, white shrimp, blue crab, red drum, black drum, spotted seatrout, sand seatrout, southern flounder, and gulf menhaden. Some information is included herein on forage species, the production of which is important to maintain as they serve as important links of the aquatic food web for many of the managed fishery species.

The Baton Rouge office of NMFS has developed preliminary design principles for hurricane and flood protection water control structures to reduce impacts to living marine resources, especially related to migrations of estuarine dependent species. The basis for the following recommended guiding principles is briefly discussed where supporting literature is available. Case specific examples for some features under the Mississippi River and Tributaries, Morganza to the Gulf of Mexico hurricane protection project and the Louisiana Coastal Protection and Restoration Project are provided in the appendices. Basic behavior and physiology effects on the passage of fishery organisms are discussed in detail in appendices C and D, to aid federal agencies in environmental evaluations and descriptions under NEPA.

This document has been developed in consideration of input from the interagency HET, university faculty, fish passage staff of various agencies, and cursory literature reviews. These design considerations are intended to address potential impacts to living marine resources pursuant to the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act. Impacts to resources managed under other authorities, such as the Endangered Species Act or the Marine Mammal Protection Act, are not addressed in this document.

GUIDING PRINCIPLES FOR DESIGNING FISHERIES FRIENDLY FLOOD PROTECTION WATER CONTROL STRUCTURES

1. Generally, bigger and more numerous openings in hurricane and flood protection levees better maintain estuarine dependent fishery migration. As much opening as practicable, in number, size, and diversity of location should be considered.

Most of Louisiana's commercial and recreational fishery species must have access to estuarine marshes to successfully complete some part of their life cycle (i.e., they are estuarine-dependent). Estuarine-dependent fishery productivity is a measure of standing crop (the number of fishery organisms present at a point in time) and the turnover rate (the rate at which the population is

replaced). All things being equal, fishery production would be lower following levee and water control construction if structures retard turnover rate. This would be the case even while standing crop may appear normal. Restrictions in tidal movement caused by water control structures and levees would result in degraded or substantially changed species composition, which could alter fishery production and/or displace fisheries.

Marine transient species emigrate (i.e., move from coastal marshes towards Gulf waters) towards higher salinity water; therefore, a structure that maintains the greatest degree of opening while allowing the project objectives to be met would be desirable (Rogers et al. 1992).

2. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.

Water control structures should be designed to have a water flow capacity (and similar dimensions where possible) comparable to the waterway before construction. Restricted water exchange in marshes enclosed by levees and water control structures diminishes recruitment and standing stocks of species that must migrate from coastal spawning sites to marsh nurseries (Rogers et al. 1994). As the amount of hydrologic control increases, the effect on migration and production of marine transients and residents increases. Greater restriction decreases turn over rate of estuarine-dependent fishery organisms, which decreases their production (Rogers et al. 1992^a). Slotted and fixed crest weirs have been found to delay immigration. As the degree of restriction increased from slotted weirs, to low elevation weir, and to fixed crest weirs, greater impacts to different fisheries species and their emigration were observed.

Design considerations for hurricane and flood protection water control structures should include features to accommodate vertical and horizontal fishery distribution patterns within interior marsh tidal pathways and coastal passes. Fishery organisms exhibit preferences by species, life stage, and in some cases tide cycle, for vertical and horizontal distribution within smaller or interior marsh tidal connections (Table 1). Behavioral and physiological responses, such as diel vertical migration, affect these preferred distribution patterns.

Study of Keith Lake Pass in Texas revealed that all portions of the water column, both vertically and horizontally, are used by fishery organisms (Hartman et al. 1987). Most estuarine-dependent fishery species preferred the bottom or shore zones during flood tides, but were much denser near the shores of the pass, in slower moving water, on ebb tide. This lateral movement on slack to ebb tides appears to be a behavioral action to prevent displacement from the pass during ebb tide to accelerate movement to marsh nursery areas. The study identified the response to light cycles with midday densities greatest at bottom and densities greatest at surface during dawn to dusk. Similar within pass distribution patterns were reported by Sabins and Truesdale at Grand Isle, Louisiana (1974).

Table 1. Table on fishery preference within the water column (Marotz et al. 1990; Herke and Rogers 1985; Hartman et al. 1987; Sabins and Truesdale 1974). “^a” denotes juveniles; “^b” denotes immigrating; “^c” denotes emigrating; “^e” denotes ebb tide; “^f” denotes flood tide.

Species	Vertical Distribution			Horizontal Distribution
	Surface	Mid-depth	Bottom	Shore/Nearshore
brown shrimp ^b	X	X		X ^e
white shrimp ^b	X	X		
white shrimp ^c		X		X ^e
blue crab	X			X ^e
red drum ^a				X ^e
red drum ^b		X	X	
red drum ^c			X	
bay anchovy	X			
striped mullet	X			
Atlantic croaker ^a	X	X		X ^e
Atlantic croaker		X	X	X ^e
spotted seatrout		X	X	
sand seatrout		X	X	X ^e
gulf menhaden	X	X		
southern flounder				X ^f
black drum				X ^e

3. Flood protection water control structures should remain completely open except during storm events.

Fish passage should be optimized by the duration that structures remain fully open. Rozas and Minello (1999) reported that even when water-control structures were open, the densities of transient species were low inside areas enclosed by levees and water control structures as compared to natural areas.

Fisheries migration that temporarily may be impacted with storm related closures are listed in Table 2. The degree of impact would be influenced by the timing and duration of a structure closure relative to peak migration.

Table 2. Migration of economically important fisheries in Louisiana that temporarily may be impacted with storm related closures.

Species	Migration Period Overlapping with Hurricane Season
brown shrimp	April - mid July
white shrimp	July - November
blue crab	June - September
spotted seatrout	April - October
sand seatrout	April - October
red drum	August - December
black drum	March - July
southern flounder	September - October

4. Any flood protection water control structures sited in canals, bayous, or navigation channels that do not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

Hartman et al. (1987) recommended structures not be constructed in a tidal pass. If a structure was constructed, they recommended the incorporation of several gates at several vertical and horizontal locations, with baffles near shore. Baffles near shore are to direct shore or near shore fish passage on ebb tides through the available structure opening(s) (e.g., gates in wing walls).

Structures should be designed and operated with multiple openings if the pre-project water depth and widths of a channel are not maintained. Multiple openings are necessary to optimize passage of fishery organisms that prefer to migrate along the sides, bottom, and top of channels. For example, Rogers et al. (1992^a) recommended opening some vertical slots and top, middle, and bottom gates in a structure with multiple slots and gates.

5. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

The location and number of structures likely affects the abundance and distribution of estuarine fishery species within habitats that would be located on the protected side of levees and water control structures. Rogers et al. (1992^c) determined that marine transient species were most numerous nearest the structures, partially due to the proximity of the openings with respect to the area enclosed. Similarly, other studies have shown there is a decrease in fishery species abundance and diversity the greater the distance from the access point (Peterson and Turner 1994). This can become more pronounced if an environmental gradient (e.g., salinity) exists between an access point and the interior habitat located on the protected side of structures (Cashner 1994).

6. Structures should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

Study of Keith Lake Pass in Texas revealed vertical and horizontal distribution patterns of fishery organisms in the pass (Hartman et al. 1987). Estuarine-dependent fishery organisms preferred the bottom or near shore zones on flood tides. Most organisms appeared near shores of the pass on ebb tide in slower moving water. Baffles near shore are to direct shore or near shore fish passage through the structure.

Many fish migrate along the water bottom. Water control structures with crests or inverts higher than the lower portion of a channel could impede migration through the deep-water portions of channels. Ramps can provide a means to guide organisms over and through structures and increase access of fisheries organisms to enclosed habitat (Lafleur 1994). Various ramp designs

need to be investigated.

7. To the maximum extent practicable, structures should be designed and/or culverts selected such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet/second.

In this preliminary investigation, no studies were located that evaluated the impacts of swimming speeds for the fishery species and life stages of concern in Louisiana. To avoid preventing or reducing ingress or egress of fishery organisms, preliminary guidance on water velocities through structures in Louisiana could be based on anecdotal comparisons with data available on general swimming speeds from studies on the west and east coasts (Tables 3 and 4).

Swimming speeds of estuarine and marine fish and crustaceans is a function of shape, stage of development, length, ambient temperature, light, and duration required for swimming performance. For most species, absolute speed increases as size increases. Generally, fish swimming speeds range from 2-4 body lengths/second with burst speeds up to 5 body lengths/second (Meyers et al. 1986).

Water intake studies have shown that maintaining water velocities less than 0.5 ft/sec would protect most fish and their life stages from being adversely affected by those flows (USEPA 2004). The species and life stages of fish for that study could not be located at this time and further investigation for Gulf of Mexico species is warranted. They also recommended creating horizontal velocity fields to avoid adverse affects on fish because fish are better able to orient to horizontal verses vertical flow. This could allow selective avoidance of water flows not preferred by fish or minimize disorientation or mortality rates caused by flows.

Eberhardt (personal communication) reported velocities exceeding 0.82 feet/second began to impede fish passage. Fish passage was decreased by 50% for velocities exceeding 2.6 feet/second. Based on evaluation of freshwater species, Gardner (2006) recommends keeping velocities through round culverts less than 1.8 ft/sec during 90% of the fish migration season. To improve fish passage through culverts, installing baffles within culverts should be considered to reduce flow velocity barriers for fish (Pacific Watershed Associates 1994).

Table 3. Water flow velocity thresholds for affecting fish passage or avoiding impingement within flows or on screens.

Source	Water Flow Velocity (ft/sec)	
Alyson Eberhardt, personal communication	0.82	Begin to impede
	2.62	Decreased fish passage by 50%
Gardner 2006	1.8	Critical velocity (freshwater fish)
Meyers et al. 1986	<0.49	To avoid impingement

USEPA 2004	<0.50	Protected 96% of the fish tested from impingement
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Table 4. Sustained fish swimming speeds. Adapted from Meyers et al. (1986). Note that no data was located for the fisheries species and life stages for the Gulf of Mexico.

Fish/life stage	Swimming Speeds (ft/sec)
Atlantic herring	0.19 - 0.3
Mullet	4.19
Horse mackerel	4.46
Sole	0.19 - 0.3
most larvae	0.82 - 0.98

Based on these limited data, larval fish could be adversely impacted by water flow rates exceeding 0.82 feet/second. Post-larval and juvenile stages of flounders could be impacted by flow rates around 1.0 ft/sec. Other species or larger life stages likely would not be adversely impacted until flow rates exceed 2.62 feet/second based on inferences from these data. Water flow velocity monitoring in the Terrebonne Basin by the U.S. Fish and Wildlife Service has found maximum flows through existing open channels exceeding 1.0 feet /second and in larger saline marsh channels and passes exceeding 2.0 feet/second.

If the spatial extent of flow velocity fields exceed the distance that can be traveled with sustained or burst swimming speeds of fishery organisms, those flows could prevent or reduce ingress or egress during the time which those flows exist. However, the degree of mortality from not being able to access nursery and foraging habitat is not known. High flow rates may aid passage of larval fish that primarily depend on passive transport for migratory distribution and access to estuarine habitat on the protected side of levees, if the high flows do not induce mortality from injury or fatigue. Water flow could exceed the fish swimming rates for short periods and still provide passage during low flows or during still water.

8. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

Design considerations should include installing baffles within culverts to reduce flow velocity barriers (Pacific Watershed Associates 1994). Passage of salmon and herring species has been shown to be impaired by culverts. With baffles or other similar features, still water areas could be created to enhance fish passage.

If water control structures include plunge pools, the invert elevation of the structure could be equal to the depth of the plunge pool if the plunge pool is deeper than the pre-project water depth. This deeper invert would optimize passage of fisheries species, in particular bottom dweller species.

Fish often require visual cues for orientation and exhibit faster swimming speeds at increased

light levels. Herring type fish (e.g., gulf menhaden) are particularly sensitive to light levels. However, although herring exhibited a preference for unshaded portions of treatments during both day and night periods, as little as 1.4% of the ambient light was necessary for their passage through a culvert (Mosser and Terra 1999).

9. Culverts should be installed in construction access roads unless otherwise recommended by the resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and at all water crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary, even if the road is less than 500 feet long, if an area would be hydrologically isolated without that culvert.

10. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after storm passage and return of normal water levels.

Regardless of structure size, designs and contingency plans should include means to rapidly open the water control structures when flooding risks subside after a storm. Designs and plans should include infrastructure, equipment, and staff necessary to open the structures even if offsite electricity is not available. Design safeguards should be developed to protect the structures from being damaged rendering them inoperable and locked in a closed configuration after passage of a storm.

11. Levee alignment and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

12. Operational plans should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

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APPENDIX C

BEHAVIOR

The physical ability (i.e., swimming speed) to navigate a structure is not the only factor influencing fish passage, especially for small structures. Behavioral responses to stimuli individually or interactively affect passage with physiological constraints or responses. Behavior generally can be categorized as schooling and non-schooling behavior.

SCHOOLING BEHAVIOR

Schooling behavior consists of strategies that provide hydrodynamic efficiency, reduced predation, increased efficiency in finding food, and increased reproductive success. Water control structures for flood protection impact large numbers of fishery organisms due to this group response. This could be because fish exhibit the tendency to approach and orient to other members of the species (i.e., biotaxis). This orientation confers a hydrodynamic advantage that is more efficient than individuals due primarily to vortices setup by lead fish. Schools function as a living organism where the group reacts to stimuli as an individual. It is this group reaction

that influences greater affect on passage through water control structures.

NON-SCHOOLING BEHAVIOR

Agonistic, territorial, and hierarchical behaviors are examples of non-schooling behavior exhibited by fish. Agonistic and territorial behaviors are largely unknown for the listed estuarine and marine fishery species of concern and their life stages. Structures that create physically taxing water flow velocities and some low flow areas may encourage these behaviors as fish compete for resting areas similar to competition seen with fish competing for resting areas within shrimp trawls or behind rocks in river riffle/pool habitat. It is possible these behavioral responses overall may not be that influential on fish passage through a structure, but may come more into play during low flow conditions such as lower tides or slack tide. Hierarchical behavior can often be driven by a combination of physiological responses and will be discussed in that section. Overall, investigation on behavioral responses to water control structures is needed to avoid and minimize adversely impacting fishery passage if not optimizing it.

APPENDIX D

PHYSIOLOGICAL

Fishery species and life stages react differently to a current of water (i.e., rheotaxis). Generally, fish are better able to orient to horizontal verses vertical flow (Meyers et al. 1986).

Locomotion

There are two means for migratory transport of estuarine and marine fish and crustaceans: passive and active transport. Passive transport is drift of organisms carried by the tides and currents. Larval and post-larval fish and crustacean life stages are predominately transported passively by tides and currents. Passive transport via tidal forcing can play a strong role in migration of sub-adult and adult brown shrimp, white shrimp, and blue crabs. Active transport is movement by swimming, which is the primary means of locomotion for sub-adults and adult fish.

SWIMMING SPEED

Refer to guiding principles number 7 for details on swimming speeds relative to impacts on fish passage.

BEHAVIORAL/PHYSIOLOGY INTERACTION

Many fishery organisms exhibit hierarchical behavior. This is a direct response to stimuli, such as astronomical (e.g., tidal rhythm) or meteorological driven flows. For example, brown shrimp mediate transport by circadian or diel vertical migration. Brown shrimp move down in the water column or cease activity as they become negatively buoyant when low salinity and temperature water develop in estuaries with north winds associated with spring fronts. Brown shrimp activity resumes with their movement up in the water column with increasing water temperature, salinity, and hydrostatic pressure associated with the southerly gulf return following after a cold front (Rogers et al. 1993). Similar selective tidal stream transport was reported by Hartman et al. (1987). Fishery organisms identify tide changes by detecting altered velocity, salinity,

temperature, all of which can cue staging for immigration with an incoming tide. Future tidal pass or inlet studies are needed for better information on vertical distribution, depth preferences, and changes in buoyancy or behavior to evaluate active and passive transport of fishery organisms.

APPENDIX E

Reference Websites, Fish Passage Agency Representatives, and University Faculty

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USACE Portland District, Fish Passage Team

http://www.nwp.usace.army.mil/pm/e/en_fish.asp

USACE, ERDC, Coastal Hydraulics Lab

<http://chl.erd.c.usace.army.mil/CHL.aspx?p=s&a=ResearchAreas;22>

USFWS Fish Passage Decision Support System

<http://fpdss.fws.gov/index.jsp>

NC State's Center for Transportation and the Environment website:

<http://www.itre.ncsu.edu/>

[http://itre.ncsu.edu/CTE/gateway/downloads/Culvert%20Impact%20Study\(December2002\).pdf](http://itre.ncsu.edu/CTE/gateway/downloads/Culvert%20Impact%20Study(December2002).pdf)

<http://itre.ncsu.edu/CTE/gateway/downloads/FishPassage.pdf>

FishXing software and learning systems for fish passage through culverts. This software is intended to assist engineers, hydrologists, and fish biologists in the evaluation and design of culverts for fish passage. It is free and available for download.

<http://stream.fs.fed.us/fishxing/>

- Allows for comparison of multiple culverts designs within a single project.
- Calculates hydraulic conditions within circular, box, pipe-arch, open-bottom arch, and embedded culverts.
- Contains default swimming abilities for numerous North American fish species.
- Contains three different options for defining tailwater elevations.
- Calculates water surface profiles through the culvert using gradually varied flow equations, including hydraulic jumps.

- Outputs tables and graphs summarizing the water velocities, water depths, outlet conditions, and lists the limiting fish passage conditions for each culvert.

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APPENDIX C
LATIN NAMES FOR SOME SPECIES DISCUSSED IN THE REPORT
AND/OR FOUND IN THE PROJECT AREA

PLANTS

American sycamore	<i>Platanus occidentalis</i>
Black willow	<i>Salix nigra</i>
Box elder	<i>Acer negundo</i>
Chinese tallow-tree	<i>Triadica sebifera</i>
Cypress	<i>Taxodium distichum</i>
Eastern cottonwood	<i>Populus deltoides</i>
Green ash	<i>Fraxinus pennsylvanica</i>
Overcup oak	<i>Quercus lyrata</i>
Red maple	<i>Acer rubrum</i>
Red mulberry	<i>Morus rubra</i>
Roughleaf dogwood	<i>Cornus drummondii</i>
Sugarberry	<i>Celtis laevigata</i>
Sweet pecan	<i>Carya illinoensis</i>
Water oak	<i>Quercus nigra</i>
Willow oak	<i>Quercus phellos</i>

FISH

Banded pygmy sunfish	<i>Elassoma zonatum</i>
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Blue catfish	<i>Ictalurus furcatus</i>
Bluegill	<i>Lepomis macrochirus</i>
Blue sucker	<i>Cycleptus elongates</i>
Brook silverside	<i>Labidesthes sicculus</i>
Bullhead minnow	<i>Pimephales vigilax</i>
Channel catfish	<i>Ictalurus punctatus</i>
Chub shiner	<i>Notropis potteri</i>
Common carp	<i>Cyprinus carpio</i>
Dollar sunfish	<i>Lepomis marginatus</i>
Dusky darter	<i>Percina sciera</i>
Emerald shiner	<i>Notropis atherinoides</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Ghost shiner	<i>Notropis buechanani</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden topminnow	<i>Fundulus chrysotus</i>

Goldeye	<i>Hiodon alosoides</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Green sunfish	<i>Lepomis cyanellus</i>
Inland silverside	<i>Menidia beryllina</i>
Largemouth bass	<i>Micropterus salmoides</i>
Logperch	<i>Percina caprodes</i>
Longear	<i>Lepomis megalotis</i>
Longnose gar	<i>Lepisosteus osseus</i>
Mimic shiner	<i>Notropis volucellus</i>
Mississippi silvery minnow	<i>Hybognathus nuchalis</i>
Orangespotted sunfish	<i>Lepomis humilis</i>
Pallid sturgeon	<i>Scaphirhynchus albus</i>
Paddlefish	<i>Polyodon spathula</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Redear	<i>Lepomis microlophus</i>
Red shiner	<i>Cyprinella lutrensis</i>
Redspotted sunfish	<i>Lepomis miniatus</i>
River carpsucker	<i>Carpiodes carpio</i>
River darter	<i>Percina shumardi</i>
Shortnose gar	<i>Lepisosteus platostomus</i>
Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>
Silverband shiner	<i>Notropis shumardi</i>
Silver chub	<i>Macrhybopsis storeriana</i>
Skipjack	<i>Alosa chrysochloris</i>
Slough darter	<i>Etheostoma gracile</i>
Smallmouth buffalo	<i>Ictiobus bubalus</i>
Spotted bass	<i>Micropterus punctulatus</i>
Spotted gar	<i>Lepisosteus oculatus</i>
Striped bass	<i>Morone saxatilis</i>
Threadfin shad	<i>Dorosoma petenense</i>
Warmouth	<i>Lepomis gulosus</i>
Western mosquitofish	<i>Gambusia affinis</i>
White bass	<i>Morone chrysops</i>
White crappie	<i>Pomoxis annularis</i>
White-striped bass hybrid	<i>Morone saxatilis x Morone chrysops</i>
Yellow bass	<i>Morone mississippiensis</i>
Yellow bullhead	<i>Ameiurus natalis</i>

AMPHIBIANS

American bullfrog	<i>Rana catesbeiana</i>
Cope's gray treefrog	<i>Hyla chrysoscelis</i>
Dwarf salamander	<i>Eurycea quadridigitata</i>
Eastern narrow-mouthed toad	<i>Gastrophryne carolinensis</i>

Fowler's toad	<i>Bufo fowleri</i>
Green treefrog	<i>Hyla cinerea</i>
Northern cricket frog	<i>Acris crepitans</i>
Pig frog	<i>Rana grylio</i>
Small mouth salamander	<i>Ambystoma texanum</i>
Southern leopard frog	<i>Rana sphenocephala</i>
Spring peeper	<i>Pseudacris crucifer</i>
Western chorus frog	<i>Pseudacris triseriata</i>
Gulf coast toad	<i>Bufo vallicipes</i>

REPTILES

American Alligator	<i>Alligator mississippiensis</i>
Cooter	<i>Pseudemys floridana</i>
Copperhead	<i>Agkistrodon contortrix</i>
Cottonmouth	<i>Agkistrodon piscivorus</i>
Diamondback terapin	<i>Malaclemys terepin</i>
Eastern stinkpot turtle	<i>Sternotherus odoratus</i>
False map turtle	<i>Graptemys pseudogeographica</i>
Five-lined skink	<i>Eumeces fasciatus</i>
Racer	<i>Coluber constrictor</i>
Red eared turtle	<i>Pseudemys scripta</i>
Ring-necked snake	<i>Diadophis punctatus</i>
Smooth softshell turtle	<i>Trionyx muticus</i>
Snapping turtle	<i>Chelydra serpentina</i>
Watersnake	<i>Nerodia fasciata</i>

