FINAL DETERMINATION OF THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S ASSISTANT ADMINISTRATOR FOR EXTERNAL AFFAIRS CONCERNING THE BAYOU AUX CARPES SITE IN JEFFERSON PARISH, LOUISIANA PURSUANT TO SECTION 404(C) OF THE CLEAN WATER ACT

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I. Introduction

Under Section 404(c) of the Clean Water Act (CWA, 33 U.S.C. 1251 et seq), the Administrator of the Environmental Protection Agency (EPA) is authorized to prohibit the specification (including withdrawal of specification) of any defined area as a disposal site, and he is authorized to deny or restrict the use of any defined area for specification (including the withdrawal of specification) as a disposal site, whenever he determines, after notice and opportunity for public hearing, that the discharge of dredged or fill materials into such area will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. Before making such a determination, the Administrator shall consult with the Chief of Engineers, the property owner(s), and the applicant(s) in cases where there has been application for a Section 404 permit. The Administrator has delegated this authority to make a Final Determination under Section 404(c) to the Assistant Administrator for External Affairs, who is EPA's national Section 404 program manager.

This determination concerns the Bayou aux Carpes site shown in Attachment A. This site, which includes approximately 3000 acres of wetlands, is the location of a proposed Corps of Engineers' flood control project. This project has been partially completed; a ring levee has been constructed around the entire site except at the confluence of the Southern Natural Gas Pipeline canal and Bayou Barataria. Completion of this project would involve the discharge of fill material into the canal at its confluence with Bayou Barataria to close the only tidal connecton to the site and into the Bayou aux Carpes (a tidal waterbody within the site) to facilitate the installation of a pumping station to drain the wetlands. The project is designed to provide flood control and land reclamation, which would be accomplished by draining the wetlands. Completing the flood control project might lead to additional proposals involving the discharge of fill material into the Bayou aux Carpes site by private property owners.

I have carefully considered the record in this case, including public comments, the public hearing record, site specific evaluations, coordination with affected property owners, and information provided by other agencies and knowledgeable individuals. I have determined that the discharge of dredged or fill material in the Bayou aux Carpes site, except as provided below, will have unacceptable adverse effects on shellfish beds, fishery areas, (including spawning and breeding areas), wildlife and recreational areas, as described more fully below, and I am, therefore, exercising my authority to restrict the site accordingly.

The restricted discharges include any for the purpose of completing the original Harvey Canal-Bayou Barataria Levee Project as well as any other discharges within the site not listed below that are subject to Section 404 of the Clean Water Act. However, this restriction does not include: (1) discharges necessary for completion of the modified Harvey Canal-Bayou Barataria Levee Project, as described in the Wilson Order of November 16, 1976 (replacement of the closure at the confluence of Bayou aux Carpes and Bayou Barataria with floodgates is a necessary element of such completion); (2) discharges associated with routine operation and maintenance of the Southern Natural Gas Pipeline Company pipeline as long as dredged or fill material is placed in piles with breaks in between to allow inundation of adjacent wetlands and as long as pre-maintenance contours are restored and; (3) discharges associated with projects with the sole purpose of habitat enhancement specifically approved by EPA. Discharges associated with these three classes of activities may take place, provided they are authorized by a Corps of Engineers' Section 404 permit. My findings and reasons for this determination are also set out below. This 404(c) action does not affect the legality of material previously discharged within the site under Section 404, or require its removal, nor does it affect discharges exempt from regulation under Section 404(f).

II. Background and History

A. The Project

In 1964, the Corps of Engineers (Corps) approved a flood control project called the Harvey Canal - Bayou Barataria Levee Project (Levee Project) for the West Bank of Jefferson Parish. The project was to be constructed in two phases: Phase I involved the construction of levees; Phase II was to involve primarily the closure of Bayou aux Carpes, which tidally connected the Bayou aux Carpes site with Bayou Barataria, as well as the installation of a pumping station at the mouth of Bayou aux Carpes waterway (refer to Attachment A). It was initially contemplated that the Levee Project would provide flood protection and land reclamation benefits in the area; land reclamation would be achieved through drainage, by the pumping station of the 3000 acres of wetlands enclosed by the levees.

The Corps New Orleans District prepared an Environmental Impact Statement (EIS) in 1970 on its proposed Civil Works project recommending that the project be constructed. Construction of initial levees for the "federal project" (Phase I) was begun in 1971 and was completed by the Corps of Engineers in November, 1973. Upon completion of Phase I, the project was 80% complete and all federal funds were exhausted. Phase I serves to provide some flood protection, but did not result in, or allow, drainage and land reclamation. In addition, gaps in the levee were left at Bayou aux Carpes, the Southern Natural Gas Pipeline Canal and a partial opening at Bayou des Familles. Because Federal funds were exhausted, all remaining work had to be financed locally (assurances of such funding are referred to as local assurances). The second lift levee work, which involves depositing additional material to raise the levee elevation, was never completed. As part of Phase II, local interests completed the closure of the Bayou aux Carpes opening using clam shell fill. This closure exists in good condition today. The Bayou des Familles opening was also closed at one point, using an earthen fill, however, this closure has deteriorated to a point which currently allows tidal exchange. Neither Bayou closure was specifically authorized pursuant to the Clean Water Act. A contract was let by the Parish for the construction of the pumping station and construction materials were moved to the site. Construction, however, was halted in November 1974 when the Corps initiated a Section 404 review of the project.[1/]

[1/] Section 404 was not considered when the project was originally approved in 1964 since Section 404 of the Clean Water Act was authorized by Congress in 1972. The Clean Water Act has no grandfather provision exempting from regulation those discharges which were planned prior to but which did not occur until after its enactment.

The Corps New Orleans District held a public hearing in January 1975 to receive comments on the proposed project. In March 1975 Colonel Heiberg, the New Orleans, District Engineer, completed his review and issued a Statement of Findings and recommended that the pumping station be installed and that the project proceed to completion. In a letter dated April 25, 1975 EPA Region VI objected to the Statement of Findings and concluded that "the permanent blocking of Bayou des Familles and Bayou aux Carpes and the subsequent draining of the area enclosed by the ring levee would result in the irretrievable loss of valuable wetlands, have an unacceptable adverse impact on wildlife and recreational areas, and not be in the public interest." Following the review of EPA Region VI's position, Brigadier General Drake Wilson, the Deputy Director of Civil Works, recommended completion of the project as originally approved and authorized. In March 1976, while further discussions with the Corps ensued, a team of EPA scientists completed a field study that supported Regions VI's April 25, 1975 position.

Another Corps review then culminated in a Revised Statement of Findings issued in July 1976, by Colonel Rush, New Orleans District Engineer. Once again, the Corps recommended that the project be completed as originally approved and authorized. Brigadier General Drake Wilson, Deputy Director of Civil Works, concurred with that recommendation by letter to EPA on August 27, 1976. He also advised EPA that the project would proceed unless EPA initiated a 404(c) action within 15 days. EPA continued to press its objections although it did not formally initiate a 404(c) action at that time. General Wilson visited the site in October, 1976, along with representatives of Jefferson Parish, EPA, property owners, representatives of environmental organizations and members of the concerned public.

Then on November 16, 1976 General Wilson reversed his previous decision and directed that the dams at Bayou aux Carpes and Bayou des Familles be removed, that flood gates be installed to be used only during flood conditions, and that the plans to construct the pumping station at Bayou aux Carpes be abandoned. These changes constituted the modified Harvey Canal-Bayou Barataria Levee Project.

B. Litigation

General Wilson's November 16, 1976 decision can be described as an attempt to retain the flood control benefits of the project without the adverse environmental consequences which would result from completion of the levees and subsequent pumping of the site. This was agreeable to the EPA and to the officials of Jefferson Parish. However, this decision directly and/or indirectly precipitated substantial litigation in both state and federal courts by the involved property owners.

In 1977, litigation was initiated in State Court in the matter of Jacques J. Creppel, et al. v. the Parish of Jefferson, et al., resulting in a final judgement enjoining and prohibiting Jefferson Parish from abandoning the project as originally planned. The Court further ordered the Parish to proceed with immediate construction of the pumping station at Bayou aux Carpes as provided in the original Corps project. That judgement was affirmed by the Louisiana 4th Circuit Court of Appeals on May 15, 1980.

In a separate proceeding, also in 1977, the property owners brought an action in federal court against the Corps in an attempt to set aside General Wilson's order of November 16, 1976. Judge Lansing Mitchell upheld General Wilson's order. His ruling in Creppel, et al. v. Corps of Engineers, 500 F. Supp. 1108 (E.D. La. 1980) was appealed to the U.S. Court of Appeals for the Fifth Circuit.

The Fifth Circuit, in a decision dated March 17, 1982, also concluded that General Wilson's November 16, 1976 modification of the project was not arbitrary, Creppel v. U.S. Army Corps of Engineers, 670 F.2d 564 (5th Cir. 1982). However, the Fifth Circuit identified two issues which it felt were unresolved and needed further consideration. Those issues were: (1) whether or not the required local assurances would be available with respect to the modified project; [2]/ and (2) whether or not Section 404 of the Clean Water Act might prevent completion of the original project. The Fifth Circuit remanded the case to Judge Mitchell for resolution of those issues.

In the subsequent proceedings, it developed that (1) Jefferson Parish would not provide local assurances as to the modified project, because it felt it was prohibited from doing so by the state court order referred to above, and (2) that EPA Region VI would not invoke its Section 404(c) procedures with respect to the modified project but, under the same circumstances that existed in 1976, would do so as to the original project.

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[2]/ Local assurances would be required to finance the installation of the flood gates which Brigadier General Wilson had directed be installed.

In August, 1984, Judge Mitchell ruled that the original project should go forward. The Department of Justice filed a Motion to Reconsider this ruling, arguing among other things that it deprived EPA of an opportunity to invoke Section 404(c). At a hearing on September 19, 1984, Judge Mitchell agreed to hold the August ruling in abeyance to give EPA ninety days to consider taking action under Section 404(c) and, if it decided to do so, an additional nine months to complete the process.3/

C. 404(c) Proceedings

In response to Judge Mitchell's ruling, EPA Region VI reviewed available information on the Bayou aux Carpes site, which included a review of Region VI's historical positions on the Marrero-Lafitte Waterline and the Westbank Hurricane Protection Levee, two projects which are not related to the Levee Project but would have resulted in adverse impacts to the site. On October 12, 1984 Region VI also conducted a field trip to the Bayou aux Carpes site in conjunction with the New Orleans District Corps regulatory functions staff and a representative of EPA's Office of Federal Activities to perform investigations and preliminary surveys.

As a result of these, and other activities, and the information derived therefrom, Dick Whittington, EPA's Region VI Regional Administrator initiated the Section 404(c) process by letter of December 17, 1984 to Colonel Eugene Witherspoon, the Corps' New Orleans District Engineer. The landowners were notified of this step simultaneously. Numerous interested parties were notified, including Jefferson Parish, State of Louisiana officials, the Louisiana Congressional delegation, and federal agencies including the National Marine Fisheries Service, the U.S. Fish and Wildlife Service and the National Park Service. As part of the notification process to Jefferson Parish officials, a member of the Parish Council offered to assist in ascertaining owners of the tract in addition to those involved in the litigation. The offer was accepted and the Parish was requested, in December 1984, to identify owners of the tract based on Parish records.

3/ Certain of the landowners have contended that the use of Section 404(c) is illegal here because it would block a flood control project which allegedly the court has held as a matter of law must be completed as originally planned, and because EPA cannot order modification of the project without local assurances. I am not persuaded. First, the district court expressly modified its order to allow EPA an opportunity to exercise its Section 404(c) authority. As the Fifth Circuit has noted, federal projects are subject to the requirements of Section 404 (supra, 670 F.2d at 564), and permission to discharge under Section 404 is subject to EPA's Section 404(c) authority. Second, EPA's Section 404(c) restriction on discharge does not require the completion of the modified project; it merely allows it, assuming requirements under other laws, such as local assurances, are met.

In early January, letters were sent out to Jefferson Parish officials who were responsible for specific areas of the 404(c) tract, such as levees and other rights of way, requesting their permission to go on the tract, inasmuch as EPA was assembling a field team to do a more detailed field investigation. The identification of all of the property owners in the Bayou aux Carpes site proved difficult. However, with the help of Jefferson Parish, a mailing list was compiled including property owners, interested public officials, interested citizens groups and all other known interested groups.

On May 17, 1985, the Region VI Administrator published in the Federal Register a Proposed Determination to prohibit, deny, or restrict the specification, or the use for specification, of the Bayou aux Carpes site as a disposal site. A Proposed Determination means that the Regional Administrator believes there are issues to be explored; it does not represent a conclusion that unacceptable adverse effects will occur, see 44 Federal Register 58082 (October 9, 1979). A public hearing on the Proposed Determination was held in Gretna, Louisiana on June 18, 1985. Copes of draft reports prepared on the Bayou aux Carpes site in conjunction with EPA's 404(c) action were made available prior to the hearing; final copies were made available at the first opportunity. Public participation at the hearing and during the comment period (which ended August 19, 1985) was substantial. The EPA proposal was supported by the National Park Service, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Louisiana Department of Wildlife and Fisheries, the Louisiana Department of Natural Resources, numerous environmental and civic groups, and many citizens with an interest in the area. Those opposing the proposal included some owners of land within the study area and several business organizations promoting the industrial development of the Gulf Intracoastal Waterway (Bayou Barataria frontage). The U.S. Army Corps of Engineers New Orleans District requested that EPA exclude from the 404(c) Final Determination an area within the Bayou aux Carpes site for the disposal of dredged material from the federal dredging of the Gulf Intracoastal Waterway (Bayou Barataria); however, they also advised that that segment of the waterway has never been dredged since the initial construction, and that the segment is not expected to require maintenance in the near future.

The public hearing comment period was extended through August 5, 1985 to allow additional time for the public, including the property owners, to review and comment on EPA's final reports on Bayou aux Carpes. On the day that the public hearing was held, an application which was jointly entered into by EPA Region VI and some of the property owners, was filed with Judge Mitchell, requesting that he extend the nine month deadline for completion of the 404(c) process an additional 120 days. In the face of opposition by other property owners, Judge Mitchell extended the deadline only 30 days to October 18, 1985. Following the Judge's ruling, Region VI extended the comment period for the public hearing an additional two weeks to August 19, 1985. This extension of the comment period was announced in the Federal Register on July 19, 1985.

After the close of the comment period, the Regional Administrator submitted to me a Recommended Determination, as well as the administrative record compiled by the Region, to restrict specification of the Bayou aux Carpes site for the discharge of fill material. This determination is based on findings that show that the proposed discharge, as well as future discharges, will have unacceptable adverse effects on shellfish beds, fishery areas (including spawning and breeding areas) wildlife and recreational areas. The Recommended Determination is dated August 30, 1985 and was received at EPA Headquarters on September 4, 1985.

EPA subsequently notified involved property owners by letters dated September 13, 1985 and September 16, 1985, the Southern Natural Gas Pipeline Company, which owns a pipeline that crosses the site, by letter dated September 13, 1985 and Major General H.J. Hatch, Director of Civil Works, Corps of Engineers, by letter dated September 13, 1985 of the Recommended Determination and of their opportunity for consultation in compliance with the Section 404(c) regulations.

In response to this notification, EPA received letters dated October 1, 1985 from Mr. Joseph E. LeBlanc, Jr, September 24, 1985 from Mr. Harold L. Molaison, and September 25, 1985 from Mr. Daniel L. Morrow, three attorneys who represent property owners within the Bayou aux Capres site. Their letters maintained the position presented in a previous letter written by Mr. LeBlanc dated August 19, 1985 which questioned the legality of EPA's 404(c) action. They did not request a meeting. EPA also received a letter dated October 1, 1985 from the Director of Civil Works, Corps of Engineers which reiterated the request of the New Orleans District Engineer for EPA to exclude an area within the Bayou aux Carpes site from the 404(c) Final Determination for dredged material disposal. The letter from the Director of Civil Works did not request a meeting to discuss this issue. The Southern Natural Gas Pipeline Company, in a letter dated September 25, 1985, advised EPA of its pipeline maintenance requirements that would necessitate depositing dredged or fill material within the Bayou aux Carpes site.

III. Description of the Site

The Bayou aux Carpes site is located approximately 10 miles south of New Orleans, Louisiana, on the "West Bank" of Jefferson Parish. The site covers approximately 3200 acres and approximately 3000 acres is wetlands as defined in 40 CFR 230.3(t). The remainder of the site consists of land classified as old orchard, residential, agricultural, industrial, wooded upland, and grassland associated with levees and roads and is not included in EPA's 404(c) determination. The site is bounded on the north by the east-west Estelle Pumping Station Outfall Canal, on the east by the Plaquemine-Jefferson Parish line and Bayou Barataria (Intracoastal Waterway), on the south by Bayou Barataria and Bayou des Familles and on the west by State Highway 3134 and the "Vee-Levee" Pipeline Canal (refer to attachments A and B). The geographic coordinates are:

Range 23 East, Township 15 South, Portions of Sections 13, 14, 55, 57, 59;
Range 23 East, Township 14 South, Portions of Sections 55, 81, 82; and
Range 24 East, Township 15 South, Portions of Sections 48, 49, 50, 57.

Vegetative characteristics and habitat types were identified through on-site field visits by EPA, the U.S.Fish and Wildlife Service (FWS) and by interpretation of color infrared aerial photography. The Bayou aux Carpes site contained approximately 2190 acres of bottomland hardwoods, wooded swamps and scrub-shrub wetlands and approximately 648 acres of fresh marshes, pond and open waterways. Bald cypress (Taxodium distichum), tupelo gum (Nyssa aquatica) red maple (Acer rubrum) and green ash (Fraxinus pennsylvania) are common overstory vegetation in the bottomland hardwood, wooded swamp and scrub-shrub areas with bald cypress and tuplelo gum being the most predominant. In the scrub-shrub wetlands, the predominant shrub species are wax myrtle (Myrica spp.), buttonbush (Cephalanthus occidentales) and eastern baccharis (Baccharis spp.). In the fresh marshes, the predominant species include bulltongue (Sagittaria falcata), softstem bullrush (Scirpus validus), pennywort (Hydrocotyle bonariensis), iris (Iris giganticaerulea), smartweed (Polygonum spp.), spikerush (Eleocharis spp.) and alligator weed (Alternanthera philoxeroides). Water hyacinth (Eichlornia crassipes), and duckweed (lemna spp.) characterize the floating vegetation of the open waterways within the site.

The entire perimeter of the Bayou aux Carpes site is spanned by levees except for the confluence of the Southern Natural Gas Pipeline canal with Bayou Barataria. The two mile long Southern Natural Gas Pipeline canal provides the primary hydrological connection between the site and Bayou Barataria (Intracoastal Waterway) and ultimately, Barataria Bay. Other major waterways within the Bayou aux Carpes site include two oil field location canals off of Bayou aux Carppes (approximately 2500 and 6,000 [illegible] long), a 3500 foot long powerline right-of-way canal connected to one [illegible]

the oil field location canals, and two plugged oil field location canals (1500 and 2000 feet long) off of Bayou Barataria. The Southern Natural Gas Pipeline Canal is directly connected to all of the aforementioned waterbodies except the two plugged canals off of Bayou Barataria. Dredged material was deposited along the banks of these canals during their construction. However, the dredged material levees have numerous breaks and are no more than a few feet above adjacent wetland elevations and do not completely block surface water flow across the site.

In addition to the relatively flat topography of the site, numerous breaks in the dredged material levees and the unfilled area at the head of the Southern Natural Gas Pipeline canal provide a pathway for surface water to exchange between the canals and surrounding swamps and marshes. Remnants of the original Bayou aux Carpes waterway are unleveed, thus allowing surface water to sheet flow across to the adjoining wetlands. Studies conducted by EPA revealed that during 1984, water levels in the Barataria Waterway exceeded the average swamp/marsh subtrate elevation of 1.24 feet National Geodetic Vertical Datum (NVGD) at least 50 percent of the time. Marsh-swamp elevations of 0.44 and 1.65 feet NGVD, which represent the range of elevations in the site, were exceeded 95% and 20% of the time, respectively, by water levels in the waterway during the EPA study in 1984. The frequency at which water levels equaled or exceeded 1.24 feet NGVD were most pronounced during the period from May through October 1984 and appeared as a response to southerly wind directions. During 1984, the average annual water level in Bayou Barataria was 10 to 14 percent below the 20-year mean; hence the potential for the flooding of the Bayou aux Carpes site may be greater than that observed during the study. A diurnal tide range of 0.3 to 0.4 feet was recorded in the Bayou aux Carpes site during the study. This range appears typical of the upper basin region of the Barataria Bay system and is further evidence of the close hydrologic relationship of the site with the rest of the system, in spite of the partially completed flood control project.

The Bayou aux Carpes site is bordered on the west by 600 acres of the Barataria Unit of Jean Lafitte National Historical Park. This portion of the park is hydrologically connected to the Bayou aux Carpes site via four sets of culverts under State Highway 3134. The Barataria Unit contains approximately 500 acres of bottomland hardwood wetlands.

IV. Ecological Values Associated With The Site

The record, including biological and hydrological studies of the Bayou aux Carpes site conducted by EPA and FWS, demonstrates that the site is a viable and valuable functioning component of the Barataria Bay and estuarine system. Despite existing alterations, which include the levee spanning its perimeter and canals with associated dredged material levees, the Bayou aux Carpes site contributes organic material for the nutritional needs of fish and shellfish communities in the adjacent estuary, provides valuable habitat for fish and wildlife, acts as a pollutant filtering mechanism helping to reduce degradation of water quality in adjacent waters, and provides opportunities for public recreation.

A. Contribution to Barataria Bay Estuary

The Bayou aux Carpes site is comprised of bottomland hardwoods, wooded swamps, scrub shrub wetlands, fresh marshes, as well as open waterways. The amount of plant biomass produced in the study area may be compared to that measured in nearby sites exhibiting similar species composition. Conner and Day (1976) reported total primary production for several types of seasonally flooded Louisiana swamps. They arrived at values of 1,574 $g/M^2/yr$ at a bottomland hardwood site and 1,140 $g/M^2/yr$ at a cypress-tupelo site. Given the similarities between the Bayou aux Carpes site and these study sites, it is reasonable to conclude that comparable levels of plant biomass are produced at the Bayou aux Carpes site.

Production of plant biomass with resultant decomposition results in the production of carbon and nitrogen which serve as nutrients. EPA field and laboratory studies confirmed that the Bayou aux Carpes study area is a source of organic carbon and nitrogen to Bayou Barataria, leading to Barataria Bay. Nutrient exchange measurements and dye tracer studies verified the export mechanism. During the study period, water transport from Bayou aux Carpes to Bayou Barataria was rapid and directed towards Barataria Bay. Traced waters leaving the Bayou aux Carpes study area via the Southern Natural Gas Pipeline canal traveled downstream in Bayou Barataria a distance of six miles in less than 24 hours.

This plant biomass is significant because it serves both as an important direct food source for numerous species of fish and wildlife that live on or visit the project site, and as a source of detritus (i.e., plant and animal material undergoing various stages of decay by the action of bacteria and fungi). Detrital materials are consumed by fishes and invertebrates and thereby contribute to the downstream estuarine food webs. By this mechanism, recreational and commercial fish and shellfish resources are supported.

B. Fishery Values

EPA conducted aquatic sampling in January 1985 in the Bayou aux Carpes site within the canals, as well as in the adjacent marshes and wooded swamps. FWS sampled primarily the canals within the site during April 1985.

Aquatic sampling conducted by EPA and FWS revealed the presence of several fish species that tolerate both fresh and brackish environments. Observations of bay anchovy, striped mullet, threadfin shad, tidewater silverside and blue crab provide recent evidence of ingress and egress of estuarine organisms. In addition, data from Day (1984) and EPA's sampling in 1985 revealed at least 15 species of fresh water fishes associated with the Bayou aux Carpes site. Many of these species, such as channel and blue catfish, sunfish and bass are recognized as important to both commercial and sport fisheries. In addition to finfish, field sampling yielded 14 taxa of macroinvertebrates from stations in the canals and Bayou aux Carpes waterway and 27 taxa of macroinvertebrates from the marsh and swamp areas. Species such as the blue crab and adult red swamp crawfish are of direct commercial value. Juvenile forms of grass shrimp, crawfish, blue crabs and bay anchovies were observed during sampling within the Bayou aux Carpes site which indicates that it is used as nursery habitat by these species.

The Bayou aux Carpes site exhibits several trophic levels (that is, several steps in the food web). For example, in addition to the available emergent and floating vegetation in the open waterways and on the marsh surface, the site contains juvenile crawfish, grass shrimp and amphipods that consume detritus. These are, in turn, used as fish food items by the aforementioned sport and commercial species.

C. Wildlife Values

The U.S. Fish and Wildlife Service (FWS) conducted a study and prepared a Habitat Evaluation Procedure (HEP) report that covered the Bayou aux Carpes site and the adjacent Barataria Unit of the Jean Lafitte National Historical Park. As noted above, these areas are hydrologically connected and both contain bottomland hardwood wetlands (The Bayou aux Carpes site also contains scrub-shrub wetlands and fresh marshes). The HEP, which is a standard procedure used by the FWS, is based on the assumption that vegetative communities have value to wildlife and that positive or negative impacts can be expressed in terms of modification (both quantity and quality) to wildlife habitat. These impacts can be measured and compared. Additionally, optimum habitat for a certain species can be characterized and any habitat can be compared to the optimum to develop a Habitat Suitability Index (HSI). There is an assumed linear relationship between the HSI and the carrying capacity of a habitat. The HSI for a particular species is determined by utilizing models which contain measurable key habitat components for a specific animal in a particular habitat. An HSI value of 0 indicates that a cover type provides little or no potential habitat for the evaluation species, whereas a value of 1.0 indicates that the habitat provides optimum life requisites in the form of food, cover, and/or reproduction.

The wildlife species selected for evaluation by the FWS for its report in this case, included the gray squirrel,pileated woodpecker, North American mink, wood duck, great egret, American alligator and the common muskrat. These are species associated with wetland systems like those within the Bayou aux Carpes site and are representative of a broad array of community positions (e.g. trophic levels, habitat requirements, taxonomic groupings), and provide recreational, commercial, and aesthetic values.

The results of the HEP analysis indicated that the bottomland hardwoods and wooded swamps of the Bayou aux Carpes site and the Barataria Unit of the adjacent park, as well as the scrub-shrub wetlands and fresh marshes of Bayou aux Carpes site are high value habitat for the evaluated species, with the exception of the muskrat; the HEP analysis revealed that the site is of moderate value for the habitat requirements of this species.

The FWS field studies revealed that the site provides valuable habitat for a diversity of wildlife species. The marshlands and forested wetlands provide feeding, resting, nesting, and escape habitat to numerous species of game and nongame mammals and commercially important furbearers, songbirds, raptors, migratory and resident waterfowl, wading birds, woodpeckers, other birds, and many species of amphibians and reptiles. During the field studies conducted by EPA and FWS, at least 70 species were observed in the Bayou aux Carpes site, including nine species of amphibians, 10 species of reptiles, 45 species of birds, and six species of mammals. Observations included the American alligator which FWS has listed on the threatened species list in Lousiana. Of those species observed, the wood duck and the osprey are considered by FWS to be National Species of Special Emphasis. FWS is monitoring these species because of their declining populations due to factors which include habitat loss. The endangered bald eagle is known to nest in the general vicinity of the Bayou aux Carpes site. At least three bald eagle nests have been documented within a 10 mile radius of this area by FWS (1984).

D. Water Retention and Pollution Filtering Values

Studies conducted by EPA scientists indicate that the relatively flat topography of the Bayou aux Carpes site, in combination with the low and/or broken levees, enhances the capacity of the site to detain surface waters and affect a slow release to downstream systems. The water storage capacity of the site was confirmed by measuring the cyclic chloride concentrations of swamp water discharged to Bayou Barataria and by monitoring a dye tracer. Chloride concentrations, measured at the junction of Southern Natural Gas Pipeline canal and Bayou Barataria, increased with ebb flows from the Bayou aux Carpes site and decreased when the direction of flow reversed and originated from Bayou Barataria (flood tide). This means that the water draining from the site was more saline. This salinity would logically be derived during the summer and fall periods when water is pushed up into this vicinity of Bayou Barataria by winds and tides. The salt content shows up in the standing water in the marsh.

The storage capacity is significant for the purposes of 404(c) because the site is absorbing pollutants and excess nutrients from stored waters. Water which is frequently introduced into the study area from Bayou Barataria contains urban runoff from the surrounding areas. EPA analyses and comparison of heavy metal content of sediments samples obtained from the Bayou aux Carpes site and Bayou Barataria revealed that the canals and swamp-marsh habitat trap finely divided particles and the associated heavy metals. Copper, lead, and iron concentrations appear uniformly distributed between the swamp, marsh, canal, and Bayou Barataria indicating the capacity of the marsh/swamp system to trap these heavy metals typically associated with urban runoff. Bayou Barataria appeared to retain greater concentrations of zinc compared to the Bayou aux Carpes swamp and marsh areas. EPA analysis did not reveal the reason for this. It may be that the particles to which zinc is bound are too heavy to remain in suspension long enough to be carried into the Bayou aux Carps site.

The biological cycling of inorganic nitrogen (NO_2-NO_3) was evident in the Bayou aux Carpes swamp. The NO_2-NO_3 concentration gradient decreased from sampling points in Bayou Barataria to stations in the forested swamp and marshes. Thus, Bayou Barataria appears to be a source of NO_2-NO_3 and the Bayou aux Carpes swamp an area for its assimilation into other nitrogen forms such as animal or plant protein. Both the nutrient assimilation and pollutant trapping help maintain water quality which benefits the associated aquatic life.

E. Recreation Values

Recreational opportunities such as boating, fishing, trapping, and some hunting (with permission from private property owners) are available within the bounds of the Bayou aux Carpes site. The public currently has access to portions of the tract by way of the Southern Natural Gas Pipeline canal that connects Bayou Bartaria with the water courses within the site.

F. Conclusion

Under Section 404(c), a finding of unacceptable adverse effects must be based on effects on one or more of the listed resources, that is, municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, and recreational areas. Based on the records and the preceding discussion, I conclude that the Bayou aux Carpes site has significant value for all these resources except municipal water supplies. The next section discusses the likely impact on these values if Bayou aux Carpes is used as a disposal site for dredged or fill material.

V. Unacceptable Adverse Impacts

As discussed above, exercise of my authority under Section 404(c) to restrict or prohibit the use of a site for disposal of dredged or fill material must be based on a finding of "unacceptable adverse impact" to one or more of the listed resources. EPA's regulations define unacceptable adverse effect to mean, in pertinent part, "significant loss of or damage to fisheries, shellfishing or wildlife habitat or recreation areas." 33 CFR §231.2(e). As the preamble explains, Section 404(c) determinations are by their nature based on predictions of future impacts; therefore, what is required is a finding of reasonable likelihood that unacceptable adverse effects will occur, not absolute certainty. (44 Fed. Reg. 58078, Oct. 9, 1979).

In evaluating the projected impacts on the relevant resources in this case, EPA studied information available from: previous studies of the area associated with various public and private project proposals; recent studies conducted in association with this determination; coordination with other agencies; comments received from the public, including affected landowners; and considered the relevant portion of the Section 404(b)(1) Guidelines, in this case 40 CFR §230.10(c). The following specific adverse impacts are likely to result from the proposed discharge of fill material to close tidal waterways and facilitate the installation of a pumping station to drain the site or from the discharge of dredged or fill material within the Bayou aux Carpes site.

A. Impacts to Shellfish Beds and Fishery Areas

As reported by the Department of Commerce (USDC, 1980), Louisiana is the third ranking state in fisheries employment and the state's estuarine system produces 28 percent of the nation's fishery harvest. Studies by Craig and Day (1977) and EPA indicate that the Barataria Basin is responsible for a large, if not the largest, share of Louisiana's total commercial fishery harvest. The National Marine Fisheries Service, utilizing commercial catch data from 1953 through 1978, calculated the average annual commercial harvest directly attributable to Barataria Basin. This annual harvest, which includes menhaden, shrimp, oysters, croaker, blue crab, sea trout, spot and red drum is approximately 302.7 million pounds at a value of approximately 83 million dollars. Adult and juvenile forms of the blue crab were observed in the Bayou aux Carpes site. Menhaden, shrimp and oysters directly consume the detritus produced and exported from the site.

Completion of the Levee Project would ultimately eliminate the export of detritus and nutrients to the downstream estuary and subsequent filling or other land conversion activities within the Bayou aux Carpes site would serve to accelerate this result. Therefore completion of the project would eventually eliminate the export of swamp-marsh production that constitutes a necessary component of the estuarine food web and, thereby, have an unacceptable adverse impact to shellfish and fishery areas. Filling the Bayou aux Carpes site without completion of the project would also eliminate such exports.

Studies conducted by EPA and FWS revealed that the Bayou aux Carpes site provides foraging and nursery habitat for fresh and estuarine species, many of which are of recreational and commercial importance including: channel and blue catfish, sunfish, bass, blue crab and red swamp crawfish. In addition, the studies revealed the presence of forage fish, juvenile crawfish, grass shrimp and other amphipods that break down detritus and are utilized as a food source by the commercial and sport species mentioned above. Completion of the Levee Project would eliminate access to, as well as the fishery values of the Bayou aux Carpes site; filling the site would have a similar effect. For all these reasons, completion of the Levee Project and/or filling in the Bayou aux Carpes site would have an unacceptable adverse effect on shellfish beds and fisheries areas.