BIRDS

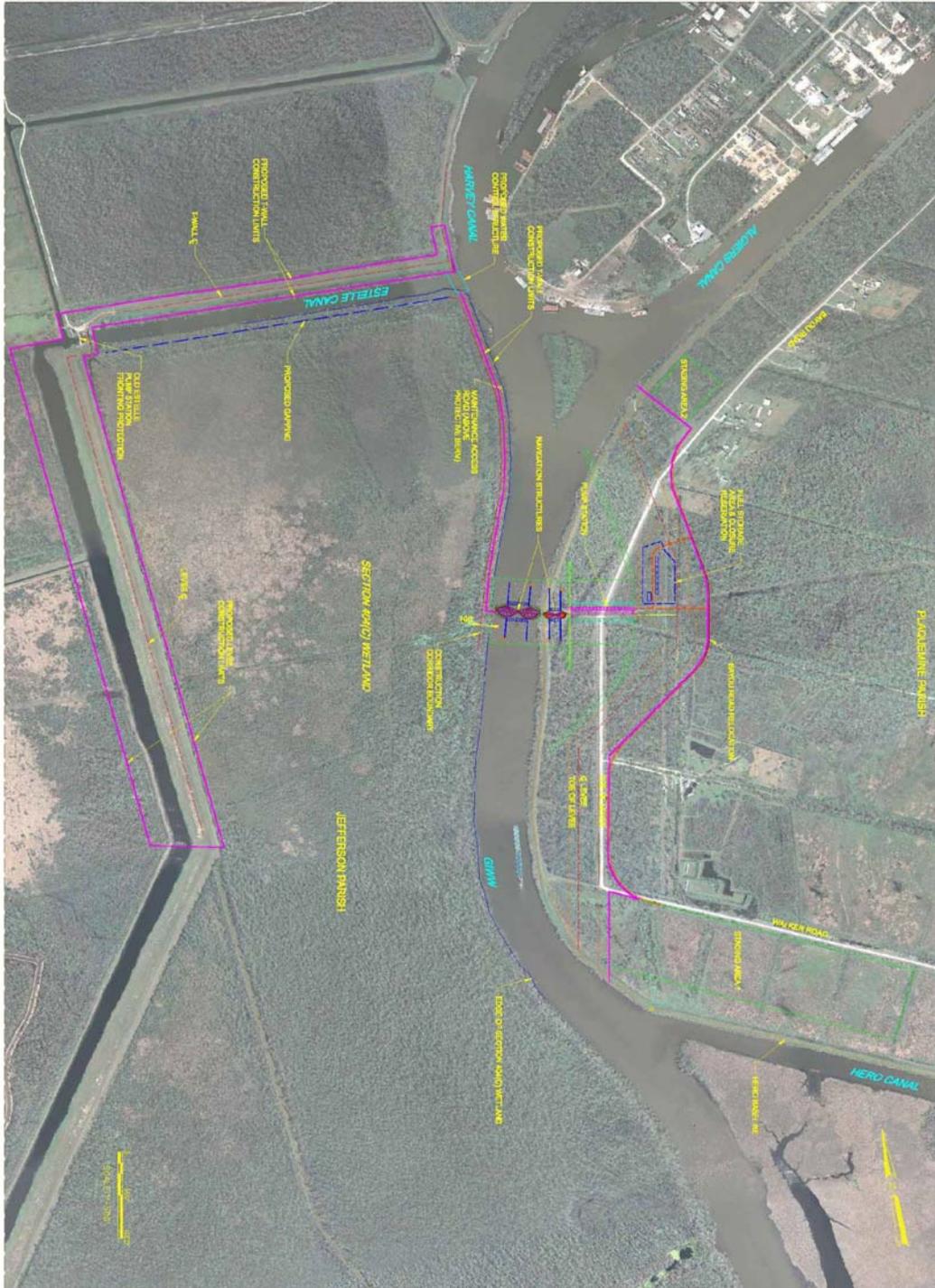
American wigeon	<i>Anas americana</i>
Anhinga	<i>Anhinga anhinga</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Barred owl	<i>Strix varia</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
Blue-winged teal	<i>Anas discors</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Gadwall	<i>Anas strepera</i>
Great blue heron	<i>Ardea herodias</i>
Great egret	<i>Ardea alba</i>
Greater white-fronted goose	<i>Anser albifrons</i>

Green heron	<i>Butorides virescens</i>
Green-winged teal	<i>Anas crecca</i>
Interior least tern	<i>Sterna antillarum athalassos</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning dove	<i>Zenaida macroura</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Northern pintail	<i>Anas acuta</i>
Osprey	<i>Pandion haliaetus</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Snow goose	<i>Chen caerulescens</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Spotted sandpiper	<i>Actitis macularia</i>
White-eyed vireo	<i>Vireo griseus</i>
Wood duck	<i>Aix sponsa</i>

MAMMALS

Bobcat	<i>Lynx rufus</i>
Cotton mouse	<i>Peromyscus gossypinus</i>
Coyote	<i>Canis latrans</i>
Eastern cottontail rabbit	<i>Sylvilagus floridanus</i>
Fox	<i>Vulpes vulpes</i>
	<i>Urocyon cinereoargenteus</i>
Fox squirrel	<i>Sciurus niger</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Mink	<i>Mustela vison</i>
Nutria	<i>Myocaster coypus</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern raccoon	<i>Procyon lotor</i>
Swamp rabbit	<i>Sylvaligus aquaticus</i>
Virginia opossum	<i>Didelphis virginiana</i>
White-tailed deer	<i>Odocoileus virginianus</i>

Appendix J: Alternative Design Detail Sheets



WCC Conceptual Detail #1



WCC Conceptual Detail #2



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

NOV 04 2008

Planning, Programs, and
Project Management Division
Environmental Planning
and Compliance Branch

Mr. Lawrence E. Starfield
Deputy Regional Administrator
Environmental Protection Agency
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Dear Mr. Starfield:

The purpose of this letter is to request modification of the Environmental Protection Agency (EPA) Bayou aux Carpes 404 (c) Final Determination issued October 16, 1985. The US Army Corps of Engineers (Corps) requests that the EPA consider approving a modification that would allow the Corps to construct a segment of the West Bank and Vicinity Hurricane Protection Project / Hurricane and Storm Damage Risk Reduction System (HSDRRS) along the northeastern property boundary. The intent of the Corps proposed action is to reduce risk to the citizens of Greater New Orleans Metropolitan area by building a more resilient and reliable storm damage and risk reduction system. We can accomplish this by constructing an improved storm surge barrier system around the Bayou aux Carpes site, crossing the Gulf Intracoastal Waterway (GIWW) with a floodgate(s)/pumping station structure, and then tying into the existing Hero Canal Federal levee (GIWW West Closure Complex (GIWW WCC) alternative, see enclosed map and floodwall cross section).

The Corps has been working closely with EPA and other federal and state resource agency staff for several months to come up with the least environmentally damaging alternative that lowers the risk of storm surge damage to the greatest number of people in the area. It is our determination that the proposed action, GIWW WCC is the best alternative to provide the greatest level of risk reduction while minimizing environmental impacts. The Corps intends to make a final decision in the upcoming months concerning this project by circulating a draft of Individual Environmental Report (IER) # 12 and a Clean Water Act Section 404 (b) (1) public notice for a 30-day public comment period. Upon completion of the 30-day comment period, the Corps will review all comments received along with the data and analysis discussed in the IER in order to make a decision on the proposed action. The Corps will not make a decision on this portion of the proposed action until the EPA makes a determination on a modification to the Bayou aux Carpes 404 (c).

-2-

The proposed alternative would require the construction of a floodwall and earthen berm along the eastern boundary of the 404 (c) site. To construct this alternative the Corps would need to impact an area within the 404 (c) area no greater than 4,200 LF by 100 LF. This action would impact no greater than 9.6 acres along the west bank of the GIWW within the Bayou aux Carpes 404 (c) area. Please refer to the enclosed documentation that describes in detail the:

- a. Need to modify the original HSDRRS alignment;
- b. Need to modify the Bayou aux Carpes 404 (c) Final Determination;
- c. Measures taken to ensure the avoidance and/or minimization of all adverse impacts to the Bayou aux Carpes 404 (c) area;
- d. Planning and design considerations to avoid additional impacts from any reasonable foreseeable future flood protection measures (i.e., the Louisiana Coastal Protection and Restoration (LACPR) Study);
- e. Plans for adequate site specific mitigation for all unavoidable adverse impacts to the Bayou aux Carpes 404 (c) area;
- f. Review of projected wetland impacts as per Corps 404 (b)(1) guidelines and the EPA 404 (b)(1) and 404 (c) procedures found in 40 CFR Parts 230 & 231; and
- g. Draft Path Forward with GIWW WCC.

Summarizing the above attachments: The Corps has determined that the GIWW WCC alternative, which alters the current system alignment, is the government's proposed action for this segment of the HSDRRS because this alternative would provide the most reliable, time sensitive and cost effective solution with the least adverse environmental impacts. Though this alternative would impact the Bayou aux Carpes 404 (c) area, the Corps agrees that final design efforts would utilize all feasible engineering and construction practices to reduce impacts to these nationally significant wetlands. In order to minimize the footprint of the surge barrier component to no greater than 4,200 LF by 100 LF along the western side of the GIWW within the Bayou aux Carpes 404 (c) area, the Corps agrees to investigate and utilize innovative techniques to design and build a structure that incorporates a floodwall and earthen berm rather than an earthen levee. The Corps would also locate the GIWW floodgate(s) as close to the Harvey and Algiers Canals confluence as engineeringly feasible in order to minimize impacts to the 404 (c) area. To further ensure the minimization of adverse impacts within the 404 (c) area, construction of the floodwall and earthen berm / access road would occur from the GIWW side of the construction area. In addition, project feature augmentations, such as allowing Old Estelle effluent into the 404 (c) area by gapping the spoil bank and removing the shell plug at Bayou aux Carpes, are being studied and would be incorporated as project features if the results of the

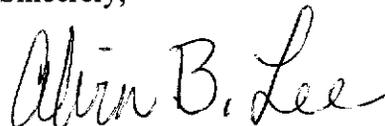
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environmental studies demonstrate that this proposed action would augment the Corps actions to minimize effects to the 404 (c) wetland habitat. Additional project feature augmentations, such as the gapping of other canal banks in the 404 (c) area are also being studied and would be incorporated into the project if it is found that the features further minimize impacts as a result of the Corps proposed action. The Corps agrees that mitigation for all unavoidable adverse impacts to the Bayou aux Carpes 404 (c) area would occur within the Bayou aux Carpes 404 (c) area and/or Jean Lafitte National and Historical Park. Mitigation projects would be designed and implemented concurrently with the design and construction of the floodwall and earthen berm / access road. Full mitigation within this unique environment may require mitigation in addition to acres indicated by the Wetland Value Assessment. The Corps further agrees to work in collaboration with the interagency team to monitor the area to ensure mitigation is successful in reaching its targeted goal and to utilize adaptive management efforts to ensure the project feature augmentations are assisting to minimize adverse impact within the 404 (c) area. The total funding required for the entire HSDRRS, \$16.8 billion, has been appropriated by Congress. This funding includes funds for the design and construction of all HSDRRS mitigation measures. The Corps would ensure that all impacts due to upgrading structures currently outlining the Bayou aux Carpes 404 (c) area would occur on the protected side and would not impact the 404 (c) area. Lastly, the GIWW WCC proposed action, would have the greatest adaptability to accommodate an enlargement associated with future system upgrades, i.e., LACPR.

We recognize the significance of this request and greatly appreciate the cooperation the EPA has shown in working with the Corps in our efforts to construct the most reliable hurricane risk reduction system possible.

If you have any questions or concerns please contact Mr. Gib Owen by E-mail: gib.a.owen@usace.army.mil or by phone at (504) 862-1337.

Sincerely,



Alvin B. Lee
Colonel, US Army
District Commander

Enclosure

See page 4 for list of copies furnished.

Mr. Garret Graves
Chairman
Coastal Protection and Restoration
Authority of Louisiana
1051 North 3rd Street
Capitol Annex Building
Baton Rouge, Louisiana 70802

Mr. James McMenis
LA Office of Coastal Protection
8900 Jimmy Wedell Road
Baton Rouge, Louisiana 70807

Mr. David Bindewald
President
Southeast Louisiana Flood
Protection Authority - West Bank
7001 River Road
Marrero, Louisiana 70072

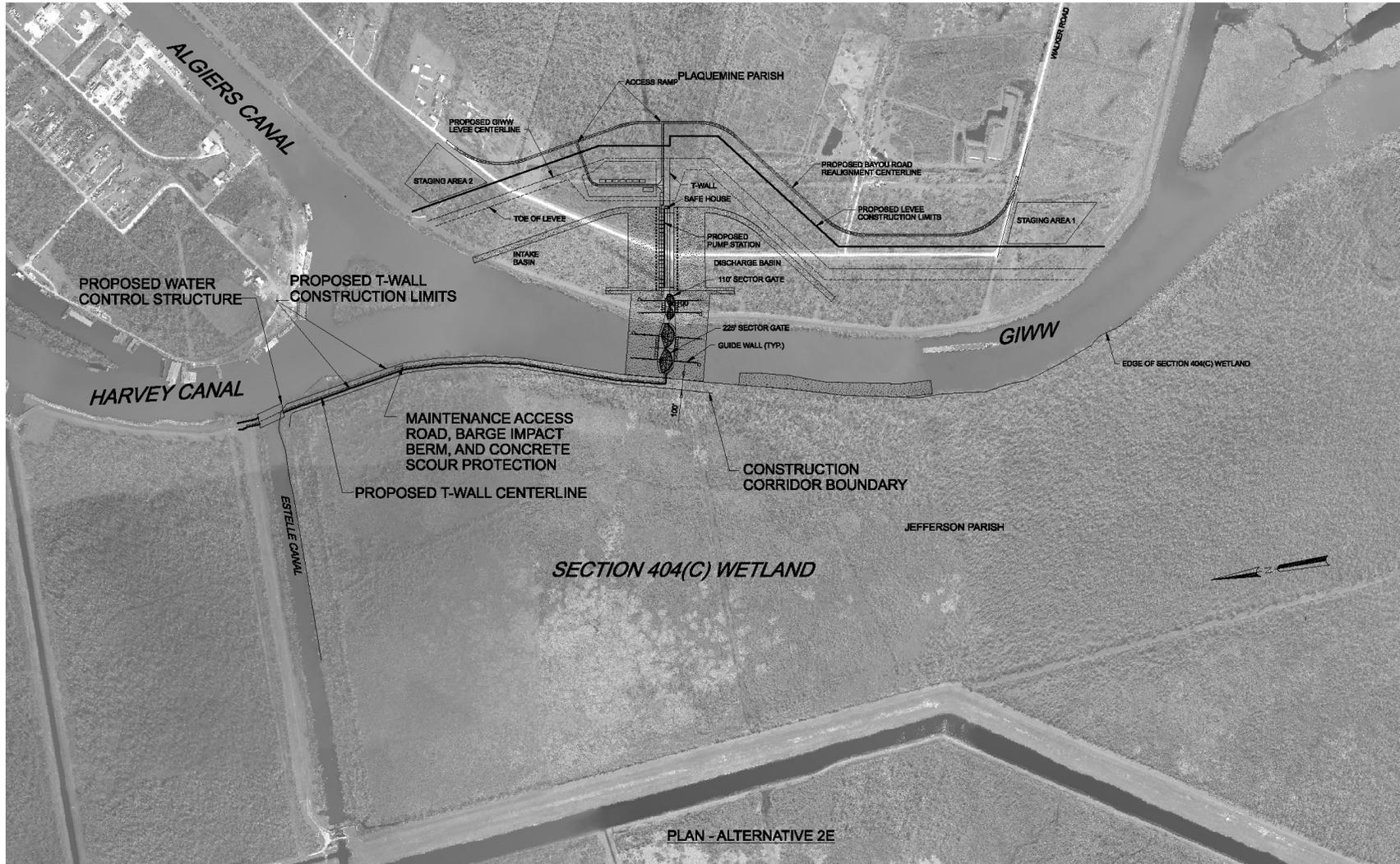
Mr. Jerry Spohrer
Executive Director
West Jeff Levee District
7001 River Road
Marrero, Louisiana 70072

Honorable Billy Nungesser
Plaquemines Parish President
8056 Highway 23, Suite 200
Belle Chasse, Louisiana 70037

Mr. David Luchsinger
Park Superintendent
Jean Laffite National Historic Park and Preserve
419 Decatur Street
New Orleans, Louisiana 70130-1035

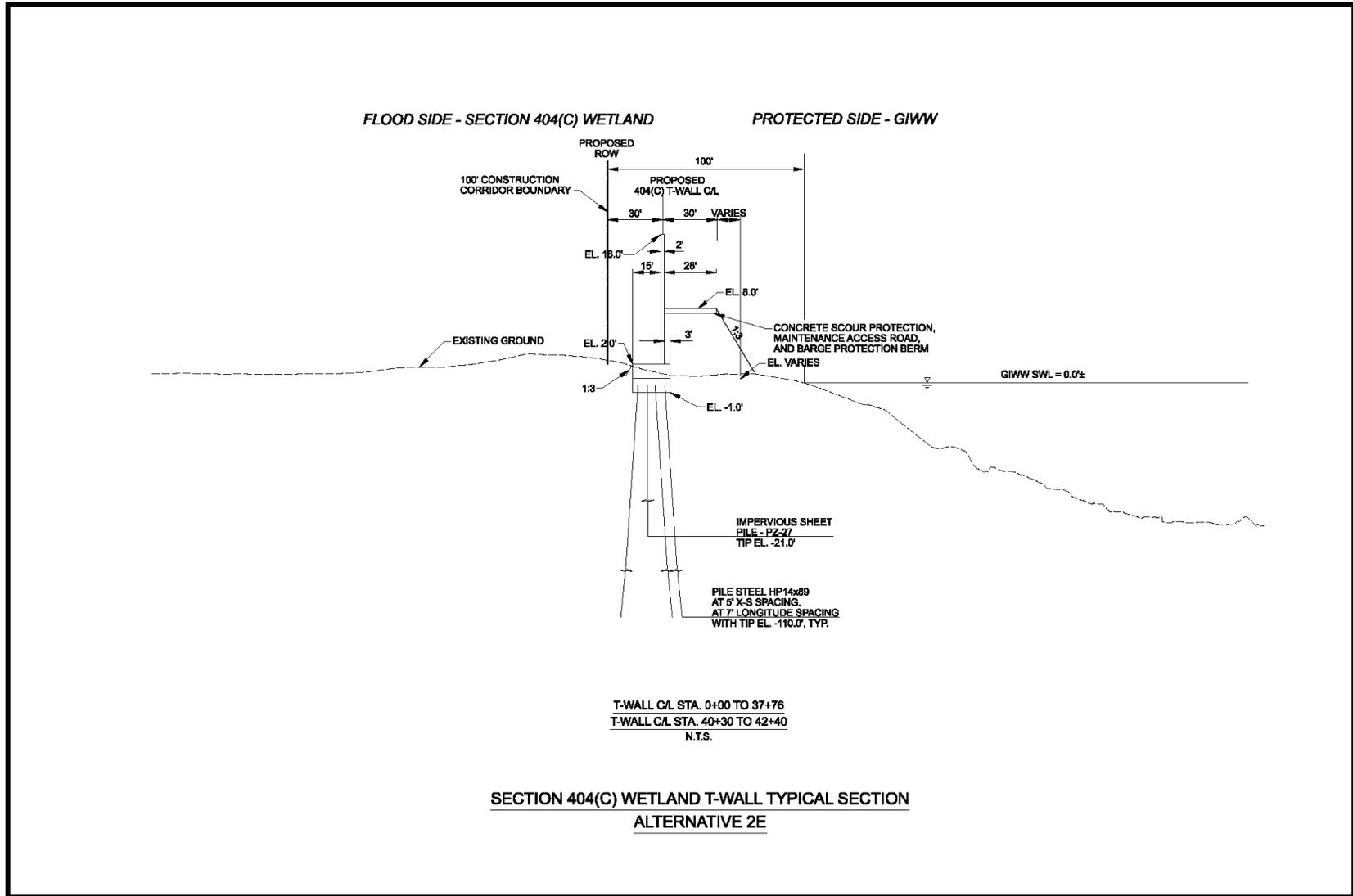
CURRENT PROPOSED SITE PLAN

- LOCATION OF STRUCTURES WITHIN 404(C) AREA WOULD REMAIN AS SHOWN. MAXIMUM AREA OF IMPACT WOULD BE 100' WIDE BY 4200' LONG (9.6 acres).
- ORIENTATION OF PUMP STATION, GATE(S), BYPASS CHANNEL AND LEVEE ON EAST SIDE OF GIWW ARE NOT FINAL AND COULD CHANGE AS DESIGN PROGRESSES.



TYPICAL PROPOSED 404(C) WALL SECTION

(FINAL DESIGN WOULD BE COMPLETED IN PARTNERSHIP WITH EPA AND NPS)



a) The need to modify the current hurricane system alignment.

The US Army Corps of Engineers (Corps) has been studying the current HSDRRS alignment, and based upon factors associated with system reliability has determined that in order to provide the greatest risk reduction, certain segments of the system must follow an improved alignment. The proposed new alignment for this project, GIWW WCC alternative, would significantly reduce risk to nearly 286,000 people living on the West bank of the Mississippi River. By removing 27 miles of parallel protection from the primary line of defense, this more streamlined surge barrier reduces the number of potential failure points in the system, increases quality control and certainty of subsurface conditions during construction, and minimizes human impacts since the existing footprint of the current system would not be widened to 100 year level of protection (LOP). This is a critical lesson learned from Hurricane Katrina in 2005. Catastrophic failure due to breaching along the 17th Street and London Avenue Outfall canals and the Inner Harbor Navigational Canal (IHNC) occurred because expanses of parallel protection were an inadequate risk reduction measure for such complex and challenging environments (USACE 2008). The structures may have been designed and constructed properly; however, there was an overall failure to incorporate new technologies and new risk reduction measures into the previous risk reduction system (USACE 2008). Hurricane Katrina brought many issues to the forefront. A major issue that surfaced was extensive reaches of levee, floodwall and floodgates provide numerous possible points of failure within the system and reduce the ability to maintain strict quality control. Hurricane Katrina also demonstrated that structures need to be resilient and must be constructed with the ability to reduce risk while withstanding system overtopping. The structures must still hold back the majority of the storm front, while some water may overtop the structure. In addition, having multiple lines of defense, such as a second barrier behind the initial surge barrier, i.e., the existing line of defense at pre Katrina authorized elevations, would even further ensure risk reduction within an area.

The Corps Project Delivery Team (PDT) identified all possible alignments in the area. All the alternatives were then evaluated according to various criteria, and all non-reasonable alternatives, i.e., those alternatives with overwhelming engineering challenges, were eliminated. In general, assessing all possible alignments demonstrated two things: system reliability increases as the actual length of the surge barrier decreases (deeming a further south, more streamlined alignment as most reliable) and this further southern alignment, which offers the most system reliability and protection, proposes to impact the Bayou aux Carpes 404 (c) area. There were five surviving alternatives brought forward from a preliminary alternative evaluation process conducted in early 2007. Two of those five alternatives were further analyzed and then eliminated due to non-constructability. The three surviving alternatives were then brought forward and further evaluated according to system reliability, environmental impacts, schedule and cost. These three surviving alternatives and the evaluation process were presented to EPA staff along with other Federal and state resource agencies to solicit input. In collaboration with the EPA and NPS, the Corps PDT revisited a previous alternative from the original proposed southern alignment that would maintain system reliability and additionally would minimize adverse environmental impacts. This fourth alternative was

evaluated against the same four criteria, was presented to the Federal and state resource agencies and local stakeholders, and was brought forward as the government's proposed action. Listed below are the proposed action and three other alternatives.

The Proposed Action - The GIWW WCC alternative would consist of the Corps along with its non-Federal partner, the State of Louisiana, constructing a floodwall and earthen / concrete barrier with an access road around the northern portion of the Bayou aux Carpes 404 (c) area. The barrier would run from the v-line levee situated west of the Bayou aux Carpes 404 (c) area to the Old Estelle pump station, west to east along the northern bank of the Old Estelle discharge canal, down the western bank of the GIWW within the Bayou aux Carpes 404 (c) area to a point where the alignment would cross the GIWW to the east bank to tie in with a levee being planned for construction along the northern side of the Hero Canal (see proposed action schematic below). Previously existing levee structures would be upgraded and/or replaced with floodwall to 14' / 16', the height specified for 100 year LOP, while a new floodwall with an earthen berm would be constructed along the western bank of the GIWW within the Bayou aux Carpes 404 (c) area. The new floodwall and earthen berm within the Bayou aux Carpes 404 (c) area would be no greater than 4,200 linear feet (LF) in length, no greater than 100 LF in width and 16' in height. Other features of the system include a navigation gate(s) system at the GIWW that would be 150 to 350 foot wide to allow for navigation and current reduction. Storm gates would be built to an elevation of 16'. The pump station would have a capacity between 20,000 and 25,000 cubic feet per second (cfs) to accommodate existing storm water discharges from the local parishes' drainage system. A by-pass channel would be built on the east bank of the GIWW to allow navigation on the GIWW during construction of the permanent gate structure. The existing Enterprise Gas pipeline would be relocated by directional drilling a new pipeline under the proposed bypass channel, the GIWW and the 404 (c) area. By directional drilling the pipeline under the 404 (c) area, the Corps not only avoids impacts to the area, but minimizes future impacts associated with maintaining the pipeline right-of-way across the area. These engineering specifics are the most current but are only preliminary and cannot be finalized without further investigation. Soil borings from the Bayou aux Carpes 404 (c) area are required to gather geotechnical specifics and give an indication of the actual floodwall and earthen berm footprint. The Corps submitted a letter on August 12, 2008 to EPA Region 6 and NPS requesting right-of-entry (ROE) within the Bayou aux Carpes 404 (c) area to conduct field surveys and obtain soil borings. Both the EPA and NPS responded quickly to the request granting ROE to begin the necessary data collection. The clearing to obtain boring samples occurred on October 6, 2008.