B. Impacts to Wildlife Values

The projection of future conditions, prepared by FWS as part of the HEP analysis, indicated that with the completion of the Levee Project, all of the evaluation species would show loss of available habitat and that, if the site were subsequently filled and developed, it would lose virtually all of its current wildlife value.

Completion of the Levee Project will adversely affect the habitat of the the American alligator, which is threatened in the state of Louisiana, the osprey and the wood duck, which are National Species of Special Emphasis, commercially important furbearers, and game animals. Completion of the project and subsequent draining and filling will have an unacceptable adverse impact on wildlife values.

C. Impacts to Water Retention and Pollution Filtering Values

Hopkins and Day (1979) found that Lake Cataouatche and, to a lesser extent, Lake Salvador have already begun to experience the effect of an altered hydrological regime. These lakes in the Barataria Basin used to be a prime nursery ground for Louisiana commercial fisheries, but now drainage canals from the West Bank of New Orleans bypass the swamps and enter directly into the lakes. High nutrient loads from the West Bank have caused Lake Cataouatche to become eutrophic and fish kills after large rainstorms are indicative of the impact of the changes in the natural hydrology of this area. The Barataria Waterway also allows urban runoff to flow unhindered to the upper part of Barataria Bay. While the total contribution of Bayou aux Carpes site for filtering pollutants has not been measured, it is certain that the adjacent waters of Bayou Barataria and the Barataria Bay estuary, as well as the associated fish and shellfish, will receive higher levels of pollutants and heavy metals from urban runoff and other sources, if the site is isolated by completing the Levee Project or if it is filled. This will contribute to the unacceptable adverse effects to fish and shellfish discussed above, in section A.

D. Impacts to Recreation

The potential for adverse effects upon recreation (primarily from the potential loss of sport fishing and hunting opportunities) within the site has generated a high level of public concern throughout the public hearing comment period.

Completion of the Levee Project will block public access to the site. Draining the site via the proposed pump will eliminate the fisheries community and, in conjunction with future filling and other land reclamation activities, eventually eliminate the available wildlife habitat. Recreation, in the form of hunting and fishing, will be eliminated within the Bayou aux Carpes site.

E. Impacts to the Barataria Unit of the Jean Lafitte National Historical Park

The Barataria Unit of the Jean Lafitte National Historical Park lies immediately west of the Bayou aux Carpes site and a 600 acre section lies within the same drainage basin as the Bayou aux Carpes site. There is a direct hydrological connection, via four sets of culverts under State Highway 3134; this area of the park is comprised of approximately 500 acres of bottomland hardwoods and wooded swamp. The FWS HEP analysis revealed that the wetlands of the Barataria Unit are of high value for the representative species selected. On site observations included the bald eagle, which has been listed by FWS on the endangered species list. In addition, there is a great egret and great blue heron nesting colony located in the wooded swamp within this section of the National Park. The fish species collected in the Bayou aux Carpes site were the same as those collected by FWS in the Barataria Unit in September 1984, with the exception of six species that were collected only in the park and two species that were collected only in the Bayou aux Carpes. This portion of the National Park and the Bayou aux Carpes site represent, in form and in function, two interconnected segments of one wetland system.

The Barataria Unit is open to the public for fishing. In addition, the Park Service has placed an emphasis on this area as an educational resource. An interpretative walkway traverses typical bottomland hardwoods wetlands, then enters a cypress-tupelo swamp. The trail receives high visitor use and is a major tool in the park's education program. Therefore, this unit of the National Park provides recreation opportunities in addition to the aforementioned ecological values.

The hydrological relationship between the Barataria Unit and Bayou aux Carpes site is such that attempts to drain or significantly alter the hydrology of the site would result in adverse hydrological alterations within the Barataria Unit of the park. A study of the effects that draining of the Bayou aux Carpes site would have on the park was conducted by John W. Day, Jr., of the Louisiana State University Center for Wetland Resources. Dr. Day concluded

that as long as the surface water connection remains functional, the forced drainage of the Bayou aux Carpes swamp would result in drainage of much of the area within the park. This would ultimately result in vegetative transition to upland species with loss of productivity, detrital export, existing fish and wildlife habitat and the attendant recreational opportunities.

Alternative means of preserving the wetland values of the park if the study area was placed under pump would include placing control structures at the highway culverts and implementing an intensive water management plan. Although the control structures might initially slow the rate of ecological transformation due to draining, EPA feels that the success of constantly maintaining flooded conditions is questionable and may eventually lead to the deterioration of the wooded swamp and bottomland hardwood communities. Attempts to reproduce natural hydrological cycles through extensive water management would be expensive, involving major alterations in order to pump water into the area and then drain it out again.

Completion of the Levee Project or any other fill proposals which would have the effect of draining, drying, or hydrologically isolating the Bayou aux Carpes site would result in adverse impacts to fisheries areas, wildlife areas and recreation associated with the Barataria Unit of the Jean Lafitte National Historical Park.

F. Cumulative Impacts

The significance of impacts associated with completing the Levee Project and eliminating the ecological contribution of the Bayou aux Carpes site are even greater when considered within the context of wetland alterations within the Barataria Basin and coastal Louisiana.

A report to the Louisiana Joint Legislative Committee on Natural Resources, stated that over the last 80 years, over 800,000 acres of land in coastal Louisiana have been lost. Approximately 58 percent of this has occurred over the past 25 years. Recent losses of forested wetlands in the state are on the order of 87,200 acres annually (U.S. FWS, March 1984; Dozier et al.; and Gagliano, 1981). These losses affect not only biological, water quality, recreational, and flood protection benefits but also economic values of the wetlands because of the significance to Louisiana's coastal fishery. The causes cited for these wetland losses include such natural phenomena as coastal subsidence and compaction, erosion, and sea level rise, and such anthropogenic causes as channelization, levee construction, canal dredging, subsidence due to mineral extraction, agricultural expansion, and urban expansion. This is significant for two reasons. First, some causes of wetland losses are natural and, therefore,

not subject to jurisdiction under Section 404 of the Clean Water Act. Second, while natural phenomena are causing wetland losses from seaward, man's activities are threatening wetlands from the landward side. It has been predicted, in a report by the Department of Commerce that "if the present draining and filling operations for urban and commercial development in the coastal area continue at the current rate, an additional 186,000 acres of the state's wetlands will be lost by the year 2000" (USDC, 1980).

The same types of activities causing significant statewide coastal wetland losses are also reported by the Department of Interior as major influences in the Barataria Basin, (USFWS, 1983). The Louisiana Department of Transportation and Development (LDTD, 1976) has calculated the total loss of Barataria Basin wetlands as being 44,800 acres by 1970. The upper Barataria Basin wetlands are increasingly being ringed by urban development. This can be seen along the Bayou des Familles ridge to the northwest of the Estelle Pumping Station Outfall Canal. Also, the effects of pumping upon habitat similar to that of the study area may be seen immediately west of that canal. The Bayou aux Carpes site represents a notable portion, roughly four percent of the periodically flooded marsh and swamp area in the Barataria Basin; and would, therefore, represent a sizeable loss to this area.

G. Proposed Corrective Measure

Counsel for some of the landowners proposed, as a corrective measure to eliminate the likelihood or unacceptable adverse effects, that the Park Service purchase a portion of the tract and that the pumping station be relocated to the pipeline canal. In my judgement this proposal would not materially reduce the significant adverse effects of the project, even if the Park Service were in a position to implement it. In any case, the Service has indicated that it does not have an interest in acquiring this land at this time.

Neither during the Regional 404(c) consultation period and public comment period nor during EPA headquarters' consultation period did any of the landowners or their representatives identify any desired property uses or specific projects which would involve less significant filling within the Bayou aux Carpes site and, therefore, could possibly be exempted from the general prohibition on discharge. However, the Southern Natural Gas Pipeline Company by letter dated September 25, 1985 indicated that routine maintenance of their pipeline would require some discharges of dredged or fill material but that it could be done so as to have minimal environmental effects. We agree and our final 404(c) determination recognizes this exception.

VI. A Discussion of the Report Prepared by Steimle and Associates, Inc. on Behalf of the Property Owners

The technical material submitted on behalf of the property owners to the record in opposition to EPA's studies of the Bayou aux Carpes site consisted of a report entitled "Review of CWA 404(c) Related Studies in the Bayou aux Carpes Area" prepared by Steimle and Associates, Inc. in August 1985. The report and EPA's analysis of same have been made part of the record on this case. This section provides a discussion of my findings regarding the main points of the report.

Steimle and Associates reviewed the assessment of the Bayou aux Carpes site performed by Region IV, Environmental Services Division in Athens, Georgia. Their report states that the sampling effort was restricted to a small segment of the site and that the duration of sampling was not sufficient to develop seasonal conclusions. In addition, the report states that the storage/detention of surface water is not supported by the study results; specifically, the Steimle report compared the water level recorder readings between the site and Bayou Barataria after a rain event and concluded that their similarity contradicted the idea that the Bayou aux Carpes site stores water.

Steimle and Associates is correct in that sampling was performed primarily in and adjacent to the major watercourses within the site. The data obtained, however, was accurate and the resultant observations and/or conclusions were not expanded to include unsampled areas. EPA feels that the literature research performed in conjunction with the assessment, as well as other site specific studies, such as the HEP analysis performed by FWS, provide information on segments of the site not directly sampled by Region IV such that the ecological values of the entire site may be ascertained.

EPA agrees that the duration of sampling was too short to support seasonal conclusions in the absence of other data. However, conclusions regarding seasonal characteristics, such as the frequency of tidal inundation, were reached by combining and comparing onsite results with the review of seasonal records and available scientific literature.

The comparison of water level recorder readings referred to by Steimle and Associates is misleading because the recorder in the Bayou aux Carpes site is located within one of the canals which is hydrologically connected to Bayou Barataria and would, therefore, react in a similar fashion to Bayou Barataria to hydrological changes. EPA believes that the study data do support the conclusion that water is stored by the Bayou aux Carpes site. The measurement of cyclic chloride concentrations confirmed that the site stores water. In addition, a diurnal tidal range of .3 to .4 feet was recorded at the site during EPA's study. This value, when added to the average marsh-swamp surface elevation of the swamp resulted in an average water level elevation of 1.54 feet NGVD. This elevation was above the maximum water level height recorded in Bayou Barataria and study canals indicating that the site was storing additional water.

Steimle and Associates also reviewed the HEP analysis conducted by FWS. The report stated the view that the HEP is based upon two assumptions that are untrue in nature; that is: (1) that there is a linear relationship between the HSI value and the number of a species that a given type of habitat can support and; (2) that all of the members of the species are going to be evenly distributed in a given habitat.

The HEP is a means by which different habitats may be compared (regarding their value to a certain wildlife species) by comparing each against a model. These procedures are a basis for comparison and do not provide absolute wildlife support information for a specific area. The two above assumptions are made to provide a qualitative basis of habitat comparison; for example, an area with an HSI of 1.00 is more valuable than an area with an HSI of 0.50 for the same wildlife species and, if two areas have the same HSI for a particular species, it is assumed that the larger area can accommodate a larger population of that species. The HEP is a standard methodology used by FWS and provides a reasonable basis for evaluating the wildlife values of the site.

Steimle and Associates also reviewed the report by Dr. Day which addressed the impacts of the Levee Project on the Barataria Unit of Jean Lafitte National Historical Park. They conclude that Dr. Day's report is general and lacks site specific data. They also state that this report dismisses the concept of water level management rather than providing a plan that could be evaluated.

The data obtained by EPA on the hydrological connection between Bayou aux Carpes and the Barataria Unit indicates that completing the Levee Project and pumping and draining the Bayou aux Carpes site will ultimately drain the Barataria Unit of the National Park. Information in the record on the ecology of this site reveals the resources that will ultimately be lost. EPA believes that, while a water management plan may be feasible from an engineering standpoint, it may still result in vegetative changes within the Barataria Unit and subsequent changes in values. Therefore it is reasonable to conclude that using the Bayou aux Carpes site for disposal will adversely affect the values of the historic park. These values include fish and wildlife habitat, as well as recreation.

In summary, the report done by Steimle and Associates fails to raise substantive issues that would cause reconsideration of the conclusions within the three aforementioned reports.

VII. Restriction on Use of the Bayou aux Carpes Site for Specification as a Disposal Site

Section 404(c) authorizes EPA to impose different limitations on discharges through actions on disposal site specifications. Where the facts warrant I may recommend that any defined area be prohibited from specification as a disposal site pursuant to Sections 404(a) and (b). If I should determine that the discharge of certain materials will have significantly less damaging effects than others, or that limiting discharges by amount, method, and/or location will reduce the likelihood of unacceptable adverse effects, I may recommend that the use of a specified site merely be restricted in some manner and/or that the restriction or prohibition apply to only a portion of the area under consideration.

In the present case, my finding of unacceptable adverse effects stems from the direct and indirect effects of discharges regulated under Section 404 of the Clean Water Act and within the Bayou aux Carpes site. Accordingly, I have decided to restrict the use of the Bayou aux Carpes site for any discharges of dredged or fill material, including those associated with the original Harvey Canal-Bayou Barataria Levee Project, with three exceptions. The first exception is discharges associated with completion of the modified Harvey Canal-Bayou Barataria Levee Project, as described in the Wilson Order of November 16, 1976; on condition that the closure at the confluence of Bayou aux Carpes and Bayou Barataria be replaced by floodgates. By retaining the current hydrologic regime except during storms, the modified project will largely maintain the current values of the site. The second exception is discharges associated with routine operation and maintenance of the Southern Natural Gas Pipeline Company pipeline as long as dredged or fill material is placed in piles with breaks in between to allow sheet flow to adjacent wetlands and as long as pre-maintenance contours are restored. The third exception is discharges associated with projects with the sole purpose of habitat enhancement and specifically approved by EPA. I believe that these three types of activities are unlikely to result in significant adverse effects to the aquatic environment as long as they are performed in accordance with these restrictions as well as any permit conditions which may be imposed by the Corps of Engineers through the permit process.

I have decided not to make a fourth exception for a disposal site for dredged material resulting from dredging in Bayou Barataria as requested by the Corps of Engineers since the disposal of dredged material within the Bayou aux Carpes site would result in the loss of a significant area and contribute to the unacceptable adverse effects discussed above. I note that there is no ongoing maintenance dredging in the Bayou and none is planned for the foreseeable future, so this should not create any

hardship. Even if circumstances should change, today's decision would permit dredged material to be used in completing and maintaining the modified Levee Project described in the Wilson Order.

Should the landowners in the future identify any other specific activities which require some discharge of dredged or fill material and which would have only minor impacts, they may, of course, apply to EPA for reconsideration of today's decision with respect to those particular activities. However, based on the current record, only the three specifically identified exceptions to my restriction are justified.

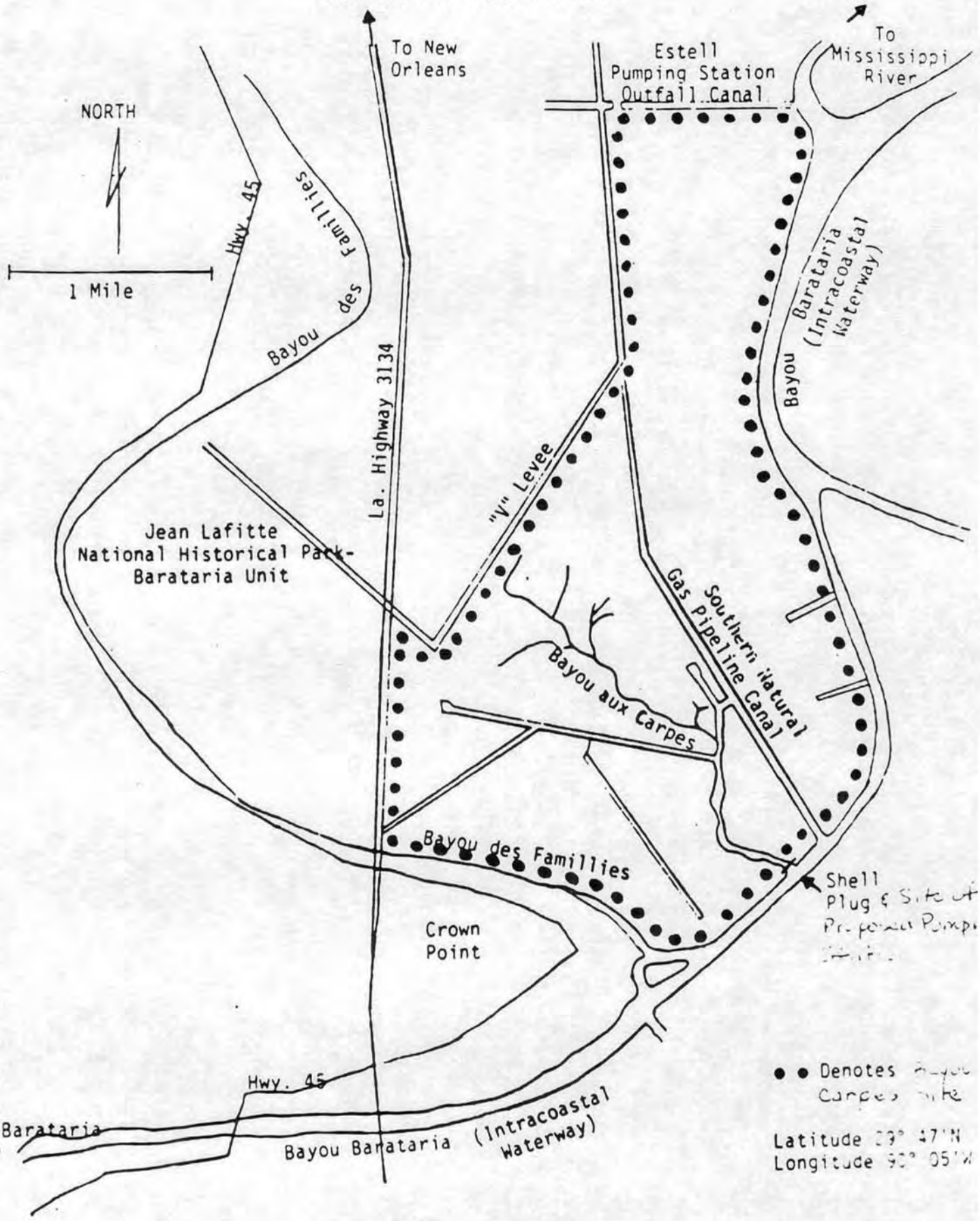
Assistant Administrator
for Office of External Affairs
U.S. Environmental Protection Agency

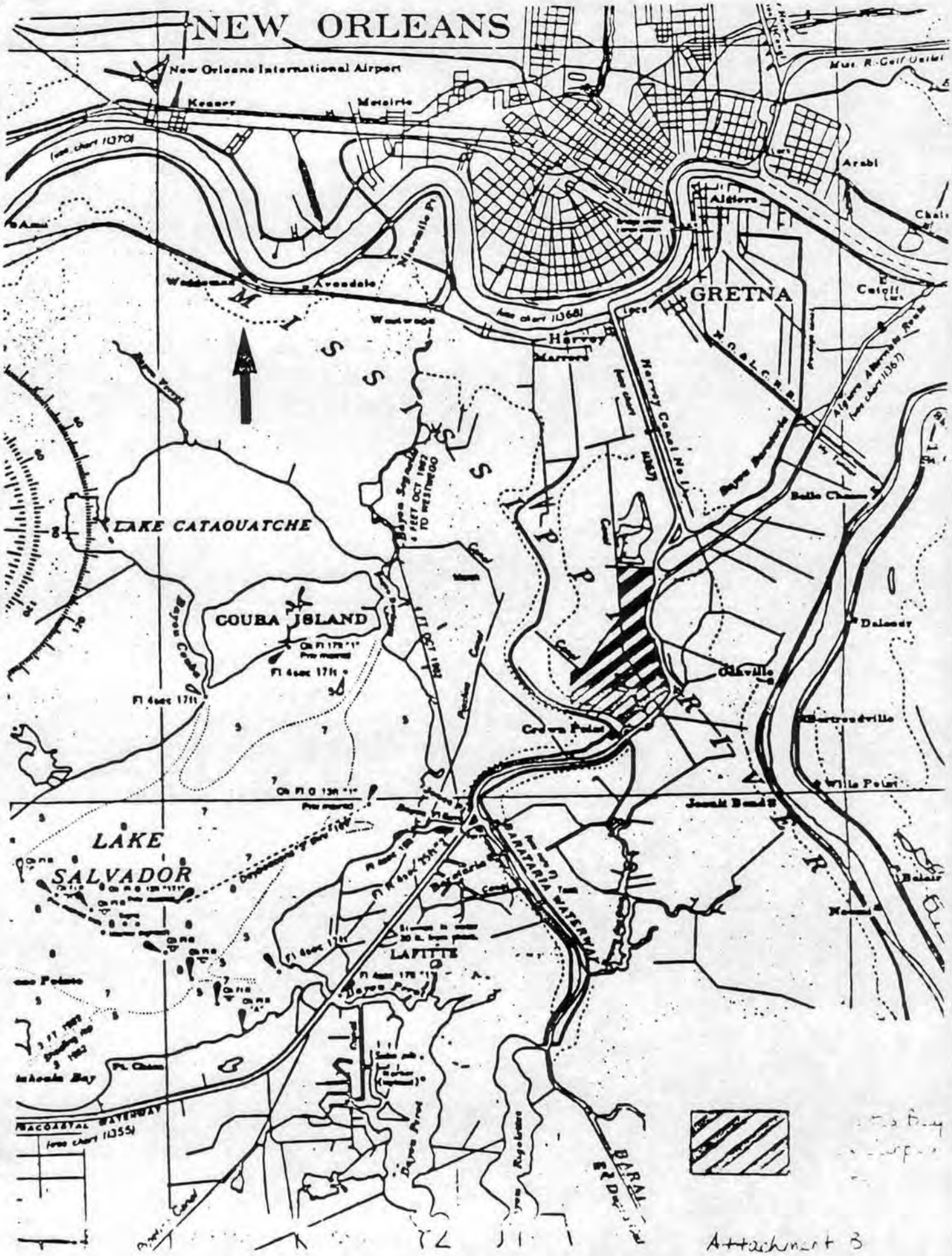
OCT 16 1985

Date

BAYOU AUX CARPES SITE

JEFFERSON PARISH, LOUISIANA




NEW ORLEANS
New Orleans International Airport
Kenner
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GRETNA
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Westwego
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LAKE CATAOUATCHE
COUBA ISLAND
LAKE SALVADOR
LAFITTE
Crown Point
Delacroix
Ville Platte
Jonald Bends
Belair
Ft. Chalmette
MISSISSIPPI RIVER
BARATARIA WATERWAY
BARATARIA BAY
Attachment B

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

REPLY TO
ATTENTION OF

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

Decision Record

Individual Environmental Report #12
Gulf Intracoastal Waterway (GIWW), Harvey, and Algiers Levees and Floodwalls
Jefferson, Orleans, and Plaquemines Parishes, Louisiana,

IER #12

Description of Proposed Action. The New Orleans District, US Army Corps of Engineers (CEMVN) proposes construction and upgrades of levees, floodwalls, floodgates, and pumping station(s) to achieve the authorized 100-year level of risk reduction for the West Bank and Vicinity of the Mississippi River (WBV) Hurricane and Storm Damage Risk Reduction System (HSDRRS). The proposed action is located in Jefferson, Orleans, and Plaquemines Parishes in the state of Louisiana. .

The action, Gulf Intracoastal Waterway West Closure Complex (WCC) alternative, proposes to alter the original system alignment and construct a streamlined surge barrier, floodwall, levee alignment. The alternative would consist of constructing approximately 3 miles of levee and floodwall that would reduce the primary line of defense by 38 percent. By removing 25 miles of existing 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 the certainty of subsurface conditions during construction, and minimizes human impacts since the footprint of the existing levees system would not be widened to 100-year level of risk reduction. Funding for the construction of the proposed action has been obtained via supplemental appropriations (see www.nolaenvironmental.gov).

Construction of this action would not only provide a high degree of system reliability and risk reduction for this segment of WBV, but would incoporate industrial areas along the Harvey Canal that are currently outside of the risk reduction system into the system. In addition, the existing protection would become a secondary line of risk reduction during a storm event.

The government's action for IER # 12 would raise and/or construct levees, floodwalls, and other structures to meet the 100-year level of risk reduction for the Harvey -Westwego, Gretna – Algiers, and Belle Chasse areas. The new levee and floodwall designs in IER # 12 would require approximately 3,125,000 cubic yards of earthen material and 310,000 tons of stone to construct (quantities are approximate and may change as construction designs are finalized).

The proposed action also includes providing risk reduction fronting protection for pump stations and backflow prevention for the existing pump stations on Harvey and Algiers Canals Existing pump stations in the detention basin would receive fronting protection to elevation 8.5 ft.

For clarity, the proposed action is described from west to east and the entire alignment has been divided into "western", "northern", and "eastern" sections.

The western section of this alignment extends north from approximately 6,000 ft northeast of the V-line levee intersection with Highway 45 in Jefferson Parish to Old Estelle Pump Station (PS). This section includes a 200 ft wide by 15 ft deep interior drainage canal on the protected side and the Bayou aux Carpes CWA Section 404(c) area on the flood side. The government's action for this section consists of an earthen levee enlargement with a protected side shift, partially outside of existing ROW. The centerline of the new levee would be shifted 58 ft to the protected side of the centerline of the existing levee. This 5,900 ft earthen levee stretch would be raised to 100-year level of risk reduction, with a design elevation of approximately El. 14 ft (table 1). An additional 125 ft of permanent ROW into a Bottomland Hardwood (BLH) area would be required along the V-line levee to the Old Estelle PS. The proposed action would require the relocation of the existing drainage canal 200 ft to the protected side. The additional ROW required to upgrade the levee and relocate the drainage canal would be 17 acres (table 1). The levee would tie into the fronting protection at Old Estelle PS.

Table 1. Proposed Action Components

	New ROW Impacts (acres)	Design Elevation (ft)	Length* (ft)	Description
Western Levee	17	14	5,900	V-line levee upgrade and Canal Relocation
Northern Floodwall	1	14	N/A	Old Estelle PS Improvements
	0	14 - 16	3,700	Estelle Outfall Canal Floodwall and Flow Control Structure
Eastern Floodwall	9.6	16	4,200	Innovative T-Wall within Bayou aux Carpes CWA Section 404(c) Area
	N/A	TBD	TBD	Project Feature Augmentations
Closure Complex and Levee and Road Realignment	240	16	N/A	Main Channel Gate (150 ft – 300 ft)
		16	N/A	Bypass Channel Gate (75 ft – 150 ft)
		16	N/A	20,000 cfs Pump Station
		14	4,000 – 5,000	Levee and Road Realignment East of the GIWW
	0	4	2,000	Foreshore Protection
Pipeline Relocation	1	N/A	N/A	Via Directional Drilling to Avoid Impacts to the Bayou aux Carpes CWA 404 (c) Area
Detention Basin Improvements	6	8.5	1,900	Harvey Canal West Bank Levees
	32	8.5	13,700	Harvey Canal West Bank Levees
	18	8.5	N/A	Belle Chasse Tunnel
	13	8.5	8,700	Algiers Lock to Belle Chasse Hwy (West)
	9	8.5	6,330	Hero Cutoff to Belle Chasse Hwy (East)
Total	**387**		**51,430**	

**Approximations*

All of the construction work for this segment would occur on the protected side of the levee and would not impact the Bayou aux Carpes CWA Section 404(c) area. Construction of the western section would be expected to take 2 years.

The northern section of this alignment extends east from Old Estelle PS to the Harvey Canal This section includes BLH habitat on the protected side and the Old Estelle Pump Station Outfall Canal on the flood side. Fronting protection would be built to the 100-year level of risk reduction at the Old Estelle PS and would tie into the levee on each side of the pump station (table 1). A T-wall would be constructed within existing ROW on the protected side of the existing earthen levee that runs along the northern bank of Old Estelle Outfall Canal. The T-wall would have a design elevation of El. 14 to El.16 ft and would be 3,700 ft in length (table 1).

This T-wall would tie into a new flow control structure at the intersection of the Old Estelle Outfall Canal and the Harvey Canal. The flow control structure would be constructed at El. 16ft, and would cross the Old Estelle Outfall Canal and tie into the eastern section of this alignment (the Bayou aux Carpes CWA Section 404(c) T-wall). This flow control structure would be required to control the discharge from the Old Estelle pumping station into the GIWW. All of the construction work would occur on the protected side of the levee and would not impact the Bayou aux Carpes CWA Section 404(c) area.

A benefit of this flow control structure would be the potential to augment the Bayou aux Carpes CWA Section 404(c) wetland area by actively managing the freshwater discharge from the Old Estelle PS. The USACE in cooperation with the EPA, the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), and other Federal and state resource agencies is conducting studies that are investigating the engineered gapping of the south bank of the Old Estelle Outfall Canal. These gaps in the outfall canal would allow freshwater from the pumping station to be directed into the Bayou aux Carpes CWA Section 404(c) area if determined to be beneficial to the wetland. The freshwater would be directed to the GIWW if it was determined not to be beneficial. Studies are ongoing to optimize the use of this feature to provide maximum benefit to the Bayou aux Carpes CWA Section 404(c) wetlands.

The eastern section of this alignment extends south from the flow control structure within the Old Estelle Outfall Canal, along the western bank of the GIWW within the Bayou aux Carpes CWA Section 404(c) area, crosses the GIWW and ends just north of Hero Canal. This section includes the GIWW channel and a BLH habitat on the GIWW east bank on the protected side of the existing HSDRRS, and a portion of the Bayou aux Carpes CWA Section 404(c) area on the flood side. A T-wall constructed north to south along the western bank of the GIWW within the Bayou aux Carpes CWA Section 404(c) area would tie into the flow control structure at the end of the Old Estelle Outfall Canal and at the southern end of the wall would tie into the closure complex and pump station complex that crosses the GIWW. This T-wall would be constructed so that a 100 ft by 4,200 ft, 9.6 acre or less, corridor of the Bayou aux Carpes CWA Section 404(c) area would be impacted by the construction of the floodwall (table 1). Obtaining the approximately 9.6 acres of new ROW to construct the innovative T-wall within the Bayou aux Carpes CWA Section 404(c) area would be contingent upon the EPA granting a modification to the Bayou aux Carpes CWA Section 404(c) Final Determination. The CEMVN submitted a formal request to modify the Bayou aux Carpes Final Determination on 4 November 2008.

In order to minimize impacts to these unique wetlands and confine construction impacts within that corridor, an innovative T-wall design will be used. This innovative T-wall design will minimize the footprint of the structure in the Bayou aux Carpes CWA Section 404(c) area. In addition, because the GIWW is a Federally maintained navigation channel, a protective earthen berm would be constructed on the protected side of the floodwall, the GIWW channel side. This berm would protect the wall from barge impacts, provide concrete scour protection, and serve as a maintenance access road.

Because of necessary channel dredging and pile driving activities, the Enterprise Pipeline will be relocated. In order to further minimize impacts to the Bayou aux Carpes CWA Section 404(c) area, the existing pipeline would be relocated utilizing modern directional drilling technologies that would allow the new line to pass under the 404c area. The pipeline relocation would not only avoid direct impacts to the 404c area, but would also minimize future impacts since the new more modern design would require less intrusive operations and maintenance than the existing pipeline.

In the GIWW adjacent to the Bayou aux Carpes CWA Section 404(c) area, 2,000 linear feet (LF) of foreshore dike protection using 650 lb stone would be constructed to prevent impacts (i.e., scouring, bank erosion, etc.) from occurring within the 404c area due to the discharge from the 20,000 cfs pump station. This foreshore dike protection would be constructed within the GIWW adjacent to but not within the Bayou aux Carpes CWA Section 404(c) area. Foreshore protection would not alter existing hydrologic conditions within the Bayou aux Carpes CWA Section 404(c) area.

The gate(s) and pump station described in the eastern section are referred to throughout this report as the "closure complex", which is a component of the proposed action referred to as the "GIWW West Closure Complex" or WCC. Features of the closure complex that would cross the GIWW would include a primary 150-ft to 300-ft navigation gate and a secondary 75-ft to 150-ft gate built to a design elevation of 16 ft (table 1). The closure complex would tie into a floodwall to the west and flood protection levee to the east. The design of the closure complex is being done in collaboration with representatives from the navigation industry and the US Coast Guard to ensure that the safest and most reliable system would be constructed. One of the primary design criteria of these gates is that the structure is large enough to meet the current flow rates in the channel. It would also be necessary to construct a permanent bypass channel and a 20,000 cfs pump station with positive backflow prevention.

A new levee would be constructed further eastward on what is currently the protected side. The levee work may require geotextile fabric and/or deep soil mixing to strengthen the levee foundation. Bayou Road would be realigned to provide access around the new levee on the protected side.

Four million cubic yards of material would be removed during construction of the eastern floodwall, closure complex, levee, and road realignment. After being evaluated for suitability this material would be used as borrow for the HSDRRS project. The material not used for borrow will be disposed of in the Walker Road borrow sites. The overburden material (i.e. roots, stumps, tress, etc.) would be mulched and used on site or hauled away to a landfill. Any road material (i.e. rock and earthen material) would be used to construct the new road.

The construction of this closure complex, levee, and road realignment would require a total of 240 acres of additional ROW to implement the construction work (table 1). The realignment of the road would have indirect impacts on the High Point Shooting area, such that they would need to reconfigure several of their shooting lanes in different directions.

Draft Individual Environmental Report (IER) #12, which detailed the impacts of the proposed actions, was released for a 30-day public review on 5 January 2009. In cooperation with the US Environmental Protection Agency (EPA) a public hearing date was set for 11 February 2009. The USACE extended the IER 12 comment period to allow stakeholders until 11 February 2009 to comment on the proposed project. Verbal and written comments were received from governmental agencies, non-governmental organizations (NGOs), and citizens. A joint EPA and CEMVN public hearing specific to IER #12 was held on 11 February 2009. Approximatley 15 comments were received from interested stakeholders during the public hearing.

Factors Considered in Determination. CEMVN has assessed the impacts of the proposed action on significant resources in the proposed project area, including the Bayou aux Carpes CWA Section 404(c) area, jurisdictional wetlands, non-jurisdictional bottomland hardwood forest (BLH), non-wetland/upland resources, prime and unique farmland, fisheries, wildlife, threatened

and endangered (T&E) species, cultural resources, recreational resources, noise quality, air quality, water quality, transportation, aesthetics, and socioeconomic resources.

The WCC alternative was selected for construction because it simultaneously (1) minimizes impacts to residential, commercial, and industrial properties, (2) minimizes the amount of storm frontage, therby decreasing risk while improving reliability, and (3) minimizes overall impacts to the human environment (specifically to the EPA designated Bayou aux Carpes CWA Section 404(c) area) as compared to other alternatives.

All jurisdictional wetlands and non-jurisdictional BLH forest impacts were assessed by the US Fish and Wildlife Service (USFWS) and CEMVN under NEPA, Fish and Wildlife Coordination Act, and Section 906 (b) WRDA 1986 requirements The unavoidable impacts for the proposed action are shown in Table 2.

Mitigation IERs will be prepared documenting and compiling the unavoidable impacts discussed in this IER. Mitigation will implement compensatory mitigation as early as possible once construction begins. All mitigation activities will be consistent with standards and policies established in the Clean Water Act Section 404 and the appropriate USACE policies and regulations governing this activity.

Table 2. Detailed Comparison of Estimated Wetland Impacts

	Protected Side Acres				**Flood Side Acres**		
	Pasture	**Early Successional BLH**	**Mid-Late Successional BLH**	**Mid-Late Successional BLH (temporary)**	**Riparian Swamp**	**404c BLH**	**404c Swamp**
Western Levee (27.5 ac)	----	23.5	4	----	----	----	----
Northern Floodwall (5.8 ac)	----	----	3.1	----	2.7	----	----
Eastern Floodwall (9.6 ac)	----	----	----	----	----	2.3	7.3
Closure Complex, Levee, and Road Realignment (142.3 ac)	----	7.8	126.2	----	8.3	----	----
Eastern Staging Areas (70.5 ac)	63.6	----	----	6.9	----	----	----
Detention Basin – West Bank Harvey (44.5 ac)	----	----	34.8	----	9.7	----	----
Detention Basin – West Bank Algiers (24.3 ac)	----	6.7	13.8	----	3.8	----	----
Detention Basin – East Bank Algiers (67.9 ac)	----	1.2	23.7	----	43	----	----
TOTAL Acres (392.6)	*63.6*	*39.2*	*205.6*	*6.9*	*67.5*	*2.3*	*7.3*
TOTAL AAHUs Lost (217.7)	*0*	*22.3*	*150.2*	*4.8*	*34.3*	*1.9*	*4.2*

Total Altered BLH (protected side) = 251.7 acres, 177.3 AAHUs
Total BLH (404c) (flood side) = 2.3 acres, 1.9 AAHUs
Total Swamp (flood side) = 74.9 acres (7.3 acres in 404c), 38.5 AAHUs

**Based on the HAM and WVA analyses 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.*

Environmental Design Commitments. Due to the action's impacts to the Bayou aux Carpes CWA Section 404(c) area, interagency collaboration, especially with the EPA, began early in the planning process and has continued during the development of IER # 12. The CEMVN agrees to support adaptive management efforts and to ensure that project feature augmentations would be implemented to minimize adverse impacts within the 404c area. The CEMVN has and would continue to employ measures to reduce the impacts to the Bayou aux Carpes CWA Section 404(c) area. Listed below are those efforts to minimize impacts to the 404c area:

- The WCC alternative: The first measure employed was the derivation of the WCC alternative in which a structure would be built along the boundary of the Bayou aux Carpes CWA Section 404(c) area instead of pursuing an alrernative that would have bisected the Bayou aux Carpes 404c area. The WCC alternative limits adverse impacts to the 404(c) area by building a structure with a narrow footprint (T-wall and earthen berm) along a portion of the Bayou aux Carpes CWA Section 404(c) area that was previously disturbed and would avoid impounding the northern third of the Bayou aux Carpes CWA Section 404(c) area, largely a flotant marsh (see section 2.4.2 of IER 12).

- Innovative techniques to build a floodwall along a navigable waterway: The structure in the Bayou aux Carpes CWA Section 404(c) area would be constructed as a floodwall in lieu of an earthen levee in order to ensure that the least environmentally damaging alternative is in place within this section. A floodwall can be built on a much smaller footprint than an earthen levee. Because the GIWW is a Federally maintained navigation channel, a protective berm would be constructed on the protected side of the floodwall, the GIWW channel side. This berm would protect the wall from barge impacts and serve as a maintenance access road. The USACE has committed to the EPA, resource agencies and to the stakeholders to minimize the footprint of this surge barrier component within the Bayou aux Carpes CWA Section 404(c) area to the greatest extent pracatacable..

- Construction via water based equipment: The floodwall and earthen berm will be constructed within the 100 ft right-of-way or less. No additional construction easements will be required for wall construction.

- GIWW Gate location: The USACE endeavored to locate the gate on the GIWW as far north as practical to further reduce impacts. This resulted in a cooridor with a maximum footprint of 4,200 ft by 100 ft for the floodwall. It is understood that the GIWW is a Federal navigation channel with heavy commercial barge traffic which requires that design of this structure be such that safety of users of the system be a paramount design consideration.

- Project feature augmentations: The USACE proposes that if it is feasible to complete augmentations to minimize adverse impacts that could potentially occur because of the

construction of the WCC alternative it will complete those augmentations, monitor the area, and apply adaptive management techniques as determined neededin cooperation with the resource agencies to the area. Studies are underway in cooperation with the EPA, NPS, and other resource agencies to determine the best and safest alternatives for augmenting the 404(c) area to avoid or minimize hydrological impacts that could resultdue to the government constructing this project. Once the studies are complete, the CEMVN, in conjunction with the resources agencies, would determine which features would be constructed. The appropriate features would be constructed as soon as this determination is made and design is completed. See chapters 5 and 7 in IER 12 for more information on the implementation and operation of project feature augmentations.

- Flow control structure: If fresh water input into the 404(c) area via dredged material bank gapping along the southern bank of the Old Estelle Outfall Canal is determined to be beneficial, the Old Estelle Canal flow control structure would be operated in a manner to provide the highest and best use of the outflow. In the event that freshwater input would result in adverse impacts, the structure would be operated to allow water to flow directly into the GIWW.

- Relocation of the Enterprise Pipeline: The pipeline relocation will be conducted in a manner to avoid impacts to the Bayou aux Carpes CWA Section 404(c) area. The existing pipeline will be relocated utilizing modern directional drilling technologies that will allow the new pipeline to pass under the 404(c) area. Directional drilling would not only avoid direct impacts to the 404(c) area, but would minimize future impacts since the newer, more modern design would require less intrusive operations and maintenance than the existing pipeline. Directional drilling of the pipeline would avoid impacts to BLH habitat in the 404(c) area.

- Foreshore protection within GIWW: Within the channel on the western side of the GIWW, adjacent to but not within the Bayou aux Carpes CWA Section 404(c) area, foreshore protection will be constructed to prevent any impacts that could result from operation of the pump station (i.e., scouring, banks erosion, etc.) within the 404(c) area due to the discharge from the 20,000 cfs pump station.

- Approximately 217.7 AAHUs of BLH and swamp habitat will be addressed in separate IERs specifically written for mitigation implementation.

Agreements between the CEMVN and cooperating Federal and state resource agencies pertinent to the proposed action are:

- Include project feature augmentations that would enhance the hydrology of the Bayou aux Carpes CWA Section 404(c) area, thus offsetting any potential indirect impacts due to the construction of the HSDRRS. The benefits of these augmentations would be determined as part of the ongoing studies;

- Develop an assessment report that addresses potential hydrological and ecological impacts to the Bayou aux Carpes CWA Section 404(c) area as a result of the HSDRRS;

- Collect baseline data within the Bayou aux Carpes CWA Section 404(c) area and surrounding water bodies to inform the impact assessment;

- Develop a long-term monitoring plan (IER 12, chapter 7);

- Develop a mitigation plan that specifies on-site mitigation for the 9.6 acres that could be impacted, will be conducted within the Bayou aux Carpes CWA Section 404(c) area or the adjoining National Park Service (NPS) Jean Lafitte National Historical Park and Preserve (JLNHPP) (IER 12, chapters 5 and 7). This mitigation plan will be discussed in a future mitigation IER, and

- CEMVN will prepare IER supplements and a Comprehensive Environmental Document (CED) that may contain additional information related to IER #12 that becomes available after the execution of the Final IER.

The proposed project feature augmentations developed in collaboration with the EPA and other resource agencies, including, in order of priority:

1. Gapping the existing earthen bank along the southern side of the Old Estelle Outfall Canal to provide regulated sheet flow into the Bayou aux Carpes CWA Section 404(c) area;

2. Modifying the existing earthen bank along the Southern Natural Gas Pipeline Canal to provide hydrological exchange between the northern and southern sections of the Bayou aux Carpes CWA Section 404(c) area;

3. Modifying the shell plug at Bayou aux Carpes to provide hydrological exchange between the GIWW and the Bayou aux Carpes CWA Section 404(c) area;

4. Closing the Southern Natural Gas Pipeline Canal to promote hydrological flow within the Bayou aux Carpes CWA Section 404(c) area;

5. Gapping or grading down drill hole access canal banks to promote hydrological flow within the Bayou aux Carpes CWA Section 404(c) area; and

6. Gapping or grading down oil well access roads to promote hydrological flow within the Bayou aux Carpes CWA Section 404(c) area.

These project feature augmentations and plans are being evaluated for effectiveness and feasibility (constructability, relation to project construction, and resource availability) in partnership with the EPA, the NPS, and other resource agencies. Final determination of which project feature augmentations to implement would be determined in collaboration with the Interagency team after an analysis of benefits and impacts is completed (See IER 12, section 7 for further details regarding the mitigation and monitoring plans for impacts to the Bayou aux Carpes CWA Section 404(c) area.

CEMVN is coordinating with USFWS to implement the recommendations laid out in the USFWS Coordination Act Report (CAR) (letter dated 24 December 2008, Appendix D). The recommendations of the USFWS, and CEMVN responses, are found in IER 12, section 6.2.

The Louisiana State Historic Preservation Officer (LSHPO) requests that if any unrecorded cultural resources are determined to exist within the proposed borrow areas, then no work will proceed in the area containing these cultural resources until a CEMVN staff archeologist has

been notified and final coordination with the LSHPO and Tribal Historic Preservation Officer has been completed.

Agency & Public Involvement. Various governmental agencies, non-governmental organizations, and citizens were engaged throughout the preparation of IER #12. Agency staff from USFWS, NMFS, EPA, US Geologic Survey (USGS), National Park Service (NPS), Louisiana Department of Natural Resources (LaDNR), and Louisiana Department of Wildlife and Fisheries (LaDWF) were part of an interagency team that has and will continue to have input throughout the HSDRRS planning process (Appendix C).

There have been over 100 public meetings since March 2007 about proposed HSDRRS work. Issues relating to draft IER # 12 have been discussed at several of these meetings. CEMVN sends out public notices in local and national newspapers, news releases (routinely picked up by television and newspapers in stories and scrolls), and mail notifications to stakeholders for each public meeting. In addition, www.nolaenvironmental.gov was set up to provide information to the public regarding proposed HSDRRS work. CEMVN has recently started sending out e-mail notifications of the meetings to approximately 300 stakeholders who requested to be notified by this method. Public meetings will continue throughout the planning process. In addition to the public meetings, the CEMVN held a joint public hearing on 11 February 2009 with the EPA to take comments on the government's proposed action.

Draft IER #12 Agency Comments (found in Appendix D)

a. USFWS
    1. Planning-aid letter dated 26 November 2007
    2. CAR dated 24 December 2008
    3. Comment letter dated 20 January 2009
b. NMFS
    1. Concurrence of USFWS recommendations in a letter dated 29 January 2009
c. LaDWF:
    1. Letter of review, dated 26 January 2009

Draft IER #12 Public Comments (found in Appendix B)

d. Mr. Jeff Grimes: emailed comment dated 26 May 2008
e. Mr. Jody Coyne: emailed comment dated 5 June 2008
f. Oakville Community Action Group: emailed comment dated 20 August 2008
g. Mr. Jody Coyne: emailed comment dated 10 December 2008
h. Mr. George David Loeb, Jr.: Comment letter dated 5 January 2009
i. Mr. Carl Ward: Comment letter dated 7 January 2009
j. Mr. Glenn Trachen: Comment letter dated 7 January 2009
k. Mississippi River Recycling: Comment letter dated 8 January 2009
l. Mr. Richard Meissner: Comment letter dated 12 January 2009
m. Mr. Jody Coyne: emailed comment dated 13 January 2009
n. Mr. Allen Hero: Comment letter dated 16 January 2009
o. U.S. Fish and Wildlife Service: Comment letter dated 20 January 2009
p. Alabama-Coushatta Tribe of Texas: Comment letter dated 22 January 2009
q. Department of Wildlife and Fisheries: Comment letter dated 26 January 2009
r. National Marine Fisheries Service: Comment letter dated 29 January 2009
s. U.S. Environmental Protection Agency: Comment letter dated 5 February 2009
t. Mr. Jay Vincent: Comment letter dated 9 February 2009
u. Gulf Restoration Network: Comment letter dated 11 February 2009
v. Louisiana Audubon Council: Comment letter dated 11 February 2009

w. Sierra Club, Delta Chapter: Comment letter dated 11 February 2009
x. Lombas@cox.net: emailed comment dated 11 February 2009

Draft IER #12 Public Hearing Comments: 11 February 2009

Verbal Comments (found in Appendix B)

1. Mayor Tim Kerner, Town of Lafitte, Louisiana
2. Mr. Donald Vallee, High Point Shoot Range owner
3. Mr. Matt Rota, Gulf Restoration Network
4. Mr. Gabriel Mondino, 8203 Maple Street, New Orleans, Louisiana
5. Ms. Jill Mastrototaro, Sierra Club
6. Mr. Harvey Stern, Sierra Club
7. Mr. Ray Champagne, resident of Lafitte, Louisiana
8. Dr. Barry Kohl, Louisiana Audubon Council
9. Ms. Felicia Kahn, League of Women Voters
10. Mr. Allen Hero, landowner in Belle Chasse, Louisiana
11. Mr. Jerry Huffman, Harvey Canal Industrial Association
12. Mr. Tom Halko, 4518 Jean Lafitte Blvd., Lafitte, Louisiana
13. Mr. Lawrence Pourciau

Decision. The CEMVN Environmental Planning and Compliance Branch has assessed the potential environmental impacts of the proposed action described in this IER, and performed a review of the comments received during the public review periods for Draft IER #12 and the public hearing held on 11 February 2009. Furthermore, all practicable means to avoid or minimize adverse environmental effects have been incorporated into the recommended plan.

The public interest will be best served by implementing the selected plan as described in IER #12 in accordance with the environmental considerations discussed above.

I have reviewed IER #12 and have considered agency recommendations and comments received from the public during the scoping phase and comment periods. I find the recommended plan fully addresses the objectives as set forth by the Administration and Congress in the 3rd, 4th, and 5th Supplemental Appropriations.

The plan is justified, in accordance with environmental statutes, and it is in the public interest to construct the actions as described in this document.

18 Feb 09
Date

Alvin B. Lee
Colonel, US Army
District Commander

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

REPLY TO
ATTENTION OF

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).

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 then 4,200 LF by 100 LF. This action would impact no greater then 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

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

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

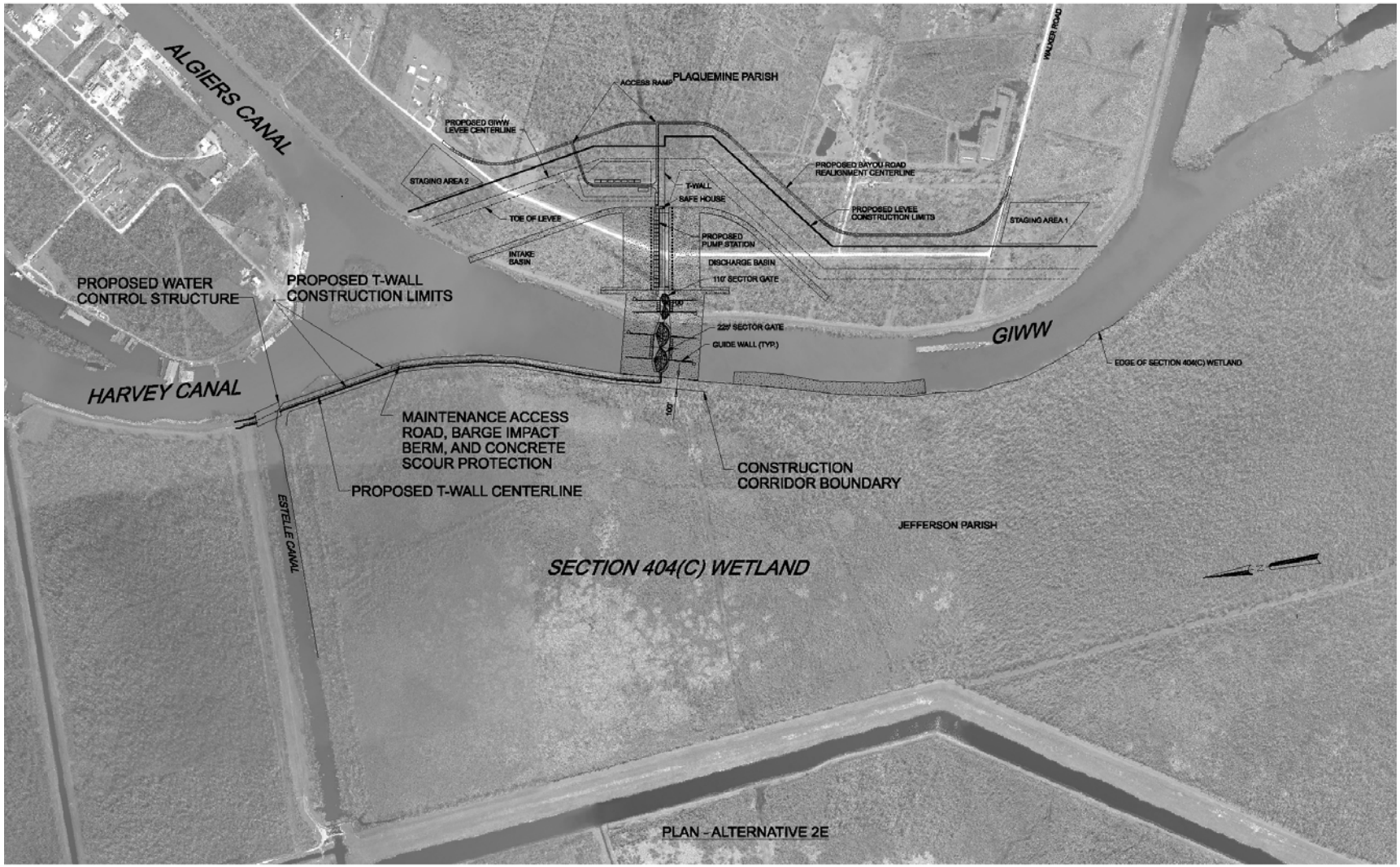
Mr. Jerry Spohrer
Executive Director
West Jeff Levee District
7001 River Road
Marrero, Louisiana 70072

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

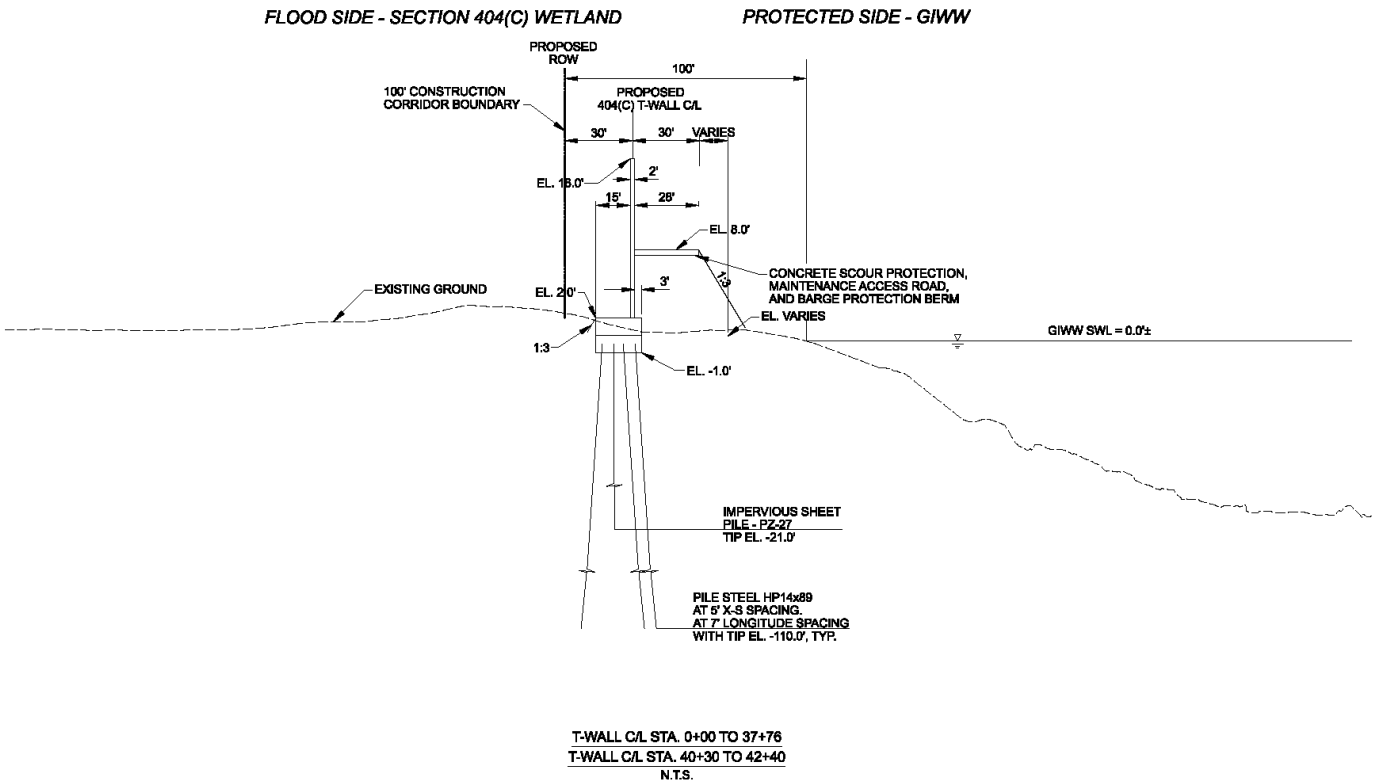
CURRENT PROPOSED SITE PLAN

- 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)



T-WALL C/L STA. 0+00 TO 37+76
T-WALL C/L STA. 40+30 TO 42+40
N.T.S.

SECTION 404(C) WETLAND T-WALL TYPICAL SECTION
ALTERNATIVE 2E

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 then 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.

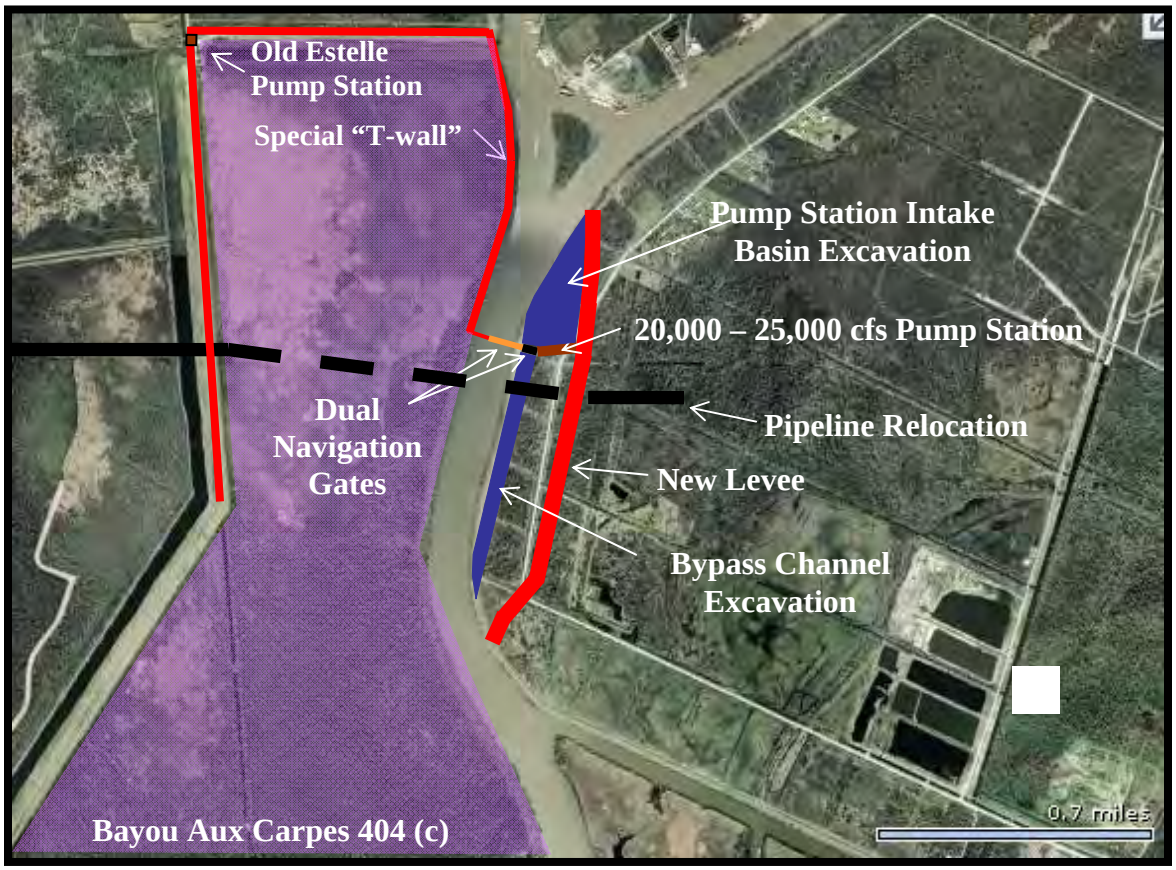


Figure1. Conceptual GIWW West Closure Complex alternative schematic.

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.

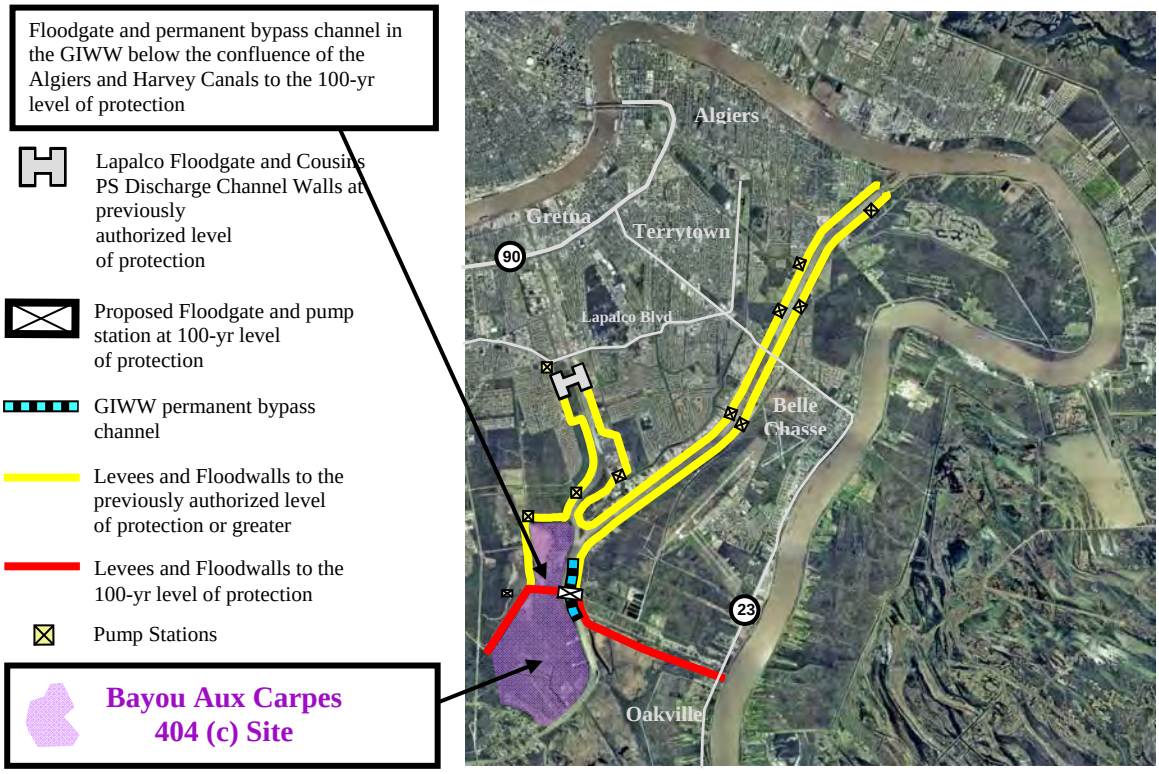


Figure 2. Conceptual GIWW A alternative schematic.

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).

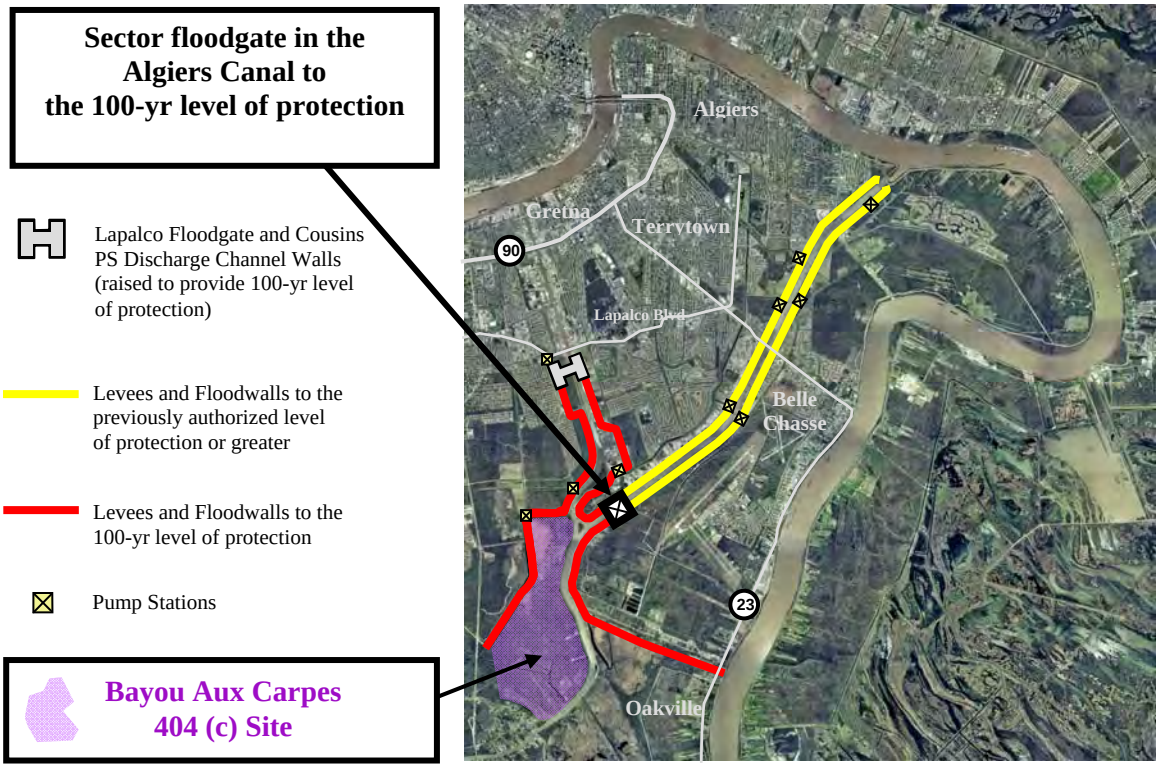


Figure 3. Conceptual Algiers Gate alternative schematic.

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 serves 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 protections 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.