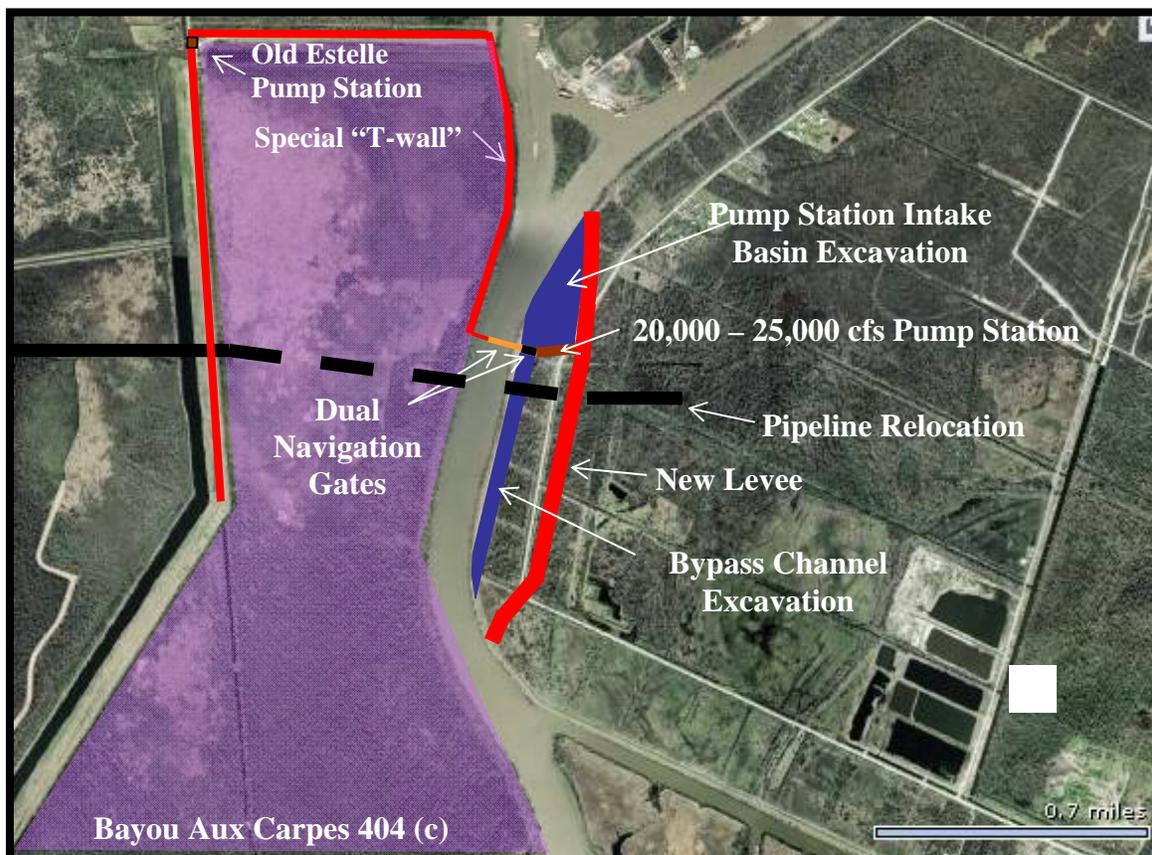


Figure1. Conceptual GIWW West Closure Complex alternative schematic.

When the GIWW WCC alternative was evaluated with respect to system reliability, adverse environmental impacts, time and cost, it was determined the construction of this alternative alignment would dramatically increase system reliability. This proposed action reduces the primary line of defense by 36% and would be comparable in system reliability to GIWW A alternative, the other southern alignment, but would be much more reliable than the Algiers Gate or Parallel Protection alternatives (see alternative descriptions below). The GIWW WCC alternative would have the fewest adverse environmental impacts. Even though proposing to impact the Bayou aux Carpes 404 (c) area, this proposed alignment would minimize all direct and indirect adverse impacts to both the natural and human environments (see item 3 below). In addition, the proposed action would have a surge barrier in place, with reduced pumping capacity, by 2011, and would be more economical to construct than the AG or PP alternatives. See the alternative comparison tables below for specific details on system reliability, environment and schedule.

The GIWW A alternative is similar to the proposed action described above, but utilizes different levee and floodwall alignments. A navigable floodgate would be constructed in the GIWW approximately 1 mile south of the confluence of the Harvey and Algiers canals. The details regarding the navigable floodgate are identical to those described for the proposed action (GIWW WCC). The overall structure would include the floodgates,

pumping station, and by-pass channel as previously described. A new 3,000-foot long tidal exchange structure would be constructed west of the navigable floodgate across the EPA Bayou aux Carpes 404 (c) area to the V-Line Levee. The tidal exchange structure floodwall would be designed to utilize the smallest construction footprint possible to minimize environmental impacts. Gates in the wall would be constructed at specified locations in an effort to maintain the natural hydrology of the area. The floodwall would also be designed to facilitate the passage of wildlife. The navigable floodgate and tidal exchange structure would be constructed to the 100-year LOP 16'. The specific tie-in locations of the GIWW A alternative to other HSDRRS (IER #13 and #14) project elements would provide 100-year LOP to the study area without raising the parallel protection above that currently authorized along the Harvey and Algiers Canal Reaches.

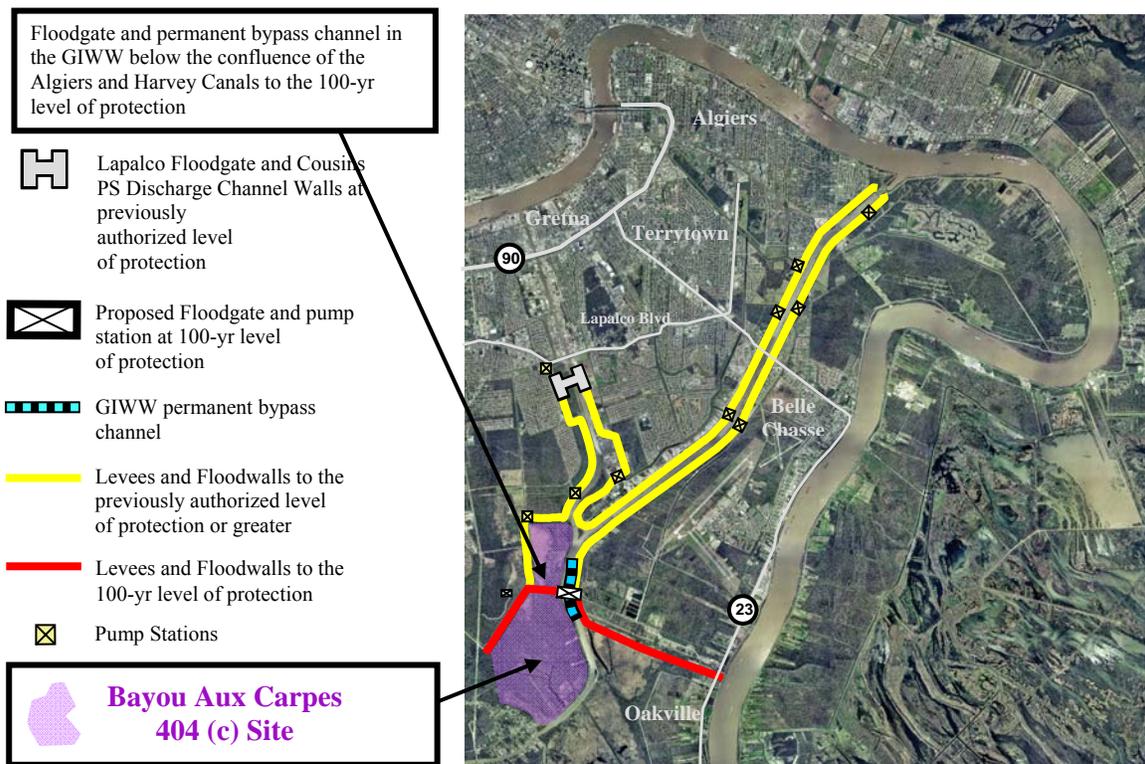


Figure 2. Conceptual GIWW A alternative schematic.

When the GIWW A alternative was evaluated with respect to system reliability, adverse environmental impacts, time and cost, the GIWW A alternative had comparable system reliability, schedule and cost to the proposed action (GIWW WCC); however, the adverse environmental impacts for the GIWW A alternative would be much greater than the proposed action. Though both alternatives would impact the Bayou aux Carpes 404 (c) area, the tidal exchange structure floodwall in GIWW A proposes to bifurcate the Bayou aux Carpes 404 (c) area and would result in irreparable direct and indirect impacts to the unique area (i.e., potential degradation or loss of flotant marsh located in the northern region of the 404 (c) area). In addition, this GIWW A alternative could preclude the possibility of including a portion of the Bayou aux Carpes 404 (c) area in the adjacent

Jean Lafitte National and Historical Park, where as the proposed action would create a more manageable situation for the NPS. While the GIWW WCC alternative also proposes a floodwall structure within the 404 (c) area, construction would be confined to a narrow footprint within a previously disturbed spoil bank along the west bank of the GIWW. The GIWW A alternative would also have a surge barrier in place, with reduced pumping capacity, by 2011, and would be much more economic to construct than the AG or PP alternatives. See the alternative comparison tables below for specific details on system reliability, environment and schedule.

The Algiers Gate alternative would require the construction of a navigable floodgate located on the Algiers Canal and major levee and floodwall improvements along the Harvey Canal, GIWW, and V-Line Levee. The AG alternative would include a 150-foot to 300-foot navigable floodgate located on the Algiers Canal, just above the confluence with the Harvey Canal. This navigable floodgate would require a permanent pumping station (approximately 20,000 cfs) adjacent to the gate, providing 100-year LOP along the Algiers Canal. Levee extending from the gate and pump station would need to be raised to 100-year LOP (14.0 feet). These improvements would tie into additional levee and floodwall improvements within the GIWW and Harvey Canal Reaches. Levees and floodwalls would be raised to 14.0 feet along both banks of the Harvey Canal, sections of the GIWW, and sections of the V-Line Levee. Levee improvements would specifically occur in two main locations. Existing levee on the eastern side of the GIWW would be raised from the navigable floodgate on the Algiers Canal to the Hero Canal Levee. In addition, existing levee on the west bank of the Harvey Canal would be raised from Lapalco Blvd. to the Estelle Pump Station Outfall Canal, west to the Estelle Pump Station, and continuing south along the V-Line Levee. Floodwall would be built to 14.0 feet on the east bank of the Harvey Canal from Lapalco Blvd. south to the GIWW. Floodwall would be used in this area in order to minimize impacts to existing development. These floodwall improvements along the Harvey Canal are currently being constructed under previous authorization. The proposed levee and floodwall improvements would require major modifications to the Harvey Canal Floodgate at Lapalco Blvd. and the Cousins Pump Station discharge channel. Fronting protection to the 100-year LOP would also be required at the Cousins Pump Station and all pump stations south of Lapalco Boulevard on the Harvey Canal, to prevent inundation of the existing pumps. These additional improvements would provide the desired 100-year LOP in coordination with levee tie-ins to additional HSDRRS projects (IER #13 and #14).

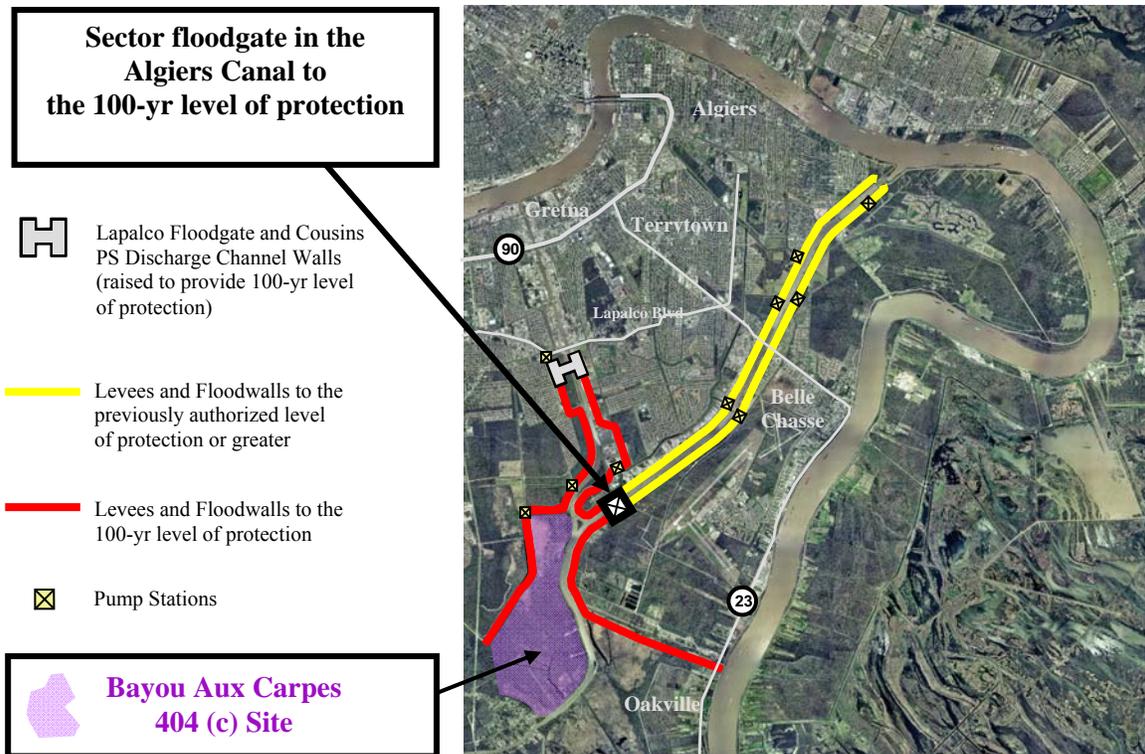


Figure 3. Conceptual Algiers Gate alternative schematic.

When the AG alternative was evaluated for system reliability, adverse environmental impacts, schedule and cost, it was determined this alternative would be less reliable than the proposed action (GIWW WCC) and GIWW A alternative but more reliable than the PP alternative. The AG alternative would reduce the primary line of defense by 18 miles. Though this alternative proposes to reduce the extent of parallel protection in the system along the Algiers Canal, there would still be areas with parallel protection serving as the primary line of defense along the Harvey Canal industrial reach. In addition, the line of parallel protection along the Harvey Canal industrial reach is situated behind the businesses and would not serve as a flood barrier to those industrial areas. The proposed action (GIWW WCC) would create a primary line of defense that would also reduce risk to those industrial areas and prevent flooding of the businesses. Construction of the proposed action would place the existing floodwalls and levees along the Harvey and Algiers canals as the secondary line of defense in the event of canal flooding due to system over topping. In addition, upgrading levee stretches west of the Harvey Canal would greatly increase the levee footprint and would impact both the human and natural environment. Adverse environmental impacts for this alternative would be greater than those of the proposed action (GIWW WCC). See the alternative comparison tables below for specific details on system reliability, environment and schedule.

The Parallel Protection alternative uses only improvements to existing levees and floodwalls along the GIWW, Harvey and Algiers Canal to achieve 100-year LOP. This alternative is similar to the AG alternative along the GIWW and Harvey Canal; however, there is no navigable floodgate built on the Algiers Canal. Instead, 100-year LOP is achieved along the

Algiers Canal by raising levees and floodwalls. Levee would be raised to 14.0 feet along the V-Line Levee to the Estelle Pump Station, continuing along the Estelle Outfall Canal, and finally running north along the western bank of the Harvey Canal to Lapalco Blvd. Major modifications to the Cousins pump station discharge walls and the Lapalco floodgate would be required. On the opposite side of the Harvey Canal (east bank), floodwall would be raised to 14.0 feet from Lapalco Blvd. to the Algiers Canal. The existing levees and floodwalls on both banks of the Algiers Canal would be modified from Hero cut to the Algiers Locks. Elevations of the levee and floodwall improvements along the Algiers Canal would range from 14.0 to 16.0 feet. Improvements to existing flood protection structures would consist of:

- Raising existing levees (which will require the acquisition of additional rights-of-way and the removal of numerous dwellings, apartment complexes, electrical transmission towers, modifying the bridge supporting piers for two vehicle bridges and one railroad bridge crossing the canal, degrading the existing levees, installing a high strength geotextile at elevation 0.0 and rebuilding the levee to the 100-year LOP);
- Constructing and modifying existing floodwalls; and
- Constructing floodwalls and floodgates on existing levees.

The construction options utilized throughout the Algiers Canal reach would be highly dependent upon localized land use and constructability. In addition to the levee and floodwall improvements, the PP alternative would require elevation modifications and flood protection tie-ins to all pump stations along the Harvey and Algiers Canals, the Algiers Locks, the Lapalco Sector Gate and the Estelle Pump Station. Some of these modifications have already occurred, or are currently under construction as part of a pre-Katrina authorized action. These modifications, and the PP alternative levee and floodwall modifications, would provide 100-year LOP in coordination with levee tie-ins with additional HSDRRS projects (IER #13 and #14).

Belle Chasse Tunnel - The existing lanes of south-bound LA 23 at Belle Chasse travel through a tunnel under the Algiers Canal; this complicates raising the LOP in that area. The tunnel structure is probably inadequate to support higher water loads that would be associated with the 100-year LOP. Two options have been identified:

- Locate the line of protection away from the canal to points beyond the tunnel entrances. This would require flood closure gates across the highway at each end of the tunnel. This plan would result in flooding of the tunnel during periods of high water, and it might even be necessary to require flooding of the tunnel to prevent structural damage from high water pressure.
- Abandon the tunnel and reroute the highway to a new high-level bridge. This plan would also require relocating the roadway and the addition of ramps to the bridge, and might require backfilling the tunnel for structural security.

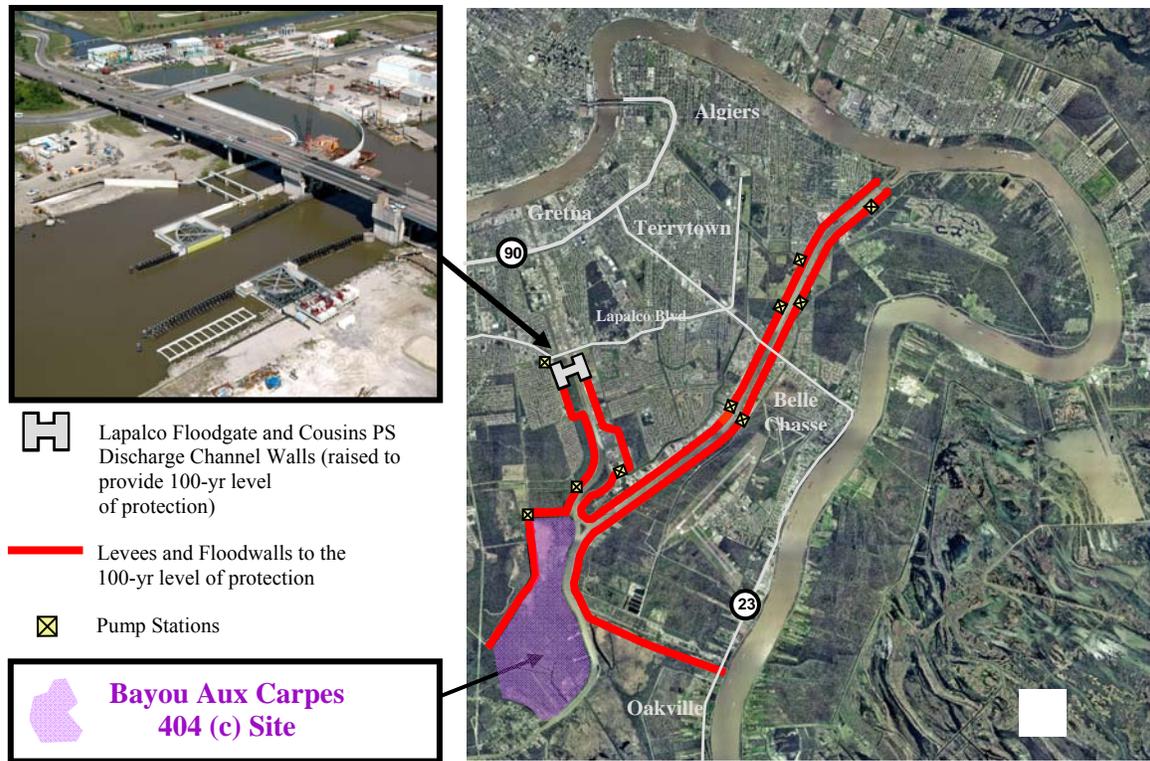


Figure 4. Conceptual Parallel Protection alternative schematic.

When the PP alternative was evaluated with respect to system reliability, adverse environmental impacts, schedule and cost, it was determined this alternative would have the lowest system reliability, have the most adverse socioeconomic impacts, have significant environmental impacts, require the most time to construct and be least economic. This alternative that keeps the approximately 27 miles of existing risk reduction system as the primary line of defense would be the least reliable because this alignment contains numerous potential failure points. In addition to reduced reliability, upgrading the current alignment would require large scale residential and commercial relocations and would have serious environmental implications (i.e. HTRW issues). See the alternative comparison tables below for specific details on system reliability, environment and schedule.

Alternative Comparison Tables

The tables below demonstrate alternative comparisons for three criteria: risk and reliability, environment, and schedule. The criteria were broken out into multiple “sub-criteria” for a more thorough comparison among alternatives. Specific cost comparison information was excluded as it cannot be disclosed at this time.