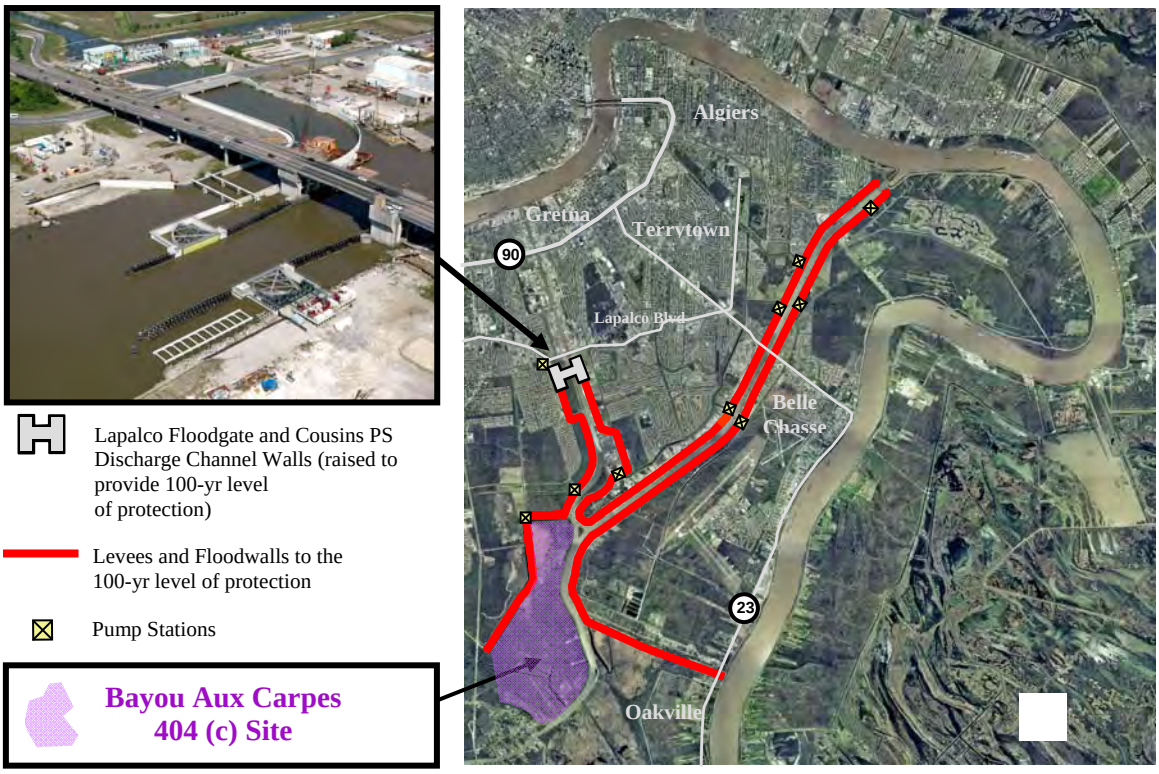


Figure 4. Conceptual Parallel Protection alternative schematic.

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 2nd 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)	**Direct Impacts**: 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** **Indirect impacts:** -Minimal -Minimal impact to flotant marsh **Other Details:** -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.	**Direct Impacts:** 5.1 acres of Nationally significant 404 (c) area wetlands + 112 acres (not in 404 (c)) = **117.1 Total acres of wetlands** **Indirect impacts:** -Bifurcation of the 404 (c) area alters wildlife migration and ground water flow -Impoundment of northern 519 acres of flotant marsh and the potential total loss of flotant marsh and degradation within the 404 (c) **Other Details:** -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	**Direct Impacts:** 161 acres of wetlands + 150 acres of BLH = **311 Total acres of wetland** **Indirect impacts**: -Minimal indirect impacts **Other Details:** -Storm surge reduction by marsh and flotant -May return ~10 acres to flood side	**Direct Impacts:** 150 acres of BLH + 50 acres BLH = **200 Total acres of wetlands** **Indirect impacts**: -Minimal indirect impacts **Other Details:** - Storm surge reduction by marsh and flotant
Socioeconomic/Human Resources	-Relocation of 1 business and 1 pipeline (Enterprise Gas pipeline) -Harvey canal businesses would included in the protection	-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	-Relocation of 13 residences and 3-4 businesses	-Relocation of 70 residences, 600 apartments, and 55 businesses

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

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 flotant 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 the12th 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. <u>The GIWW WCC alternative:</u> 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.

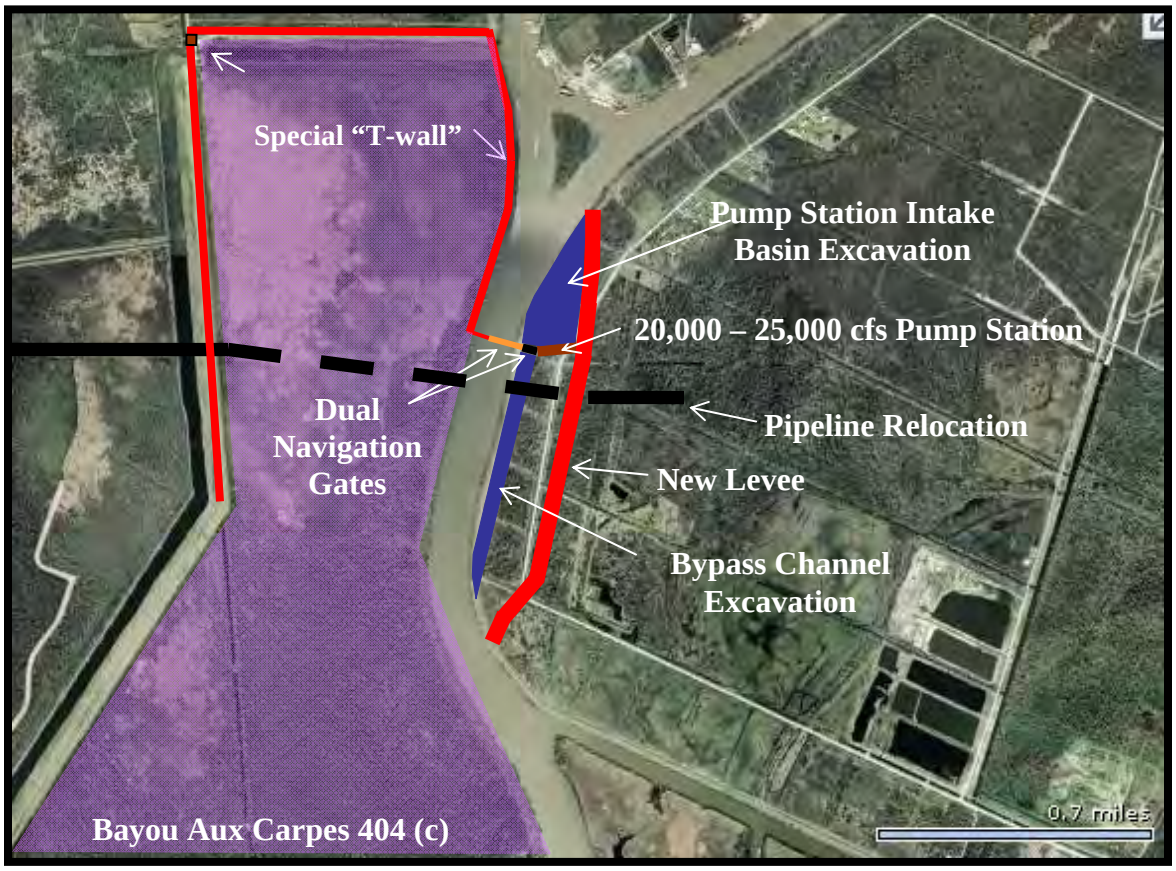
The current levee and floodwall system providing parallel protection for the GIWW, Algiers, and Harvey Canals is 27 miles long and will provide secondary protection to 8.5 feet NAVD.

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)).

	Preliminary[1]		Final[2]	
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.		X	
(2) Suspended particulates/turbidity impacts.		X	
(3) Water column impacts.		X	
(4) Alteration of current patterns and water circulation.		X	
(5) Alteration of normal water fluctuations/ hydroperiod.		X	
(6) Alteration of salinity gradients.	X		
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
(1) Effect on threatened/endangered species		X	
(2) Effect on the aquatic food web.		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	Yes
(2) Hydrography in relation to known or anticipated sources of contaminants ……	No*
(3) Results from previous testing of the material or similar material in the vicinity of the project	Yes
(4) Known, significant sources of persistent pesticides from land runoff or percolation	No*
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	No*
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	No*

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

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).	YES	NO*
b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5).	YES	NO*
c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5)	YES	NO*
d. Contaminant availability (review sections 2a, 3, and 4).	YES	NO*
e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5).	YES	NO*
f. Disposal site (review sections 2, 4, and 5).	YES	NO*
g. Cumulative impact on the aquatic ecosystem.	YES	NO*
h. Secondary impacts on the aquatic ecosystem.	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.

availability, it plans to consider whatever data are available.

As part of the Agency's evaluation, it plans to examine, at a minimum, the following classes of facilities: hazardous waste generators, hazardous waste recyclers, metal finishers, wood treatment facilities, and chemical manufacturers. This list may be revised as the Agency's evaluation proceeds. EPA is currently scheduled to complete and publish in the **Federal Register** a notice addressing additional classes of facilities the Agency plans to evaluate regarding financial responsibility requirements under CERCLA Section 108(b) by December 2009, and, at that time, will solicit public comment.

VII. Conclusion

Based upon the Agency's analysis and review, it concludes that hardrock mining facilities, as defined in this notice, are those classes of facilities for which EPA should identify and first develop requirements pursuant to CERCLA Section 108(b). EPA will carefully examine specific activities, processes, and/or metals and minerals in order to determine what proposed financial responsibility requirements may be appropriate. As part of this process, EPA will conduct a close examination and review of existing Federal and State authorities, policies, and practices that currently focus on hardrock mining activities.[50]

Dated: July 10, 2009.

Lisa P. Jackson,

Administrator.

[FR Doc. E9–16819 Filed 7–27–09; 8:45 am]

BILLING CODE 6560–50–P

[50] As part of developing proposed and final rules the Agency will consider whether hardrock mining facilities which have a RCRA Part B permit or are subject to interim status under RCRA Subtitle C and already are subject to RCRA financial assurance and facility-wide corrective action requirements need to also be subject to the financial responsibility requirements under Section 108(b) of CERCLA. In addition, EPA is aware and will consider in its development of proposed and final rules, that mining on Federal land triggers either the Bureau of Land Management's (BLM) Part 3809 regulations (43 CFR Part 3809) and the Forest Service's Part 228 regulations (36 CFR Part 228), both have financial responsibility requirements that cover reclamation costs. Many States also have reclamation laws.

ENVIRONMENTAL PROTECTION AGENCY

[FRL–8932–9]

Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes in Jefferson Parish, LA

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This is a notice of EPA's Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes to allow for the discharge of dredged or fill material for the purpose of the construction of the West Closure Complex as part of the larger flood protection project for the greater New Orleans area. EPA believes that this Final Determination for modification achieves a balance between the national interest in reducing overwhelming flood risks to the people and critical infrastructure of south Louisiana while minimizing any damage to the Bayou aux Carpes CWA Section 404(c) site to the maximum degree possible in order to avoid unacceptable adverse effects.

DATES: *Effective Date:* The effective date of the Final Determination for Modification was May 28, 2009.

ADDRESSES: U.S. Environmental Protection Agency, Office of Water, Wetlands Division, Mail code 4502T, 1200 Pennsylvania Ave, NW., Washington, DC 20460. The following documents used in the Bayou aux Carpes modification are listed on the EPA Wetlands Division Web site at *http://www.epa.gov/owow/wetlands/regs/404c.html:* New Orleans District of the Corps letter dated November 4, 2008, requesting that EPA modify the Bayou aux Carpes CWA Section 404(c) designation; Public Notice of Proposed Determination to modify the Bayou aux Carpes CWA Section 404(c) designation published in the **Federal Register** on January 14, 2009; April 2, 2009, Recommended Determination (RD) for modification of the Bayou aux Carpes 404(c) action; and the May 28, 2009, Modification of the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes. Additional documents that are related to the Bayou aux Carpes modification can be located on the U.S. Army Corps of Engineers New Orleans District Web site at *http://www.nolaenvironmental.gov/projects/usace_levee/IER.aspx?IERID=12.*

Publicly available document materials are available either electronically through *http://www.regulations.gov* or in hard copy at the Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566–1744, and the telephone number for the Water Docket is (202) 566–2426.

FOR FURTHER INFORMATION CONTACT: Mr. Clay Miller at (202) 566–1365 or by e-mail at *miller.clay@epa.gov.* Additional information and copies of EPA's Final Determination for Modification are available at *http://www.epa.gov/owow/wetlands/regs/404c.html* or *http://www.nolaenvironmental.gov/projects/usace_levee/IER.aspx?IERID=12.*

SUPPLEMENTARY INFORMATION: Section 404(c) of the Clean Water Act (CWA) (33 U.S.C. 1251 *et seq*) authorizes EPA to prohibit, restrict, or deny the specification of any defined area in waters of the United States (including wetlands) as a disposal site for the discharge of dredged or fill material whenever it determines, after notice and opportunity for public hearing, that such discharge into waters of the United States will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

Congress directed the U.S. Army Corps of Engineers (Corps) to enhance the existing Lake Pontchartrain and Vicinity Hurricane Protection project and the West Bank and Vicinity Hurricane Protection project to the 100-year level of protection. One section of this much larger project is within the Bayou aux Carpes area that is subject to a 1985 EPA CWA Section 404(c) action that prohibited the discharge of dredged or fill material in the Bayou aux Carpes site south of the New Orleans metro area. On November 4, 2008, the New Orleans District of the Corps requested a modification of the Bayou aux Carpes CWA Section 404(c) designation to accommodate discharges to the Bayou aux Carpes wetlands associated with the proposed enhanced levee system in Jefferson Parish, Louisiana.

In evaluating the Corps of Engineers proposal for modification of the 1985 Bayou aux Carpes CWA Section 404(c) Final Determination, the key elements of a Section 404(c) process were followed. These include a hearing and opportunity for the public to provide written comments, preparation and submittal of a Recommended Determination proposed by EPA Region 6 to EPA Headquarters, and a Final Determination for Modification issued by EPA Headquarters.

Background

On October 16, 1985, EPA issued a Final Determination pursuant to Section 404(c) of the Clean Water Act restricting the discharge of dredged or fill material in the Bayou aux Carpes site, Jefferson Parish, Louisiana, based on findings that the discharges of dredged or fill material into that site would have unacceptable

adverse effects on shellfish beds and fishery areas (including spawning and breeding areas), wildlife, and recreational areas. EPA published a CWA Section 404(c) Final Determination prohibiting, with three exceptions, future discharges of dredged or fill material to wetlands into the Bayou aux Carpes site at 50 FR 47267 (November 15, 1985). The first exception was for discharges associated with the completion of the Corps modified design for the Harvey Canal—Bayou Barataria Levee Project. The second exception was for discharges associated with routine operation and maintenance of the Southern Natural Gas Pipeline. The third exception covered discharges associated with EPA approved habitat enhancement activities. The CWA Section 404(c) action was based upon a thorough record of investigations, including field surveys, remote sensing, and other technical analyses conducted by three EPA facilities, the U.S. Fish and Wildlife Service (USFWS), the National Park Service (NPS), and the Louisiana State University (LSU) Center for Wetland Resources.

After completion of the Final Determination, several requests for modifications were reviewed by EPA. The one request that was granted was for an emergency exception to bury an existing pipeline deeper via horizontal drilling techniques as a response to unstable soil conditions and a leaking pipeline. Shell Pipe Line Corporation (Shell) petitioned EPA for reconsideration of exceptions identified in EPA's 1985 Final Determination concerning the Bayou aux Carpes site on December 18, 1991. Shell requested a modification to the Final Determination in order to (1) temporarily discharge dredged or fill material associated with performing emergency work to relocate an existing below ground pipeline located in the restricted Section 404(c) area; and (2) exclude from the Bayou aux Carpes Section 404(c) restriction future discharges associated with routine operation and maintenance of this pipeline. On February 28, 1992, Shell's request for modification was approved by the EPA Assistant Administrator for Water on the basis that relocating the pipeline to non-wetlands was infeasible from the perspectives of engineering alternatives and public safety, the work would have only minimal and temporary impacts on the wetlands, and the work was essentially the same as that envisioned under the second exception granted in the 1985 Final Determination (57 FR 3757).

As a result of the residential, commercial, and industrial damage caused by Hurricanes Katrina and Rita in 2005, Congress directed the Corps to enhance the existing Lake Pontchartrain and Vicinity Hurricane Protection project and the West Bank and Vicinity Hurricane Protection project to the 100-year level of protection, as determined by the Federal Emergency Management Agency (FEMA). The overall Corps project to provide protection to southern Louisiana involves two large levee systems, the West Bank and Vicinity Hurricane Protection Project and the Lake Pontchartrain and Vicinity Hurricane Protection Project, and approximately 350 miles of earthen levees and floodwalls throughout five parishes in the New Orleans metropolitan area. One section of this much larger project is within the Bayou aux Carpes area. The Corps' proposal for providing increased hurricane and storm damage risk reduction for this area does not fall within one of the previously established exceptions to the Section 404(c) Final Determination. Since the construction of the Corps' project would result in discharges of dredged or fill material within the Bayou aux Carpes site, a request for modification of 1985 EPA's Final Determination was submitted for consideration and final decision.

On November 4, 2008, the New Orleans District of the Corps requested a modification to the 1985 EPA action, which prohibited the discharge of dredged or fill material in the Bayou aux Carpes site south of the New Orleans metro area. The Corps requested that EPA modify the Bayou aux Carpes CWA Section 404(c) designation to accommodate discharges to the Bayou aux Carpes wetlands associated with the proposed enhanced levee system in Jefferson Parish, Louisiana. The project known as the West Closure Complex proposes the construction of a ''T-wall'' style floodwall in lieu of an earthen levee in order to minimize the footprint. A berm to protect the floodwall from barge collisions would be constructed on the water side of the floodwall and would serve as a maintenance access road. The floodwall would be built from the water side to reduce construction impacts.

The placement of the wall within a 100 foot by 4,200 foot corridor on a previously impacted area of the Bayou aux Carpes site, along with the commitment by the Corps to augment the design as necessary to enhance the hydrology of the Bayou aux Carpes 404(c) area to offset any potential impacts due to construction, provides the most practical approach from an environmental perspective while ensuring the 100-year level of risk reduction is accomplished. Construction of the proposed action would impact less than 10 acres within the Bayou aux Carpes 404(c) boundary.

EPA carefully reviewed the proposal and the information submitted by the New Orleans District of the Corps, comments received pursuant to the notice published in the **Federal Register** and public hearing held in New Orleans, and the existing Bayou aux Carpes administrative record. On January 14, 2009, EPA posted a notice in the **Federal Register** announcing a public comment period on the request by the New Orleans District of the Corps to amend the 1985 Bayou aux Carpes CWA Section 4040(c) Final Determination. There were 25 written comments received from individuals and organizations that included opinions about whether the modification should be granted or denied, consideration of a project alternative that would avoid all impacts to the Bayou aux Carpes site, the need for a detailed mitigation plan to be included, the need to thoroughly research and plan mitigation and augmentation features, and the need for a long-term monitoring plan. A public hearing was held on February 11, 2009. Thirteen people spoke at the hearing, and raised issues about the larger plans for providing upgraded hurricane and storm damage risk reduction for a portion of the West Bank and Vicinity Hurricane Protection Levee system as well as whether EPA should grant the modification.

Conclusion

The West Closure Complex project sited on the Bayou aux Carpes area is a part of a much larger project with the intent to reduce flood risks to the 250,000 people living on the west bank of the Mississippi River and to infrastructure supporting the greater New Orleans area by building a more resilient and reliable storm damage and risk reduction system, as directed by Congress. In an effort to reconcile the potentially conflicting goals of increased flood protection and ecological protection, the Corps and EPA worked closely together and with other Federal partners, State and local agencies, and many stakeholders in an effort to understand fully the possibilities for accommodating these dual objectives. Having worked closely with the Corps and other resource agencies on the evaluation of the environmental aspects of this segment of the overall West Bank and Vicinity project upgrade, EPA agreed with the Corps' conclusion that

there is no reasonable and less environmentally damaging practicable alternative for achieving the Congressional directive than to locate a sector gate adjacent to the Bayou aux Carpes CWA 404(c) site.

In consideration of the above information, EPA believes that compelling circumstances justify a modification of the 1985 Bayou aux Carpes CWA Section 404(c) designation, that there are no less environmentally damaging practicable alternatives that would adequately address those circumstances, and that all feasible means of minimizing adverse wetland effects to the Bayou aux Carpes site will be implemented. Therefore, EPA is modifying the 1985 Bayou aux Carpes CWA 404(c) Final Determination with conditions to allow for discharges associated with construction of the West Closure Complex on the Bayou aux Carpes site as described in the Corps' November 4, 2008, request for modification. EPA believes that this Final Determination for modification achieves a balance between the national interest in reducing overwhelming flood risks to the people and critical infrastructure of south Louisiana while minimizing any damage to the Bayou aux Carpes CWA Section 404(c) area to the maximum degree possible in order to avoid unacceptable adverse effects.

Dated: July 21, 2009.

Michael H. Shapiro,

Acting Assistant Administrator for Water.

[FR Doc. E9–17928 Filed 7–27–09; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–8935–8]

Notice of a Project Waiver of Section 1605 (Buy American Requirement) of the American Recovery and Reinvestment Act of 2009 (ARRA) to the Sharon Elementary School Water System, Sharon, VT

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: The EPA is hereby granting a project waiver of the Buy American requirements of ARRA section 1605 under the authority of section 1605(b)(2) [manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality] to the Sharon Elementary School Water System in Sharon, Vermont for the purchase of NSF–55 Class A certified Ultra Violet (UV) disinfection equipment. This is project specific waiver and only applies to the use of the specified product for the ARRA funded project being proposed. Any other ARRA project that may wish to use the same product must apply for a separate waiver based on project specific circumstances. The UV disinfection equipment under consideration is manufactured outside of the United States by two companies based in Canada and meets the water system's technical and design specifications. The Acting Regional Administrator is making this determination based on the review and recommendations of the Municipal Assistance Unit. The Sharon Elementary School Water System has provided sufficient documentation to support its request. The Assistant Administrator of the Office of Administration and Resources Management has concurred on this decision to make an exception to section 1605 of the ARRA. This action permits the purchase of specific UV disinfection equipment for the proposed project being implemented by the Sharon Elementary School Water System.

DATES: *Effective Date:* July 17, 2009.

FOR FURTHER INFORMATION CONTACT: Katie Connors, Environmental Engineer, (617) 918–1658, or David Chin, Environmental Engineer, (617) 918–1764, Municipal Assistance Unit (CMU), Office of Ecosystem Protection (OEP), U.S. EPA, One Congress Street, CMU, Boston, MA 02114.

SUPPLEMENTARY INFORMATION:

In accordance with ARRA section 1605(c) and pursuant to section 1605(b)(2) of Public Law 111–5, Buy American requirements, EPA hereby provides notice that it is granting a project waiver to the Sharon Elementary School Water System (the ''System'') in Sharon, Vermont for the acquisition of NSF–55 Class A certified Ultra Violet (UV) disinfection equipment manufactured outside of the United States.

Section 1605 of the ARRA requires that none of the appropriated funds may be used for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States, or unless a waiver is provided to the recipient by the head of the appropriate agency, here EPA. A waiver may be provided if EPA determines that (1) Applying these requirements would be inconsistent with the public interest; (2) iron, steel, and the relevant manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron, steel, and the relevant manufactured goods produced in the United States will increase the cost of the overall project by more than 25 percent.

The State of Vermont requires that water supply installations must comply with the Vermont Standards for Water System Design, Construction and Protection (Vermont Water Supply Rule—Chapter 21). In order to meet these standards the State of Vermont requires public water systems using UV disinfection to use National Sanitation Foundation (NSF) Standard 55 (Ultraviolet Microbial Water Treatment Systems) Class A certified UV equipment. The State of Vermont, Agency of Natural Resources, Water Supply Division (VTANR) has identified three lines of UV disinfection systems with NSF–55 Class A certification, all manufactured in Canada. Two of the three include the UV Pure Hallett 15xs ultraviolet water system, as well as the Trojan Technologies Sterilight SPV 200 series units. The design engineer and the VTANR have conducted research and determined that there are no domestic manufacturers that have NSF–55 Class A certification at the time of this waiver request.

The design engineer for the System indicated that he chose to use four Hallett 15xs (15 gpm) UV units for the school buildings and one Sterilight SPV 200 (2 gpm) UV unit for a remote location which receives its water supply from the school well. The designs also took into account the limited space available for retrofitting the water supply and distribution systems, as well as the attributes of the specific equipment. The estimated cost for all of the UV equipment for the proposed project was under $10,000.

The System's submission clearly articulates functional reasons for its technical specifications and requirements, and has provided sufficient documentation that the relevant manufactured goods are not produced in the United States in sufficient and reasonably available quantity and of a satisfactory quality to meet its technical specifications.

The April 28, 2009 EPA HQ Memorandum, ''Implementation of Buy American provisions of Public Law 111–5, the 'American Recovery and Reinvestment Act of 2009' '', defines *reasonably available quantity* as ''the quantity of iron, steel, or relevant manufactured good is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project

Modification to the
1985 Clean Water Act Section 404(c)
Final Determination for Bayou aux Carpes

I. Introduction

Section 404(c) of the Clean Water Act (CWA), 33 U.S.C. §1344(c), authorizes the Environmental Protection Agency (EPA) to restrict or prohibit the use of a wetland area as a disposal site for dredged or fill material if the discharge will have unacceptable adverse effects on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. The regulations establishing procedures to be used by EPA in applying this provision are found at 40 CFR Part 231. In 1984 and 1985 these procedures were employed by EPA when the existing Bayou aux Carpes CWA Section 404(c) designation was made. Key milestones during that process included a hearing and opportunity for the public to provide written comments, a Recommended Determination proposed by EPA Region 6, and a Final Determination issued by EPA Headquarters and noticed in the Federal Register on November 15, 1985 (50 Fed. Reg. 47267).

EPA proceeded with a similar process for the review of the Army Corps of Engineers' request for a modification of the 404(c) designation for the Bayou aux Carpes area. On November 4, 2008, the New Orleans District of the Corps requested that EPA modify the Bayou aux Carpes CWA Section 404(c) designation to accommodate discharges to the Bayou aux Carpes wetlands associated with the proposed enhanced flood protection system in Jefferson Parish, Louisiana. The proposed discharge for construction of the flood wall would impact no more than 9.6 acres of wetlands within the Bayou aux Carpes area. A notice of Proposed Determination was published in the Federal Register on January 14, 2009, and a public hearing was held in New Orleans on February 11, 2009. Public comments were accepted through February 23, 2009. Based on the record developed during the public comment period, the Regional Administrator[1] makes a decision to either withdraw the Proposed Determination, or prepare a Recommended Determination in accordance with the regulations. On April 2, 2009, Acting EPA Regional Administrator (Region 6) Lawrence E. Starfield signed the Recommended Determination (RD) for modification of the Bayou aux Carpes 404(c) action. The RD and associated documents were transmitted to EPA's Office of Water (OW) for Final Determination action by the Assistant Administrator for Water (AAOW).[2] Upon receipt of the RD and the administrative record, the AAOW makes a Final Determination (FD) affirming, modifying or rescinding the recommendation.

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[1] Lawrence E. Starfield is the Deputy Regional Administrator for the U.S. Environmental Protection Agency, Region 6, in Dallas, Texas, and is currently acting as Regional Administrator.

[2] Signature authority on issuance of Section 404(c) Final Determinations has been delegated by the Administrator to the Assistant Administrator for Water.

II Background

A. Project History: Bayou aux Carpes CWA Section 404(c)

1985 Bayou aux Carpes CWA Section 404(c) Determination

On October 16, 1985, the EPA Assistant Administrator for External Affairs[3] issued a FD pursuant to Section 404(c) of the CWA restricting the discharge of dredged or fill material in the Bayou aux Carpes site, Jefferson Parish, Louisiana based on findings that the discharges of dredged or fill material into that site would have unacceptable adverse effects on shellfish beds, fishery areas (including spawning and breeding areas), wildlife, and recreational areas. EPA published the FD prohibiting, with three exceptions, future discharges of dredged or fill material to wetlands into the Bayou aux Carpes site at 50 Fed. Reg. 47267 (November 15, 1985). The first exception provided for discharges associated with the completion of the U.S. Army Corps of Engineers' (Corps) modified design for the Harvey Canal – Bayou Barataria Levee Project. The second exception provided for discharges associated with routine operation and maintenance of the Southern Natural Gas Pipeline. The third exception addressed discharges associated with EPA approved habitat enhancement activities. The CWA Section 404(c) action was based upon a thorough record of investigations, including field surveys, remote sensing, and other technical analyses conducted by three EPA facilities, the U.S. Fish and Wildlife Service (USFWS), the National Park Service (NPS), and the Louisiana State University (LSU) Center for Wetland Resources. These study reports and additional documentation supporting the designation may be found at: http://www.nolaenvironmental.gov/nola_public data/projects/usace levee/docs/original/BayouAuxCarpes404c1985RecDeterm.pdf.

1992 Modification to Bayou aux Carpes CWA Section 404(c) Action

After completion of the FD, several requests for modifications were reviewed by EPA.[4] The one request that was granted was for an emergency exception to bury an existing pipeline deeper via horizontal drilling techniques as a response to unstable soil conditions and a leaking pipeline. Shell Pipe Line Corporation (Shell) petitioned EPA for reconsideration of exceptions identified in EPA's 1985 FD concerning the Bayou aux

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[3] In 1985 the signature authority for CWA Section 404(c) had been delegated to the Assistant Administrator for External Affairs. This responsibility has been subsequently delegated to the Assistant Administrator for Water.

[4] In 1988 the Corps requested an exception to allow construction of the West Bank Hurricane Protection Levee such that the toe of the V-shaped levee would extend into the 404(c) protected area. That request was based only on potential cost savings, did not fall within the bounds of the exceptions set out in the 404(c) Final Determination, and was therefore considered to be a restricted action. In response, the Corps modified the levee alignment and constructed the levee without discharges into the Bayou aux Carpes CWA Section 404(c) site.

Carpes site on December 18, 1991.[5] Shell requested a modification to the FD in order to (1) temporarily discharge dredged or fill material associated with performing emergency work to relocate an existing below ground pipeline located in the restricted Section 404(c) area; and (2) except from the Bayou aux Carpes Section 404(c) restriction future discharges associated with routine operation and maintenance of this pipeline. On February 28, 1992, Shell's request for modification was approved by the AAOW on the basis that relocating the pipeline to non-wetlands was infeasible from the perspectives of engineering alternatives and public safety, the work would have only minimal and temporary impacts on the wetlands, and the work was essentially the same as that envisioned under the second exception granted in the 1985 FD (57 Fed. Reg. 3757).

Current Modification to Bayou aux Carpes CWA Section 404(c) Action Request

As a result of the residential, commercial, and industrial damages caused by Hurricanes Katrina and Rita in 2005, Congress directed the Corps of Engineers (Corps) to enhance the existing Lake Pontchartrain and Vicinity Hurricane Protection project and the West Bank and Vicinity Hurricane Protection project to the 100-year level of protection, as determined by the Federal Emergency Management Agency. The overall Corps project to provide protection to southern Louisiana involves two large levee systems, the West Bank and Vicinity Hurricane Protection Project and the Lake Pontchartrain and Vicinity Hurricane Protection Project, and approximately 350 miles of earthen levees and floodwalls throughout five parishes in the New Orleans metropolitan area. One section of this much larger project is within the Bayou aux Carpes area. The Corps' proposal for providing increased hurricane and storm damage risk reduction for this area does not fall within one of the three exceptions provided for in the 1985 Section 404(c) Final Determination. Since the construction of the Corps' project would result in discharges of dredged or fill material within the Bayou aux Carpes site, a request for modification of EPA's FD was submitted for consideration and final decision.

On November 4, 2008, the New Orleans District of the Corps requested that EPA modify the Bayou aux Carpes CWA Section 404(c) designation to accommodate discharges to the Bayou aux Carpes wetlands associated with the proposed enhanced flood protection system in Jefferson Parish, Louisiana. Region 6 completed a RD on April, 2, 2009, and transmitted the RD and associated documents to EPA's OW for review and final decision pursuant to CWA Section 404(c).

B. Project Description

Prior to the November 2008 request for the Section 404(c) modification, the Corps' preferred alternative initially included a 3,000 foot long levee and then a 3,000 foot floodwall, bisecting the Bayou aux Carpes CWA Section 404(c) site. However, early in the planning process, EPA Region 6 notified the Corps that this alternative bisecting the site would present irreparable environmental impacts and would most likely result in the loss of over 600 acres of unique flotant marsh wetlands within the Bayou aux Carpes site.

[5] Additional information supporting Shell's request for modification was received by EPA on January 17, 1992 and January 21, 1992.

EPA Region 6, in coordination with the National Park Service, suggested a conceptual alternative, which the Corps subsequently designed. This alternative is now the current proposed project alternative, also known as the West Closure Complex. The floodwall is located within the Bayou aux Carpes CWA Section 404(c) site on an area comprised of bottomland hardwood and cypress-tupelo habitat that has formed on top of the western bank of the Gulf Intracoastal Waterway (GIWW), established when the waterway was originally created. The bank is low and undulating and shows signs of downed and damaged trees as a result of recent hurricane winds. The Corps plans to construct an improved storm surge barrier system and tie into a new array of flood gates and pumping stations crossing the GIWW as part of the aforementioned 100 year flood protection plan. The significant structural element that will be within the Bayou aux Carpes site is a floodwall that would be constructed on the previously impacted GIWW spoil bank (Fig. 1).