RISK & RELIABILITY COMPARISON

		GIWW WCC	GIWW A	AG	PP
Reliability	Storm load exposure	Approximately 3 miles of storm frontage	Approximately 1 mile of storm frontage	Approximately 9 miles of storm frontage	Approximately 27 miles of storm frontage
	Overtopping frequency	Overtopping frequency more than GIWW A alternative but less than AG alternative	Lowest overtopping frequency because it has least lineal exposure and 2' superiority over 100-yr water elevations along entire storm front	Overtopping frequency more than GIWW WCC alternative but less than PP alternative	Highest frequency of overtopping because it has greatest lineal exposure and least superiority over 100-yr water elevations
	Overtopping volume	Overtopping volume more than GIWW A alternative but less than AG alternative	Lowest overtopping volume because it has the highest superiority over 100-yr elevations and shortest frontage	Overtopping volume more than GIWW WCC alternative but less than PP alternative	Highest overtopping volume because it has no superiority over 100-yr elevations and longest frontage
	Non-storm load exposure	More storm load exposure than GIWW A alternative but less than AG alternative	Least lineal exposure to non-storm loads. Not susceptible to vegetation and wildlife encroachment. Protection is perpendicular to the navigation, possibly affecting frequency or severity of collisions	Significantly more storm load exposure than GIWW WCC alternative but less than PP alternative	Greatest lineal exposure to non-storm loads. Earthen levees are susceptible to vegetation and wildlife encroachment. Protection is parallel to the navigation, possibly affecting frequency or severity of collisions
	Value to terrorists	Less value to terrorists than GIWW A alternative, but more than AG alternative	High because HPS features are concentrated in terms of location and value, but easier to monitor and defend	Less value to terrorists than GIWW WCC alternative, but more than PP alternative	Low because HPS features are distributed by location and value, but harder to monitor and defend
	Resistance to explosive devices	Lower resistance to man-portable explosives and more accessible to larger devices	Lower resistance to man-portable explosives and more accessible to larger devices	Lower resistance to man-portable explosives and more accessible to larger devices	High resistance to man-portable devices; vulnerability to larger devices is low because access would be difficult
	Transitions (levee-to-floodwall, floodwall-to-floodgate, etc)	Approximately 10	Least number of transitions approximately 6	Approximately 60	Highest number, approximately 90
	Compartmentalization	Creates 2 nd largest storm water storage subbasin	Creates the largest storm water storage subbasin	Creates smallest storm water storage subbasin	No new sub-compartments created
	Foundations	Same as GIWW A alternative, except for some levee reaches, in which case see PP alternative	Pile foundations are engineered	Same as GIWW A alternative, except for some levee reaches, in which case see PP alternative	Levee foundations would be non-engineered unless geo-textile or soil cement design alternatives are adopted; any T-wall foundations would be engineered
	Complexity	High; largest number of new HPS features, though many separate levee reaches are eliminated	High; largest number of new HPS features, though many separate levee reaches are eliminated	High; though lower than GIWW WCC and GIWW A alternatives	Low; largest number of reaches, but no new HPS features created
Interdependency of features	8-9 pump stations upstream dependent on the new pump station	9 pump stations upstream become dependent on the new pump station	7 pump stations upstream depend on new pump station	No new dependencies	
Redundancy	Pumping capacity is	Pumping capacity is	Pumping capacity is	No redundancy	

		supplied by 4 sets of 4 independently powered pumps; 2 generators provide redundant backup power supply to each set of pumps	supplied by 4 sets of 4 independently powered pumps; 2 generators provide redundant backup power supply to each set of pumps	supplied by 3 sets of 3 independently powered pumps; 2 generators provide redundant backup power supply to each set of pumps	
	Active vs. Passive control	Pump station and gates must be staffed before, during, and after a storm event; 1 additional pump station (Old Estelle) must be staffed	Pump station and gates must be staffed before, during, and after a storm event	Pump station and gates must be staffed before, during, and after a storm event; 30 flood gates and 4 pump stations must be operated	Levees are generally considered passive flood protection, but there are 47 floodgates, 33 sluice gates, and 19 butterfly valves that must be manually operated
	Operation & Maintenance	Most expensive	Most expensive	Less expensive than GIWW WCC and GIWW A alternatives, but significantly more than PP alternative	Least expensive
	Inspections and maintenance	More rigorous inspections	More rigorous inspections	More rigorous inspections	Less rigorous; only visual inspection of levee and floodwalls
	Quality control	Pre-fabricated components have added layers of quality control prior to placements and must satisfy industry standards; however, any specialized test procedures and resources required for these features may be a liability	Pre-fabricated components have added layers of quality control prior to placements and must satisfy industry standards; however, any specialized test procedures and resources required for these features may be a liability	Pre-fabricated components have added layers of quality control prior to placements and must satisfy industry standards; however, any specialized test procedures and resources required for these features may be a liability	Greatest opportunity for non-compliance with construction specifications; Quality during placement and compaction of earthen levees and floodwalls would vary over space and time
	Utility dependence	Pump stations and gates will require connection to utility grids	Pump stations and gates will require connection to utility grids	Pump stations and gates will require connection to utility grids	No connection to utility grids required
	Reliability Team Assessment (relative scoring)	7(extrapolated)	8	3	0
Risk	Hurricane seasons under construction	3	3	3	5
	Redundancy of system	Most redundant	Most redundant	Redundancy on Algiers Canal; no redundancy on Harvey Canal	No redundancy
	Uncertainty in subsurface conditions	More uncertain than GIWW A alternative, Less uncertain than AG alternative	Least uncertain	More uncertain than GIWW WCC alternative, Less uncertain than PP alternative	Most uncertain
	Barge impact causing catastrophic failure	Least susceptible	Least susceptible	More susceptible than GIWW WCC and GIWW A alternatives, but less than PP alternative	Most susceptible

ENVIRONMENTAL COMPARISON

	GIWW WCC	GIWW A	AG	PP
Total Wetlands and Non-wetlands Uplands Resources (Unavoidable Impacts)	<p><u>Direct Impacts:</u> 9.6 acres of Nationally significant 404 c area wetlands + 223.3 acres of direct impacts to BLH + 8.9 acres of swamp (not in 404 (c)) = 232.2. Total acres of wetland</p> <p><u>Indirect impacts:</u> -Minimal -Minimal impact to floatant marsh</p> <p><u>Other Details:</u> -Possible project feature augmentation by discharging Estelle PS storm water effluent into 404 (c) area (dependent on study and coordination with EPA and rest of Interagency team to minimize impacts to the 404 (c) area as a result of the Government's action. Could be engineered to allow storm water flow on 404 (c) area to better maintain the fresh/salt water regime -May return 20 acres of land currently on the protected side of levee to the flood side as part of the bypass navigation channel. Habitat could be restored to bottomland hardwood forest. -Wall along GIWW would prevent industrial debris and effluent from flowing into 404 (c) area.</p>	<p><u>Direct Impacts:</u> 5.1 acres of Nationally significant 404 (c) area wetlands + 112 acres (not in 404 (c)) = 117.1 Total acres of wetlands</p> <p><u>Indirect impacts:</u> -Bifurcation of the 404 (c) area alters wildlife migration and ground water flow -Impoundment of northern 519 acres of floatant marsh and the potential total loss of floatant marsh and degradation within the 404 (c)</p> <p><u>Other Details:</u> -Floodwall would be designed to allow drainage and exchange of surface water during non-storm conditions -The wall would be designed and built to control outflow of flooded marsh -This alternative may return 20 acres of wetlands to the flood side</p>	<p><u>Direct Impacts:</u> 161 acres of wetlands + 150 acres of BLH = 311 Total acres of wetland</p> <p><u>Indirect impacts:</u> -Minimal indirect impacts</p> <p><u>Other Details:</u> -Storm surge reduction by marsh and floatant -May return ~10 acres to flood side</p>	<p><u>Direct Impacts:</u> 150 acres of BLH + 50 acres BLH = 200 Total acres of wetlands</p> <p><u>Indirect impacts:</u> -Minimal indirect impacts</p> <p><u>Other Details:</u> - Storm surge reduction by marsh and floatant</p>
Socioeconomic/Human Resources	<p>-Relocation of 1 business and 1 pipeline (Enterprise Gas pipeline) -Harvey canal businesses would included in the protection</p>	<p>-Relocation of 1 business -Bisecting 404 (c) degrades recreational use of area and potentially impacts hunting, bird watching, canoeing, kayaking, photography and commercial uses (swamp tours, etc.), though gates crossing the 404 c could accommodate the recreational use -Harvey canal businesses would be included in the protection</p>	<p>-Relocation of 13 residences and 3-4 businesses</p>	<p>-Relocation of 70 residences, 600 apartments, and 55 businesses</p>

Other: HTRW, borrow, air quality, noise quality, cultural, and aesthetics	-Minimal HTRW issues -keeps HTRW out of 404 c area -possible impacts due to borrow transport (likely barge in borrow to reduce impacts (3.5 M cy)) -Air quality medium impacts	-Minimal HTRW issues -minimal environmental impact due to borrow transport (250K cy) -minimal air quality issues	-Minimal HTRW issues on Harvey reaches (surge into area would pick up industrial debris, etc.) -possible Impacts due to borrow Transport (likely barge in borrow to reduce impacts (4.5 M cy)) -Air quality medium impacts	-Potential significant HTRW issues on Harvey reaches (surge into area would pick up industrial debris, etc.); landfills on Algiers reaches -Cultural issues: Antebellum homes -Impacts due to borrow Transport (9.54M cy) -Air quality high impacts
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TIME COMPARISON

	GIWW WCC	GIWW A	AG	PP
Construction Completion Date	MAR 2013	MAR 2013	AUG 2013	JUN 2013
100-year “wall of protection” completion date. Full pumping capacity would not be in place until Construction Completion date	JUN 2011	JUN 2011	JUN 2011	JUN 2013
Possible time slips due to real estate, relocations, environmental proceedings and litigation	Action within 404 (c) area, and relocation issues	Action within 404 (c) area and relocation issue Acquisition of property	Real estate and relocations issues	Real estate and relocation issues

Summary

The proposed action, GIWW WCC alternative proposes to alter the original system alignment and construct a streamlined surge barrier. The alternative would consist of 3 miles of levee and floodwall that would reduce the primary line of defense by 36%, a navigation gate(s) structure, a 20,000 -25,000 cfs pump station, 10 transition points, and a bypass channel. The existing protection at the approximate elevation 8.5’ would become the secondary line of protection during a storm event. Construction of this alternative would directly impact a total of 232.2 total acres of wetlands (9.6 acres of nationally significant 404 (c) wetlands), would have minimal indirect impacts to wetlands, and would have minimal socioeconomic impacts. Borrow requirement would be approximately 250,000 cubic yards (cy).

The GIWW A alternative also proposes to alter the original system alignment to construct a streamlined surge barrier. This alternative would consist of less than 1 mile (0.9 mi) of levee and floodwall that would reduce the primary line of defense by 41%, a navigation gate(s) structure, an approximately 20,000 -25,000 cfs pump station, 6 transition points, and a bypass channel. The existing protection at the approximate elevation 8.5’ would become the secondary line of protection during an event. This

alternative would directly impact 117.1 acres of wetland (5.1 acres of nationally significant 404 (c) wetlands) would bifurcate the 404 (c) area and have potentially significant, irreparable direct and indirect impacts to the northern impounded region (alter ground water flow, alter animal migration, potentially degrade float marsh, etc.) However, this alternative would have minimal socioeconomic impacts (i.e., residential or commercial relocations.) Borrow requirement would be approximately 3.5 M cy.

The AG alternative proposes to keep parallel protection along the Harvey Canal but build a gate at Algiers Canal to reduce the primary line of defense by 24%. This alternative would consist of 9 miles of floodwall (4 miles) and levee (5 miles), fronting protection at 4 pump stations, retrofitting the Lapalco Sector Gate, 30 floodgates on Harvey Canal, and 12 transition points. The existing protection at approximate elevation 8.5' behind the Algiers Canal gate would serve as secondary protection during an event. This alternative would impact 311 acres of wetlands, 13 residences, and 3-4 businesses. Borrow requirement would be approximately 4.5 M cy

The PP alternative proposes to keep the original alignment, approximately 27 miles of levee and floodwall, 47 floodgates on Algiers (17) and Harvey canals (30), approximately 90 transitions, 33 sluice gate structures, 19 butterfly valves, fronting protection and backflow suppression at 9 pump stations, retrofitting the Lapalco Sector Gate, and secure the Belle Chasse tunnel. This alternative would have no secondary line of defense during an event, would impact 200 acres of wetlands, 70 residents, 600 apartments and 55 businesses. Borrow requirement would be approximately 9.4 M cy.

Government's Proposed Action

The Corps has determined that the GIWW WCC alternative, which alters the current system alignment, is the government's proposed action for this segment of the HSDRRS because this alternative would provide the most reliable, time sensitive and cost effective solution with the least adverse environmental impacts.

b) The need to modify the Bayou aux Carpes 404 (c) Final Determination and why this modification is in the public's interest.

After rigorous investigation of all possible alternatives and close collaboration with the EPA, other Federal and state resource agencies, and local stakeholders, the Corps has brought forward the GIWW WCC alternative as the proposed action. Though possible to design, engineer and construct all four previously discussed alternatives, the proposed action would provide the most system reliability and maximum risk reduction with the least adverse environmental impacts; therefore, the GIWW WCC alternative has been identified as the proposed action.

Since the alternative that would provide the most reliable, least risk, time sensitive and cost effective solution with the least adverse environmental impacts would require constructing a floodwall along the western bank of the GIWW within the Bayou aux Carpes 404 (c) area, the Corps requests a modification to the Bayou aux Carpes 404 (c) Final Determination.

The proposed action would serve the national public interest because it would significantly reduce the risk during a 100 year storm event for nearly 286,000 people, nearly 80,000 residences, and over 3,000 businesses on the West Bank of the Mississippi River. Given the lessons learned from Hurricane Katrina, it is in the national interests for the Federal government to wisely invest in the alternative that provides the lowest risk and is the least environmentally damaging. The hurricane system in New Orleans is only as good as the sum of its parts. By ensuring that all the parts are selected and constructed to the highest standards possible, the nation would benefit due to lower risk to the system and lower potential for catastrophic losses. The system, when completed, will provide the citizens of the area the opportunity to participate in the National Flood Insurance Program. Certification of the system to meet flood insurance standards is an issue critical to the full economic recovery of the area. Pre-Hurricane Katrina assets for the area at risk were valued at nearly 22 billion dollars. The GIWW WCC alternative would provide a more streamlined barrier system that would not only reduce the length of the hurricane system but would also create a primary and secondary line of defense during a storm event. The proposed action also builds upon the Federal mandate to avoid and minimize environmental impacts by reducing overall impacts to wetlands, bottomland hardwoods and people. The GIWW WCC alternative eliminates the need to relocate businesses and residents along the Algiers and Harvey canals that would be required if the Corps were to construct either the AG or PP alternatives. The construction of this proposed action would be a tremendous step forward for the nation in providing the 1% LOP congressionally authorized and demonstrates the Corps' drive to incorporate current, more adequate risk reductions measures into the system.

There are also overwhelming benefits to the overall economy of the nation from constructing this alternative. The proposed action serves the public interest of the nation as stated above by reducing risk for the City of New Orleans, but this alternative also provides for a more resilient Port of New Orleans.

The Port of New Orleans is the fifth largest port in the United States based on cargo handled, is the second largest in Louisiana after the Port of South Louisiana, and is the 12th largest in the United States for value of cargo. The Port of New Orleans handles approximately 84 million short tons of cargo a year, where as the Port of South Louisiana handles approximately 199 million short tons a year. The two Louisiana ports combined form the largest port system in the world by bulk tonnage, and the world's fourth largest by annual volume handled. The Port of New Orleans is a major transshipment point for steel, rubber and coffee. It is the largest port in the United States for rubber imports. Approximately 6,000 ships from nearly 60 nations dock at the Port of New Orleans annually. The chief exports are grain and other foods from the Midwestern United States and petroleum products. The leading imports include rubber, chemicals, cocoa beans, coffee, and petroleum. The port handles more trade with Latin America than does any other United States gateway, including Miami. In addition, the rail system is a major component in cargo transport, and the Port of New Orleans is the only seaport in the US with access to six class one rail roads (Port of New Orleans 2008).

New Orleans is also a busy port for barges. The Mississippi River and the Gulf Intracoastal Waterway (GIWW) in the New Orleans area are used to transport approximately 50,000 barges a year. Within the port, cargo (commodity) is transferred from barges to rail and overland transport for distribution across the country. In addition to shipping commerce, the Port of New Orleans is considered one of the nation's premier cruise ports. It handles nearly 700,000 cruise passengers a year (Port of New Orleans 2008).

Besides serving local interests and reducing risk to local residences and business for the purpose of public safety and securing the local economy, the construction of this proposed alignment (GIWW WCC alternative) would also serve the national interest and reduce risk for the Port of New Orleans, a cornerstone of the national economy.

c) Planning and design efforts that have been incorporated into the proposed action to minimize impacts to the 404 (c) area.

The Corps proposes to employ several measures to reduce the impacts to the Bayou aux Carpes 404 (c) area.

1. The GIWW WCC alternative: The first measure employed was the derivation of the GIWW WCC alternative. Based on a system reliability study of the West bank and vicinity HSDRRS, the Corps had initially proposed the GIWW A alternative; however, after collaborating with EPA, National Park Service staff and other Federal and state resource agencies, the GIWW WCC alternative was derived to minimize adverse direct and indirect impacts to the Bayou aux Carpes 404 (c) area. The GIWW WCC alternative, which would maintain system reliability while minimizing adverse environmental impacts, was accepted by the Corps and brought forward as the proposed action. As described in the alternative comparison above, the GIWW WCC alternative limits adverse impacts to the 404

- (c) by building a structure with a narrow footprint (floodwall and earthen berm) on a previously disturbed area along the west bank of the GIWW.
2. Innovative techniques to build a floodwall along a navigable water way: The segment of the WBV HSDRRS 100 year LOP proposed within the Bayou aux Carpes 404 (c) area would be constructed as a floodwall in lieu of an earthen levee in order to ensure that the most reliable, least damaging alternative is in place. A floodwall can be built on a much smaller footprint than an earthen levee. The Corps recognizes that there are certain risks associated with placing a floodwall along a navigable waterway, but to minimize the footprint of this surge barrier component within the Bayou aux Carpes 404 (c) area, the Corps will investigate and utilize innovative techniques to design and build a structure with the narrowest footprint possible.
 3. Construction via water based equipment: The floodwall would be constructed within the 100' right-of-way. No additional construction easements would be required for wall construction.
 4. GIWW Gate location: The Corps proposes to move the gate on the GIWW as far north as practical to further reduce impacts. However, it is understood that the GIWW is a Federal navigation channel that is of national significance which requires that design of this structure be such that safety of users of the system be a paramount design consideration.
 5. Project features: The Corps also believes that it is feasible to complete alterations to existing project features to minimize adverse impacts that could potentially occur as a result of the construction of the GIWW WCC alternative along 4,200 LF of the eastern shoreline of the Bayou aux Carpes 404 (c) area. Another feature would be the redirection of the Old Estelle pump station storm water effluent into the 404 (c) area to introduce additional nutrients and fresh water into the system. Additionally, under the proposed action, the Corps would create gaps in several existing canals in the southern end of the 404 (c) area to promote improved hydrology within the 404 (c) area. Specifically, the shell plug at Bayou des Familles as well as plugs along other canals would be removed if study results demonstrate a positive benefit in minimizing the environmental impacts to the area can be achieved. All actions would be fully coordinated with EPA and the interagency team. Studies are underway at the Corps Engineering Research and Development Center (ERDC) in Vicksburg, Mississippi to determine the best possible design to allow for maximized benefit of this work in the Bayou aux Carpes 404 (c) area. Hydrology studies are ongoing and are expected to be completed by 17 October 2008. Environmental surveys are underway to determine the appropriate areas for the proposed spoil bank gapping within the Old Estelle discharge canal and for the removal of plugs in Bayou des Familles and other canals. In addition, the surveys will determine the appropriate water flow velocities within the 404 (c) when creating the gaps and removing canal plugs, and the appropriate nutrient loading levels. These studies will be integrated

into the efforts of the Interagency resource team that was formed early in the analysis phase to ensure that the national interest placed on the Bayou aux Carpes site meets the wisest and best use of the area.

d) Planning and design considerations that have been taken to avoid additional impacts from any reasonably foreseeable future flood protection measures (i.e. the Louisiana Area Coastal Protection and Restoration (LACPR) Study) when designing hurricane protection to prevent further impacts to the 404 (c) area.

In 2007, Congress authorized the Corps to conduct a study to be known as the Louisiana Coastal Protection and Restoration (LACPR) to determine viable projects to be considered for providing a higher level of risk reduction (Category 5) and coastal restoration for southern Louisiana. The Corps is not authorized by Congress to incorporate adaptations for LACPR when planning and designing the 1 percent risk reduction projects; however, the Corps is carefully considering the impacts that could occur if Congress authorized a larger project.

Of the alternatives investigated to reduce risk during a 100 year storm event, the GIWW WCC alternative (the proposed action) has the greatest adaptability to accommodate an enlargement. The Corps proposes that the upgrade to the floodwall and earthen berm be constructed via water access as currently proposed. In addition, all upgrades to levee and floodwall stretches that border the eastern and northern side of the 404 (c) area would be shifted to the protected side of the risk reduction system and would not impact the 404 (c) area. It is also not likely that a Category 5 upgrade to the risk reduction system would require movement of the navigation gate(s) structure.

The GIWW A alternative which would bisect the 404 (c) area would require additional construction impacts to cross the 404 (c) area, potentially compounding the ecological and hydrologic impacts to the area.

If the Algiers Gate alternative were constructed it would require further upgrades to the Harvey Canal and levees west of Harvey Canal, which would result in more business relocations, leaves Harvey Canal business on the flood side of the protection system, and has more direct environmental impacts. This would pose serious design considerations and costs given the length of the system (45,720 LF or 9 miles), the instability of the western side of the Harvey Canal, and the amount of upgrades to floodgates and pump stations required to reach the prescribed elevations.

The Parallel Protection alternative poses even more serious design and cost issues. Upgrading approximately 27 miles of the risk reduction system would include the upgrades and impacts listed above for the Harvey Canal and upgrades for all of the levees, floodwalls, and floodgates along the Algiers Canal, and the Belle Chasse tunnel. If upgrading the current alignment along the Algiers and Harvey canals for the 1 percent storm risk reduction system requires the relocation of approximately 700 people and 55

businesses, upgrading the system for a Category 5 system would potentially directly impact 1,000s of people and hundreds of businesses.

e) Detailed plan for adequate site specific mitigation of unavoidable adverse impacts to the 404 (c) area, at a level commensurate with the significance of an action impacting wetlands with in a 404 (c) area.

The Corps agrees that mitigation for unavoidable impacts to the unique and nationally significant Bayou aux Carpes 404 (c) wetlands would be determined in partnership with the EPA and NPS and that mitigation would occur within the 404 (c) area and/or the adjacent Jean Lafitte National Historic Park and Preserve. Mitigation projects proposed by EPA, NPS and other members of the Interagency team consist of spoil bank gapping of drill hole areas within the 404 (c) area, and tallow tree control projects within the Bayou aux Carpes 404 (c) area and the National Park. The Interagency team is committed to continue to investigate reasonable alternatives as the Corps moves forward with finalizing a construction alternative for the GIWW West Closure Complex. Once field surveys are conducted, and refined habitat units of impact are defined, mitigation projects can be explored and designs can be developed and submitted to the Interagency team for review. Once a decision is made by the Corps on the governments action for reducing risk in the Harvey and Algiers Canal area, mitigation projects would be fully developed. The Corps proposes to implement any required mitigation projects within the 404 (c) area concurrently with the design and construction of the floodwall and earthen berm / access road.

Currently a feasibility level analysis of the mitigation options is underway. A draft Wetlands Value Assessment (WVA) coordinated by US Fish and Wildlife Service has been provided to the Interagency team for comments. The Corps agrees that all impacts calculated by this WVA process will be fully mitigated. Even any unavoidable impacts to the Bayou aux Carpes area as a result of the investigative surveys and borings would be included in the final mitigation plan for the project. The Corps acknowledges the significance of the 404 (c) wetlands and agrees full mitigation for adverse impacts within this unique area may require mitigation in addition to the direct impacts calculated by the WVA to fully compensate for the impacts associated with constructing the Government's proposed action. Monitoring of the mitigation implemented would be conducted in collaboration with the EPA, the NPS, and other Federal and state resource agency partners. If monitoring reveals any issues, changes would be investigated and implemented to ensure full mitigation.

The Corps in partnership with the non Federal sponsor, the state of Louisiana, the EPA and NPS would closely monitor mitigation efforts within the 404 (c) area throughout the life of the project (50 years) to ensure the benefits of the mitigation projects.

The HSDRRS project is fully authorized and funded at 16.3 billion. This funding includes sufficient amounts to complete the design and construction of any identified mitigation measures.

f) A review of projected wetland impacts as per the Corps 404 (b)(1) guidelines, and EPA 404 (b)(1) and 404 (c) procedures found in 40 CFR Parts 230 & 231.

The Corps is preparing a Clean Water Act, Section 404 evaluation using standard methods and analysis practices. This evaluation will be coordinated with Federal and state resource agencies before being published for a 30-day public review period. The evaluation will follow the guidelines and procedures of 404 (b)(1) and 404 (c) as found in 40 CFR Parts 230 & 231.

A draft of the Corps 404 (b)(1) evaluation that would be available during the 30-day public comment period is provided below.

SECTION 404 (b)(1) EVALUATION

The following short form 404 (b)(1) evaluation follows the format designed by the Office of the Chief of Engineers. As a measure to avoid unnecessary paperwork and to streamline regulation procedures while fulfilling the spirit and intent of environmental statutes, the New Orleans District is using this format for all proposed project elements requiring 404 evaluation, but involving no significant adverse impacts.

PROJECT TITLE: IER #12: WBV, GIWW, Algiers and Harvey Canals Hurricane Protection Alternatives

PROJECT DESCRIPTION.