Figure 1. West Closure Complex features on the Bayou aux Carpes site and vicinity. Note 4,200 foot T-wall.

Once the West Closure Complex alternative became the preferred design, EPA requested the Corps to consider any siting or design options that could reduce the environmental impacts further. Alternatives which would have built the floodwall within the same alignment but closer to the GIWW or completely within the water outside the boundary of the Bayou aux Carpes CWA Section 404(c) site were considered. A number of environmental organizations also focused on this issue. After considerable evaluation, the Corps found this was not a practicable alternative that would meet the project purpose based on a determination that this alternative design and siting posed significant

navigational safety issues and would not meet the cost, social, and engineering risk and reliability criteria. Furthermore, the US Coast Guard agrees with the Corps' assessment that constructing a floodwall in the waterway would increase hazards to navigation and the possibility of a major marine accident. In a letter to the EPA, dated February 23, 2009, the US Coast Guard stated that it objects to the construction of any segment of the floodwall in the GIWW channel based on these navigation hazard concerns. After careful review of the Corps' analysis on these alternative designs and siting, EPA accepted those conclusions.

The Corps has incorporated into the West Closure Complex alternative a number of innovative designs and construction techniques to reduce the wetland impacts. The structure proposed in the Bayou aux Carpes CWA Section 404(c) area would be constructed as a "T-wall" style floodwall in lieu of an earthen levee in order to minimize the footprint (Fig. 2.). A berm to protect the floodwall from barge collisions would be constructed on the water side and would incorporate a maintenance access road. This configuration would contain impacts within a maximum 100 foot width. The floodwall would be built from the water side to reduce construction impacts. Further, the Corps has located the gates and pumps that would span the GIWW as far north as practical to further reduce the length of the structure along the boundary of the Bayou aux Carpes CWA Section 404(c) site. These factors have resulted in a maximum corridor for the floodwall of 4,200 feet by 100 feet.

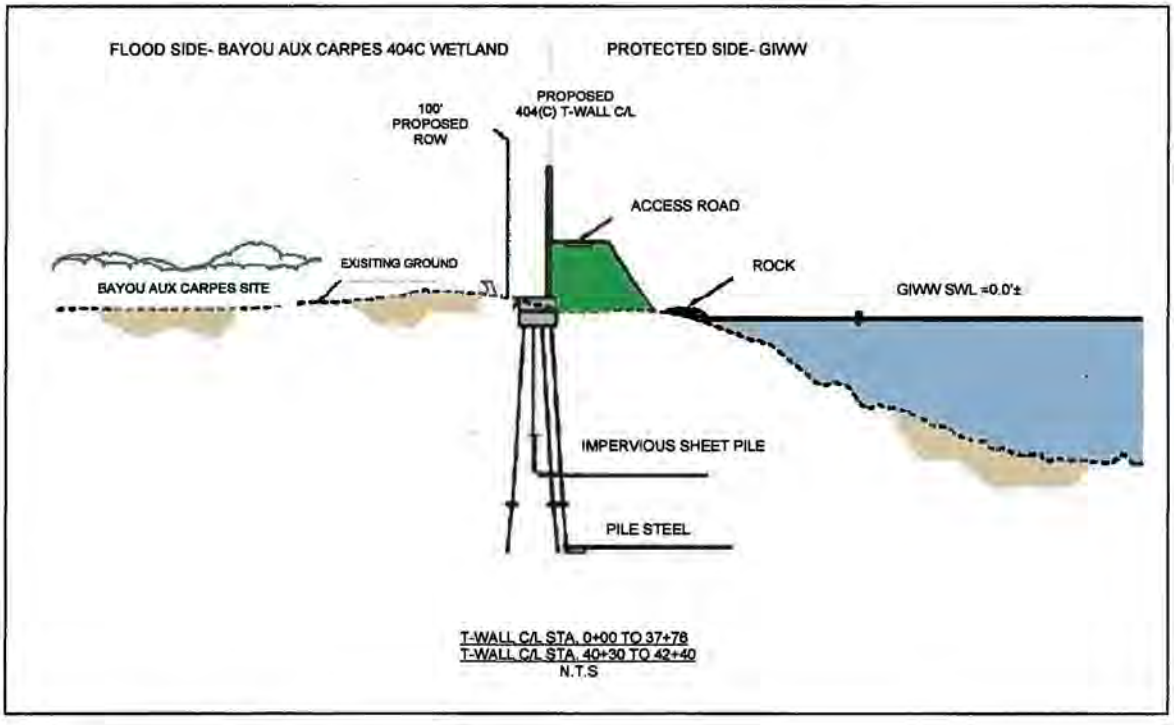

Figure 2. Cross-section of the proposed T-Wall design.

The T-wall would tie into the proposed flow control structure at the end of the Old Estelle Outfall Canal to the north and the closure and pump station complex that would cross the

GIWW to the south. The T-wall is designed to an elevation of +16.0 ft (NAVD 88 2004.65). A continuous steel sheet pile wall will be provided beneath the base slab for seepage cutoff purposes.

Construction of the proposed action would impact no more than 9.6 acres within the Bayou aux Carpes 404(c) boundary. The location of the wall away from the waterway's edge increases the safety of the wall against potential catastrophic vessel impacts by absorbing the energy of the impact in the embankment, thus stopping the vessel before it contacts the wall. Placement of the protected earthen berm outside the channel results in no constriction of the waterway as a storm water evacuation route. The placement of the wall within the 100 ft by 4,200 ft corridor on the previously impacted area of the Bayou aux Carpes 404(c) area, along with the commitment by the Corps to provide augmentation and mitigation measures to enhance the hydrology and habitat of the Bayou aux Carpes 404(c) area to offset any potential impacts due to construction, provides the most practical approach from an environmental perspective while ensuring the 100-yr level of risk reduction is achieved.

C. EPA Headquarters Action

The key elements of a Section 404(c) process have been followed as EPA considered this modification request. These include a hearing and opportunity for the public to provide written comments, preparation and submittal of a RD proposed by EPA Region 6 to EPA Headquarters, a FD (this document) issued by EPA Headquarters and subsequent notice in the Federal Register of the final decision.

On January 14, 2009, a notice for the proposed modification of the Bayou aux Carpes Section 404(c) was published in the Federal Register. A public hearing, which EPA OW representatives attended, was held in New Orleans on February 11, 2009. Public comments were accepted through February 23, 2009. On February 10, 2009, representatives from the EPA OW and EPA Region 6, accompanied by personnel from the National Park Service, US Geological Service, and the Fish and Wildlife Service, conducted a site visit of the Bayou aux Carpes area (Photos 1 and 2). On April 2, 2009, Acting Regional Administrator for Region 6, Lawrence E. Starfield, signed the RD for modification of the Bayou aux Carpes 404(c) action and the RD was transmitted to EPA's OW for FD action by the AAOW. Upon receipt of the RD and the administrative record, the AAOW makes a FD affirming, modifying or rescinding the recommendation. During this review period the OW provided an opportunity to the Corps to meet with EPA officials for further consultation.

III. Site Characterization

The Bayou aux Carpes site (Fig. 3) lies in the upper Barataria basin within the Mississippi deltaic plain, an area experiencing some of the highest historic rates of coastal wetland loss in the country. Coastal wetland loss has been widespread in

Photos 1 and 2. Bayou aux Carpes February 10, 2009 field visit EPA Office of Water, EPA Region 6, National Park Service, US Geological Service and US Fish and Wildlife Service.

Louisiana over the past half century averaging approximately 100 km^2 per year during the 1960's through the 1980's, but decreasing to approximately 62 km^2 per year between 1990 and 2000. An additional loss of approximately 1300 km^2 is anticipated by 2050.[6] Although this region experienced a spike in wetland loss and degradation as a result of hurricanes over the last few years, the Bayou aux Carpes site has weathered the storms and other natural and human-induced forces. Today the approximately 3,000 acres of unique and productive wetlands of the Bayou aux Carpes CWA Section 404(c) site are an important regional and national asset providing ecological, flood storage, and water quality benefits. The Bayou aux Carpes CWA Section 404(c) site is bounded on the north by the east–west Old Estelle Pumping Station Outfall Canal, on the east by Bayou Barataria (Gulf Intracoastal Waterway, or GIWW), on the south by Bayou Barataria and Bayou des Familles, and on the west by State Highway 3134 and the "V-Levee." Immediately across State Highway 3134 to the west of the site is the Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve (Fig. 4).

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[6] Evers, D. Elaine, Erick M. Swenson, Lee Stanton, and Charles E. Sasser. *Distribution and Ecological Characteristics of the Marshes in the Eastern Mississippi River Delta Plain, Louisiana.* June 2007. Louisiana State University, Coastal Ecology Institute, Baton Rouge. Prepared for U.S. Environmental Protection Agency, Dallas, Texas.

Figure 3. Location of Bayou aux Carpes site (outlined in red) within the vicinity of the Greater New Orleans Metro area, Louisiana.

Today, the habitat of Bayou aux Carpes looks much the same as it did at the time of the 1985 Section 404(c) action. The Bayou aux Carpes site is a diverse estuarine ecosystem consisting of a mosaic of habitats, including forested wetland, shrub wetland, cypress-tupelo swamp, marsh, and open water. From an ecological perspective, the Bayou aux Carpes CWA Section 404(c) site exhibits some particularly notable habitat features. Within the forested swamps, naturally regenerating cypress trees may be found, a situation all too uncommon along the Louisiana coast where natural and human-induced alterations have resulted in conditions limiting natural regeneration. In addition to the forested wetland systems, the site also contains flotant (or floating) marsh, an ecologically valuable and unique wetland type. This type of wetland has also become increasingly rare because of major losses in the floating marshes that historically covered extensive areas, particularly in the Mississippi River Deltaic Plain.

The Bayou aux Carpes CWA Section 404(c) site also incorporates valuable coastal resources and provides a wide array of benefits to the citizens of this area. For example, the Bayou aux Carpes CWA Section 404(c) wetlands provide floodwater storage and water quality benefits. During the 1984 -1985 studies, the relatively flat topography was found to enhance the capacity of the area to detain surface waters and slow the release of water downstream. Most of the site is now federally owned and the CWA Section 404(c) designation continues to apply to all wetlands within the site, regardless of ownership. The most recent federal action was finalized on March 30, 2009, as the President signed the Omnibus Public Land Management Act of 2009, which added the federally owned portion of the CWA Section 404(c) site to the Barataria Preserve Unit of Jean Lafitte National Historical Park and Preserve.

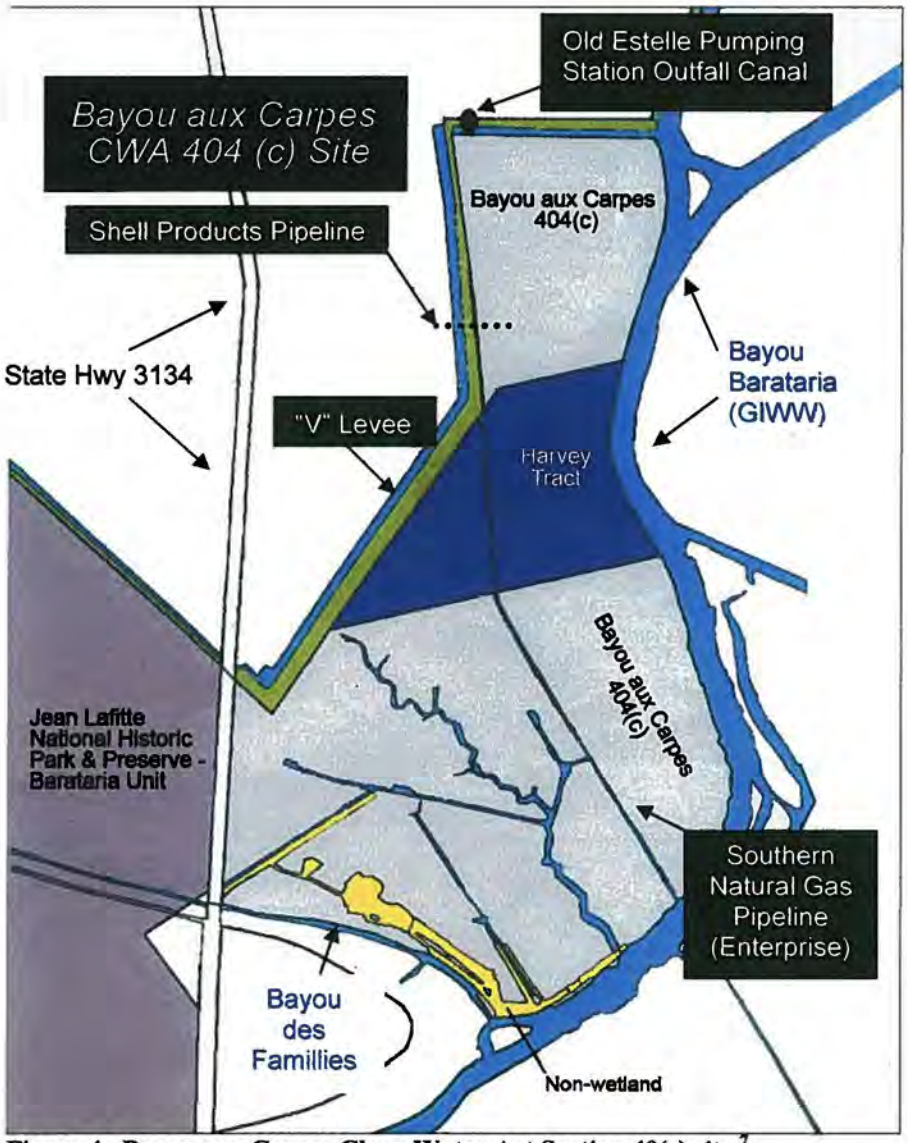

Figure 4. Bayou aux Carpes Clean Water Act Section 40(c) site.[7]

During the field studies in 1984 and 1985, at least 70 wildlife species, at least 23 species of freshwater fish, and 27 taxa of macroinvertebrates were observed.[8] The field data showed the area to be seasonally brackish, supporting species that can tolerate both fresh and brackish salinities. The Bayou aux Carpes drainage area and associated habitats provide valuable spawning, feeding, and nursery habitat for recreationally-important freshwater and estuarine fish. The USFWS 1985 habitat analysis determined that the bottomland hardwood and forested swamp habitat in this drainage area provided valuable

[7] On March 30, 2009, the federally owned portion of the CWA Section 404(c) site was added to the Barataria Preserve Unit of Jean Lafitte National Historical Park and Preserve.

[8] USFWS. Fish and Wildlife Resources of the Bayou aux Carpes Drainage Area, Jefferson Parish, Louisiana. June 1985. Lafayette, Louisiana.

habitat and the 2008 field studies revealed that the habitat continues to be significant for fish and wildlife.

IV. Adverse Environmental Impacts

A. Adverse Impacts to Wetlands

The proposed floodwall would impact no more than 9.6 acres within a 100 foot width from the GIWW toward the interior of the Bayou aux Carpes CWA Section 404(c) site. A maximum of 7.2 acres of cypress-tupelo swamp and 2.4 acres of bottomland hardwood wetlands within the site would be directly and permanently impacted by mechanical clearing and grubbing prior to construction of the new floodwall. Hydrologic impacts to the CWA Section 404(c) site from the floodwall are expected to be minimal. No additional indirect effects are anticipated.

The planning, engineering, and interagency review process has resulted in the development of this storm damage risk reduction alternative, the West Closure Complex alternative, which has avoided and minimized impacts to the Bayou aux Carpes CWA Section 404(c) area to the maximum extent practicable. However, implementation of this alternative will still result in unavoidable impacts, or discharges, to wetlands in the restricted site. Loss of this habitat value is not expected to jeopardize the ecological integrity of Bayou aux Carpes wetland site and the loss of habitat will be fully compensated, as described below.

V. Mitigation and Enhancement Features

Early in the planning process, EPA advised the Corps that unavoidable wetland impacts to the Bayou aux Carpes CWA Section 404(c) site must be fully and appropriately mitigated and compensated for consistent with the regulations. EPA Region 6 staff has provided guidance to the Corps on avoiding and minimizing the impacts to the Bayou aux Carpes CWA Section 404(c) site from the West Closure Complex alternative. In addition, Region 6 is working with an interagency team, including the Corps, to evaluate an array of additional features that might provide environmentally beneficial hydrologic and wetland effects to this area. These enhancement features are being evaluated and considered in order to add an extra measure of environmental benefits in light of the unique status of the Bayou aux Carpes site.

Evaluation of these features continues and agreement has been reached with the Corps and the interagency review team regarding the minimum amount of mitigation required to offset the wetland impacts. The Corps has also agreed to fund and implement additional ecological enhancement features, if the results of ongoing investigations indicate that they will contribute environmental benefits. An adaptive management approach will be utilized to monitor changes over time, evaluate the observed results with respect to intended objectives, and apply any changes needed to achieve the desired outcome.

Mitigation procedures and requirements regarding impacts within the Bayou aux Carpes 404(c) area are being coordinated with the EPA, USFWS, USGS, NOAA Fisheries,

National Park Service, and other State representatives on the interagency team. Although a final mitigation plan has yet to be finalized, the District Commander for the New Orleans District in a letter to the Regional Administrator for EPA Region 6 dated November 4, 2008, (Appendix 1) committed to mitigate for all unavoidable adverse impacts to the Bayou aux Carpes CWA Section 404(c) area within the Bayou aux Carpes CWA Section 404(c) area and/or Jean Lafitte National Historical Park and Preserve, as per an agreement with EPA and the resource agencies. Furthermore, the Corps committed that mitigation projects will be designed and implemented concurrently with the design and construction of the project. The District Commander in that letter also stated that "full mitigation within this unique environment may require mitigation in addition to acres indicated by the Wetland Value Assessment." Based on the minimum mitigation that the Corps has committed to and is required to perform pursuant to Section 2036 of the Water Resources Development Act of 2007,[9] as well as on the Corps' commitment to provide additional mitigation and augmentation features EPA believes that any discharges of dredged or fill material associated with the Corps' West Closure Complex alternative would not result in unacceptable adverse effects to the Bayou aux Carpes wetland resources. Additionally, EPA expects the final mitigation plan to be adequate to offset unavoidable impacts consistent with mitigation regulations (33 CFR 332) with the goal to ensure no net loss of either wetland acres or functions. EPA must agree with the proposed mitigation plan prior to the mitigation plan being finalized. In addition to mitigation, project augmentation measures will be considered by the interagency team to enhance the wetland functions and values of the site and provide added compensation for any unavoidable impacts.

VI. Final Determination

A. Findings and Conclusion

EPA has carefully reviewed the proposal and the information submitted by EPA Region 6, the New Orleans District of the U.S. Army Corps of Engineers, comments received pursuant to the notice published in the Federal Register on January 14, 2009, and public hearing held in New Orleans on February 11, 2009, the alternative NEPA documents for the proposed project, and the existing Bayou aux Carpes administrative record. Based on EPA's review of the Corps' recommendations regarding the relative flood risk reduction benefits, social and economic costs, as well as the hydrologic, engineering, and navigation constraints, EPA concludes the West Closure Complex alternative has the potential to accomplish the Corps' flood control, navigation, timing, and engineering objectives while avoiding and minimizing the impacts to the Bayou aux Carpes CWA Section 404(c) area to the maximum degree possible. In reaching a decision, EPA considered whether the discharges of dredged or fill material associated with the Corps' West Closure Complex would result in unacceptable adverse effects on the shellfish beds, fishery areas (including spawning and breeding), wildlife, and recreational areas of the

[9] Section 2036 "Mitigation for Fish and Wildlife and Wetlands Losses" of the Water Resources Development Act of 2007 requires the Corps to mitigate losses to flood damage reduction capabilities and fish and wildlife resulting from a water resources project, the Corps is required to ensure that the mitigation plan for each water resources project complies with the mitigation standards and policies established pursuant to the regulatory programs administered by the Corps.

Bayou aux Carpes Section 404(c) area. EPA concludes that the discharges of dredged or fill material associated with the West Closure Complex alternative would not result in unacceptable adverse effects to the Bayou aux Carpes Section 404(c) wetland resources.

The West Closure Complex project sited on the Bayou aux Carpes area is a part of a much larger project with the intent to reduce risks to the 286,000 people living on the west bank of the Mississippi River and to infrastructure supporting the greater New Orleans area by building a more resilient and reliable storm damage and risk reduction system, as directed by Congress. In an effort to reconcile the potentially conflicting goals of increased flood protection and ecological protection, the Corps and EPA worked closely together and with other federal partners, State and local agencies, and many stakeholders in an effort to understand fully the possibilities for accommodating these serious needs in an environmentally sensitive manner. EPA agrees with Corps' conclusion that there is no reasonable and less environmentally damaging practicable structural alternative for achieving the Congressional directive of levee enhancement than to locate a sector gate adjacent to the Bayou aux Carpes CWA Section 404(c) site.

In conclusion, EPA believes that compelling circumstances justify a modification of the Bayou aux Carpes CWA Section 404(c) designation, that there are no less environmentally damaging practicable alternatives that would adequately address those circumstances, and that all feasible means of minimizing adverse wetland effects to the Bayou aux Carpes site will be implemented, and any discharges of dredged or fill material associated with the Corps' West Closure Complex would not result in unacceptable adverse effects to the Bayou aux Carpes section 404(c) wetland resources. Therefore, EPA is modifying the 1985 Bayou aux Carpes CWA Final Determination, with specific conditions on the modification to allow for discharges associated with construction of the West Closure Complex alternative not to exceed 9.6 acres of impact on the Bayou aux Carpes 404(c) site as described in the Corps of Engineers' November 4, 2008, request for Section 404(c) modification. EPA believes that this FD for modification achieves a balance between the national interest in reducing overwhelming flood risks to the people and critical infrastructure of southern Louisiana while avoiding and minimizing adverse effects to the ecologically significant Bayou aux Carpes CWA Section 404(c) site to the maximum extent practicable. EPA has a long record of protecting these wetlands, dating back to the early 1970's and does not believe that this modification, coupled with EPA approved mitigation and site augmentation features, will result in significant or unacceptable adverse effects to the Bayou aux Carpes CWA Section 404(c) wetland resources. The projected construction impacts will be limited in time and area, the unavoidable impacts will be appropriately mitigated, additional environmental augmentation features will be developed and implemented, and the site will be monitored and managed for any adverse changes for the life of the Corps project.

B. Modification and Conditions

The October 16, 1985, Bayou aux Carpes Final Determination is hereby modified, subject to conditions specified below, by adding the following: The US Army Corps of Engineers may discharge dredged or fill material for the purpose of constructing the West Closure Complex alternative, as described by Colonel Alvin B. Lee, District Commander

for the New Orleans District, in the November 4, 2008, letter requesting modification of the 1985 Bayou aux Carpes 404(c) FD. In this letter (Appendix 1), Colonel Lee requested modification of the 404(c) designation of the site to allow for the construction of a 4,200 foot floodwall and earthen berm within a 100 ft by 4,200 ft corridor along the eastern boundary of the Bayou aux Carpes 404(c) site, Jefferson Parish, Louisiana.

As stated above, this modification is subject to the specific conditions that EPA found were necessary in order for the Agency to grant this modification. The conditions are consistent with EPA and Corps regulations for mitigation and must be implemented in order for any discharges of dredged or fill material to comply with the terms of the 1985 Bayou aux Carpes 404(c) Final Determination. Not-with-standing the fact that the conditions contained in the Final Determination are binding requirements on the Corps, in order to demonstrate the high level of inter-agency cooperation and commitment that compensatory mitigation projects will be provided and maintained, a letter agreeing to the conditions below must be provided by the Corps to EPA (e.g., a formal, documented commitment from a government agency or public authority) (33 CFR 332.3 (n)), as soon as possible and in any event prior to any construction activities authorized by this Final Determination modification. The District Commander for the New Orleans Corps District must provide in writing to EPA AAOW a commitment to plan, design, ensure full funding, implement and monitor all mitigation, augmentation and monitoring measures that are conditions on which this modification was based to the satisfaction of EPA. EPA recognizes that full funding of the mitigation, augmentation and monitoring measures is subject to the availability of appropriated funds, however the District Commander for the New Orleans Corps District would agree to request through the Corps' budget process the funding that is necessary to fully implement and monitor the mitigation, augmentation and monitoring measures as detailed below.

As set forth in this modification, this action is reflective of a unique set of circumstances. The modification granted today does not have any bearing on any other CWA Section 404(c) designations or modification requests. Each CWA Section 404(c) designation represents a unique situation that responds to a specific set of parameters unlike any other.

i. Project Design and Construction

1. During final project design, the New Orleans District of the Corps (Corps) shall utilize all feasible engineering and construction practices to reduce impacts to the Bayou aux Carpes CWA Section 404(c) wetlands.[10]

2. During project construction, the Corps shall comply with the conservation recommendations as specified in the "Fish and Wildlife Coordination

[10] This commitment was stated in a November 4, 2008, request for Section 404(c) modification letter to Mr. Lawrence E. Starfield, Deputy Regional Administrator EPA Region 6 from Colonel Alvin B. Lee, District Commander for the New Orleans District for the US Army Corps of Engineers (Appendix 1). Note: enclosed documents referenced in this letter are not attached in Appendix 1, but can be found in EPA Region 6 Recommended Determination dated April 2, 2009.

Act Report, Individual Environmental Report (IER) 12, Harvey to Algiers" (February 18, 2009), or as they may be amended by the USFWS, Ecological Service, Lafayette.

ii. Mitigation

1. The New Orleans District of the Corps shall ensure full funding and implementation of mitigation measures to compensate for the unavoidable adverse impacts of the project. EPA will make the final determination as to whether compensation is adequate, appropriate, and satisfactorily implemented in a timely manner.

2. The New Orleans District of the Corps shall obtain written approval from EPA Region 6, after consulting with the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (GNOHSDRRS) interagency review team, prior to implementing any mitigation feature. At a minimum, the Corps shall document for EPA Region 6 the concurrence or non-concurrence on each mitigation feature by the National Park Service (Jean Lafitte National Historical Park and Preserve), US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), US Geological Survey (USGS), Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and Louisiana Department of Wildlife and Fisheries.

3. The New Orleans District of the Corps shall be responsible for obtaining all necessary permits and conducting all required regulatory coordination and approvals prior to implementing any mitigation feature. The Corps shall coordinate with the Jean Lafitte National Historical Park and Preserve to determine the appropriate lead agency for conducting the interagency coordination and approval processes and shall obtain all necessary National Park Service permits.

iii. Augmentation Features

1. The New Orleans District of the Corps shall insure full funding and implementation of augmentation features to enhance the wetland functions and values of the site. EPA will make the determination as to whether augmentation features are adequate, appropriate, and satisfactorily implemented in a timely manner.

2. The New Orleans District of the Corps shall obtain written approval from EPA Region 6, after consulting with the GNOHSDRRS interagency review team, prior to implementing any augmentation feature. At a minimum, the Corps shall document for EPA Region 6 the concurrence or non-concurrence on each augmentation feature by the NPS (Jean Lafitte National Historical Park and Preserve), USFWS, NMFS, USGS, Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and Louisiana Department of Wildlife and Fisheries.

3. The Corps shall be responsible for obtaining all necessary permits and conducting all required regulatory coordination and approvals prior to implementing any augmentation feature. The Corps shall coordinate with the Jean Lafitte National Historical Park and Preserve to determine the appropriate lead agency for conducting the interagency coordination and approval processes and shall obtain all necessary National Park Service permits.

iv. Long-term Monitoring and Operation

1. The New Orleans District of the Corps shall coordinate the development of a long-term site monitoring plan, to be approved in writing by EPA, after consulting with the GNOHSDRRS interagency review team. EPA will make the determination as to whether the monitoring plan is adequate and appropriate.

2. The New Orleans District of the Corps and EPA Region 6 shall develop and sign a Memorandum of Agreement with those willing and active State, federal, and local participants with natural resource management missions who have participated on the IER # 12 [11]interagency review team. The Memorandum of Agreement shall document the commitment to participate in the planning and analyses specified by the long-term monitoring plan.

3. The New Orleans District of the Corps shall obtain written approval from EPA Region 6, after consulting with the GNOHSDRRS interagency review team, prior to implementing the long-term monitoring plan. At a minimum, the Corps shall document for EPA Region 6 the concurrence or non-concurrence on the long-term monitoring plan by the NPS (Jean Lafitte National Historical Park and Preserve), USFWS, NMFS, USGS, Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and Louisiana Department of Wildlife and Fisheries.

4. The New Orleans District of the Corps shall be responsible for ensuring implementation of a long-term site monitoring plan, to extend no less than the first 50 years of the Corps project life, unless otherwise addressed in a long-term agreement with another party approved by EPA.[12] The long-term monitoring plan for the Bayou aux Carpes Modification mitigation and augmentation features will focus on monitoring both the mitigation and augmentation features, as well as the impacts of the floodwall. The plan should provide for making adjustments if the mitigation or augmentation features prove not to perform as expected. Though it is not expected that the Corps would need to make future adjustments to the floodwall, the effects of the floodwall are to be monitored to determine unexpected impacts which may warrant other corrective actions.

5. The New Orleans District of the Corps shall provide EPA Region 6 with digital aerial photography of the site (season and flood stage to be determined jointly) prior to

---

[11] The Corps has divided the study area for the GNOHSDRRS into 17 project component areas. Each of these component areas will report on plans for those areas in Individual Environmental Reports (IERs). The proposed plans for the Bayou aux Carpes CWA Section 404(c) area are reported in IER #12.

[12] The ultimate responsibility to plan, design, fully fund, implement and monitor all mitigation, augmentation and monitoring measures that are conditions on which this determination was based are the responsibility of the U.S. Army Corps of Engineers. Although the Corps may enter into long term agreements with another party with respect to the work authorized by this modification, such agreements do not obviate the Corps' responsibility for meeting the conditions of this modification, and any concerns EPA may have will be raised with the Corps, not other involved parties.

constructing the floodwall along the perimeter of the site and annually for the first five years after its construction, and at other times as specified by EPA Region 6.

6. The New Orleans District of the Corps shall gather the monitoring data and report results to EPA Region 6 annually, on a schedule to be specified by EPA Region 6, each year for the first five years, and at other times as specified by EPA Region 6.

7. Throughout the life of the project, the New Orleans District of the Corps shall ensure that any necessary adaptive construction modifications, including removal or repair, of any mitigation or augmentation feature is instituted based on the recommendations of EPA.

8. In the event that EPA determines during the life of the project that operation, maintenance, or long-term management by the Corps of the flood protection/risk reduction features, mitigation features, or augmentation features is causing unanticipated and unacceptable wetland impacts, EPA may modify the terms of these conditions.

Michael Shapiro

Michael H. Shapiro
Acting Assistant Administrator for Water

5/28/09

Date

Appendix 1

Modification to the 1985 Clean Water Act Section 404(c) Final Determination for Bayou aux Carpes

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

REPLY TO
ATTENTION OF

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).

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 then 4,200 LF by 100 LF. This action would impact no greater then 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

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

Alvin B. Lee
Colonel, US Army
District Commander

Enclosure

See page 4 for list of copies furnished.

Mr. Garret Graves
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Mr. Jerry Spohrer
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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P. O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

JUL 27 2009

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

Mr. Michael Shapiro
Acting Assistant Administrator for Water
Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Mail Code: 4101M
Washington, DC 20460

Dear Mr. Shapiro:

I am writing to you today to reaffirm the US Army Corps of Engineers (Corps) November 4, 2008, commitment to the US Environmental Protection Agency (EPA) that the Corps will plan, design, ensure full funding, implement and monitor all mitigation, augmentations and monitoring measures that are described in the May 28, 2009, Modification to the 1985 Clean Water Act Section 404 (c) Final Determination for Bayou aux Carpes, subject to the availability of appropriated funds.

Additional information on the Corps' approved project to reduce the risk of hurricane and storm damage to the people of the West Bank of New Orleans, Louisiana, and the Corps' plans to complete mitigation and augmentations for unavoidable impacts to the Bayou aux Carpes 404(c) area can be found in Final Individual Environmental Report 12 and Decision Record dated February 18, 2009. A copy of this report can be obtained by contacting Mr. Gib Owen or directly from the nolaenvironmental.gov web site.

If you have any questions or concerns, please contact Mr. Gib Owen at: US Army Corps of Engineers, CEMVN PM-R, Attn: Mr. Gib Owen, P.O. Box 60267, New Orleans, Louisiana, 70160-0267. Mr. Owen can be contacted by E-mail: gib.a.owen@usace.army.mil or by phone at (504) 862-1337.

Sincerely,

Alvin B. Lee

Alvin B. Lee
Colonel, US Army
District Commander

Prepared by/for:
U.S Army Corps of Engineers
Regional Planning and Environment Division South
New Orleans District

Bayou Aux Carpes 404(c) Augmentation Measures Evaluation

October 2019

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1.0 Introduction

The purpose of this document is to describe and evaluate potential augmentation measures considered to offset any potential impacts due to construction of the WBV 404(c) flood wall component of the West Bank and Vicinity (WBV) Project, West Closure Complex (WCC) by enhancing the hydrology and habitat of Bayou aux Carpes.