The proposed action, GIWW West Closure Complex (WCC), includes construction of a navigation/current reduction flow structure and gate in the Gulf Intracoastal Waterway (GIWW) south of the confluence of the Algiers and Harvey Canals and upstream of the Hero Canal, along with an adjacent pumping station and a by-pass canal. Upgrading of existing levees and/or construction of new levee structures will be required for 3 miles; approximately 4200 linear feet (LF) of floodwall construction along the west side of the GIWW, 3700 LF of floodwall improvements from the Harvey Canal to Old Estelle pump station, and 5700 LF of improvements along the V-line levee. This will result in approximately 3 miles of levee improvements or construction for this alternative.

Features of the system along the east side of the GIWW include a 150-to-300 foot gate and a 100-to-200 foot gate built to a protection elevation of 16 feet or greater, tied to the nearest flood protection levee. A pumping station of at least 20,000 cubic feet per second (cfs) will provide 100-year discharge and positive backwater prevention. The bypass channel will be used in the event of the closure of the primary closure structure. The adjacent 404 (c) area will be affected by the levee construction on the western side of the GIWW.

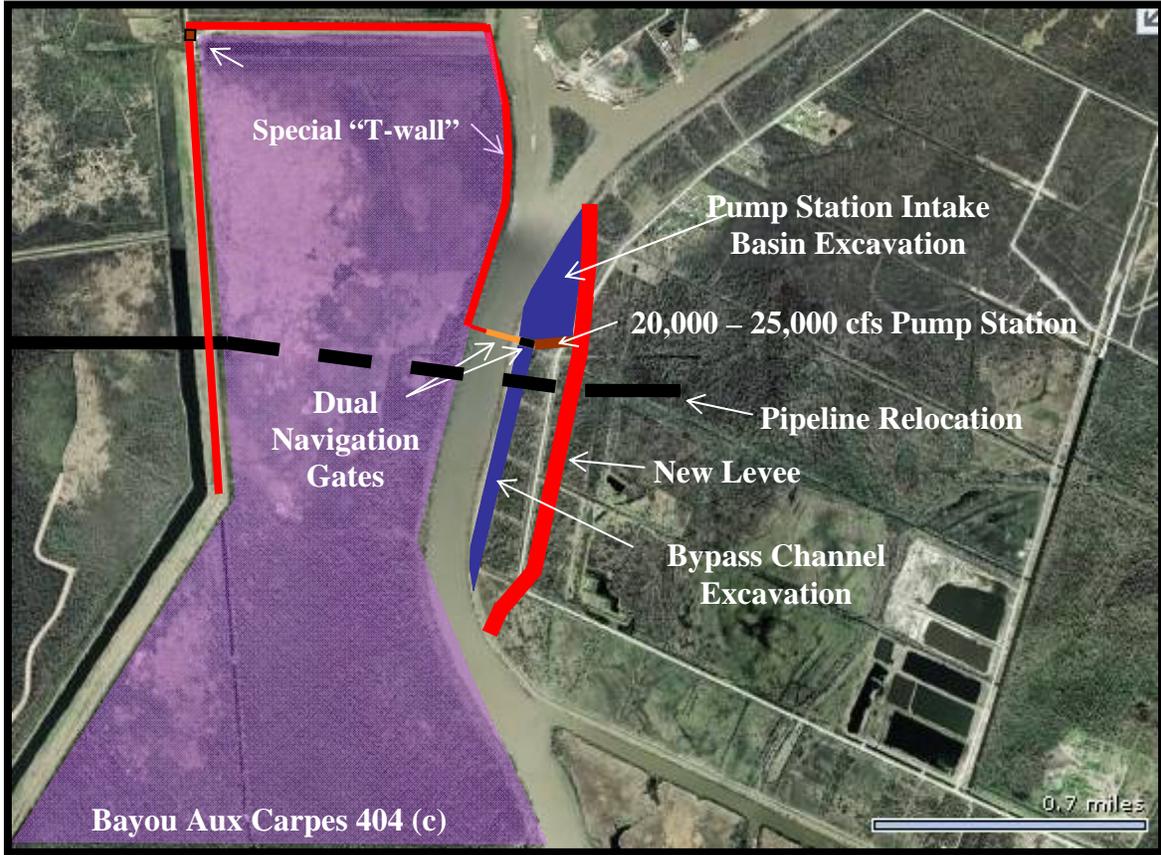
The current levee and floodwall system providing parallel protection for the GIWW, Algiers, and Harvey Canals is 27 miles long and will provide secondary protection to 8.5 feet NAVD.

The new levee design will require approximately 986,000 cubic yards of earthen material and 120,000 cubic yards of stone to construct.

The WCC alternative provides 100-year protection based upon improvements, enhancements, and construction confined to the GIWW reach in concert with tie-ins to improvement to the Hero Canal Levee (IER #13) and the Pipeline Canal Levee (IER #14).

Typical equipment utilized to accomplish the work outlined above will include water trucks, dump trucks, hole cleaners\trenchers, bore\drill rigs, cement and mortar mixers, cranes, graders, tractors/loaders\backhoes, bull dozers, front end loaders, aerial lifts, pile drivers, fork lift, generators and, marine vessels and barges.

FIGURE 1: IER 12



1. Review of Compliance (230.10 (a)-(d)).

Preliminary¹

Final²

A review of this project indicates that:

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for environmental assessment alternative);

YES

NO*

YES

NO

b. The activity does not appear to: (1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act; (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);

YES

NO*

YES

NO

c. The activity will not cause or contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values (if no, see section 2);

YES

NO*

YES

NO

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).

YES

NO*

YES

NO

2. Technical Evaluation Factors (Subparts C-F).

N/A

Not Significant

Significant*

a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).

- (1) Substrate impacts.
- (2) Suspended particulates/turbidity impacts.
- (3) Water column impacts.
- (4) Alteration of current patterns and water circulation.
- (5) Alteration of normal water fluctuations/hydroperiod.
- (6) Alteration of salinity gradients.

	X	
	X	
	X	
	X	
	X	
X		

b. Biological Characteristics of the Aquatic Ecosystem (Subpart D).

- (1) Effect on threatened/endangered species
- (2) Effect on the aquatic food web.

	X	
	X	

2. Technical Evaluation Factors (Subparts C-F).

	N/A	Not Significant	Significant*
(3) Effect on other wildlife (mammals, birds, reptiles, and amphibians).		X	

c. Special Aquatic Sites (Subpart E).

(1) Sanctuaries and refuges.		X	
(2) Wetlands.			X
(3) Mud flats.		X	
(4) Vegetated shallows.		X	
(5) Coral reefs.	X		
(6) Riffle and pool complexes.	X		

d. Human Use Characteristics (Subpart F).

(1) Effects on municipal and private water supplies.	X		
(2) Recreational and commercial fisheries impacts.		X	
(3) Effects on water-related recreation.		X	
(4) Esthetic impacts.		X	
(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.		X	

Remarks. Where a check is placed under the significant category, preparer has attached explanation below.

Implementation of the proposed action will directly impact approximately 232.2 acres of wetland habitat. All wetland impacts will occur adjacent to sections of pre-existing ROW within the GIWW reach. The proposed action will primarily impact bottomland hardwood forest, cypress-tupelo swamp and marsh wetland habitats. The majority of the wetland impacts will occur on the eastern side of the GIWW due to the construction of the gate and bypass channel. Wetland impacts are minimized along the remaining sections of the alternative by utilizing floodwall and protected side shifts where necessary, particularly to avoid additional impacts to the EPA 404 (c) area. Among the wetlands potentially impacted by the proposed action, a total of 71 acres of forested wetland habitat will be impacted, specifically requiring in-kind mitigation. Approximately 9.6 acres of wetland impacts within the GIWW reach would potentially occur within the EPA Bayou Aux Carpes 404 (c) site.

3. Evaluation of Dredged or Fill Material (Subpart G).³

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

(1) Physical characteristics	<u>Yes</u>
(2) Hydrography in relation to known or anticipated sources of contaminants	<u>No*</u>
(3) Results from previous testing of the material or similar material in the vicinity of the project	<u>Yes</u>
(4) Known, significant sources of persistent pesticides from land runoff or percolation	<u>No*</u>
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	<u>No*</u>
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	<u>No*</u>

3. Evaluation of Dredged or Fill Material (Subpart G).³

(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities

No*

(8) Other sources (specify)

No*

* All fill material will be free from contaminants before use in levee construction projects. The fill will come from multiple sources but will all meet minimal physical and chemical criteria being evaluated separate IERs.

Appropriate references:

1. Environmental Regulatory Code, Part IX. Water Quality Regulation, Louisiana Department of Environmental Quality, 1994, 3rd Edition.
2. State of Louisiana Water Quality Management Plan, Volume 5, Part B – Water Quality Inventory, Louisiana Department of Environmental Quality, Office of Water Resources, 1994.
3. Sector Gate South, Final Assessment Report, GIWW, Algiers and Harvey Canal and Highpoint Shooting Range, AEROSTAR Environmental Services, July 2008

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria.

YES

NO

4. Disposal Site Delineation (230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

(1) Depth of water at disposal site	<u>Yes</u>
(2) Current velocity, direction, and variability at disposal site	<u>No</u>
(3) Degree of turbulence	<u>Yes</u>
(4) Water column stratification	<u>No</u>
(5) Discharge vessel speed and direction	<u>NA</u>
(6) Rate of discharge	<u>Yes</u>
(7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	<u>Yes</u>
(8) Number of discharges per unit of time	<u>No</u>
(9) Other factors affecting rates and patterns of mixing (specify)	<u>No</u>

Appropriate references:

Same as 3(a).

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.

YES

NO*

5. Actions to Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of the recommendations of 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

YES

NO*

Actions taken: A number of actions will minimize the adverse effects of the proposed actions.

5. Actions to Minimize Adverse Effects (Subpart H).

The material must meet certain criteria to be used in levee construction, and will be similar to material used in the original levee work.

According to the Corps, all material will be free from contaminants before use in levee rebuilding projects. The fill may come from many different areas being evaluated in separate IERs. Qualified contractors using the appropriate equipment to minimize impacts to wetland areas will place all material.

The new footprint of the levee was designed to minimize wetland impacts by utilizing existing ROW and non-wetland areas whenever feasible. Best Management Practices will be utilized during the placement of the fill to minimize runoff and turbidity.

6. Factual Determination (230.11).

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term (adverse) environmental effects of the proposed discharge as related to:

- | | | |
|---|------------------------------|-----|
| a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5 above). | <input type="checkbox"/> YES | NO* |
| b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5). | <input type="checkbox"/> YES | NO* |
| c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5) | <input type="checkbox"/> YES | NO* |
| d. Contaminant availability (review sections 2a, 3, and 4). | <input type="checkbox"/> YES | NO* |
| e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5). | <input type="checkbox"/> YES | NO* |
| f. Disposal site (review sections 2, 4, and 5). | <input type="checkbox"/> YES | NO* |
| g. Cumulative impact on the aquatic ecosystem. | <input type="checkbox"/> YES | NO* |
| h. Secondary impacts on the aquatic ecosystem. | <input type="checkbox"/> YES | NO* |

*A negative, significant, or unknown response indicates that the proposed project may not be in compliance with the Section 404 (b)(1) Guidelines.

¹ A negative response to three or more of the compliance criteria at this stage indicates that the proposed project may not be evaluated using this "short form procedure". Care should be used in assessing pertinent portions of the technical information of items 2a-d, before completing the final review of compliance.

² A negative response to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404 (b)(2) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.

³ If the dredged or fill material cannot be excluded from individual testing, the "short form" evaluation process is inappropriate.

7. Evaluation Responsibility.

Evaluation prepared by:

Position: Robert H. Boudet, Senior Project Manager, AEROSTAR Environmental Services

Date: October 10, 2008

Evaluation reviewed by:

Position: Getrisc Coulson Environmental Manager, Ecological Planning and Restoration Section CEMVN

Position: Gib A. Owen, Chief, Ecological Planning and Restoration Section, CEMVN

Date:

8. Findings.

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404 (b)(1) guidelines

YES

b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404 (b)(1) guidelines with the inclusion of the following conditions

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404 (b)(1) guidelines for the following reason(s):

(1) There is a less damaging practicable alternative

(2) The proposed discharge will result in significant degradation of the aquatic ecosystem

(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem

Date

Elizabeth Wiggins
Chief, Environmental Planning
and Compliance Branch

In addition, below is a path ahead for this project, the GIWW West Closure Complex – Individual Environmental Report 12. Since the project being proposed is a Federal action, it is in the public’s best interest to present all of the information concurrently. Thus it is in the government’s best interest to simultaneously publish for 30 day public review the draft Individual Environmental Report, the Corps Clean Water Act 404 (b)(1) public notice, and the EPA notice of consideration of a modification to the Bayou aux Carpes 404 (c) Final Determination. Additionally, given the Administration’s commitment to expedite the construction of the HSDRRS and the Corps’ stated goal of having the system in place by 2011, the simultaneous publishing of the government’s proposal is in the public’s best interest and is critical for moving this project towards completion.

g) **Draft Path Forward with GIWW WCC**

Task	Duration	Start Date	Remarks
Colonel Lee Approved Proposed Action		7/10/2008	
Briefed Corps TFH Director		7/24/2008	
Briefed Corps MVD Commander		7/30/2008	
Briefed Corps HQ		8/13/2008	
Corps Submitted CZM, WQ, T&E, etc.		8/18/2008	
Public Meeting (IER 12,13,14)		8/21/2008	
Briefed Corps ASA		9/16/2008	
EPA Briefed HQ Level		9/30/2008	
NGO Quarterly Meeting		10/7/2008	
Submit Formal Request to EPA for Modification of 404 (c) Final Determination		11/4/08	
EPA Completeness Review		11/4/08	Review of Corps' Request for Modification Document
Complete Draft IER 12 and 404 (b)(1) Public Notice		TBD	EPA will get draft IER 12 to review before it goes out for public comments
IER 12 Public Review - Start	30	12/4/08	
IER 12 Clean Water Act Section 404 (b)(1) Public Notice public review	30	12/4/08	
EPA notice in Federal Register: Proposed modification; Request for comments to the proposed action; Notice for a public hearing regarding the proposed action	30	12/4/08	Concurrent Tasks
Corps Review Public Comments	7	1/3/09	Possibility for an addendum and second 30-day public review period if substantive comments received.
Joint Corps/EPA public hearing on proposed action		1/5/09	
EPA review of public comments on proposed action (with Corps support)	7	1/5/09	
Final IER and Clean Water Act Section 404 (b)(1) staffed for approval	7	1/10/09	IER 12 Decision Record routed for Commanders approval ¹ (assumes no substantive comment) COL Lee signs Final IER 12 anytime after 1/11/09
EPA R6 sends all supporting documentation to EPA HQ	7	1/12/09	
EPA lists modification in Fed Reg.	1	1/19/09	
Final Modification Determination	30	1/19/09	Effective 30 days after publication (2/18/09)
Signing of Clean Water Act 404 (b)(1)	0	2/19/09	Approved by Chief PM-R

¹ Approval of IER 12 Decision Record allows Corps to proceed with approval of Project Description Document (Internal Corps Document) and a Project Partnering Agreement with the non-Federal Sponsor (State of Louisiana – (CPRA). 404 (b)(1) not signed by Corps until EPA modification is approved and published.

Literature Cited

US Army Corps of Engineers (USACE). 2008. Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System. Final Report of the Interagency Performance Evaluation Task Force (IPET). Volume 1-Executive Summary and Overview. June.

Port of New Orleans. 2008. "Port of New Orleans Overview." Accessed 15 September, 2008 from http://www.portno.com/pno_pages/about_overview.htm.

Appendix L: IER # 12 Algiers Canal Dredging and Disposal Plan

BACKGROUND

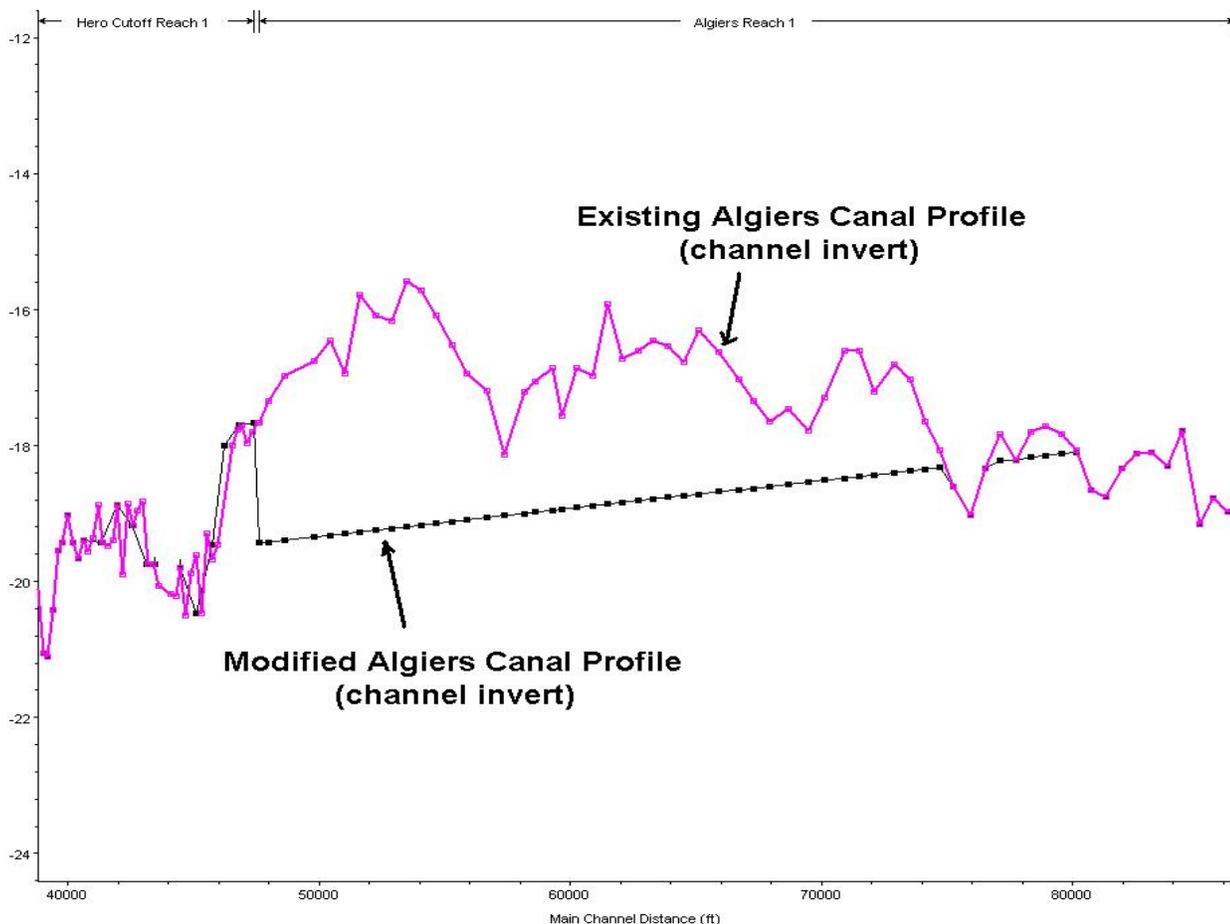
Based on the results of the HEC-RAS hydraulic models for the Gulf Intracoastal Waterway (GIWW) West Closure Complex (WCC), a still water level of 5.8 with a protection of 8.5 would require a 20,000 cfs pump station and minimize the work along Algiers and Harvey Canals. Dredging of the Algiers Canal would be required from the Belle Chasse Tunnel South to the Hero Cutoff. Geotechnical analysis conducted with the proposed dredged channel has shown that the existing levees would remain stable with the revised channel geometry. Based on preliminary design results it was determined that a retention basin still water level between 5 and 6 would minimize the required fortifications along the Algiers and Harvey Canals. With a levee built to design elevation 8.5, only one lift would be needed to maintain El. 8.5 over 50 years.

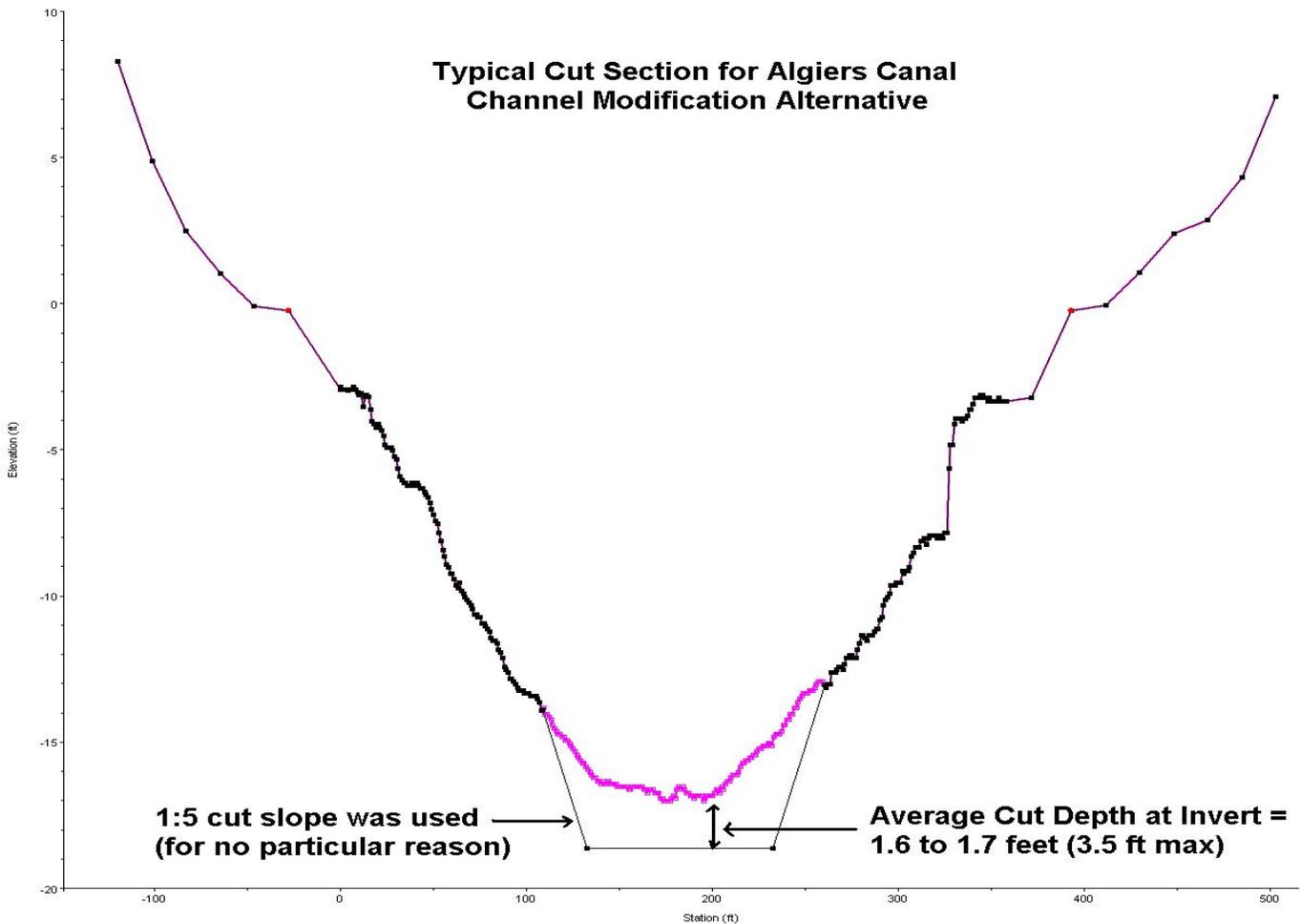
METHODS

Currently, the project team is exploring the possibility of dredging the Algiers Canal to lower the water elevation in the retention basin behind the proposed gated structure.

Dredging is proposed to be performed between the Harvey/Belle Chasse tunnel, and the confluence of the Harvey Canal and Algiers Canal, a distance of approximately 4.9 miles. Dredging shall be performed to the grades, widths and slopes shown below.

Algiers Channel Modification Profile Plot





QUANTITIES

Approximately 700,000 cubic yards would be excavated from the Algiers Canal.

FREQUENCY

The frequency of maintenance dredging would exceed 20 years.

SEDIMENT TESTING

The CEMVN has notified the appropriate resource agencies as to which course of action is preferred. The resource agencies will continue to be involved as cost estimates and the results of any further sediment tests become available.