The Bayou aux Carpes Clean Water Act (CWA), Section 404(c) site (BAC Site), located in Jefferson Parish, Louisiana, is an approximately 3,000 acre complex with unique and productive wetland habitat. This complex has been an important regional and national asset that provides ecological, flood storage and water quality benefits.

In 1985, the Environmental Protection Agency (EPA) issued its CWA Section 404(c) Final Determination for Bayou aux Carpes, in accordance with 33 U.S.C. §1344(c), and 40 CFR Part 231 (Appendix 1). The EPA took the action to designate the BAC Site as CWA, Section 404(c) due to concerns that construction of the Harvey Canal – Bayou Barataria Levee Project, whose purpose was to provide flood control and land reclamation benefits, would have resulted in additional future land reclamation proposals involving discharge of fill material into the BAC Site by private property owners. Such discharge could have resulted in the eventual loss of BAC Site wetlands to development. The CWA Section 404(c) designation restricts or otherwise prohibits the site for use as a disposal area for dredged or fill material because it was determined that such activities would have unacceptable adverse effects on shellfish beds, fishery areas (including spawning and breeding areas), wildlife, and recreational areas. However, the Section 404(c) designation did include three exceptions, one of which was a provision to allow discharges associated with the then original modified U.S. Army Corps of Engineers (USACE) Harvey Canal – Bayou Barataria Levee Project.

Following Hurricanes Katrina and Rita in 2005, Congress authorized USACE to complete construction of an improved WBV, Hurricane and Storm Damage Risk Reduction System (HSDRRS). This system would ultimately include construction of a storm surge barrier feature that would extend along the northeastern boundary of the BAC Site along the west bank of Bayou Barataria (Individual Environmental Report 12; Appendix 2). The USACE, New Orleans District (CEMVN) worked closely with the EPA and other Federal and state resource agencies to develop a plan to construct the WBV WCC, including the WBV 404(c) flood wall, in such a way as to minimize negative impacts to the BAC Site to the maximum extent possible.

In order to move forward with construction, the CEMVN made a formal request, by letter dated November 4, 2008, to the EPA to modify the Section 404(c) Final Determination for Bayou aux Carpes to include the 4,200 linear foot WBV 404(c) flood wall, including a 100-foot wide corridor (Appendix 3). This work would result in unavoidable permanent impacts to approximately 9.6 acres to forested wetlands (2.3 acres bottomland hardwoods (BLH) and 7.3 acres swamp).

Ultimately, the EPA issued the Modification to the 1985 CWA Section 404(c) Final Determination for Bayou aux Carpes to allow construction of the WBV 404(c) flood wall (Appendix 4). As part of the Modification, the CEMVN committed to fully mitigate and compensate for unavoidable impacts to the Bayou aux Carpes 404(c) area as a result of the flood wall construction, consistent with regulations. In addition to the compensatory mitigation,

the EPA requested (Appendix 5) and the CEMVN committed to evaluate and consider for implementation additional ecological augmentation features that would add an extra measure of environmental benefits due to the unique status of the BAC Site (the subject of this report; Appendix 6). The CEMVN agreed to document for EPA Region 6 the concurrence or non-concurrence on each augmentation feature by an Interagency Environmental Team (IET). The IET includes the National Park Service (NPS), US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), US Geological Society (USGS), Louisiana Department of Natural Resources (LDNR), Louisiana Department of Environmental Quality (LDEQ), and Louisiana Department of Wildlife and Fisheries (LDWF). The CEMVN agreed to fund and implement such ecological augmentation features as part of the WBV Project, if the results of investigations indicate that such augmentation would contribute environmental benefits. If any of the augmentation features are implemented, CEMVN would use an adaptive management approach to monitor changes over time, evaluate the observed results with respect to intended objectives, and apply any changes needed to achieve the desired outcome.

If any augmentation measures(s) are further considered for construction, CEMVN would follow relevant environmental laws, procedures, and policy. This would include the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality's Regulations (40 CFR 1500-1508), as reflected in USACE Engineering Regulation ER 200-2-2. Other relevant environmental laws and regulations could include, but may not be limited to the Clean Air Act (CAA), Clean Water Act (CWA), Coastal Zone Management Act, Endangered Species Act (ESA), Bald and Golden Eagle Protection Act (BGEPA), Migratory Bird Treaty Act (MBTA), Fish and Wildlife Coordination Act, Magnuson-Stevens Fisheries Conservation and Management Act, Migratory Bird Treaty Act, and National Historic Preservation Act of 1966 (NHPA).

2.0 Existing Conditions

2.1 Project Area Description

The BAC Site is in Jefferson Parish, Louisiana, and is bounded on the north by the Old Estelle Pumping Station (OEPS) outfall canal, on the east by Bayou Barataria (Gulf Intracoastal Waterway, or GIWW), on the south by the GIWW and Bayou des Familles, and on the west by State Highway 3134 and the "V-line Levee" (Figure 1). It lies in the upper Barataria Basin within the Mississippi deltaic plain. The majority is managed and owned by the NPS as part of the Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve (JLNHPP); however, there is a privately owned parcel of land known as the Harvey Tract that bisects the BAC Site.

Bayou aux Carpes, a natural waterway within the BAC Site, is plugged at its connection with the GIWW (Figure 2). This plug is a manmade feature and was installed between August 27 and October 31, 1974, by the Jefferson Parish Government possibly with Federal funding provided as part of the Harvey Canal – Bayou Barataria Levee Project (Appendix 7). Tidal connectivity within the BAC Site is now maintained through the Southern Natural Gas Pipeline (SNGP) canal that courses through the site. A few oil and gas canals connect the SNGP canal with Bayou aux Carpes. There are also several pipeline right-of-ways (ROWs) that traverse the area from east to west across the northern section of the drainage area. Two man-made "keyhole" (colloquial

term that describes the general shape of some oil and gas canals) canals are located perpendicular to the GIWW, but are no longer connected with the GIWW. Currently two hydrologic control devices are located in the OEPS outfall canal. On the west end, Jefferson Parish manages the Estelle Pump Station 1 for interior drainage. On the east end at the junction with the GIWW, the Old Estelle Flood Gate – South is managed by Southeast Louisiana Flood Protection Authority – West (SLFPA-W) for hurricane and storm surge risk reduction. See Figure 2 for a map of BAC Site features.

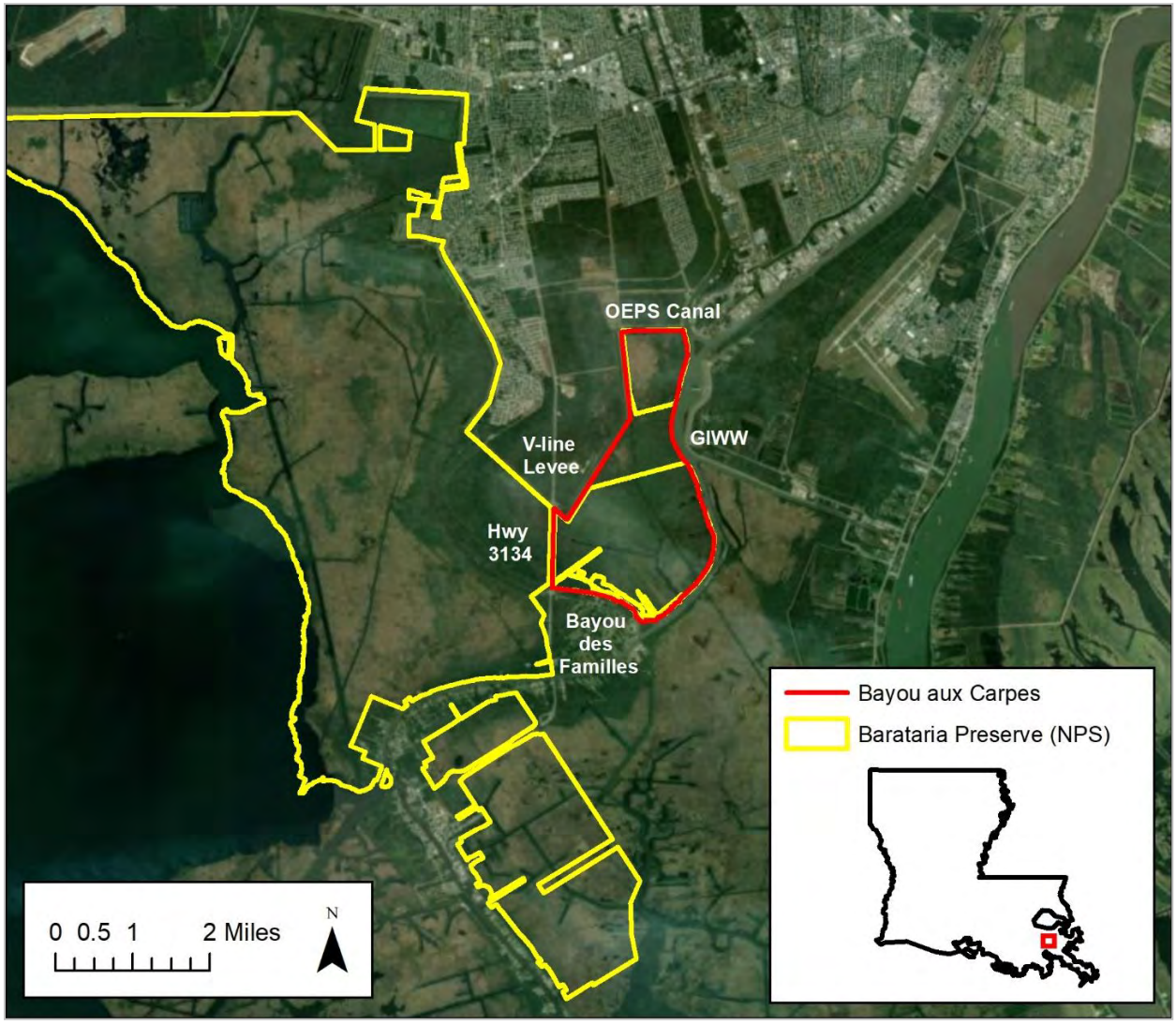

Figure 1. BAC Site and vicinity. The BAC Site is bounded on the north by the OEPS outfall canal, on the east by the GIWW, on the south by the GIWW and Bayou des Familles, and on the west by State Highway 3134 and the "V-line Levee".

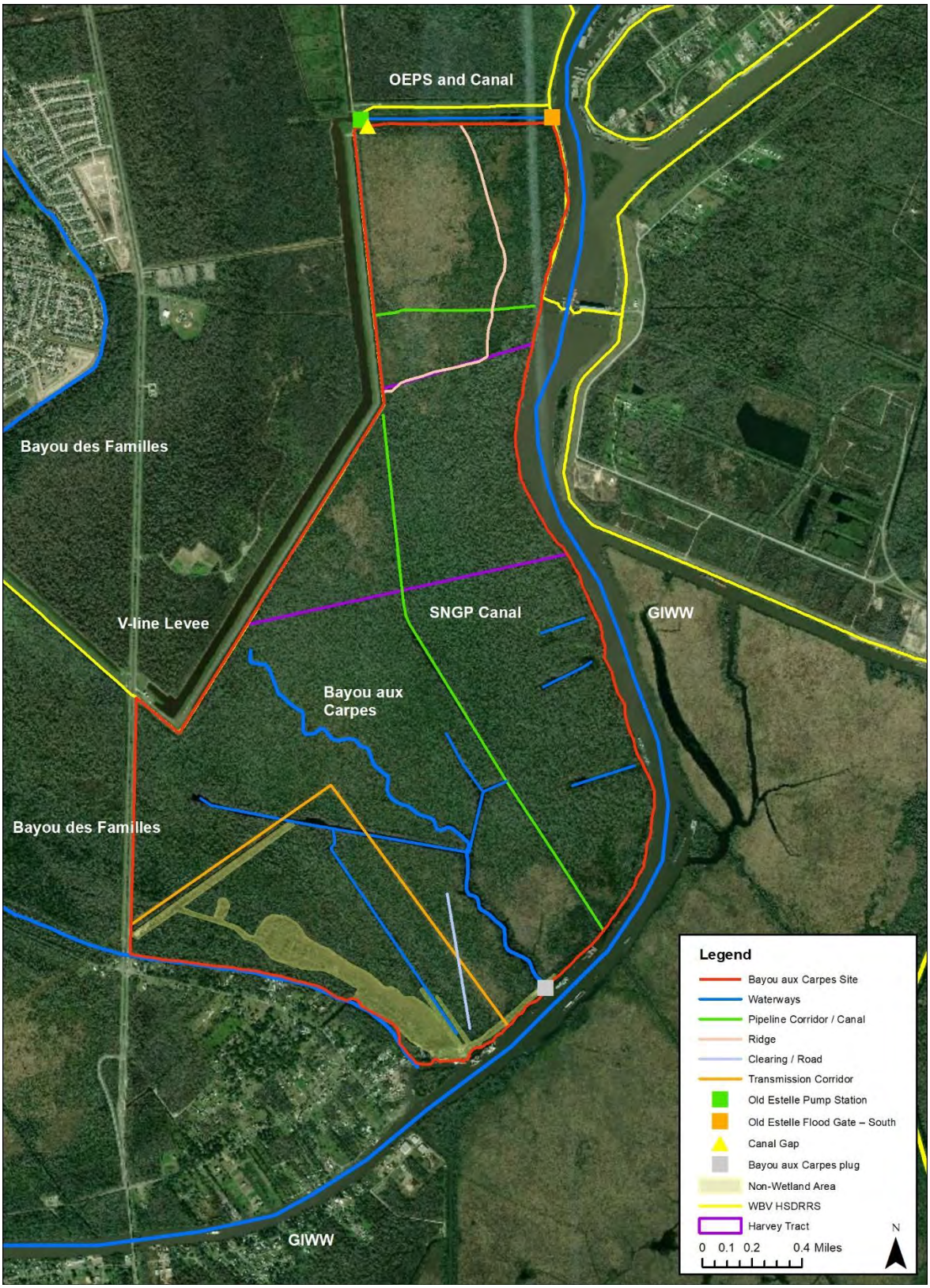

Figure 2. BAC Site and waterways and other features.

2.2 Relevant Resources

Wetlands, wildlife, aquatic resources and fisheries, and water quality have been determined by the EPA to be significant resources for the BAC Site (Appendix 1 and Appendix 5). Under CWA Section 404(c), a finding of unacceptable adverse effects must be based on one or more of the listed resources which include municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, and recreational areas. The CWA Section 404(c) Final Determination for Bayou aux Carpes concluded that it has significant value for all but municipal water supplies. The CWS 404(c) Final Determination also mentions that the BAC Site provides significant values to water quality. The EPA's Modification to the 1985 CWA Section 404(c) Final Determination for impacts related to fill associated with WBV designates BAC Site wetlands as unique and productive, and found two wetland types to be ecologically significant: 1) naturally generating bald cypress swamps; and 2) flotant marsh (Appendix 5).

2.2.1 Wetlands

Approximately 3,000 acres of unique and productive wetlands within the BAC Site are an important regional and national asset providing ecological, flood storage, and water quality benefits to the watershed. The NPS's Vegetation Mapping Inventory Program (VMI) report indicates 20 different habitat classifications, including open water, ruderal (habitat with vegetation indicative of high levels of anthropogenic disturbance), and natural vegetation types (Hop et al, 2017). Three of the top four habitat classifications, by area, are wetland habitat types, making up 52% of the total area (Table 1). Of the remaining 17 classifications, eight are marshes and two are forested wetlands (Figure 3).

Table 1. Top three wetland habitat classifications by area in the BAC Site from NPS's VMI report.

Habitat Type	Description	Acreage	Percent Coverage
Bald Cypress Wooded Marsh	woodlands (25-60% canopy cover) dominated by bald cypress that are inundated to flooded	1120	30%
Bald Cypress Tupelo Flooded Forest	Forests ($\geq$ 60% canopy cover) dominated by bald cypress that are inundated to flooded	501	14%
Arrowhead-Spikerush-Maidencane Marsh	Herbaceous marsh community dominated by bultongue arrowhead (*Sagittaria lancifolia*) and spikerush (*Eleocharis* spp.), and occasionally by maidencane (*Panicum hemitomon*)	290	8%

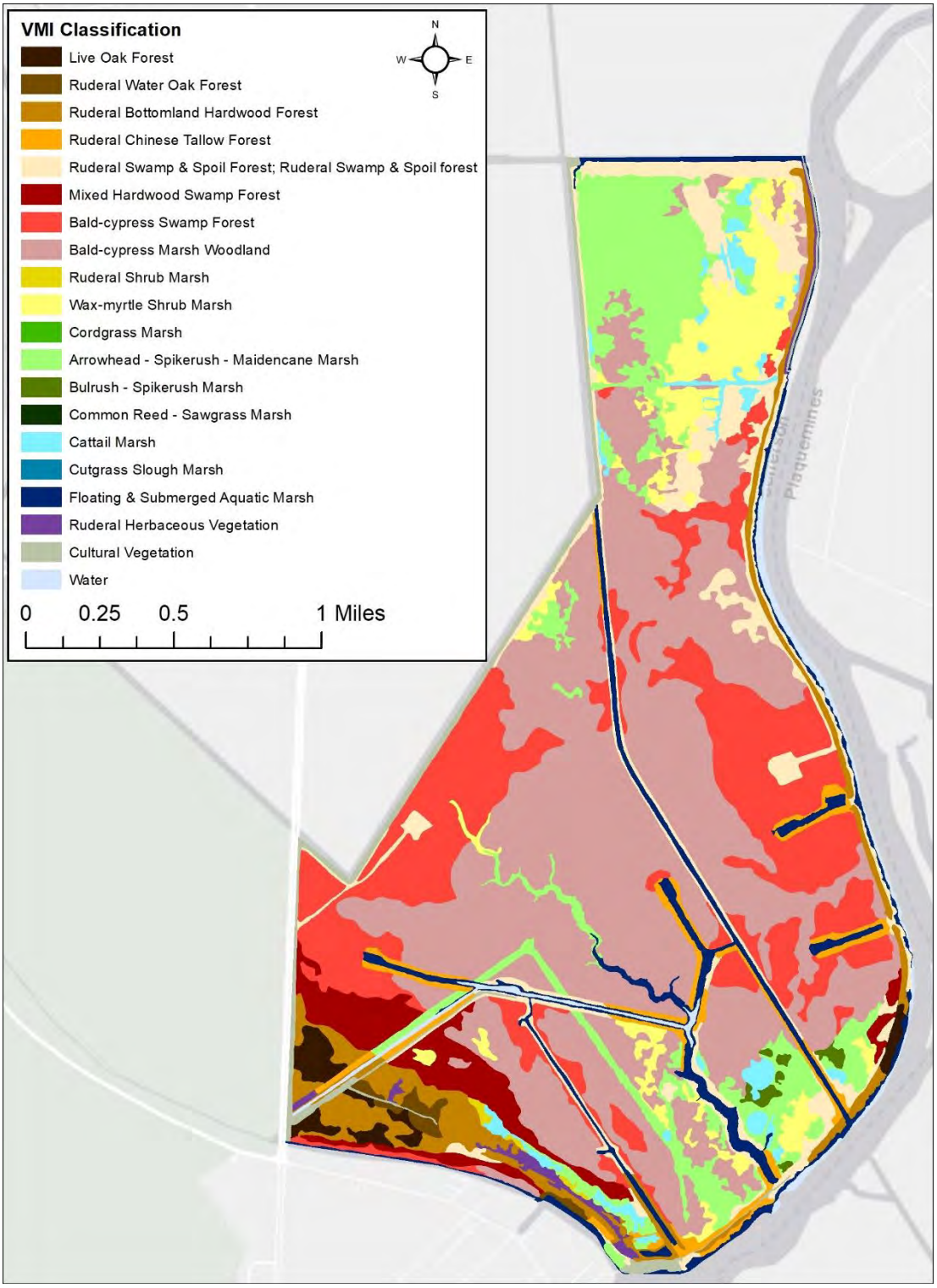

Figure 3. Map classifications based on the National Park Services (NPS) Vegetation Mapping Inventory Program (VMI: Hop et al, 2017).

2.2.1.2 Cypress Swamp

Naturally regenerating cypress swamp is specified in EPA's Modification to the 1985 CWA 404(c) Final Determination as one of two unique and ecologically valuable wetland habitat types found within the BAC Site (Figure 4; Appendix 5). Much less cypress swamp exists in Louisiana today than in the past. This is in part due to large-scale cypress tree harvesting that mainly occurred from 1890 - 1940. Despite being capable of coppice regeneration, natural regeneration of cypress swamps remains low in coastal Louisiana. There are several factors that may have contributed to this, including altered hydrology, subsidence, sea level rise, land loss, and herbivory (Conner and Toliver, 1990). Some of the cypress swamp in the BAC Site is naturally regenerating, as saplings have been recently observed in the understory.

2.2.1.3 Flotant Marsh

Flotant marsh is also specified in EPA's Modification to the 1985 CWA 404(c) Final Determination as one of the unique and ecologically valuable wetland habitat types found within the BAC Site (Figure 4; Appendix 5). Flotant marsh is a colloquial term for floating marsh, which is characterized by freshwater vegetation that occurs as a buoyant mat floating over water for at least part of the time. This mat, which includes the plant's roots and soil, remains on the water's surface by moving vertically as water level changes. This unique characteristic allows flotant marsh to be resilient to periodic flooding, but they may appear exclusively in low energy environments in Louisiana (Sasser et al, 1991, Sasser et al., 1996) and elsewhere (Junk and Howard-Williams, 1984; Azza et al., 2006). While many different vegetation communities occur in Louisiana's flotant marshes, in general they exhibit high plant diversity (Russell, 1942; Sasser et al., 1996). Unique hydrology influences the quality and health of these sensitive wetland habitats (Zhang and Nepf, 2011). For example, if water levels recede for an extended duration, flotant marsh vegetation may root into the underlying substrate. If the marsh vegetation becomes rooted into the underlying substrate and water level rises, vegetation could drown; or if water level rises too rapidly the marsh can break apart (Thompson 1985; Azza et al., 2006). As such, flotant marsh may be more susceptible to collapse following high energy events (e.g., tropical storms). There are several different ways in which flotant marsh may form, including expansion of root mats into open water and colonization of floating aquatic vegetation (FAV; Russell, 1942).

Figure 4. Swamp (left) and flotant marsh (right) within the BAC Site.

2.2.2 Wildlife Resources

The CWA Section 404(c) designation was based, in part, on significant values to wildlife.

During field studies in 1984 and 1985, at least 70 wildlife species were found within the BAC Site. The site provides valuable habitat for resident waterfowl and migratory game species (e.g., wood ducks (*Aix sponsa*), mallards (*Anas platyrynchos*), and other waterfowl) and non-game species (e.g., great blue herons (*Ardea herodias*) and great egrets (*Ardea alba*)). Bald eagles (*Haliaeetus leucocephalus*) and osprey (*Pandion haliaetus*) have been observed in the area as well. Several species of non-game, resident and migratory birds (e.g., red-headed woodpecker (*Melanerpes erythrocephalus)*, prothonotary warbler (*Protonotaria citrea*), and wood thrush (*Hylocichla mustelina*)) that are known or expected to utilize the project area have exhibited substantial population declines throughout their respective ranges over the last 30 years, primarily as the result of habitat loss and fragmentation.

The USFWS's 1985 Habitat Evaluation Procedures (HEP) analysis determined that BLH and wooded swamp habitats rated moderate to high value for all species evaluated (i.e., eastern gray squirrel (*Sciurus carolinensis*), pileated woodpecker (*Dryocopus pileatus*), American mink (*Neovison vison*), wood duck, great egret, American alligator (*Alligator mississippensis*), and muskrat (*Ondata zibethicus*)). Upland forested habitat rated low for gray squirrel and pileated woodpecker, but was found to be optimal for mink. Scrub-shrub wetlands rated high for wood duck wintering and alligator habitat, and moderate for mink, great egret, and muskrat. Fresh marsh rated high to moderate as alligator, mink, and muskrat habitat.

2.2.3 Aquatic Resources and Fisheries

The CWA Section 404(c) designation was based, in part, on significant values to shellfish beds and fishery areas (including spawning and breeding areas).

Twenty-three freshwater fish species, and 27 taxa of macroinvertebrates were observed during USFWS 1985 surveys. The field data showed the area supports species that can tolerate low salinities. Bayou aux Carpes has valuable spawning, feeding, and nursery habitat for recreationally important freshwater fish such as largemouth bass and various other 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., western mosquitofish (*Gambusia affinis*), threadfin shad (*Dorosoma petenense*), and golden top minnow (*Fundulus chrysotus*)) were the most abundant fish species. The invasive Apple Snail (*Pomacea maculata*) has also colonized the area.

Aquatic vegetation, such as FAV and submerged aquatic vegetation (SAV) can be found in low energy waterways throughout the BAC Site. Generally, SAV are indicative of good water quality and provide important habitat for many fishes and macroinvertebrates (Rozas and Odum, 1987). However, based on personal observation, most of the FAV is non-native water hyacinth (*Eichhornia crassipes*) and *Salvinia* spp., which are considered to be nuisance species throughout the Southeastern US.

2.2.4 Recreational Resources

The CWA Section 404(c) designation was also based, in part, on significant values to recreation.

The NPS has an agreement with the EPA to manage the BAC Site as part of the Barataria Preserve. Many people use the area to view wildlife, hunt, fish, and enjoy nature in the BAC Site. In addition, at least one swamp tour business operates within the BAC Site. Access to the BAC Site is primarily via watercraft, with the major public access point being the juncture of the SNGP canal and the GIWW. This includes access to the Harvey Tract, a section of privately owned land within the BAC Site.

2.2.5 Water and Soil Quality

The CWA Section 404(c) designation was also based, in part, on significant values to water quality.

Water quality in the BAC Site is influenced by natural as well as anthropogenic controls. The hydrology in the area is highly altered due to many anthropogenic impacts (e.g., canals, spoil banks, pumping, and oil and gas infrastructure).

2.2.5.1 Surface Water Quality

A water quality report on all waters of the Barataria Preserve, excluding the BAC Site, indicated high fecal coliform counts associated with rain events, periodic low dissolved oxygen for some areas, low nitrate, normal pH, low extractable Phosphorus except following rain events, seasonal and meteorological changes in specific conductivity, generally low turbidity with some seasonal trends, and warm seasonal temperatures (Meiman, 2015). These findings may be indicative of the general water quality characteristics of the BAC Site, because of its proximity to Meiman's (2015) study area.

Many freshwater sources influence the BAC Site and vicinity. These may be generalized into three groups: 1) waters associated with the Mississippi River; 2) stormwater drainage; and 3) direct rainfall. The interaction between the BAC Site and all of these water sources varies as water follows an elevation gradient. The net effect of any one water source would depend on the contributions of all of the other sources.

Fresh water from the Mississippi River is periodically conveyed into the Barataria Basin near the BAC Site from sources including the Mississippi River via the Harvey and Algiers Locks, the Atchafalaya River via the GIWW, and potentially the Davis Pond Freshwater Diversion structure (Swarzenski, 2003a; Meiman, 2015). Many studies suggest that re-introduction of Mississippi River water into coastal freshwater wetlands would build land and improve wetland habitat (e.g., Lane and Day, 1999, Allison and Meselhe, 2010, Shaffer et al., 2016, Baustian et al., 2019), but there are some important concerns associated with increased nutrient loading and pollutants (e.g., Turner and Rabalias, 1991, Boyd et al., 2003, Zhang et al., 2012) that may reduce substrate and plant health (Swarzenski et al., 2008).

USGS collected and analyzed stormwater samples at three locations within the BAC site vicinity (Figure 5) during a period of high precipitation (more than four inches in three days) in March 2012 (Appendix 8). Atrazine and Fipronil were above detectable limits for all sites tested. The highest concentrations were found outside of the BAC Site (Site 3 in Figure 5), which was the only area sampled that was actively conveying stormwater. The pumps located at the OEPS outfall canal were not in use and stormwater was not being conveyed down OEPS outfall canal during this high rainwater event. See section 2.2.5.3 for more information on the recent operation of the OEPS.

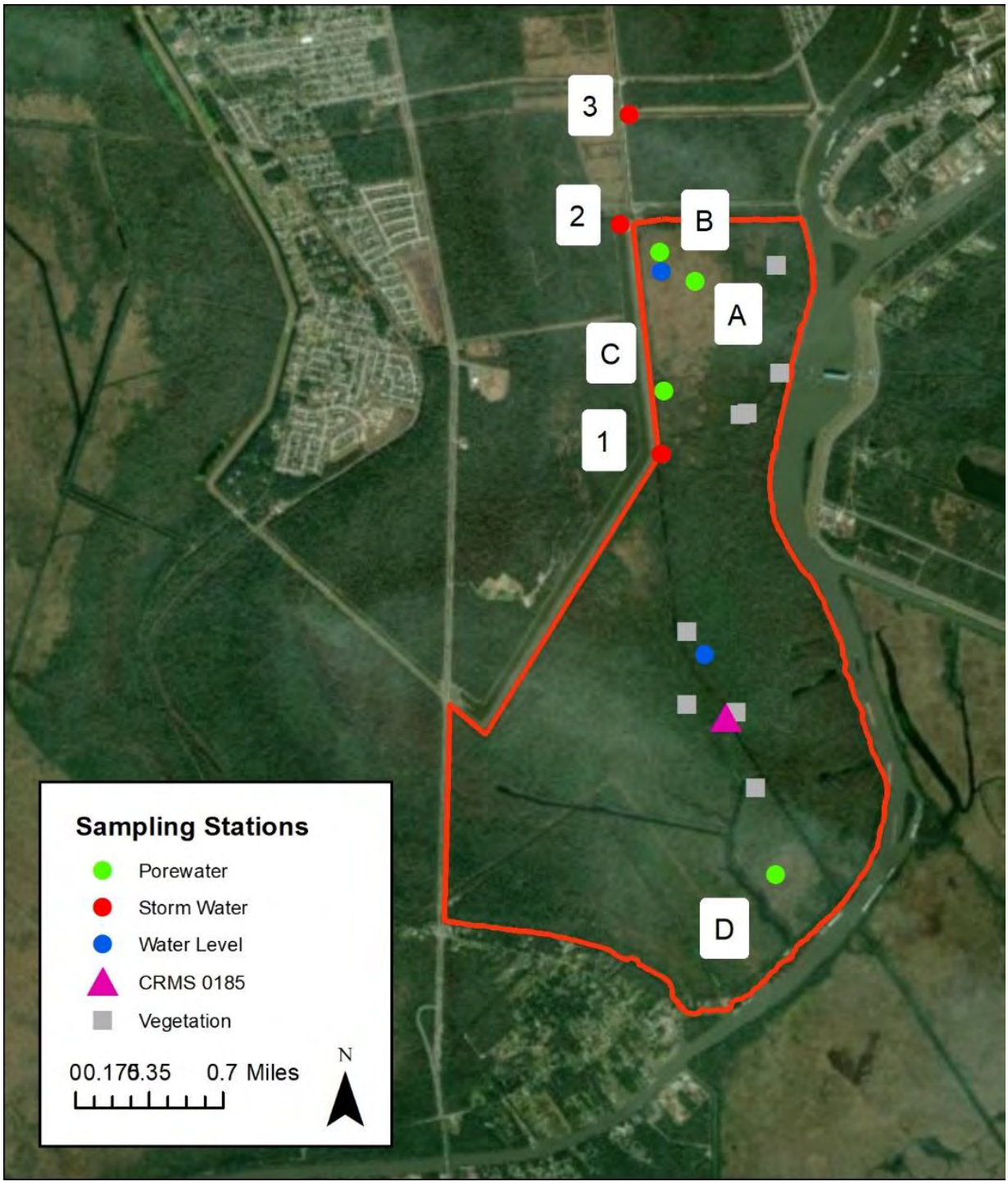

Figure 5. Monitoring stations from the Baseline Monitoring of Bayou aux Carpes (c) Marshes, Jefferson Parish, from 2009-2012 Report (porewater, stormwater, water level; Appendix 8) and the Bottomland Hardwood and Swamp Forest Monitoring Plan for the EPA CWA Bayou aux Carpes 404(c) Area (Vegetation; Appendix 15). Porewater sampling stations are labeled with letters and stormwater sampling stations are labeled with numbers. The Coastwide Reference Monitoring System (CRMS) Station 0185 is also shown.

Evidence suggests that rainwater may be one of the most influential water sources for the BAC Site. A water quality study of the nearby Barataria Preserve indicated that local rainfall, along with seasonality, may be the major components impacting water quality in these nearby marsh and swamp habitats (Meiman, 2015). Hydrodynamic modeling indicated that rainfall can significantly influence BAC Site hydrology (Appendix 9, Section 2.2.5.3).

Based on available data, BAC Site water surface salinities are typically less than 1.0 parts per thousand (ppt). However, there has been one recorded spike in salinity in the recent past. Coastwide Reference Monitoring System (CRMS) Station 0185 is located on the SNGP canal within the BAC Site (CPRA, 2017). This station's surface water salinity was analyzed from September 13, 2011 to March 31, 2017. These data suggest no obvious increasing or decreasing trends for surface water salinity during the period of analysis with consistently low salinities observed (mean = 0.34, standard deviation = 0.23; Figure 6). However, from October 23, 2015 to March 13, 2016 a period of high salinity was observed (red box in Figure 6), with a maximum salinity of 5.46 ppt recorded on October 26, 2015. There was no tropical system during this time period, and other nearby stations continuously recording salinity (i.e., nearby CRMS and National Oceanic and Atmospheric Administration stations) indicated similar trends. While the cause of increased salinity was not analyzed, it could have been due to wind patterns, low Mississippi River discharge, and/or drought conditions. It should be noted that two tropical storm systems, including Hurricane Isaac, affected the BAC Site and vicinity between September 13, 2011 and March 31, 2017. However, lower water surface salinities were observed during these tropical storm events compared to observations from the October 23, 2015 to March 13, 2016 time period.