DISPOSAL

The preferred alternative is the disposal of the material into the Jean Lafitte National Historical Park and Preserve (JLNHPP) Lake Salvador "Geocrib," and the alternative use of the material is placement of the material in the Walker Road borrow sites (see figures 1-4). The alternative of placement of dredged material in the Walker Road borrow sites would be done only as a convenience to the government if the preferred option is not practicable. The placement of dredged material in the Walker Road borrow sites would not be considered backfilling of those sites. If dredged material is placed in the Walker Road borrow sites, the

quantity of the material would be insufficient to refill those sites. Disposal of the material in either location would be considered a project feature. The first option of placing the dredged material into the JLNHPP Lake Salvador Geocrib is preferred because it is a beneficial use site and the wetlands created with this material would be counted as mitigation for the Hurricane and Storm Damage Risk Reduction System (HSDRRS) projects.

Disposal options are consistent, to the maximum extent practicable, with the Louisiana Coastal Resources Program. This requires that dredged material be used beneficially when practicable.

Provided the material is determined to not be contaminated, the material could be excavated via either:

- a) hydraulic cutter head dredge and transported as a slurry to a disposal site(s) via pipeline, or
- b) via mechanical dredge (i.e. barge mounted dragline or backhoe) and placed in barges and transported to site, and either removed from the barges via a hydraulic pump and transported to the site via pipeline, or offloaded from barges, placed within trucks, and hauled to disposal site where it would then be mechanically offloaded into the disposal site.

The following alternative plans would be considered for accomplishment of this task:

- a) Preferred Option - Material from the Algiers Canal to be excavated by barge-mounted dragline/backhoe and transported via barge from Algiers Canal down the GIWW, Bayou Barataria and Lake Salvador, and placed within the Geocrib site in JLNHPP. Retention dikes would be constructed, as necessary, in order to retain the dredged material and prevent effluent sedimentation from occurring outside of the site. Prior to disposal, a before disposal survey of the disposal site, as well as the water bodies adjacent to the disposal site, would be performed. This is a 16 mile transport option (figure 7).
- b) Hydraulic cutter head dredging, with material excavated from the canal transported via barge from Algiers Canal down the GIWW, Bayou Barataria, and Lake Salvador, and placed within the Geocrib site in JLNHPP. Retention dikes would have to be constructed as necessary in order to retain the dredged slurry and prevent effluent sedimentation from occurring outside of the site. A silt screen/turbidity curtain may be installed to trap and prevent any sediment that might exit the site and fall out into the adjacent water bodies. Prior to disposal, a before disposal survey of the disposal site, as well as the water bodies adjacent to the disposal site, would be performed. This is a 16 mile transport option.
- c) Material from the Algiers Canal to be excavated by hydraulic cutter head dredge and transported via pipeline within Algiers and Hero Canals and placed within the Walker Road borrow sites adjacent to Hero Canal (appendix L). Retention dikes would be constructed around the pit(s) as necessary in order to retain the dredged slurry to the pit(s) and prevent effluent sedimentation from occurring outside of the pit(s). A marsh buggy dragline/backhoe would be used for construction of the retention dikes with borrow for retention dikes to come from within the pit(s) themselves. Waste water would be drained from the pit(s) via spill box weirs that would be constructed within the retention dikes paralleling Bayou Barrier canal. The spill box weirs would be controlled and monitored to assure that retention of the material is maximized and to prevent effluent sedimentation from occurring within Bayou Barrier. A silt screen/turbidity curtain would be installed in Bayou Barriere just north of the spill box to trap and prevent any sediment that might exit the weir and fall out into the canal/bayou. Prior to disposal, a before disposal survey of the canal would be performed and the bayou restored to pre-disposal conditions if needed. This is a 7.5 mile transport option.
- d) Material from the Algiers Canal to be excavated by barge-mounted dragline/backhoe and transported via barge and placed within the Walker Road borrow sites adjacent to the Hero Canal. The material could either be offloaded onto trucks and hauled to the Walker Road borrow sites, or removed from barge via hydraulic pump and transported via pipeline pumped to the Walker Road borrow sites. Retention dikes would be constructed around the pit(s) as necessary in order to retain the dredged material to the pit(s) and prevent effluent sedimentation from occurring outside of the

pit(s). A marsh buggy dragline/backhoe would be used for construction of the retention dikes with borrow for retention dikes to come from within the pit(s) themselves. Waste water would be drained from the pit(s) via spill box weirs that would be constructed within the retention dikes paralleling Bayou Barrier canal. The spill box weirs would be controlled and monitored to assure that retention of the material is maximized and to prevent effluent sedimentation from occurring within Bayou Barrier. A silt screen/turbidity curtain would be installed in Bayou Barriere just north of the spill box to trap and prevent any sediment that might exit the weir and fall out into the canal/bayou. A before disposal survey of the canal would be performed and the bayou would be restored to that pre-disposal condition if needed. This is a 7.5 mile transport option.

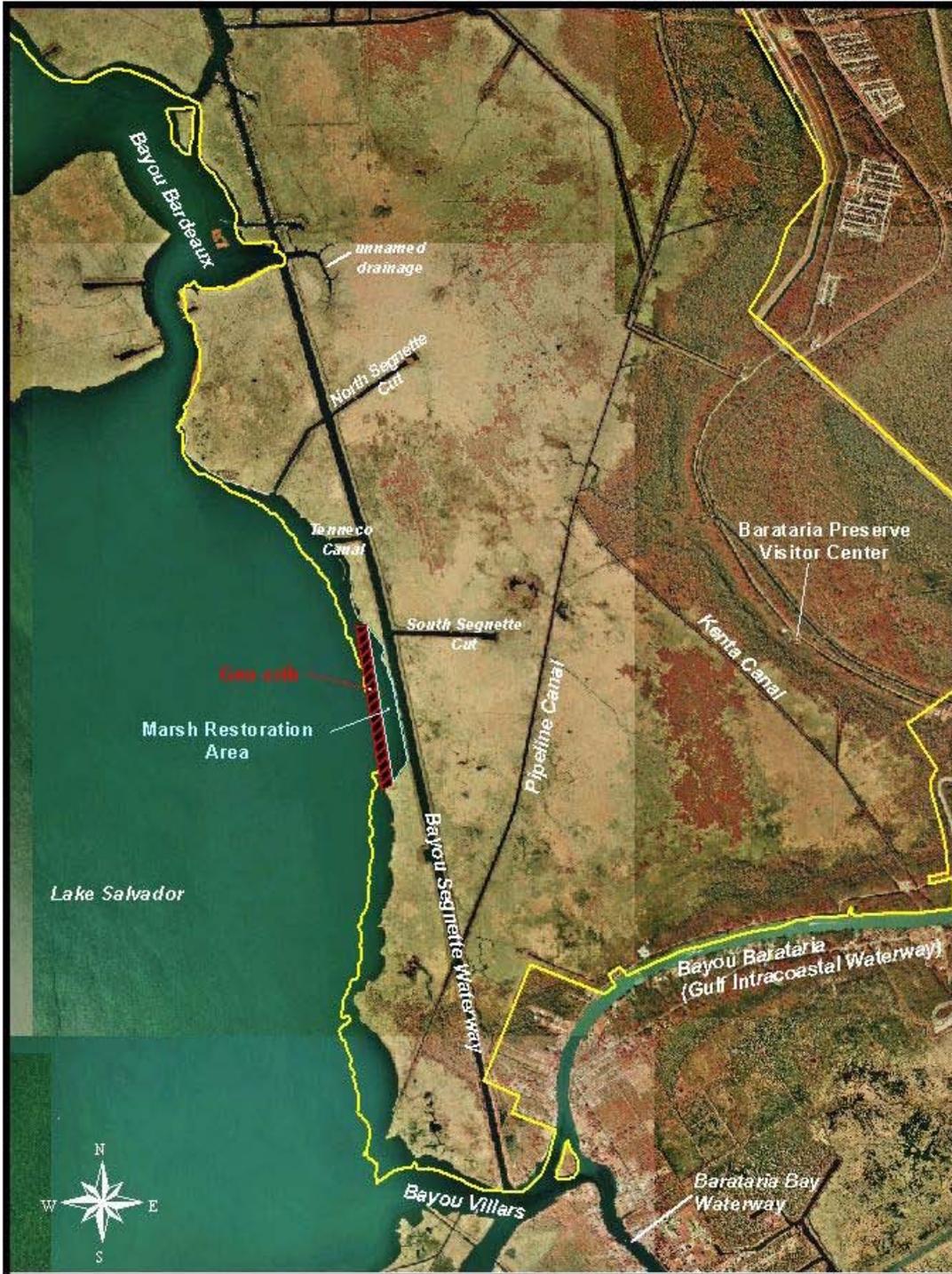
- e) If the material is found to be classified as contaminated then the material would be mechanically dredge (i.e. barge-mounted dragline or backhoe) and the excavated material would be placed in sealed barges and transported to a disposal site for contaminated material. Initial tests conducted by the United States Army Corps of Engineers (USACE) do not indicate that the material is contaminated, but additional testing is underway. This is a 77 mile transport option to the Type I landfill in Venice, LA.



Figure 1. Extent of Dredging in Algiers Canal



Figure 2. Pipeline Path from Algiers Canal to Walker Road Borrow Pits



**Lake Salvador Shoreline Protection Project
Marsh Restoration Phase**

Approximate Park Boundary

Figure 3. Geocrib Site Map

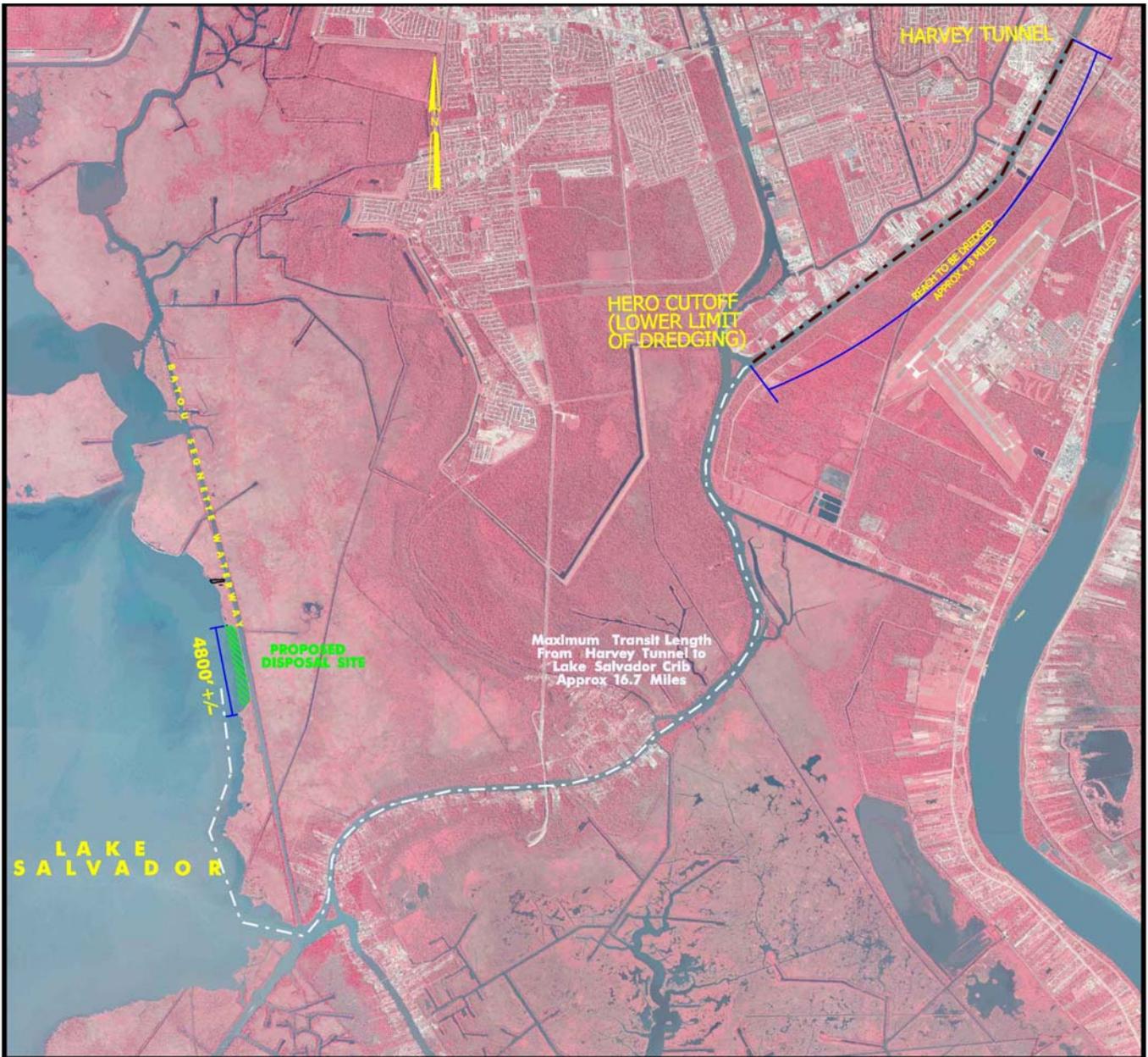
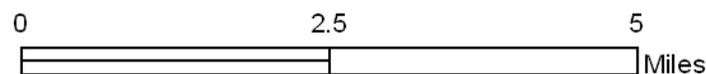


Figure 4. Barge Path from Algiers Canal to Geocrib Site

Algiers Canal Dredging Extent and Beneficial Use Areas



-  Alternative Disposal Site
-  Proposed Disposal Site



Algiers Canal Phase II Environmental Site Assessment

Limited Phase II Environmental Site Assessment (PIESA) was conducted as part of A GIWW navigation sector gates and associated by-channels. A large stretch of the Algiers canal (approximately 5.5 miles) will be dredged for navigational purposes; therefore the dredged material should first be characterized for contaminants.

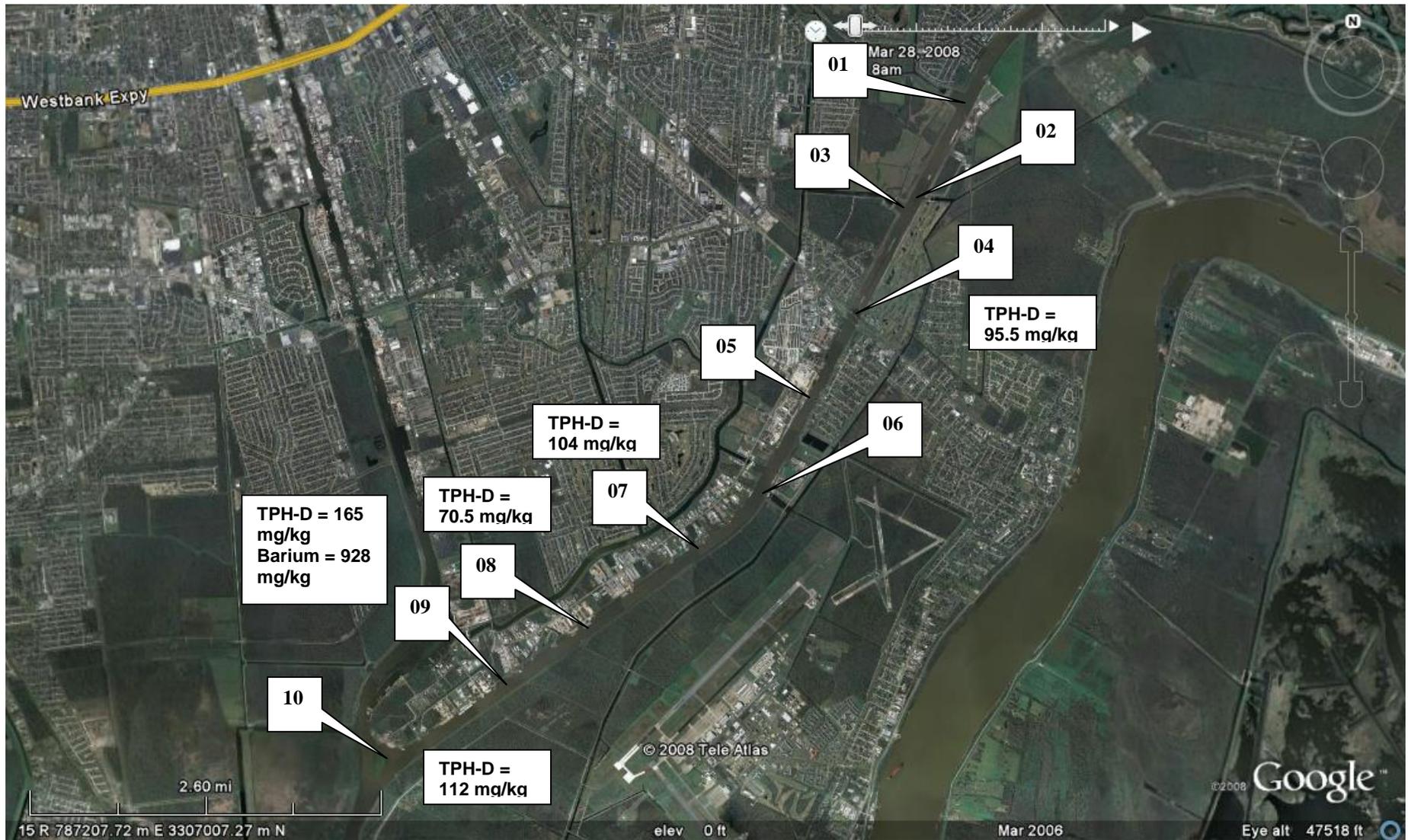
TPH-D was present at concentrations exceeding the State of Louisiana risk-based screening standards (LDEQ RECAP) at sample locations 4, 7, 8, 9, and 10, while barium exceeded the standard at location 9 only. The affected sample locations are at the western end of the 5.5-mile stretch, toward the Harvey Canal. See the attached figure.

For the screening purposes of this investigation and unlimited reuse options for the sediment, the RECAP standards considered were the more stringent of non-industrial exposure and protective of groundwater (in terms of drinking water). While the river is used for industrial purposes (navigation, etc.), it is also used for drinking water.

The barium concentration exceeds the non-industrial standard (550 mg/kg), but not the industrial (14,000 mg/kg) or protective of groundwater (2,000 mg/kg) standards. Barium is commonly used in petroleum industries and this one high spot (9) may be results of drilling activities. Therefore, the barium concentration at location 9 is acceptable for the proposed USACE plan and further consideration of the barium concentration is not necessary.

The TPH-D concentrations exceed both the non-industrial and protective of groundwater standards (both 65 mg/kg). The sample interval for the sediment samples was the 0-1 foot into the surface of the sediment. The result is that the levels presented are very concentrated. While the TPH-D concentrations exceed the screening standards, they aren't that high. In addition, the screening standards are intended for larger sample intervals (i.e. 0-3 feet). Once the sediment is dredged and mixed with deeper sediment (likely unimpacted), the elevated concentrations will decrease.

It is our opinion that dredged materials canal disposal is feasible. We recommend more sediment sampling where high TPH-D were detected to further delineate the contaminated area. It is anticipated that increasing sampling interval (0-3 feet) will lower the contamination level. The areas with TPH-D can be stockpiled during dredging activities and resampled for TPH-D as well as oil and grease for confirmation of acceptable concentrations prior to deposition into the GIWW.



Section 84 was not covered from at least 1945 to at least 1949, appeared to be undeveloped from at least 1951 to 2004, and appears to have been used as Sector Gate construction staging since 2005.

Section 85 was not covered from at least 1945 to at least 1949, appeared to be undeveloped from at least 1951 to at least 1967, was not covered in 1969, appeared to be developed with the Cousins Pump Station in 1972, was not covered in 1975, and appears to have been developed with the Cousins Pump Station and commercial properties since at least 1980.

1.6 Findings and Conclusions

AEROSTAR has performed a Phase I ESA in conformance with the scope and limitations of ASTM Standard E 1527-05 of IER 12, located along the Algiers Canal-Intracoastal Waterway and Harvey Canal, Jefferson, Orleans, and Plaquemines Parishes, Louisiana, hereafter referred to as the site. Any exceptions to, or deletions from, this practice are described in Section 2 of this report. The Executive Summary serves as a summary of this report and presents the significant findings, conclusions and recommendations. The Executive Summary should not be considered a stand-alone document and must be evaluated in conjunction with the discussions, supporting documentation, and limitations within this ESA report.

This assessment has revealed no evidence of recognized environmental conditions in connection with the site, except for those listed in Table 1 in Section 1.7 of this report.

1.7 Recommendations

Based on the information reviewed during this investigation, additional assessment is recommended at this time. On-site inspections of properties identified as recognized environmental conditions are recommended once access agreements are executed with the owners. Additionally, interviews with owners and occupants are recommended as access agreements are provided. Soil and groundwater assessment may be prudent at sites with identified recognized environmental conditions should acquisition of these sites be requested for construction activities. AEROSTAR recommends that these conclusions and recommendations be reviewed again as soon as 60% construction plans are available.

Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the north of Section 1	The northern adjoining properties appear to have been commercially developed since at least 1967.	N29.873523, W-90.068499	Boat Stuf	Offsite concerns were noted from listings as Power Dynamics Hydraulic Equipment from at least 1975 to at least 2000.
		N29.873396, W-90.069586	Northern portion of Moser Fabrication	Offsite concerns were noted from a listing as Evans Corp. in 1961.
		N29.872149, W-90.069156	Majors Tool Company, Inc.	Offsite concerns were noted from lack of soil and groundwater quality information for this UST facility.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
1	Section 1 appeared to be commercially developed from at least 1961 to 2005, and appears to have been commercially developed and vacant commercial property since 2006.	N29.874387, W-90.068986	Southern portion of Moser Fabrication	Onsite concerns were noted from a listing as Evans Corp. in 1961 and drums and ASTs of unknown content and condition present onsite.
		N29.872149, W-90.069156	Majors Tool Company, Inc.	Offsite concerns were noted from lack of soil and groundwater quality information for this UST facility.
		N29.871057, W-90.067078	Western portion of Par 3	Onsite concerns were noted from a listing as Taylor Oil Field Rental in 1965 and the likely use of herbicides and pesticides.
		N29.870347, W-90.068285	Evans Corp.	Onsite concerns were noted from drums and ASTs of unknown contents and condition present onsite.
		N29.872654, W-90.068307	Vacant commercial property	Onsite concerns were noted from lack of commercial occupant information since at least 1961.
Adjoining properties to the east of Section 1	The eastern adjoining properties appeared to be commercially developed from at least 1967 to at least 2005, and appear to have been vacant commercial property since 2006.	N29.873024, W-90.067200	A-1 Electrical Contractors	Offsite concerns were noted from the drilling of Well 68731.
		N29.871526, W-90.066104	Eastern portion of Par 3	Offsite concerns were noted from a listing as Taylor Oil Field Rental in 1965 and the likely use of herbicides and pesticides.
2	Section 2 appeared to be residentially developed in 1951, and appears to have been commercially developed since at least 1967.	N29.868159, W-90.065564	Hydradyne Hydraulics, Inc.	Onsite concerns were noted from listings as a maintenance facility (1975-1980) and as Hydradyne Hydraulics since at least 2005.
		From N29.869274, W-90.067771 to N29.864629, W-90.066148	Dynamic Industries, Inc.	Onsite concerns were noted from a listing in 2005 of Dynamic Industries, present operations, the presence of drums and ASTs of unknown contents and condition, and a sandblast grit discharge into the Harvey Canal.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the east of Section 2	The eastern adjoining properties appeared to be commercially developed from at least 1967 to at least 1991, vacant commercial property from at least 1994 to at least 1996, commercially developed from at least 1998 to at least 2000, and appear to have been commercially developed and vacant commercial property since at least 2004.	N29.867842, W-90.063780	Vacant property	Offsite concerns were noted from lack of commercial occupant information since at least 1967.
3	Section 3 appears to have been commercially developed since at least 1967.	N29.862645, W-90.065297	Chet Morison Contractors, Inc.	Onsite concerns were noted from sandblasting activities and the presence of an AST of unknown contents and condition.
		From N29.863956, W-90.065967 to N29.863067, W-90.063670	Vacant commercial properties	Onsite concerns were noted from lack of commercial occupant information since at least 1967.
		N29.863028, W-90.063624	National Environmental Controls	Onsite concerns were noted from lack of regulatory information on this NFRAP facility.
Adjoining properties to the east of Section 3	The eastern adjoining properties appeared to be commercially developed from at least 1967 to at least 1991, vacant commercial property in 1994, commercially developed from 1995 to at least 2004, and appear to have been vacant commercial property since 2005.	N29.864165, W-90.062740	Vacant commercial properties	Offsite concerns were noted from lack of commercial occupant information since at least 1967.
4	Section 4 appears to have been commercially developed since at least 1967.	From N29.861966, W-90.065200 to N29.856299, W-90.063213	Premier Industries, Inc.	Onsite concerns were noted from listings as New Orleans Shipyard (1991) and Premier Industries (2005), present operations, and the presence of drums and ASTs of unknown contents and condition.
		From N29.862371, W-90.063542 to N29.856747, W-90.061538	Vacant commercial properties	Onsite concerns were noted from lack of commercial occupant information since at least 1967.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the east of Section 4	The eastern appeared to be commercially developed from at least 1972 to at least 1991 and appear to have been vacant commercial property since at least 1994.	From N29.862712, W-90.062039 to N29.857189, W-90.060113	Vacant commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1972 and the drilling of Well 167984.
5	Section 5 appears to have been commercially developed since at least 1980.	From N29.856266, W-90.063247 to N29.853316, W-90.062160	Nabors Offshore Corporation, Inc.	Onsite concerns were noted from listings of oil and gas well drilling companies (1980-2005), present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.856132, W-90.060598	Cell tower	Onsite concerns were noted from the presence of associated equipment of unknown condition.
Adjoining properties to the east of Section 5	The eastern adjoining properties appear to have been commercially developed since at least 1972.	N29.856914, W-90.059824; N29.855647, W-90.059408	Eastern portion of Nabors storage yard; electrical substation	Offsite concerns were noted from listings of oil and gas well drilling companies (1980-2005), present operations, and the presence of drums and ASTs of unknown contents and condition.
6	Section 6 appears to have been commercially and residentially developed since at least 1972.	N29.8521811, W-90.061881	Belle Chasse Marine Transport, Inc.	Onsite concerns were noted from the onsite tank farm and the listing as Mayronne Drilling Mud, Co. from 1980 to 1996.
		N29.852620, W-90.060242	Hassel's Trailer Park	Onsite concerns were noted from the drilling of Well 184790 and a listing as American Termite and Pest and the possible storage of associated chemicals.
		N29.852981, W-90.058564	AA Vacuum Truck Service, Inc.	Onsite concerns were noted from the listing as AA Vacuum Truck Service in 2000, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.852871, W-90.061743	Vacant warehouse	Onsite concerns were noted from lack of commercial occupant information since at least 1972.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
7	Section 7 appeared to be commercially developed from at least 1967 to at least 2005, and appears to have been commercially developed and vacant commercial property since 2006.	N29.851101, W-90.061800	US Minerals Stan Blast	Onsite concerns were noted from a listing as Avondale Boat Division in 1991, present operations, and the presence of ASTs of unknown contents and condition.
		N29.851837, W-90.059705	Center Staging, Inc.	Onsite concerns were noted from a listing as Degulf Supply, a pipeline supplier, from at least 1975 to at least 1991.
		N29.852285, W-90.059019	Crescent City Choppers, RT Manufacturing	Onsite concerns were noted from listings as a mobile laboratory company and as commercial-industrial businesses from at least 1975 to at least 2000 and present operations.
		N29.851790, W-90.058853	Swanson's Perfect Ponds	Onsite concerns were noted from a 2005 listing as a lawn and maintenance business and possible stored associated chemicals and substances.
		N29.850769, W-90.059068	Vacant Northrup- Grummon facility	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1969 and the presence of an AST of unknown contents and condition.
Adjoining properties to the east of Section 7	The eastern adjoining properties appeared to be residentially developed from at least 1983 to at least 1991, vacant residential properties from at least 1994 to at least 2004, and appear to have been wooded property since 2005.	N29.852273, W-90.056413	Wooded property	Offsite concerns were noted from the drilling of Well 131717.
8	Section 8 appeared to be commercially and residentially developed from at least 1967 to at least 1995 and appears to have been commercially developed since 1996.	From N29.845751, W-90.057229 to N29.844176, W-90.056696	Boomtown Casino	Onsite concerns were noted from a 1975 listing as Tom Hicks Transfer Co., the presence of a storage area of drums and ASTs of diesel and unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
9	Section 9 appeared to be residentially developed in 1951, commercially and residentially developed from at least 1967 to at least 1991, commercially developed and vacant residential property from at least 1994 to 1995, and appears to have been commercially developed since 1996.	From N29.850110, W-90.058638 to N29.845751, W-90.057229	M-1 Swaco, Inc.	Onsite concerns were noted from listings as M-1 Swaco, an oil well drilling mud additives company and the presence of drums and ASTs of unknown contents and condition.
10	Section 10 appeared to be commercially and residentially developed in 1951, and appears to have been commercially developed since at least 1967.	N29.843634, W-90.057080	Mississippi River Recycling	Onsite concerns were noted from salvage company listings (2000-2005), present operations, road construction, and the presence of drums and ASTs of unknown contents and condition.
		N29.842559, W-90.056883	Goldin Metals	Onsite concerns were noted from a trucking company listing (1969), salvage company listings (1996, 2005), present operations, road construction, and the presence of drums and ASTs of unknown contents and condition.
Adjoining properties to the east of Section 10	The eastern adjoining properties appeared to be commercially and residentially developed from at least 1972 to at least 1991 and appear to have been vacant properties since at least 1994.	N29.845947, W-90.053560	Wooded property	Offsite concerns were noted from lack of commercial occupant information from at least 1972 to at least 1991.
11	Section 11 appeared to be residentially developed in 1951 and appears to have been commercially and residentially developed since at least 1967.	From N29.841457, W-90.055781 to N29.838547, W-90.054649	Bollinger Gretna Shipyards	Onsite concerns were noted from shipyard listing since at least 1996, present operations, road construction, regulatory status, and the presence of drums and ASTs of unknown contents and condition.
Adjoining properties to the east of Section 11	The eastern adjoining properties appeared to be residentially developed from at least 1967 to at least 2004, and appear to have been commercially developed since 2005.	N29.841391, W-90.052090	Captain Lee Jr. Marine, Inc.	Offsite concerns were noted from a 2005 listing as a contract designer and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
12	Section 12 appears to have been developed with the Hero Pump Station since at least 1951.	From N29.838547, W-90.054649 to N29.837520, W-90.054343	Hero Pump Station	Onsite concerns were noted from present operations and ASTs of unknown condition.
13	Section 13 appeared to be residentially developed from at least 1951 to at least 1983 and appears to have been commercially developed since at least 1986.	N29.836689, W-90.055009; N29.837239, W-90.053546	Beire Radio; Boat Stuf	Onsite concerns were noted from listings of various construction and oil field service businesses.
		N29.835537, W-90.054977	Cell tower	Onsite concerns were noted from the presence of associated equipment of unknown condition.
Adjoining properties to the east of Section 13	The eastern adjoining properties appeared to be residentially developed in 1951 and appear to have been commercially developed since at least 1967.	N29.837054, W-90.052335	Commercial warehouse	Offsite concerns were noted from lack of commercial occupant information since at least 1976.
Adjoining properties to the south of Section 13	The southern adjoining properties appear to have been commercially developed since at least 1986.	N29.833926, W-90.055845	Industrial Welding Supply Company	Offsite concerns were noted from listings from at least 1986 to at least 1991 as a pipeline company and a 2005 listing as a welding supply company and present operations.
14	Section 14 appeared to be residentially developed in 1951, commercially and residentially developed from at least 1967 to 2004, and appears to have been commercially developed since 2005.	N29.835898, W-90.056437	Royal Chemical Corporation	Onsite concerns were noted from listings as Royal Corp (1986-1991), present operations, and the presence of buckets and ASTs of unknown contents and condition.
		N29.0836002, W-90.057824	Barnett Marine Contractors, Inc.	Onsite concerns were noted from listings as Barnett Marine since at least 1986 and the presence of an AST of unknown contents.
		N29.835784, W-90.056717	Vacant warehouse	Onsite concerns were noted from lack of commercial occupant information since at least 1967.
Adjoining properties to the south of Section 14	The southern adjoining properties appear to have been commercially developed since at least 1986.	N29.833926, W-90.055845	Industrial Welding Supply Company	Offsite concerns were noted from listings from at least 1986 to at least 1991 as a pipeline company and a 2005 listing as a welding supply company and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
15	Section 15 appeared to be residentially developed in 1951 and appears to have been commercially developed since at least 1967.	N29.833944, W-90.059120	Elmwood Dry Dock and Repair	Onsite concerns were noted from dry dock listings since at least 1986, dilapidated barges, present operations, the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the southeast of Section 15	The southeastern adjoining properties appeared to be residentially developed from at least 1967 to at least 1998 and appear to have been commercially and residentially developed since at least 2000.	N29.833394, W-90.057230	Technical Fabrication, Inc.	Offsite concerns were noted from listings as Technical Fabrication since at least 2000.
16	Section 16 appeared to be residentially developed in 1951 and appears to have been commercially developed since at least 1967.	From N29.833526, W-90.060896 to N29.826836, W-90.068432	McDonough Marine Services, Inc.	Onsite concerns were noted from the drilling of Well 91772, listings as McDonough Marine Services since at least 1986, present operations, and presence of an AST of unknown contents and condition.
Adjoining properties to the southeast of Section 16	The southeastern adjoining properties appeared to be residentially developed from at least 1967 to at least 2004 and appear to have been commercially and residentially developed since 2005.	N29.830828, W-90.060664	B Wreckers, Co.	Offsite concerns were noted from present operations as a salvage and wrecker company.
		N29.830828, W-90.060664	CLC Liquidators, Inc.	Offsite concerns were noted from a 2005 listing as a wrecker company and present operations.
17	Section 17 appears to have been commercially developed since at least 1983.	N29.827134, W-90.062273	Alsem Industries, Inc.	Onsite concerns were noted from commercial-industrial listings since at least 1991, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.825435, W-90.064512	Marine Coatings and Linings, Inc.	Onsite concerns were noted from a 2000 listing as a construction company, present operations, and the presence of drums and ASTs of unknown contents and condition.
18	Section 18 appears to have been commercially developed since at least 1983.	N29.831126, W-90.056852	Midstream Barge Co.	Onsite concerns were noted from a 2005 listing as Midstream Barge, present operations, and the presence of drums and ASTs of unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
		N29.829216, W-90.059086; N29.830674, W-90.056607	Universal Services and Associates; Bay Offshore, Limited	Onsite concerns were noted from the commercial-industrial listings since at least 1986, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.827131, W-90.061617	Dixie Offshore Transportation Inc.	Onsite concerns were noted from the commercial-industrial listings since at least 1991 and present operations.
		N29.830314, W-90.056427	Targa, Inc.	Onsite concerns were noted from present operations and the presence of drums and ASTs of unknown contents and condition.
		Unable to be located	Tom Hicks Oilfield and Hauling Company	Onsite concerns were noted from lack of regulatory information on this NFRAP facility.
Adjoining properties to the northeast of Section 18	The northwestern adjoining properties appeared to be residentially developed from at least 1967 to at least 2004 and appear to have been commercially and residentially developed since 2005.	N29.830828, W-90.060664	B Wreckers, Co.	Offsite concerns were noted from present operations as a salvage and wrecker company.
		N29.830828, W-90.060664	CLC Liquidators, Inc.	Offsite concerns were noted from a 2005 listing as a wrecker company and present operations.
19	Section 19 appears to have been commercially developed since at least 1980.	N29.931821, W-90.055671	Continental Construction, Co.	Onsite concerns were noted from the commercial-industrial listings since at least 2000, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.832107, W-90.054565	Efila Fiberglass Tanks	Onsite concerns were noted from listings as B&I Industries from at least 1991 to at least 2000, the drilling of Well 143396, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.832430, W-90.053278	River Construction, Co.	Onsite concerns were noted from a 2005 listing as River Construction, the presence of creosote-soaked poles, present operations, and the presence of drums and ASTs of unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
		N29.830703, W-90.055858	Eymard Towing	Onsite concerns were noted from the presence of drums and ASTs of unknown contents and condition.
		N29.832430, W-90.053278	Fabricating Yard for Offshore Pylons	Onsite concerns were noted from lack of regulatory information on this ERNS site.
Adjoining properties to the northwest of Section 19	The northwestern adjoining properties appeared to be residentially developed from at least 1967 to at least 1972 and appear to have been commercially and residentially developed since at least 1983.	N29.833394, W-90.057230	Technical Fabrication, Inc.	Offsite concerns were noted from listings as Technical Fabrication since at least 2000.
		N29.833926, W-90.055845	Industrial Welding Supply Company	Offsite concerns were noted from listings from at least 1986 to at least 1991 as a pipeline company and a 2005 listing as a welding supply company and present operations.
20	Section 20 appears to have been commercially developed since at least 1972	From N29.832620, W-90.052270 to N29.834070, W-90.049738	Vacant commercial building; Superior Offshore, Inc.; Power Marine; and Wilson	Onsite concerns were noted from the numerous listings of several commercial businesses since at least 1986, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the north of Section 20	The northern adjoining properties appear to have been commercially developed since at least 1972.	N29.835082, W-90.051995; N29.835355, W-90.051057	SeaTrax Marine Cranes, Inc.; Simco Coatings, Inc.	Offsite concerns were noted from the numerous listings of several commercial businesses since at least 1986, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
21	Section 21 appears to have been commercially developed since at least 1983.	N29.835228, W-90.048990	Pelican Marine Supply, Inc., Pelican Grocery, Inc.	Onsite concerns were noted from listings as grocery and marine supply companies since at least 1986 and regulatory status.
		N29.834942, W-90.049798	Belle Chasse Boat and RV Storage	Onsite concerns were noted from present operations.
22	Section 22 appears to have been commercially developed since at least 1972.	N29.836787, W-90.048266	Scott Armature, Inc.; Climate Controlled Industrial Storage, Inc.	Onsite concerns were noted from listings as electric motor manufacturers and storage companies since at least 1986 and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
		N29.837128, W-90.047564	United Tugs, Inc.	Onsite concerns were noted from a 2005 listing as United Tugs, present operations, and presence of an AST of unknown contents and condition.
Adjoining properties to the north of Section 22	The northern adjoining properties appeared to be residentially developed in 1972 and appear to have been commercially developed since at least 1983.		Fluid Systems, Inc	Offsite concerns were noted from listings of oil field service companies in 1986 and 2000 to 2005 and present operations.
			Junkyard	Offsite concerns were noted from lack of commercial occupant information since at least 1983 and present operations.
Adjoining properties to the northeast of Section 22	The northeastern adjoining properties appeared to be residentially developed from at least 1972 to at least 1991 and appear to have been commercially developed since at least 1994.	N29.837700, W-90.047256	Commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1994.
23	Section 23 appeared to be residentially developed in 1951 and appears to have been commercially and residentially developed since at least 1967.	N29.836538, W-90.045522	J. W. Stone Fuel Dock	Onsite concerns were noted from a tank farm, a 2005 listing as Belle Chasse Docks, and present operations.
		N29.837064, W-90.046331	Vacant storage yard	Onsite concerns were noted from listings of fabrication businesses since at least 1986 and the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 23	The northwestern adjoining properties appeared to be residentially developed from at least 1967 to at least 1991 and appear to have been commercially developed since at least 1994.	N29.837700, W-90.047256	Commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1994.
24	Section 24 appears to have been commercially developed since at least 1967.	From N29.837506, W-90.045367 to N29.837506, W-90.045367	Sunland Construction, Co.	Onsite concerns were noted from listings as oil field service and construction companies since at least 1980, regulatory status, present operations, and the presence of drums and ASTs of unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the northwest of Section 24	The northwestern adjoining properties appear to have been commercially developed since at least 1972.	N29.840330, W-90.044201	H&E Equipment Rental	Offsite concerns were noted from listings of industrial equipment companies since at least 1980 and present operations.
		N29.840260, W-90.044823	General Mill, Inc.	Offsite concerns were noted from listings as engine companies since at least 1980 and present operations.
		N29.839931, W-90.045130	Jo-De Equipment Rental, New Orleans Party Rentals	Offsite concerns were noted from listings as an equipment rental business since at least 1980 and present operations.
		N29.839560, W-90.046122	Commercial property	Onsite concerns were noted from lack of commercial occupant information since at least 1972.
25	Section 25 appears to have been commercially developed since at least 1967.	N29.839645, W-90.042132	C&C Boat Works	Onsite concerns were noted from listings as Power Structure from at least 1986 to at least 1991, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
		N29.839645, W-90.042132	Omega Service Industries, Inc.	Onsite concerns were noted from lack of regulatory information on this UST facility.
Adjoining properties to the northwest of Section 25	The northwestern adjoining properties appear to have been commercially developed since at least 1972.	N29.841087, W-90.043292	Harbor Construction, Inc.	Offsite concerns were noted from present operations and the drilling of Well 105807.
		N29.841569, W-90.042636	Vacant commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1972.
26	Section 26 appeared to be commercially developed from at least 1972 to 2004 and appears to have been vacant commercial property since 2005.	N29.841579, W-90.039670	Southern Imports	Onsite concerns were noted from listings as transportation companies since at least 1980 and the presence of an AST of unknown contents and condition.
		N29.841579, W-90.039670	J.A. Brandt and Associates, Inc.	Onsite concerns were noted from lack of regulatory information on this UST facility.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the northwest of Section 26	The northwestern adjoining properties appeared to be commercially developed from at least 1972 to at least 2004 and appear to have been vacant commercial property since 2005.	N29.842713, W-90.041028	Junkyard, vacant commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1972 and present operations.
27	Section 27 appears to have been commercially developed since at least 1972.	N29.842480, W-90.039050; N29.842494, W-90.037898	The Design Build Group, Inc., General Marine Leasing	Onsite concerns were noted from listings as Comet Construction (1986-1996) and General Marine Leasing (2005), present operations, and the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 27	The northwestern adjoining properties appear to have been commercially developed since at least 1972.	N29.843891, W-90.039452	Hobson Galvanizing, Inc.	Offsite concerns were noted from listings as galvanizing and manufacturing businesses since at least 1986, regulatory status, and present operations.
28	Section 28 appears to have been commercially developed since at least 1980.	N29.843974, W-90.035936	Westbank Business Center	Onsite concerns were noted from numerous commercial listings since at least 1980, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
		N29.843201, W-90.036823	H&E Equipment Services Crane Department- Reman Center	Onsite concerns were noted from listings as Production Management (1991) and B&B Trucking and Equipment (2000), present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.843201, W-90.036823	Coastal Equipment Company, Inc.	Onsite concerns were noted from lack of regulatory information on this CE – SQG facility.
Adjoining properties to the northwest of Section 28	The northwestern adjoining properties appear to have been commercially developed since at least 1972.	N29.845234, W-90.036772; N29.844845, W-90.037485	Rasmussen Equipment, Company; Office Park and Laredo Offshore Services, Inc.	Offsite concerns were noted from numerous listings as commercial-industrial businesses since at least 1986 and present operations.
		N29.844363, W-90.037806	Gulf Engine and Equipment, Inc.	Offsite concerns were noted from numerous listings as commercial-industrial businesses since at least 1986.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
29	Section 29 appears to have been commercially developed since at least 1980.	N29.845074, W-90.034045	Baker Oil	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1980, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.844288, W-90.034840	B&S Equipment site construction	Onsite concerns were noted from present operations and the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 29	The northwestern adjoining properties appeared to be commercially developed in 1972 and appear to have been commercially and residentially developed since 1983.	N29.846586, W-90.033984	Plant Performance Services Seco, Inc.	Offsite concerns were noted from listings as Seco Industries since at least 1986 and regulatory status.
		N29.845738, W-90.035550	Tiger Equipment and Supply	Offsite concerns were noted from listings as oil field service and industrial equipment companies since at least 1986.
		N29.845786, W-90.035290; N29.845503, W-90.035912	Keith's Diesel and Compressor; Universal Compression	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1986.
		N29.845738, W-90.035550	Baker Oil Tools	Offsite concerns were noted from lack of soil and groundwater quality information for this CE - SQG/UST facility.
30	Section 30 appears to have been commercially developed since at least 1980.	N29.846267, W-90.031868	Unitech Diesel	Onsite concerns were noted from listings as Louisiana Machine Power from at least 2000 to at least 2005, present operations, and the presence of drums and ASTs of unknown contents and condition.
		N29.846567, W-90.032524	Panther Helicopters	Onsite concerns were noted from listings as Offshore Service Ships (1980-1991) and Panther Helicopters (1996-2005), present operations, and the presence of ASTs of unknown contents and condition.
		N29.846445, W-90.031461	Marine Systems, Inc.	Onsite concerns were noted from lack of commercial occupant information since at least 1980.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the northwest of Section 30	The northwestern adjoining properties appear to have been commercially developed since at least 1972.	N29.846586, W-90.033984	Plant Performance Services Seco, Inc.	Offsite concerns were noted from listings as Seco Industries since at least 1986 and regulatory status.
		N29.847567, W-90.031687	Marsh Buggies, Inc.	Offsite concerns were noted from listings as equipment rental companies since at least 1986.
		N29.847958, W-90.032082	Junkyard	Offsite concerns were noted from lack of commercial occupant information since at least 1972 and present operations.
31	Section 31 appeared to be commercially developed from at least 1983 to at least 1986, vacant commercial property from at least 1989 to at least 1991, and appears to have been commercially developed since at least 1998.	N29.847097, W-90.030614	RV park; Delta Ice, Air, and Heat, Inc.	Onsite concerns were noted from lack of commercial occupant information since at least 1983 and present operations.
Adjoining properties to the northwest of Section 31	The northwestern adjoining properties appeared to be residentially developed in 1972 and appear to have been commercially developed since 1983.	N29.848595, W-90.031164	Torq/Lite, Inc.	Offsite concerns were noted from listings as industrial equipment businesses in 1986 and 2005.
		N29.847958, W-90.032082	Junkyard	Offsite concerns were noted from lack of commercial occupant information since at least 1972 and present operations.
32	Section 32 appears to have been commercially developed since at least 1980.	N29.848527, W-90.029504	Plains All American Pipeline, LLP	Onsite concerns were noted from listings as BP companies since at least 1991.
		N29.848427, W-90.029711	OFS, Inc.	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1980.
		N29.847836, W-90.029742	F&K Fabrication, Inc.	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1980, present operations, and the presence of ASTs of unknown contents and condition.
		N29.848018, W-90.030163	Delta Coatings, Inc.	Onsite concerns were noted from listings as Delta Coatings from at least 1991 to at least 2005, present operations, and the presence of drums and ASTs of unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the northwest of Section 32	The northwestern adjoining properties appear to have been commercially developed since at least 1980.	N29.849179, W-90.029851	Door 2 Door	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1980.
		N29.848936, W-90.030443	Tri-Star Supply, Co.	Offsite concerns were noted from listings as Sullair Gulf States in 1980 and Tri-star Supply since at least 1991.
		N29.848858, W-90.030608	Hydra Force, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1980.
		N29.848595, W-90.031164	Torq/Lite, Inc.	Offsite concerns were noted from listings as industrial equipment businesses in 1986 and 2005.
33	Section 33 appears to have been commercially developed since at least 1972.	N29.848465, W-90.027647	Canal Barge, Co.	Onsite concerns were noted from listings as Canal Barge since at least 1980, present operations, and the presence of drums of unknown contents and condition.
		N29.849265, W-90.028373	Hose Specialty and Supply, Co.	Onsite concerns were noted from listings at an industrial machinery business since at least 1991, present operations, and the presence of drums of unknown contents and condition.
Adjoining properties to the northwest of Section 33	The northwestern adjoining properties appeared to be residentially developed in 1972 and appear to have been commercially developed since at least 1980.	N29.850092, W-90.028984	Aerial Access Equipment	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1986 and present operations.
		N29.849661, W-90.029180	Swaglok Capital Valve and Fittings, Inc.	Offsite concerns were noted from listings as Capital Valve and Fittings since at least 1980.
		N29.849448, W-90.029485	Margan Equipment Rental	Offsite concerns were noted from a 2005 listing as Margan Equipment Rental and present operations.
		N29.850409, W-90.028513	Bluewater Rubber Gasket	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1980 and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
34	Section 34 appears to have been commercially developed since at least 1972.	N29.850090, W-90.025912	NREC	Onsite concerns were noted from listings as Marine Engine (1980-1991) and Universal Machine (1996-2000), present operations, and the presence of ASTs of unknown contents and condition.
		N29.849460, W-90.027075	Sugarland Garden Soils and Materials	Onsite concerns were noted from the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 34	The northwestern adjoining properties appeared to be residentially developed in 1972 and appear to have been commercially developed since at least 1980.	N29.851517, W-90.027099	Acme Truck Line, Inc.	Offsite concerns were noted from listings as a trucking company since at least 1980 and present operations.
		N29.850548, W-90.028067	Commercial property	Offsite concerns were noted from listings as commercial businesses.
35	Section 35 appeared to be residentially developed from at least 1972 to at least 1975, commercially developed from at least 1980 to at least 1986, commercially and residentially developed from at least 1989 to 1995, and appears to have been commercially developed since 1996.	N29.850699, W-90.025250	Ace Transportation Inc.	Onsite concerns were noted from a 2005 listing as B&V Trucking and Equipment, present operations, and the presence of an AST of unknown contents and condition.
		N29.851159, W-90.024548	T. O.'s Lawn and Landscaping; Atlas Boats	Onsite concerns were noted from listings as commercial-industrial companies (1980-1996) and a lawn and landscaping business (2005), present operations and the presence of ASTs of unknown contents and condition.
		N29.851233, W-90.025320	Marcel's Limousines	Onsite concerns were noted from present operations and the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 35	The northwestern adjoining properties appeared to be residentially developed in 1972, commercially developed from at least 1983 to at least 1986, commercially and residentially developed from at least 1989 to at least 1995, and appear to have been commercially developed since 1996.	N29.581598, W-90.023981	Conmaco	Offsite concerns were noted from regulatory status, listings as Conmaco since at least 1986, and present operations.
		N29.851877, W-90.026036	CMP Coatings, Inc.	Offsite concerns were noted from as marine coatings businesses since at least 1986 and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
36	Section 36 appears to have been commercially developed since at least 1972.	N29.852176, W-90.023470	Vacant commercial property	Onsite concerns were noted from a 2000 listing as Wire Line and Testing.
		N29.581598, W-90.023981	Conmaco	Onsite concerns were noted from present operations, and the presence of drums and ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 36	The northwestern adjoining properties appeared to be residentially developed in 1972 and appear to have been commercially developed since at least 1980.	N29.853259, W-90.024727	Point Eight Power, Inc.	Offsite concerns were noted from listings as Point Eight Power since at least 1986 and present operations.
		N29.853055, W-90.024908	Sulzer Enpro, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1986 and present operations.
		N29.581598, W-90.023981	Conmaco	Offsite concerns were noted from regulatory status, listings as Conmaco since at least 1986, and present operations.
37	Section 37 appears to have been commercially developed since at least 1967.	N29.853263, W-90.023083	Point Eight Power Structural Division	Onsite concerns were noted from lack of commercial occupant information since at least 1967 and present operations.
Adjoining properties to the northwest of Section 37	The northwestern adjoining properties appear to have been commercially developed since at least 1967.	N29.854176, W-90.024030	Pacific-Gulf Wire Rope, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1986 and present operations.
38	Section 38 appears to have been commercially developed since at least 1983.	N29.854531, W-90.021664	Williams Group; Intracoastal Truck and Trailer Services, LLC; Southeastern Logistics, LLC; SAT Services, LLC; DWT Service, LLC	Onsite concerns were noted from listings as an oil field service company from at least 1986 to at least 2000 and the presence of an AST of unknown contents and condition.
		N29.853958, W-90.022075	JYD Auto Recyclers	Onsite concerns were noted from present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
39	Section 39 appeared to be commercially developed from at least 1983 to at least 1986, residentially developed from at least 1989 to at least 1991, and appears to have been developed with the Whitney-Barataria Pump Station since 1995.	N29.855800, W-90.021207	Whitney-Barataria Pump Station	Onsite concerns were noted from lack of commercial occupant information and the presence of ASTs of unknown contents and condition.
Adjoining properties to the west of Section 39	The western adjoining properties appear to have been commercially developed since at least 1983.	N29.855901, W-90.022826	Tetra Applied Technologies, Inc.	Offsite concerns were noted from listings as commercial-industrial companies since at least 1986 and present operations.
		N29.856974, W-90.021978	D&M Steel, Inc.	Offsite concerns were noted from a 2005 listing as D&M Steel and present operations.
40	Section 40 appears to have been commercially developed since at least 1967.	N29.857621, W-90.019933	Circle, Inc. storage yard	Onsite concerns were noted from lack of commercial occupant information and the presence of drums and ASTs of unknown contents and condition.
Adjoining properties to the west of Section 40	The western adjoining properties appeared to be residentially developed in 1967, commercially and residentially developed in 1972, and appear to have been commercially developed since at least 1983.	N29.858452, W-90.021276	Circle, Inc.	Offsite concerns were noted from listings as Circle since at least 1986 and present operations.
41	Section 41 appears to have been commercially developed since at least 1967.	N29.859260, W-90.018664	Southern portion of Versabar, Inc.	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1986, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the west of Section 41	The western adjoining properties appeared to be commercially developed from at least 1967 to at least 1996 and appear to have been vacant commercial property since at least 1998.	N29.859469, W-90.020378	Commercial property	Offsite concerns were noted from listings of commercial-industrial companies since at least 1986.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
42	Section 42 appears to have been commercially developed since at least 1967.	N29.861993, W-90.017103	Northern portion of Versabar, Inc.	Onsite concerns were noted from listings as commercial-industrial businesses since at least 1986, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the west of Section 42	The western adjoining properties appear to have been commercially developed since at least 1983.	N29.862989, W-90.018897	Wooded and vacant commercial properties	Offsite concerns were noted from lack of commercial occupant information since at least 1983.
43	Section 43 appears to have been commercially developed since at least 1972.	N29.864633, W-90.015381	C&C Marine and Repair	Onsite concerns were noted from listings as commercial-industrial businesses from at least 1986 to at least 1996, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
			Global Divers and Contractors, Inc.	Offsite concerns were noted from lack of soil and groundwater quality information for this UST facility.
Adjoining properties to the west of Section 43	The western adjoining properties appeared to be residentially developed from at least 1967 to at least 1969 and appear to have been commercially developed since at least 1972.	N-29.865586, W-90.016852	Mickey O'Conner General Contractor	Offsite concerns were noted from a 2005 listing as Mickey O'Conner General Contractor.
44	Section 44 appears to have been commercially developed since at least 1972.	N29.868236, W-90.013831	Concrete company	Onsite concerns were noted from listings as concrete companies since at least 2000, present operations, and the presence of ASTs of unknown contents and condition.
			N29.866907, W-90.013687	C.F. Bean
Adjoining properties to the west of Section 44	The western adjoining properties appear to have been commercially developed since at least 1967.	N29.869407, W-90.014753	Pre-heat, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1980 and present operations.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
		N29.868125, W-90.015257	Western Wireline Services, Inc.	Offsite concerns were noted from listings as Western Wireline since at least 1980 and present operations.
		N29.867563, W-90.016066	Tuboscope, Packard Truck Lines, Inc., Packard Pipe Terminals, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1991 and present operations.
		N29.868535, W-90.015081	Vacant commercial property	Offsite concerns were noted from lack of commercial occupant information since at least 1967 and the presence of ASTs of unknown contents and condition.
45	Section 45 appears to have been commercially developed since at least 1972.	N29.869651, W-90.012419	Quick Recovery Auto Salvage	Onsite concerns were noted from a 2005 listing as Quick Recovery Auto Salvage, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the west of Section 45	The western adjoining properties appear to have been commercially developed since at least 1972.	N29.869414, W-90.014654	L&M Machine Works, Inc.	Offsite concerns were noted from listings as an engine repair business (1986) and L&M Machine Works (1996-2005) and present operations.
		N29.870333, W-90.013906	Pre-heat, Inc.	Offsite concerns were noted from listings as commercial-industrial businesses since at least 1980, present operations, and the presence of ASTs of unknown contents and condition.
		N29.870987, W-90.013654	Commercial building	Offsite concerns were noted from lack of commercial occupant information since at least 1972.
46	Section 46 appeared to be commercially developed from at least 1983 to at least 1986, vacant commercial property from at least 1989 to at least 1991, commercially developed from at least 1994 to at least 1996, vacant commercial property in 1998, and appears to have been commercially developed since at least 2000.	N29.871502, W-90.011289	Double Aught Construction	Onsite concerns were noted from listings as fabrication and construction companies and present operations.
		N29.872068, W-90.011598	Cell Tower	Onsite concerns were noted from the presence of associated equipment of unknown condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the west of Section 46	The western adjoining properties appeared to be residentially developed from at least 1967 to at least 1972 and appear to have been commercially developed since at least 1980.	N29.872289, W-90.011815	Southern Snow, Inc.	Offsite concerns were noted from listings as Lesser Radiator Service (1980-1996) and Southern Snow Manufacturing (1980-2005) and present operations.
		N29.871906, W-90.012257	Faucheux Welding Fab, Inc.	Offsite concerns were noted from listings as Faucheux Welding Fab since at least 1986 and present operations.
47	Section 47 appeared to be residentially developed from at least 1945 to at least 1951 and appears to have been developed with the Plaquemines Parish Welcome Park and Belle Chasse Tunnel since at least 1967.	N29.872622, W-90.010526	Plaquemines Parish Welcome Park (West Bank), Belle Chasse Tunnel	Onsite concerns were noted from the presence of an AST of unknown contents and condition.
48	Section 48 appeared to be residentially and agriculturally developed from at least 1945 to at least 1949 and appears to have been residentially developed since at least 1951.	From N29.872990, W-90.009753 to N29.879690, W-90.005744	Residential subdivision	Onsite concerns were noted from the drilling of Well 11675 and past uses for agriculture.
		N29.879290, W-90.006815	N.C. Hero, Jr.	Offsite concerns were noted from lack of soil and groundwater quality information for this UST facility.
Adjoining properties to the west of Section 48	The western adjoining properties appeared to be residentially and agriculturally developed from at least 1949 to at least 1949 and appear to have been residentially developed since at least 1951.	N29.874552, W-90.011851	Residential subdivision	Offsite concerns were noted from past uses for agriculture.
49	The western adjoining properties appeared to be agriculturally developed and pastureland from at least 1949 to at least 1949 and appear to have been undeveloped since at least 1951.	From N29.879690, W-90.005744 to N29.882969, W-90.004072	Wooded property	Onsite concerns were noted from the drilling of Well 6699 and past uses for agriculture.
Adjoining properties to the west of Section 49	The western adjoining properties appeared to be agriculturally developed and pastureland from at least 1949 to at least 1949 and appear to have been undeveloped since at least 1951.	From N29.880266, W-90.008353 to N29.883821, W-90.006678	Wooded property	Offsite concerns were noted from past uses for agriculture.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
50	Section 50 appeared to be pastureland from at least 1945 to at least 1949, appeared to be residentially developed in 1972, and appears to have been developed with the Planters Pump Station and a residence since at least 1983.	N29.883933, W-90.004044	Planters Pump Station	Onsite concerns were noted from pump station improvements and the presence of drums and ASTs of unknown contents and condition.
		N29.883814, W-90.005515	Residence	Onsite concerns were noted from the presence of drums and ASTs of unknown contents and condition.
51	Section 51 appears to have been wooded land and pastureland since at least 1983.	N29.885586, W-90.002094	Wooded property, pastureland	Onsite concerns were noted from the dead vegetation observed onsite.
52	Section 52 appeared to be pump station construction in 1972 and appears to have been developed with the S&WB #13 Pump Station since at least 1983.	N29.895838, W-89.997622	S&WB #13 Pump Station	Onsite concerns were noted from the presence of ASTs of unknown contents and condition.
Adjoining properties to the northwest of Section 53	The northwestern adjoining properties appeared to be residentially developed from at least 1972 to at least 1991 and appear to have been residentially and commercially developed since at least 1994.	N29.905369, W-89.991404	Gas station, dry cleaners	Offsite concerns were noted from lack of regulatory information.
54	Section 54 was agriculturally developed from at least 1945 to at least 1949, appeared to be residentially developed from at least 1967 to at least 1996, and appears to have been residentially and agriculturally developed since at least 1998.	From N29.906395, W-89.986879 to N29.914834, W-89.975372	Residences, wooded property	Onsite concerns were noted from past and present uses for agriculture, the presence of buckets of unknown contents and condition, and the presence of dumping.
Adjoining properties to the northwest of Section 54	The northwestern adjoining properties appeared to be agriculturally developed from at least 1945 to at least 1949, residentially developed from at least 1967 to at least 1996, and appear to have been residentially and agriculturally developed since at least 1998.	From N29.897424, W-90.000437 to N29.908490, W-89.988983	Residential subdivisions	Offsite concerns were noted from past and present uses for agriculture.
55	Section 55 was undeveloped and agriculturally developed from at least 1945 to at least 1949 and appears to have been developed with the Algiers Lock since at least 1967.	From N29.915688, W-89.971368 to N29.913898, W-89.974582	Algiers Lock	Onsite concerns were noted from past uses for agriculture and the presence of an AST of unknown contents and condition.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the north of Section 55	The northern adjoining properties appeared to be agriculturally developed from at least 1945 to at least 1949 and appear to have been residentially developed since at least 1967.	N29.916419, W-89.973835	Wooded property	Offsite concerns were noted from past uses for agriculture.
Adjoining properties to the northeast of Section 55	The northeastern adjoining properties appeared to be agriculturally developed from at least 1945 to at least 1949 and appear to have been developed with a portion of the Algiers Lock since at least 1967.	N29.916768, W-89.970142	Northernmost portion of Algiers Lock	Offsite concerns were noted from past uses for agriculture.
57	Section 57 appears to have been developed with the S&WB #11 Pump Station since at least 1967.	N29.909753, W-89.977735	S&WB #11 Pump Station	Onsite concerns were noted from the presence of buckets, drums, and ASTs of unknown contents and condition and an area of staining.
59	Section 59 appears to have been commercially developed since at least 1983.	N29.902911, W-89.985298	Industrial park	Onsite concerns were noted from listings of commercial-industrial businesses since at least 1980 and the presence of drums and ASTs of unknown contents and condition.
		N29.903322, W-89.986403; N29.903647, W-89.985621	Cell Tower and Radio Tower	Onsite concerns were noted from the presence of associated equipment of unknown condition.
Adjoining properties to the southeast of Section 59	The southeastern adjoining properties appear to have been commercially developed since at least 1980.	N29.901836, W-89.984612	Industrial park	Offsite concerns were noted from listings of commercial-industrial businesses since at least 1980 and the presence of buckets and ASTs of unknown contents and condition.
0.13 miles south of Section 59	The property appears to have been commercially developed since at least 1980.	N29.899784, W-89.985192	Daigle Quick Shop	Offsite concerns were noted from lack of soil and groundwater quality information for this LUST facility.
60	Section 60 appears to have been under construction for levee improvements since 2006.	From N29.902559, W-89.987937 to N29.898470, W-89.991766	Grassy property, levee construction	Onsite concerns were noted from the presence of drums of unknown contents.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
61	Section 61 appears to have been commercially developed since at least 1983.	N29.894578, W-89.993070	The Mud Masters Group	Onsite concerns were noted from lack of commercial occupant information since at least 1983, present operations, and the presence of drums and ASTs of unknown contents and condition.
62	Section 62 appears to have been commercially developed since at least 1983.	N299.893506, W-89.994045	Vacant commercial property	Onsite concerns were noted from lack of commercial occupant information since at least 1983 and the presence of an AST containment area.
63	Section 63 appears to have been commercially developed since at least 1967.	N29.891135, W-89.995497	French's Welding and Maintenance and Pelican Commercial Waste Services	Onsite concerns were noted from listings as Fleming Equipment and Construction (2000) and Pelican Commercial Waste Services (2005), present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
64	Section 64 appears to have been commercially developed since 1995.	N29.888907, W-89.996123	Tri-State Oil	Onsite concerns were noted from listings as Tri-State Oil since at least 2000, present operations, and the presence of ASTs of unknown contents and condition.
65	Section 65 appeared to be residentially developed from at least 1998 to at least 2000.	N29.886900, W-89.997929	Wooded property	Onsite concerns were noted from the drilling of Well 101223.
66	Section 66 appeared to be pump station construction in 1994 and appears to have been developed with the Belle Chasse Pump Station 2 since 1995.	N29.884360, W-89.999630	Belle Chasse Pump Station 2	Onsite concerns were noted from present operations, pump station improvements, and the presence of drums and ASTs of unknown contents and condition.
67	Section 67 appeared to be residentially developed from at least 1945 to 1951 and appears to have been commercially developed since at least 1967.	From N29.873146, W-90.005451 to N29.870269, W-90.008407	Western portion of Bayou Barriere Golf Club	Onsite concerns were noted from the use of herbicides and pesticides, the drilling of Well 18029, and the presence of ASTs of unknown contents and condition.
Adjoining properties to the southeast of Section 66	The southeastern adjoining properties appeared to be residentially developed from at least 1945 to at least 1949, appeared to be commercially and residentially developed in 1951, and appear to have been commercially developed since at least 1967.	From N29.883913, W-89.997892 to N29.869461, W-90.005191	Eastern portion of Bayou Barriere Golf Club	Offsite concerns were noted from use of herbicides and pesticides.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
68	Section 68 appeared to be residentially developed from at least 1945 to 1951; developed with the Plaquemines Parish Welcome Park, the Belle Chasse Tunnel, and residences from at least 1967 to at least 1972; and appears to have been developed with the Plaquemines Parish Welcome Park and Belle Chasse Tunnel since at least 1983.	N29.870945, W-90.007921	Plaquemines Parish Welcome Park (East Bank), Belle Chasse Highway and Tunnel	Onsite concerns were noted from the presence of ASTs of unknown contents and condition.
70	Section 70 appears to have been developed as a park since at least 1994.	N29.858845, W-90.015182	Louisiana's Medal of Honor Park and Museum	Onsite concerns were noted from the presence of an AST of unknown contents and condition.
71	Section 71 appears to have been commercially developed since at least 1972.	N29.855197, W-90.016040	Barriere Construction, Co.	Onsite concerns were noted from listings as Barriere Construction from at least 1980 to at least 1996, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
72	Section 72 appears to have been commercially developed since at least 1980.	N29.853413, W-90.017394	Kostmayer Construction, Co.	Onsite concerns were noted from listings of construction companies (1980, 1996, and 2005), present operations, levee construction, and the presence of buckets, drums, and ASTs of unknown contents and condition.
73	Section 73 appears to have been developed with the Belle Chasse Pump Station 1 since at least 1967.	N29.852514, W-90.019228	Belle Chasse Pump Station 1	Onsite concerns were noted from listings as the Belle Chasse Drainage Department since at least 2000, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
75	Section 75 appeared to be residentially developed in 1951 and appears to have been developed with the jet fuel pipeline and loading dock since at least 1998.	N29.836753, W-90.067661	NAS-JRB	Onsite concerns were noted from the presence of the jet fuel pipeline and the presence of ASTs of unknown contents and condition.
76	Section 76 appears to have been undeveloped since at least 1951.	N29.815582, W-90.067661	Wooded property	Onsite concerns were noted from the presence of a buried petroleum pipeline.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
Adjoining properties to the east of Section 76	The eastern adjoining properties appear to have been commercially and residentially developed since at least 1983.	N29.810925, W-90.068358	High Point Shooting Grounds	Offsite concerns were noted from listings as High Point Shooting Grounds (1996; 2005) and present operations.
77	Section 77 appears to have been undeveloped since at least 1951.	N29.816133, W-90.083072	Wooded and grassy property, Pipeline Canal	Onsite concerns were noted from presence of a buried petroleum pipeline and the drilling of Well 174164 and Well 183151.
78	Section 78 appears to have been developed with the Old Estelle Pump Station since at least 1967.	N29.826906, W-90.083008	Old Estelle Pump Station	Onsite concerns were noted from presence of a buried petroleum pipeline, present operations, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the west of Section 78	The western adjoining properties were developed with a drill hole from at least 1966 to at least 1989 and appear to have been undeveloped since at least 1991.	N29.827973, W-90.086022	Wooded property and pastureland	Offsite concerns were noted from presence of a buried petroleum pipeline and the drilling of Well 79407.
79	Section 79 appears to have been undeveloped since at least 1951.	N29.827973, W-90.086022	Wooded and grassy property, unnamed canal	Onsite concerns were noted from presence of a buried petroleum pipeline.
81	Section 81 appears to have been developed with the New Estelle Pump Station since at least 1998.	N29.833768, W-90.068714	New Estelle Pump Station	Onsite concerns were noted from present operations and the presence of drums and ASTs of unknown contents and condition.
82	Section 82 appears to have been undeveloped since at least 1951.	N29.845680, W-90.062258	Wooded property	Onsite concerns were noted from levee construction.
83	Section 83 appeared to be developed with ponds from at least 1983 to at least 2005, and appears to have been undeveloped since 2006.	N29.857365, W-90.067139	Wooded property	Onsite concerns were noted from the ponds located on the section from at least 1983 to at least 2005.
Adjoining properties to the west of Section 83	The western adjoining properties appeared to be developed with ponds from at least 1983 to at least 2005, and appear to have been undeveloped since 2006.	N29.856451, W-90.068875	Wooded property	Onsite concerns were noted from the ponds located on the section since at least 1983 and the drilling of Well 122343.