Herbicides (BASF Plateau, BASF Overdrive Monsanto Round Up Pro Max, Dupont Pastora, Monsanto Outrider, and Weedestroy Am-40) are applied in the OEPS outfall canal by Jefferson Parish approximately three times per year (Mitchell Theriot, Director, Jefferson Parish Department of Drainage, October 2017).

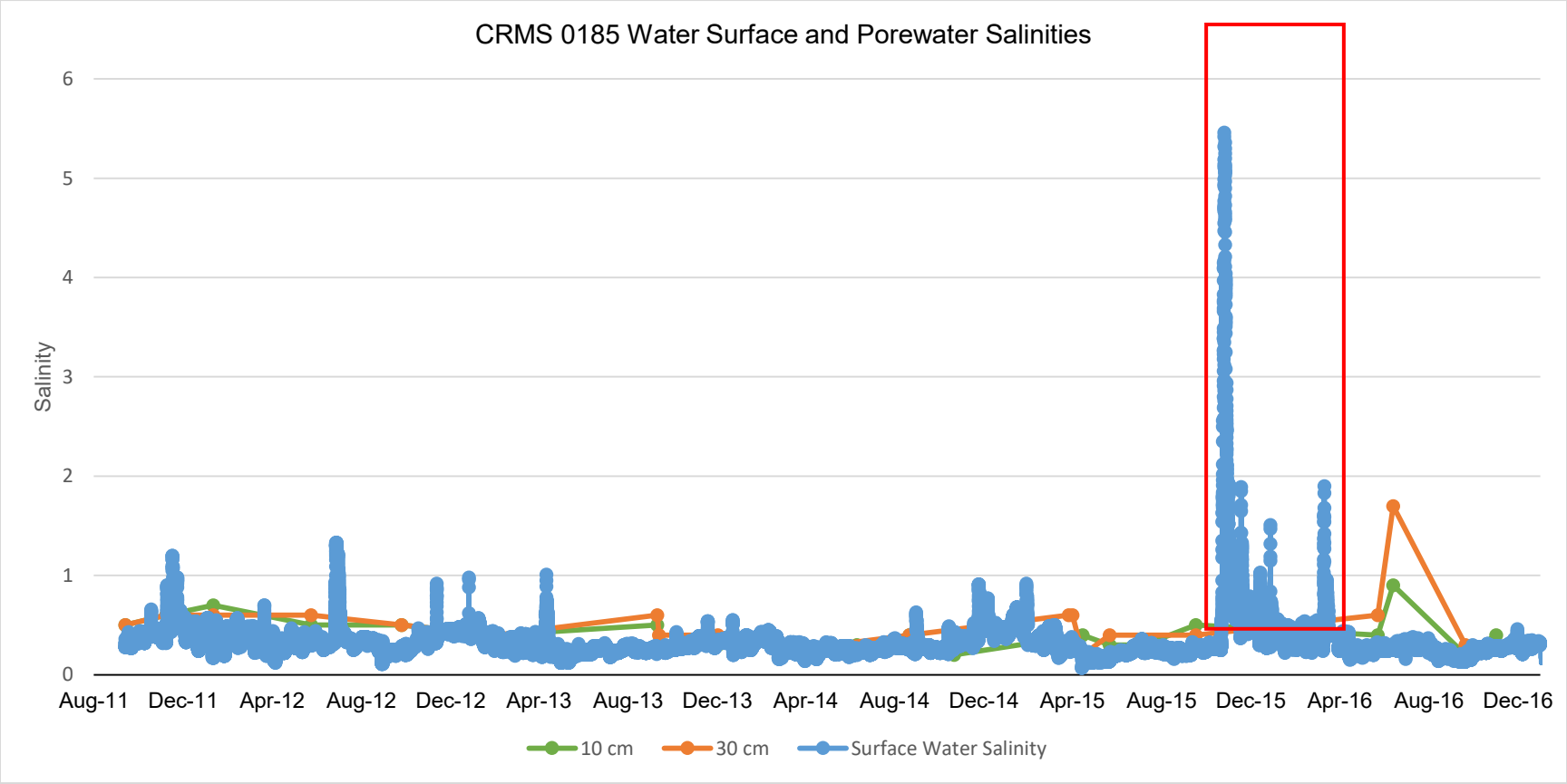

Figure 6. This plot shows surface water and porewater salinities from CRMS Station 0185, located on the SNGP canal. Mean porewater salinities are shown at depths of 10 cm and 30 cm below the surface of the substrate. A period of high surface water salinities from October 23, 2015 to March 13, 2016 is indicated by a red box.

2.2.5.2 Porewater and Soil Quality

The USGS performed porewater surveys for marsh sites within the BAC Site from 2009 to 2012, and compared them to nearby healthy reference sites located within the Barataria Preserve as a part of the Baseline Monitoring of Bayou aux Carpes 404(c) Marshes, Jefferson Parish, from 2009-2012 Report (Appendix 8). The goal was to analyze a variety of surface and porewater samples for indications of decomposed marsh soil organic matter. In addition, the USGS tested stormwater for contaminants (Section 2.2.5.1) and water levels (Section 2.2.5.3).

Porewater constituents [salinity, calcium, strontium, magnesium, alkalinity, dissolved organic carbon (DOC), total nitrogen (TN), ammonium, ortho-phosphate, pH, conductance, and temperature] were tested quarterly from December 2011 through September 2012 at the soil surface and below the soil surface at four locations within the BAC Site (Figure 4). Soil decomposition was also estimated by measuring the original volume, a non-fractionated volume, and a fractionated volume using methodology described by Swarzenski and others (2008).

Soil porewater analysis results from the Baseline Monitoring of Bayou aux Carpes 404(c) Marshes, Jefferson Parish, from 2009-2012 Report are summarized below, by site (Appendix 8)

Site A is located on the interior of the BAC Site near the OEPS outfall canal (Figure 4). It was composed of flotant marsh dominated by maidencane (*Panicum hemitomon*). Site A had relatively high DOC and TN values, but the ratio between the two did not differ from other sites. Calcium to strontium ratios (Ca:Sr) can be used to differentiate rainwater and Mississippi River water for this area (Swarzenski, 2003b). In addition, Ca:Sr decline as salinity increases. The Ca:Sr for Site A suggested that something other than rainwater or seawater was influencing soil porewater. There was nothing to suggest poor or decomposed soil based on any other analysis. It could be inferred that a source water other than rainwater or seawater is influencing Site A, but does not have a deleterious effect on the soil. Waters from the OEPS outfall canal could be influencing Site A based on its proximity to a cut and channel along the south side of this Canal (Figure 4).

Site B is located on the interior of the BAC site and is the closest site to the channel connecting the BAC Site with the OEPS outfall canal (Figure 4). It was composed of attached marsh dominated by maidencane, and a water level gage was installed nearby. The Ca:Sr suggested that this site was affected by source waters other than rainwater and seawater. There was high alkalinity and inorganic nutrients, and low salinity which suggest mineralized soils. These findings along with the Ca:Sr suggest that source waters' influence may have resulted in a relatively poor quality soil. This site had the lowest ratios of non-fractionated and fractionated soil volumes to original soil volume. It was interpreted to have the most decomposed soil further corroborating lower quality soil conditions. Site B is located adjacent to a large (approximately 100 feet wide) channel that connects the OEPS outfall canal with the interior BAC Site, suggesting it is more influenced by these source waters than other sites tested. Results for Site B suggest that OEPS outfall canal water may be negatively impacting marsh soils at Site B.

Site C is a mixed marsh and forested site located near the terminus of the SNGP canal at the V-line levee (Figure 4). Spike rushes (*Eleocharis* spp.) were the dominant marsh species present.

Ammonium was elevated at Site C, but this did not appear to be related to reactions with seawater because concentrations were not concomitant with elevated alkalinity and salinity values. The Ca:Sr did not suggest source water greatly affected the soil porewater. The ratios of fractionated and non-fractionated volumes to original soil volumes suggested that soil decomposition was low. Ortho-phosphate concentrations were not high. These findings suggest that source waters may be slightly affecting the soil at Site C, but that it was in better condition than Sites B and D.

Site D is a marsh site along Bayou aux Carpes near the plug at the GIWW composed primarily of Olney's three-square bulrush (*Schoenoplectus americanus*) and cattail (*Tyhpha* spp). It had the highest average porewater salinity (2.0 ppt, Site A was the next highest with 1.0 ppt) and the highest alkalinity. Ca:Sr did not suggest that waters other than seawater and rain water affected the soil porewater. Inorganic nutrients were elevated for Site D. The soil decomposition tests could not be performed at this site, because cattail confounds the results of this test. The results for Site D suggest that its soil is in relatively poor condition as a result of seawater impacts.

Soil porewater salinity from CRMS Station 0185 (Figure 4) was analyzed from September 13, 2011 – March 31, 2017 (Figure 5). Salinity for all but one sample was below 1.5 ppt. The highest measured values were in 2016, which followed a period of high surface water salinity (Figure 5). Soil porewater salinity appears to have decreased following the high values measured in 2016.

2.2.5.3 Hydrology

The hydrology in the BAC Site and vicinity was greatly modified prior to its CWA Section 404(c) designation, mainly through the construction of canals, placement of spoil material, levee construction, and oil and gas infrastructure (Figure 2). There are also several pipeline and power transmission ROWs that traverse the area from east to west across the northern section of the drainage area. Two man-made "keyhole" canals are located perpendicular to the GIWW, but are no longer connected to the GIWW.

The vicinity was historically mostly forested and natural drainage features included Bayou des Familles and Bayou aux Carpes. The upstream extents of both bayous were cut off by construction of the V-Line levee and canals. Hydrologic connection between Bayou aux Carpes and the GIWW was cut-off upon construction of a shell plug at the confluence of these two waterways. Currently the SNGP canal provides the only completely open exchange (i.e., without a control structure) between the BAC Site and the GIWW. The SNGP canal is connected to Bayou aux Carpes via old oil and gas access canals. There are many existing gaps in the spoil banks along Bayou aux Carpes and the SNGP canal (Appendix 9, Figure 7).

Figure 7. Location of gaps along the SNGP canal and Bayou aux Carpes.

Historically the northern section of the BAC Site was part of an expansive marsh complex (see Figures 9 and 10) and is now isolated from that complex due to construction of the hurricane protection levees to the north, east, and west of the site. Additionally, an area of slightly higher elevations near the center of the BAC Site may restrict water movement from the north to the south unless the area experiences high rainfall. The OEPS outfall canal is adjacent to and outside of the WBV levee system.

Currently two hydrologic control devices are located on the OEPS outfall canal. On the west end, Estelle Pump Station 1 is managed by Jefferson Parish and was activated less than once per month (16 total days) from January 2016 through September 2017 (Mitchell Theriot, Director, Jefferson Parish Department of Drainage, October 2017). A plot showing the number of hours/day the pump station was operated versus the number of inches of rain per day does not indicate a clear association with rainfall (Figure 8). This may be due to Estelle Pump Station 1 being operated less frequently since the installation of a newer pump farther north. A gap in the southern bank of the OEPS outfall canal near the pump station (approximately 100 feet wide) allows for flow exchange with the adjacent flotant marsh habitat. On the east end of the OEPS outfall canal, at the junction with the GIWW, the Old Estelle Flood Gate – South is managed by SLFPA-W. The gate currently remains in the open position except during threat of an approaching tropical storm. A large rain event co-occurred with baseline monitoring conducted by USGS in March 2012 (See Appendix 8). Despite receiving approximately six inches of rain in three days, the pumps at the OEPS were not activated during this event.

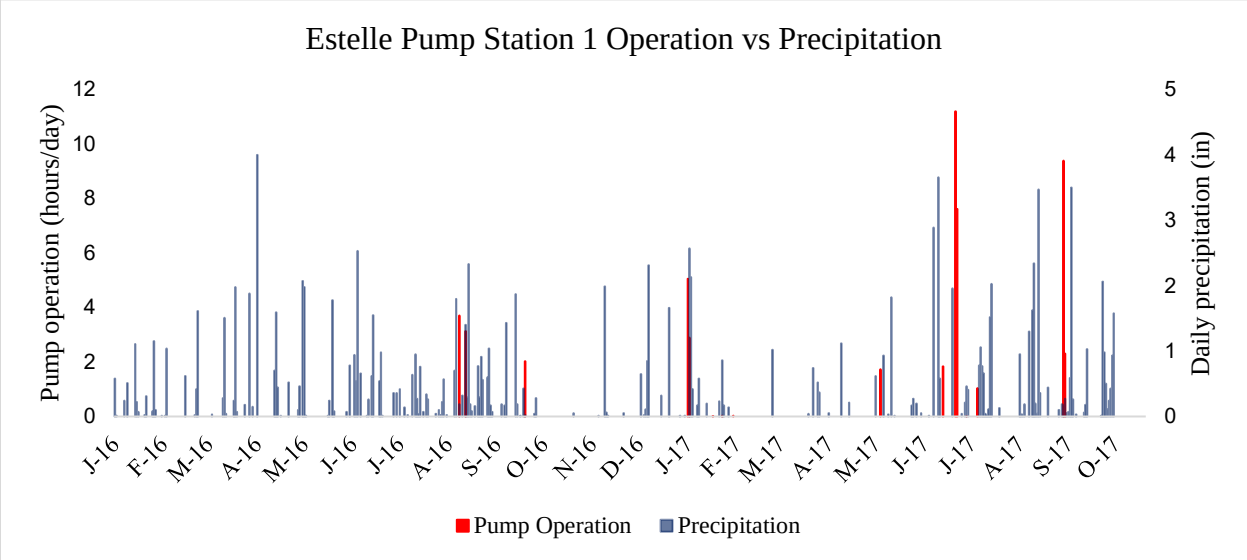

Figure 8. Estelle Pump Station 1 Operation vs. Precipitation. Jefferson Parrish provided pump operation in hours/day for each day from 1 January 2016 through 30 September 2017. These data were plotted and compared to daily precipitation totals for the New Orleans International Airport, which is approximately 15 miles northwest of the BAC Site.

The USACE 2013 model study evaluation, BAC Site: Improved Circulation Study (Appendix 9, annex 1), and subsequent Model Study Revisions (Appendix 9, annex 2) evaluated hydrodynamics and the potential impacts of various augmentation measures to the BAC Site. A

2-Dimensional Free Surface Finite Element Code (RMA2) hydrodynamic model with the Marsh Porosity wetland simulation feature was used. Model bathymetry and topography were developed using Light Detection and Ranging (LIDAR) data. LIDAR data that indicated erroneously high elevations in some of the marsh areas in the northern BAC section were used in the initial model, but were corrected with GPS-based field data for the model revision. A tidal signal from the nearby Boomtown Casino Gage on Harvey Canal was applied at the boundary. Initial modeling indicated that flow exchange within the BAC Site was tidally dependent. The model used a tidal signal with a slower rising tide and a quicker falling tide with similar changes in water surface elevation, and indicated that the quicker falling tide resulted in more flow exchange than the slower rising tide.

The initial model simulations for OEPS were run with 256 cubic feet per second (cfs) and 515 cfs discharges, with the T-Wall sluice gates closed and compared the existing condition to the optimized plan condition of a 250-foot wide gap in the spoil bank, with rainfall (1.75 inches per hour for 10 hours). The revised model refined simulations for OEPS outfall canal to include a 75-foot wide gap, the T-Wall sluice gates opened and closed, and with and with/out rainfall conditions over the BAC Site. The revised model used a 24 hour duration rainfall event from April 30, 2004 (approximately 4 – 6 inches total).

LIDAR data used in the initial Improved Circulation Study indicated a slight rising slope from the SNGP canal to the OEPS outfall canal (south to north) in the BAC Site. Despite this, modeling suggests that sheet flow from north to south may be possible during a rainfall event. Water elevation data from the Baseline Monitoring of Bayou aux Carpes 404(c) Marshes, Jefferson Parish, from 2009-2012 Report corroborated water flowing from north to south within the BAC Site (Appendix 8). Additionally, the hydrologic modeling indicated that the many gaps in the SNGP canal spoil banks should not inhibit sheet flow from the north to south (Appendix 9 Annex 2; Figure 4). There is a ridge oriented perpendicular to the OEPS outfall canal that may influence east to west flow exchange within that part of the BAC (Figure 2). There are several raised areas in the southern section of the BAC Site that influence hydrology (Figure 2).

Flow exchange area was estimated for each model run, because increased flow exchange in backwater swamps of Louisiana has been associated with benefits to water quality and plant health (Lane et al., 2015, Baustian et al., 2019). Flow exchange acres were calculated by a two-step process. First, flow velocity vectors were contoured. Then, all areas with flow velocity contours greater than 0.05 feet per second were summed. Flow exchange was used to compare existing conditions and the effects of augmentation measures in the final array (Section 5.2).

3.0 Habitat and Land Use Change

3.1 Aerial Photography

Historic aerial photography was assembled and visually analyzed for land use and habitat trends in the BAC Site and vicinity from over a 52 year period (1936-1987). Aerial photography from 1936 was provided to CEMVN by the NPS (Figure 9). The CEMVN maintains a historic aerial photography database which organizes photographs and mosaics by month and year. This entire database was visually scanned using GIS software (ESRI ArcMap 10.2.2) and high quality photographs and mosaics from select years between 1945 and 1987 are shown in

Figures 10 through 15. Figures 1 and 2 in Section 2.1 can be used to reference the location of BAC Site waterways and features. The keyhole canals, the SNGP canal, and the OEPS outfall canal can be first seen in 1965 photography, indicating these features were constructed between 1945 and 1965. The final canal connecting the SNGP canal with Bayou aux Carpes is first apparent in the March 1974 photography, indicating this connection was finished between 1968 and 1974. Highway 3134 can be first seen in 1987, suggesting it was constructed between 1974 and 1987. Widening of the GIWW is apparent throughout this time series, especially between 1936 and 1945. Circular areas along the western bank of the GIWW may be indicative of the deposition of dredged material from the widening and/or deepening of the channel and subsequent channel maintenance. Much of the area was historically drained by Bayou aux Carpes which was plugged from August 27, 1974 and October 31, 1974, according to a January 23, 1975 letter from the CEMVN District Engineer (Appendix 7). Aerial photography from March 1974 and May 1975 corroborates this letter (Figure 16).

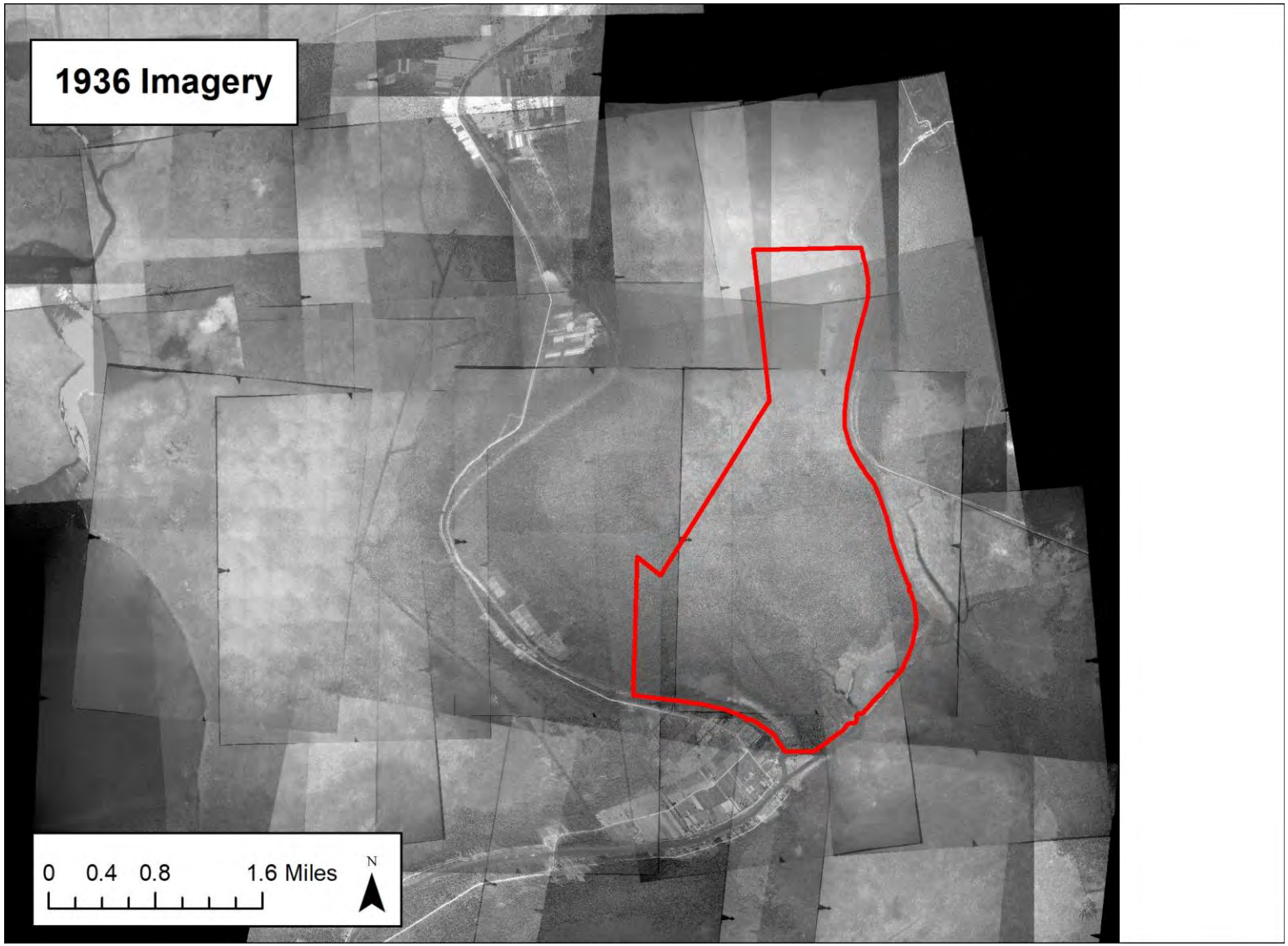

Figure 9. Aerial photography of the BAC Site (outlined in red) and vicinity from 1936 provided by the NPS.