Table 1				
Properties with Recognized Environmental Conditions				
Section Number	Section Summary	Center Location	Facility Name/Use	Recognized Environmental Conditions
84	Section 84 appears to have been used as Sector Gate construction staging since 2005.	From N29.867601, W-90.069960 to N29.870213, W-90.069786	Sector Gate construction	Onsite concerns were noted from the use of the property as Sector Gate construction staging and the presence of buckets, drums, and ASTs of unknown contents and condition.
85	Section 85 appeared to be developed with the Cousins Pump Station in 1972 and appears to have been developed with the Cousins Pump Station and commercial properties since at least 1980.	N29.872214, W-90.073076	A&B Valve and Piping Systems storage yard	Onsite concerns were noted from listings as oil field service and pipeline companies since at least 1980.
		N29.872536, W-90.071597	Southern portion of Petrex	Onsite concerns were noted from listings as Petrex since at least 1996, present operations, and the presence of ASTs of unknown contents and condition.
		N29.871311, W-90.073290	Cousins Pump Station	Onsite concerns were noted from present operations, pump station improvement, and the presence of buckets, drums, and ASTs of unknown contents and condition.
Adjoining properties to the north of Section 85	The northern adjoining properties appear to have been commercially developed since at least 1980.	N29.872729, W-90.073175	A&B Valve and Piping Systems	Offsite concerns were noted from listings as oil field service and pipeline companies since at least 1980 and the presence of ASTs of unknown contents and condition.
		N29.873216, W-90.071962	Northern portion of Petrex	Offsite concerns were noted from listings as Petrex since at least 1996, present operations, and the presence of ASTs of unknown contents and condition.

The remainder of this report is organized as follows: Section 2 describes the scope of work and limitations for this report; Section 3 presents a site description; Section 4 presents user provided information; Section 5 presents a records review; Section 6 presents a summary of the site reconnaissance; Section 7 presents a summary of interviews; Section 8 presents a summary of AEROSTAR's findings and opinions; Section 9 presents a summary of AEROSTAR's conclusions; Section 10 presents any deviations from the ASTM standard; Section 11 provides additional services conducted as part of this Phase I ESA; Section 12 presents the references; Section 13 presents the signatures of environmental professionals preparing and reviewing the report; and Section 14 presents the qualifications of the environmental professionals participating in this Phase I ESA. Figures are included in Appendix A. The property record information is included in Appendix B. Site photographs are included in Appendix C. A computerized regulatory agency database search is included in Appendix D. Historical research documentation is included in Appendix E. Interview documentation is included in