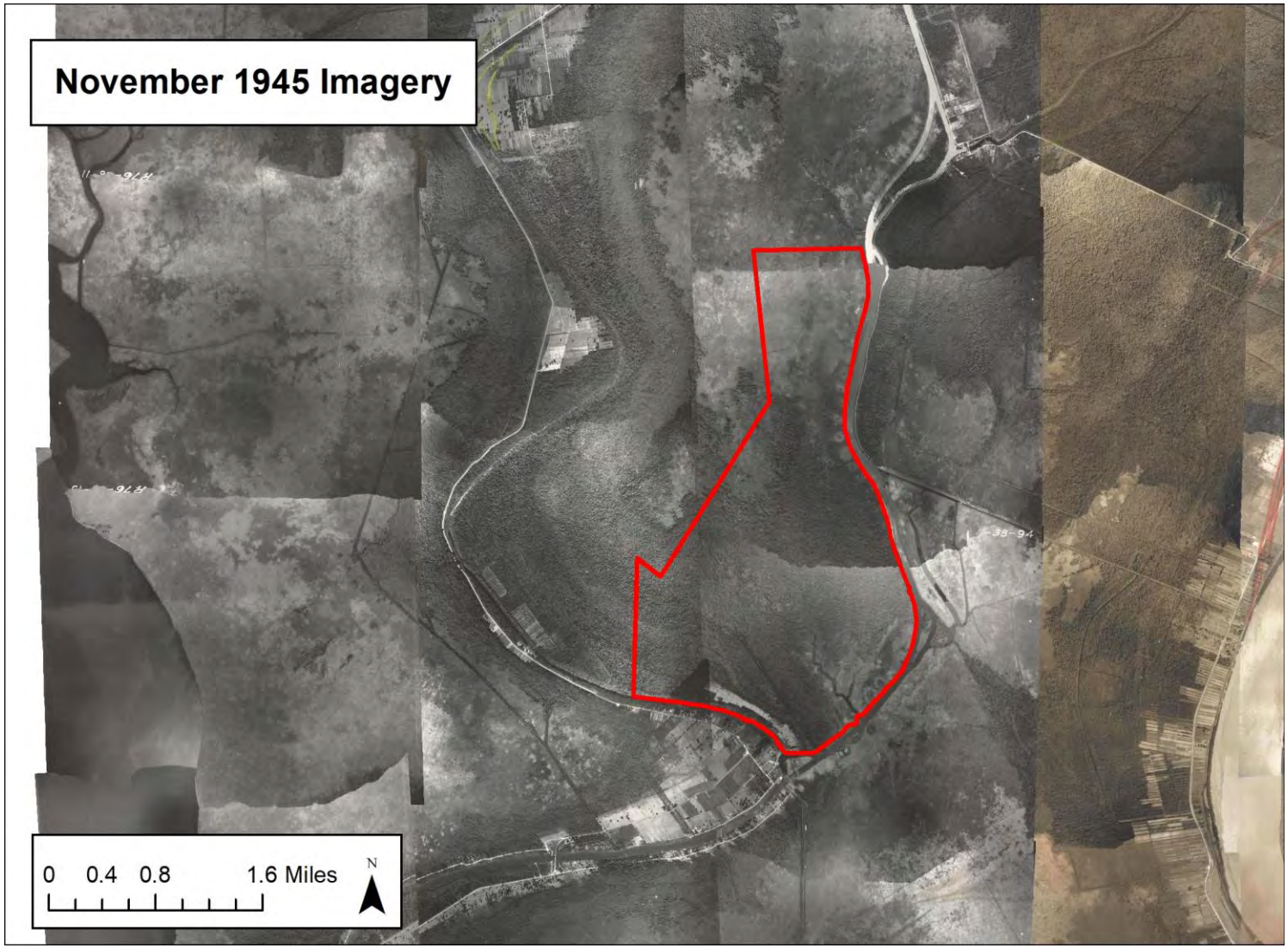

Figure 10. November 1945 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

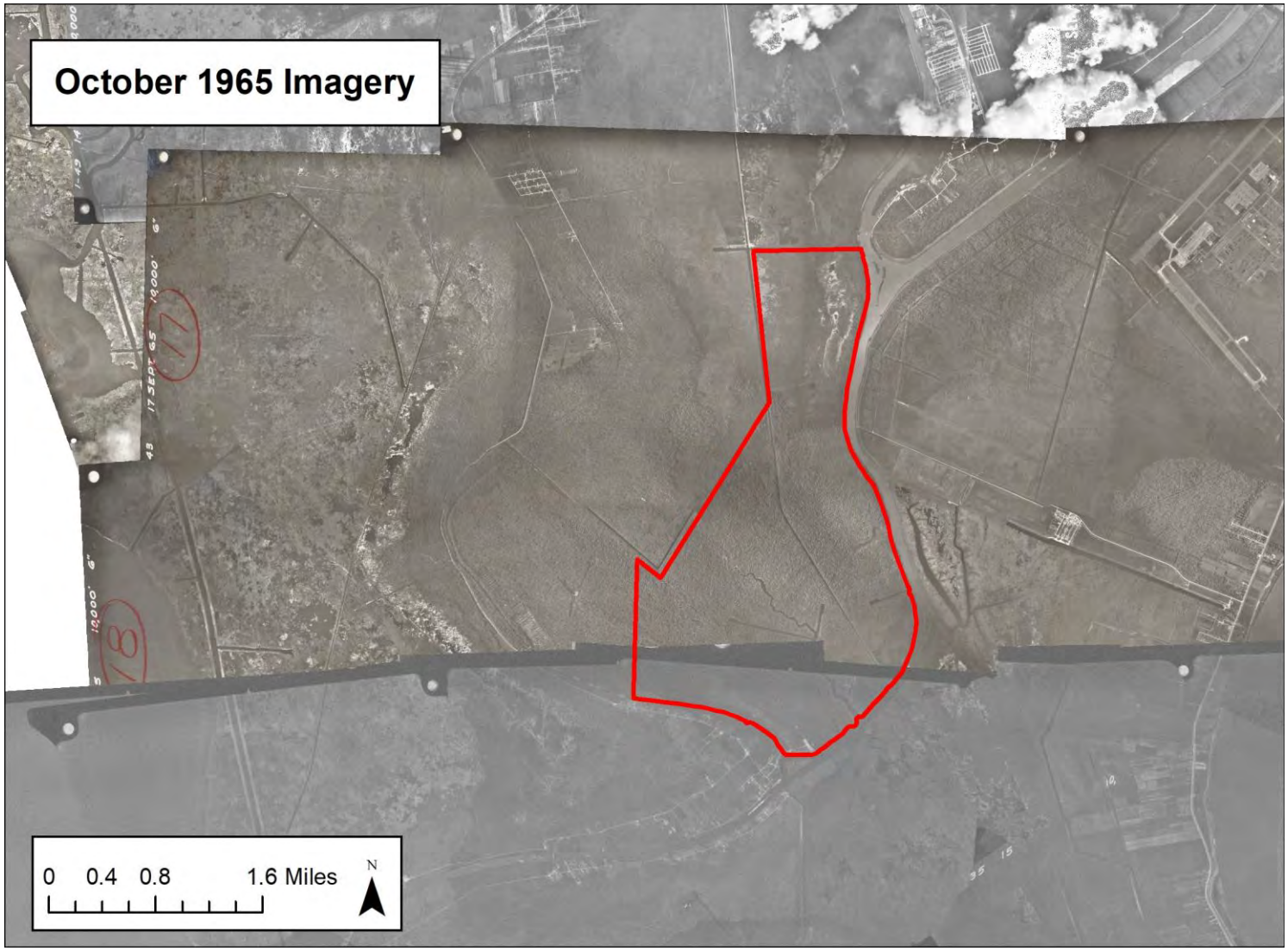

Figure 11. October 1965 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

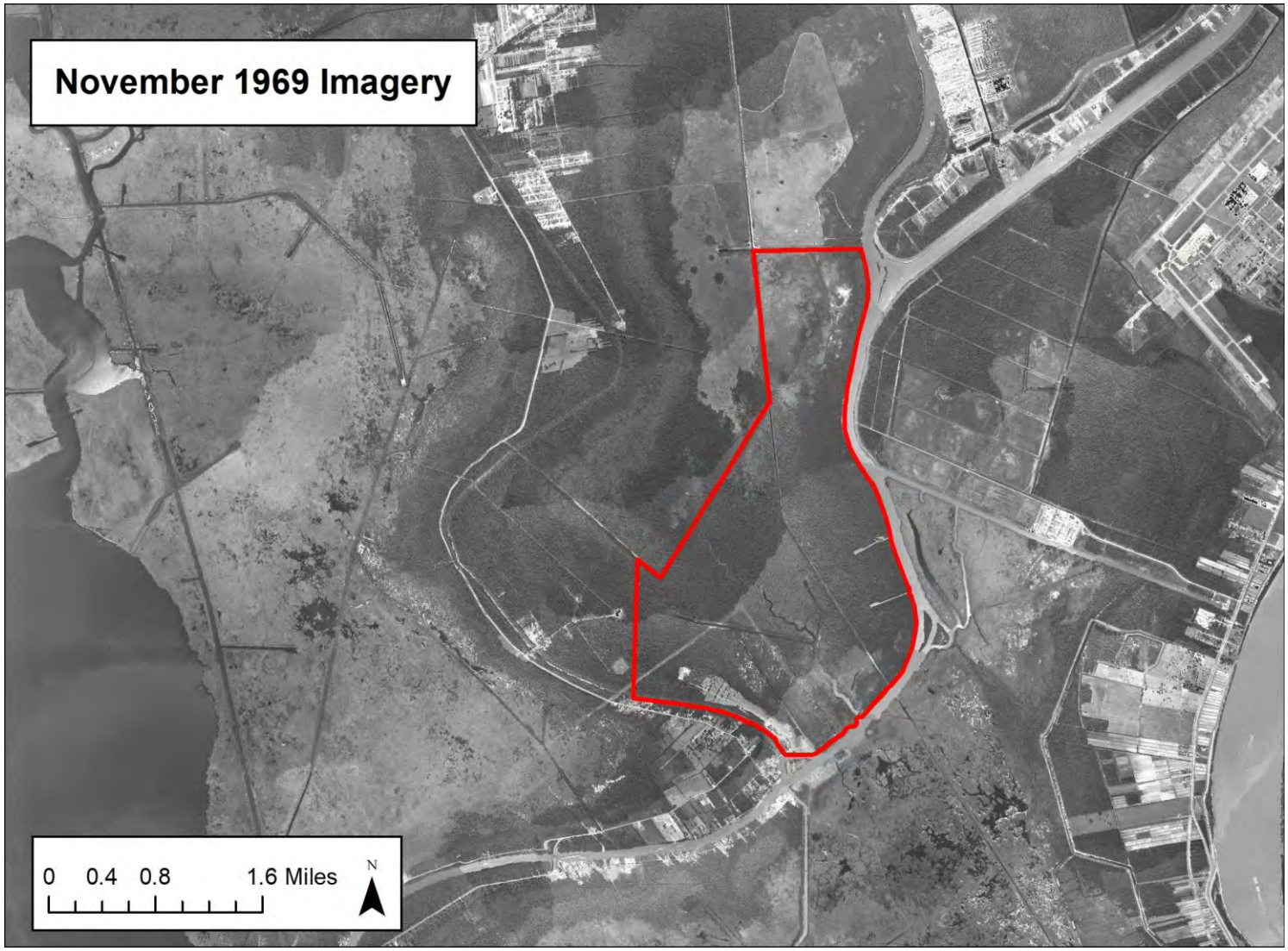

Figure 12. November 1969 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

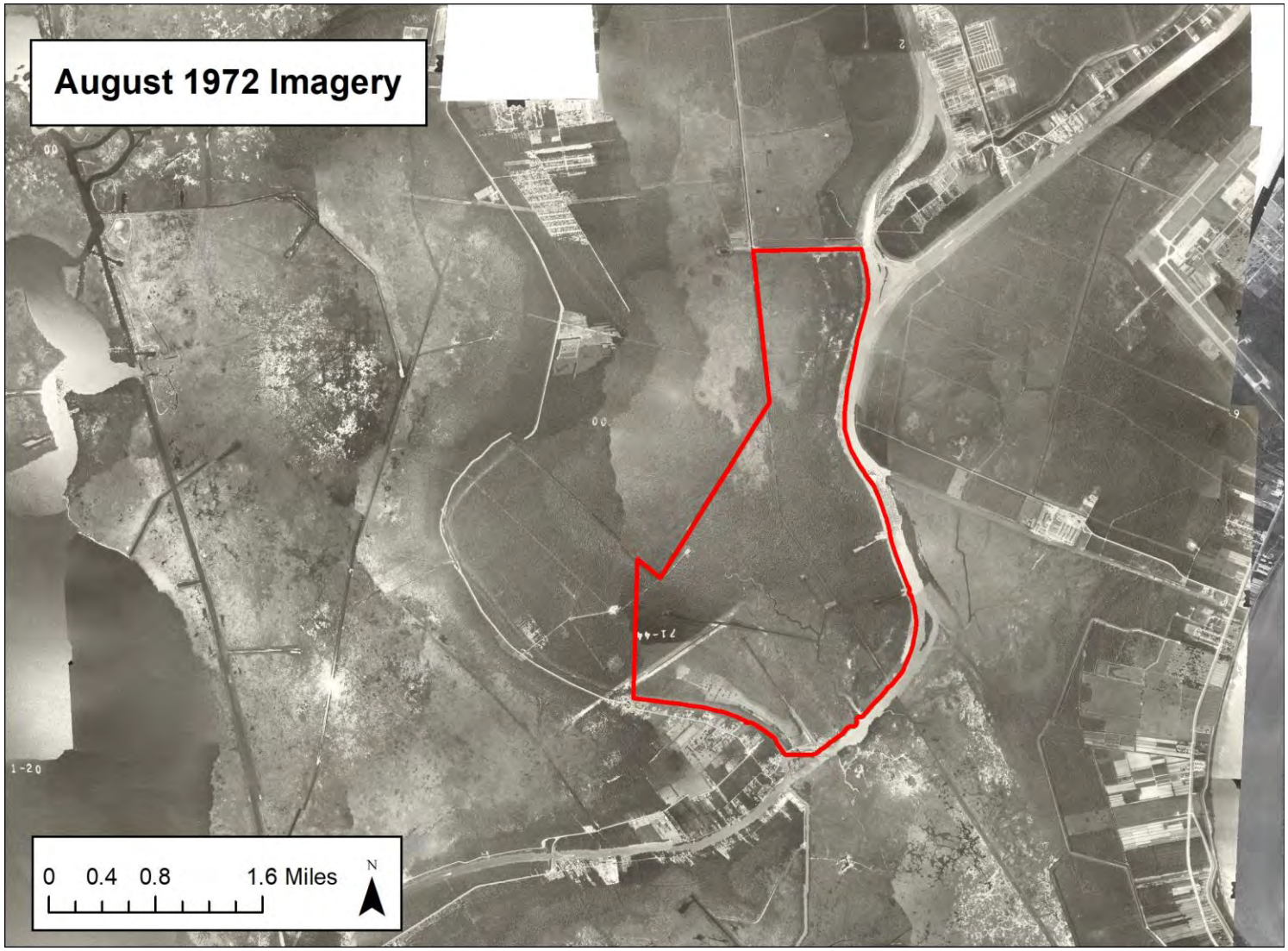

Figure 13. August 1972 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

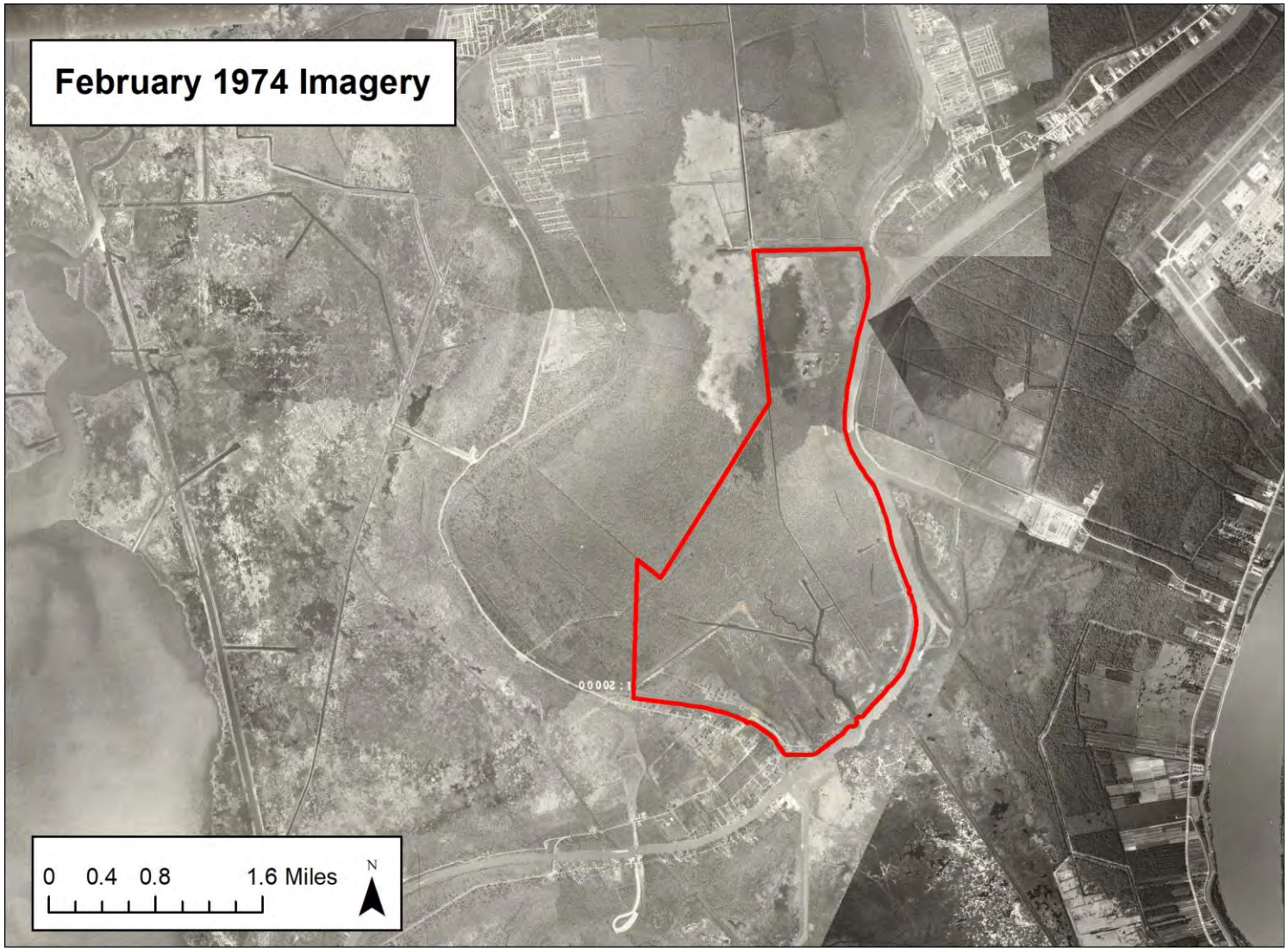

Figure 14. February 1974 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

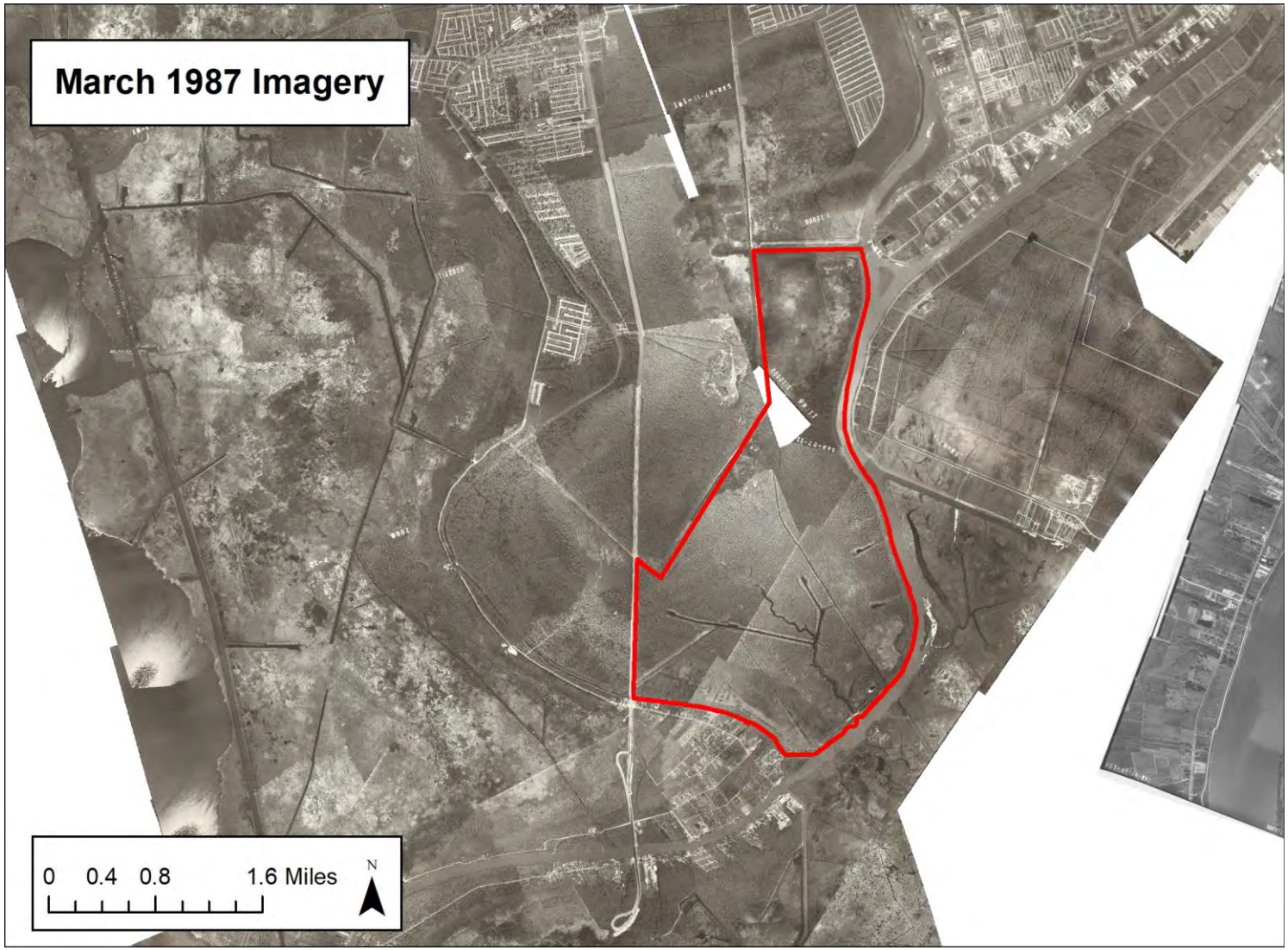

Figure 15. March 1987 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the BAC Site (outlined in red) and vicinity.

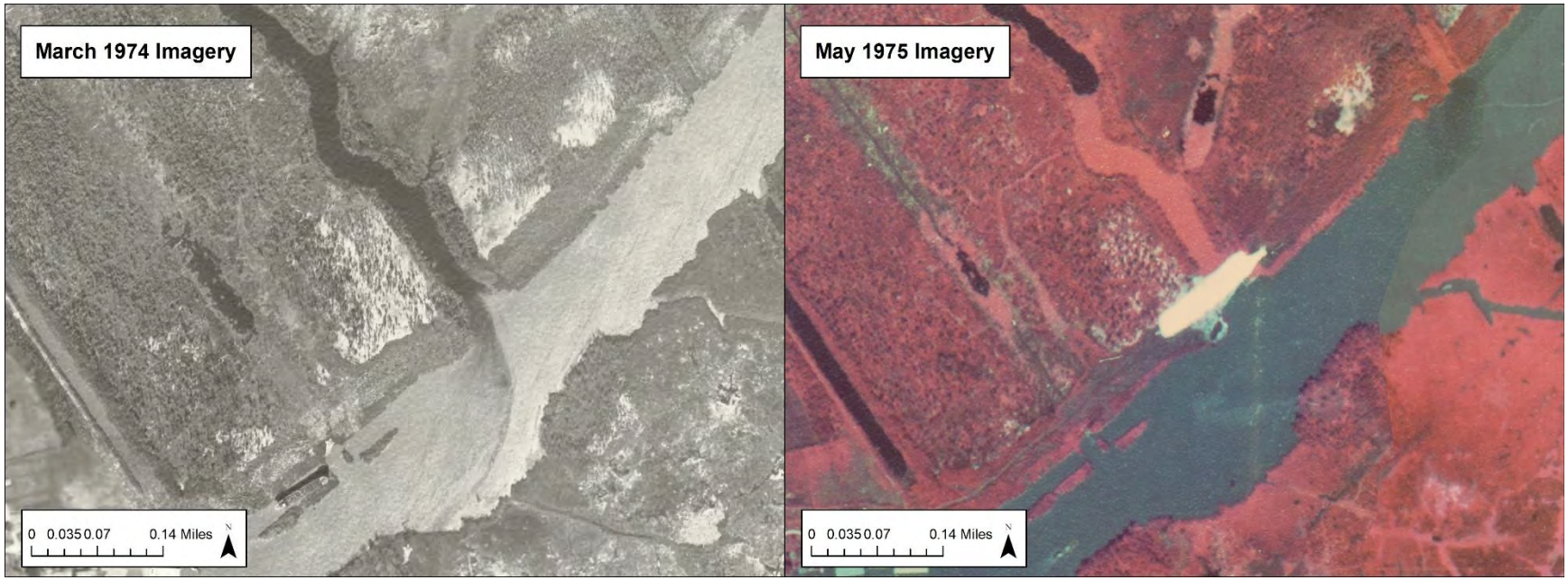

Figure 16. Side by side comparison of March 1974 and May 1975 aerial photography mosaic from CEMVN's Historic Aerial Photography database of the Bayou aux Carpes and GIWW junction.

3.2 Habitat Analyses

3.2.1 Normalized Difference Vegetation Index Analysis

Landsat satellites measure electromagnetic radiation as it reflects off the earth's surface. Healthy vegetation reflects more infrared radiation and absorbs more visible light. Normalized Difference Vegetation Index (NDVI) compares the ratio of infrared radiation and visible light reflection measured by satellite to estimate vegetation health. This NDVI analysis was performed using Landsat imagery data from April or May of 13 years between 1987 and 2014 for the BAC Site (Appendix 10). The goal of this analysis was to estimate the relative health across years of the marsh and forested habitats of the BAC Site. Results were indexed from between -1 to +1, with higher numbers representing healthier vegetation. Table 2 summarizes the results of this study by indicating the relative vegetative health estimated using NDVI across years. These results provide a better understanding of the interannual variation of vegetative health in the BAC site during the period of analysis, but do not indicate obvious trends of change or stasis over time. The results could be used as a baseline for the average existing vegetative heath for the BAC Site if subsequent NDVI analyses are performed.

Table 2. Summary of NDVI results from the NDVI and Habitat Change Analysis Report.

Years with highest departures		
Year	Northern	Southern
1987	-	-
1989	+	+
1993	0	0
1994	+	+
1995	+	0
1999	-	+
2001	+	+
2003	0	-
2005	-	-
2006	+	-
2007	n/a	+
2014	-	+

Note: A plus sign (+) indicates years where vegetative health was higher than the long-term mean, a minus sign (-) indicates years with vegetative health lower than long-term mean, and 0 indicates years that were close to the long-term mean.

3.2.2 Habitat Change Analysis

A habitat change analysis from 1956 through 2010 accompanied the NDVI analysis report (Appendix 10; Section 3.2.1). The analysis provided percent cover and total acres by habitat type for five years (1956, 1978, 1988, 2005, and 2010). Wooded habitats increased from 1978 to 2010. Marsh acres decreased from 1988 to 2010. The largest between year change was a 108 acre (23%) decrease in marsh acreage from 2005 (before Hurricane Katrina) to 2010. All other habitat types from 2005 (before

Hurricane Katrina) to 2010 increased. Time series analyses were not performed because there were limited data points (i.e., only five measurements). Figure 17 summarizes the results for each habitat type and year.

The BAC Site was divided into six discrete areas (Figure 18) and analyzed for the habitat change analysis. Each area was delineated based on apparent habitat/vegetation differences and/or topological separations as visually identified by examining aerial photography. Most areas analyzed followed the overall observation trend of decreases in marsh acreages and increases in wooded acreages, with three notable exceptions (Figure 15). A large south-central part of the BAC, Area 5, is wooded and was stable throughout the period of analysis. Area 5 represents approximately 77% of the BAC Site, and its stability may be driving the stable trend observed wooded habitats throughout the BAC Site. The northern section was divided into four unique areas (Areas 1-4), and all but one indicated a transition from marsh to wooded habitats for the period of analysis. Area 1, located in the northwest corner, remained marsh and was stable (Figure 18). Area 6, located near the plug at the confluence of Bayou aux Carpes and the GIWW, had a slight transition from wooded to marsh habitat (Figure 18).

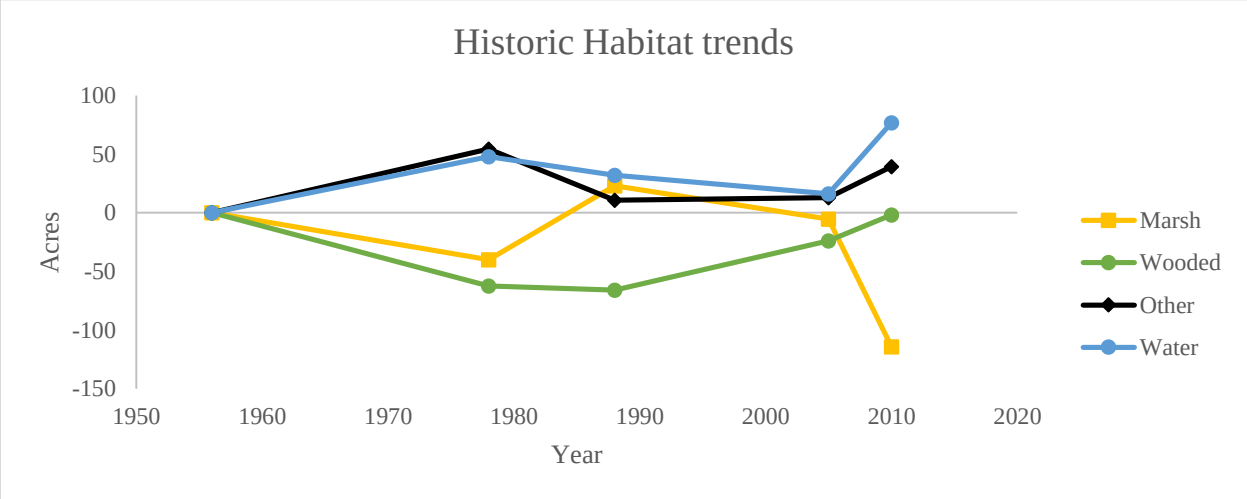

Figure 17. Results from the Vegetative Habitat Analysis from the Bayou aux Carpes 404c NDVI and Habitat Analysis Summary May 1987-2014 which mapped and calculated the percent coverage for marsh and wooded habitats from 1956, 1978, 1988, 2005, and 2010 (Appendix 10).

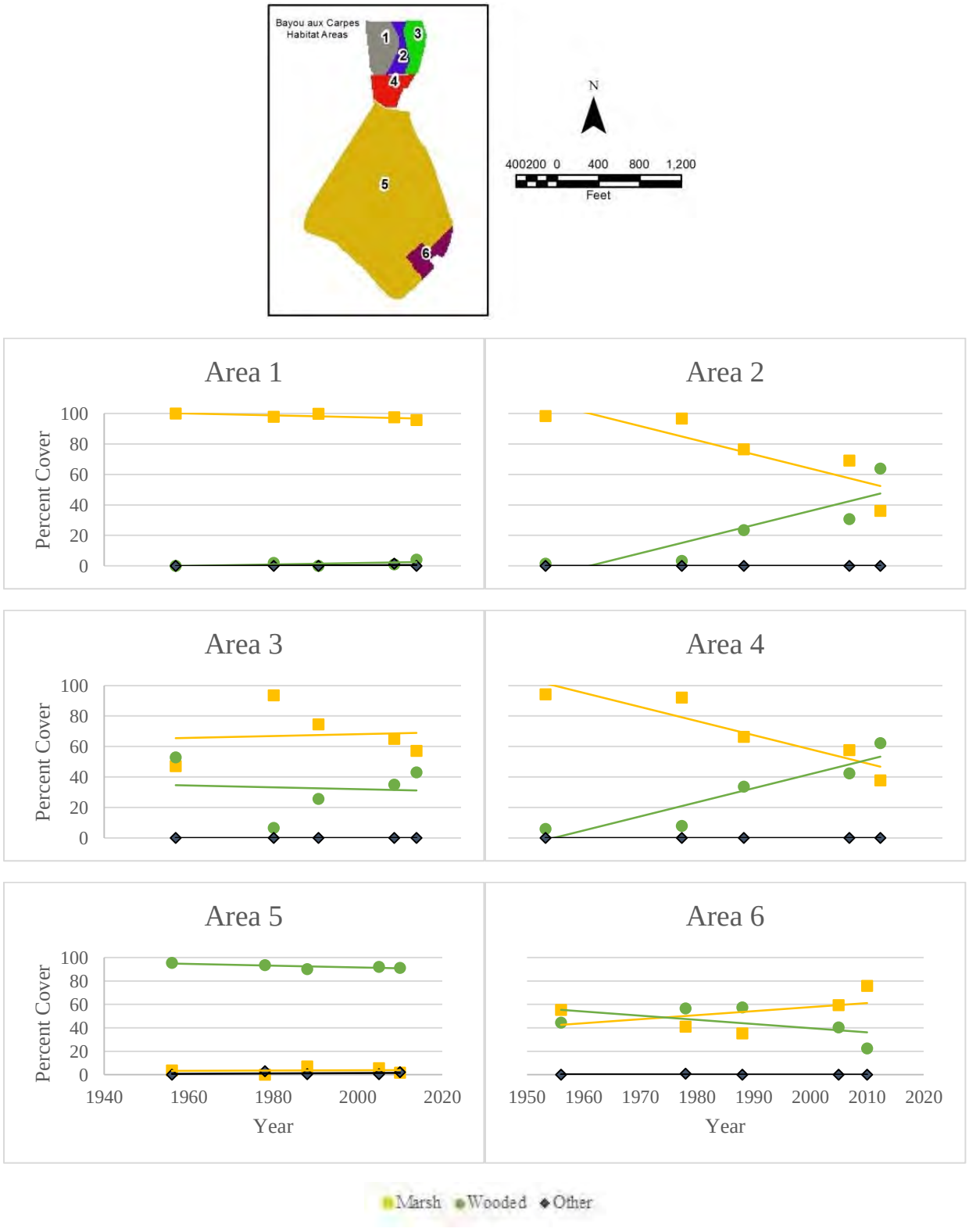

Figure 18. Results of the Vegetative Habitat Analysis from the Bayou aux Carpes 404c NDVI and Habitat Analysis Summary May 1987-2014 by area.

3.3 Flotant Marsh

Marsh has been present in the northern section of the BAC Site since at least 1936 (Figure 9). Currently much of the marsh in this section is classified as flotant and may have been flotant in 1936. The BAC Site marsh was isolated from the larger marsh complex in the 1950s or 1960s as a result of construction of the V-line levee and associated canals, as well as the OEPS outfall canal (Figures 9 and 10). In addition, the historic widening, deepening, and maintenance of the GIWW has produced spoil that has been placed along the channel resulting in direct and indirect negative impacts to adjacent sensitive marsh habitat.

Much of the historic marsh outside of the BAC Site has transitioned to other habitat types since 1945 (Figures 10 – 15). Much of the marsh that was historically contiguous with the flotant marsh in the BAC Site is now residential housing. Most of the remaining undeveloped land has transitioned from marsh to forest.

Within the BAC Site, much of the marsh has transitioned to forest. The habitat change analysis accompanying the NDVI Report (Section 3.2.2; Appendix 10) indicates that forest habitats increased from 1956 to 2010 across the BAC Site, except for the northwestern section which includes flotant marsh. This trend is also apparent in the aerial photography (Figures 9 – 15).

A relatively small area of marsh exists east of Bayou aux Carpes near its juncture with the GIWW. A visual comparison between aerial imagery from 1936 and 2015 indicates a conversion of marsh to open water or forest during this time period. However, the Vegetative Habitat Analysis from the Bayou aux Carpes 404c NDVI and Habitat Analysis Summary May 1987-2014 Report found a slight increase in marsh between 1956 and 2010 in this area, suggesting that a habitat shift from marsh to other habitats occurred between 1936 and 1956 (Appendix 10). A comparison between the November 1945 photography and the 1936 photography indicates that the GIWW may have been dredged and widened during this time. Spoil placement from these efforts may be responsible for the conversion of marsh to forested habitat. The dredging and widening could also have resulted in the increase in open water habitats within the BAC Site.

3.4 Forested Wetlands

Forested wetlands, predominantly swamp, have been present in the central and southern part of the BAC since the 1936 photography. A large expanse of forested wetlands (1,790 acres or approximately 77% of the total BAC area) remained stable from 1956 through 2010 (Section 3.2.2; Appendix 10). Data suggests that much of the northern section of the BAC Site has trended from marsh to forested wetlands throughout this period (Section 3.2.2; Appendix 10). However, these data indicate an opposite trend east of Bayou aux Carpes near the GIWW (Section 3.2.2; Appendix 10). Some of the marsh in this area appears to have converted to swamp and open water based on aerial photographs between 1936 and 1956 (Figures 9 and 11). Since 1956, habitat data suggests that some forested habitat east of Bayou aux Carpes near the GIWW has transitioned to marsh (Section 3.2.2; Appendix 10).

4.0 Purpose and Need for Augmentation

As part of the WBV Project USACE impacted 9.6 acres of wetlands on the Section 404(c) of the CWA designated Bayou aux Carpes area. EPA specified (via letter on May 28, 2009; Appendix 5) and USACE agreed (via letter on July 27, 2009; Appendix 6) to consider augmentation of area wetlands in addition to compensatory mitigation. Six augmentation measures were preliminarily identified that could potentially improve existing hydrology with the goal of enhancing wetland functions and values.

5.0 Augmentation Measures Evaluated

The Record of Decision for IER 12 identified six augmentation measures that would be considered (Figure 19). Each of these measures is independent of the others and considered on its own merit (i.e., not considered alternative to one another).

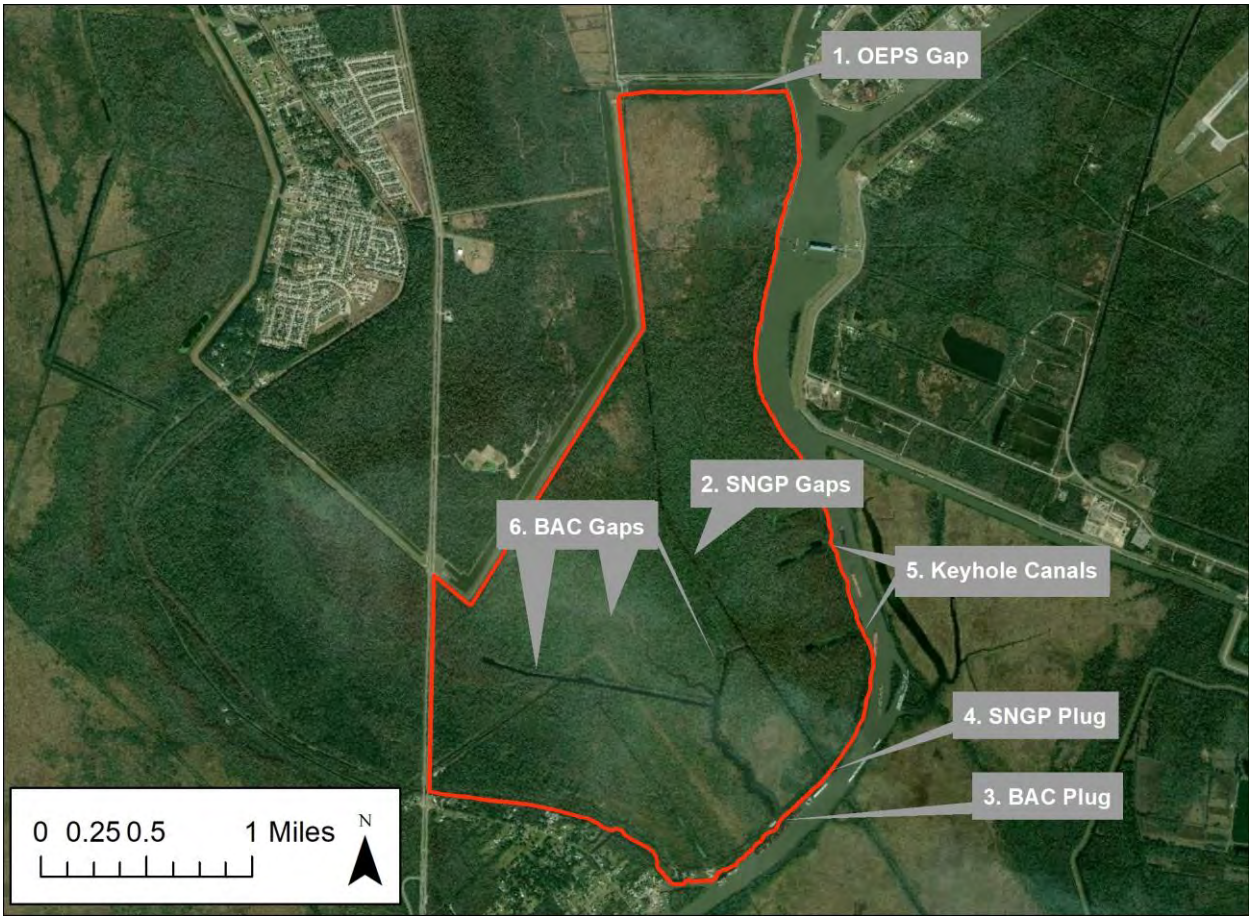

Figure 19. Map showing the BAC Site and location of the six augmentation measures initially considered.

5.0.1 Measure 1

Gap the dredged material disposal bank along the southern side of the OEPS outfall canal to partially restore historic sheet flow regime to the BAC 404c Site and provide a dedicated source of freshwater to provide additional nutrients.

5.0.2 Measure 2

Modify the spoil bank along the SNGP canal to provide hydrologic exchange between the northern and southern sections of the BAC Site, thereby partially restoring the historic sheet flow regime.

5.0.3 Measure 3

Modify the shell plug at Bayou aux Carpes to provide hydrologic exchange between the GIWW and the BAC Site, thereby partially restoring the historic sheet flow regime.

5.0.4 Measure 4

Close the SNGP canal to promote hydrologic flow within the BAC Site, thereby partially restoring historic sheet flow regime.

5.0.5 Measure 5

Gap or degrade keyhole oil well access canal banks to promote hydrologic flow within the BAC Site, thereby partially restoring historic sheet flow.

5.0.5 Measure 6

Gap or degrade oil well access roads to promote hydrologic flow within the BAC Site, thereby partially restoring historic sheet flow regime.

There are seven locations that were considered (Table 3, Figure 20). Some, all, or a combination of gapping and or degrading at these locations was considered.

Table 3. Description of the seven Measure 6 gap and/or degradation locations.

Measure 6 Descriptions and Locations	
6.1	Degrade or gap road existing road where Bayou aux Carpes meets the GIWW
6.2	Establish gaps in an old road adjacent to the east side of a canal located in the far southeast portion of the BAC site.
6.3	Establish gaps in an old road adjacent to the west side of a canal located in the far southeast portion of the BAC site.
6.4	Establish gaps in a road at the south of BAC site.
6.5	Degrade or gap a road adjacent to a canal in the southwestern portion of the BAC site.
6.6	Degrade or gap a road located north of the keyhole canals.
6.7	Extending the “Old Canal” such that it directly connects to the GIWW.

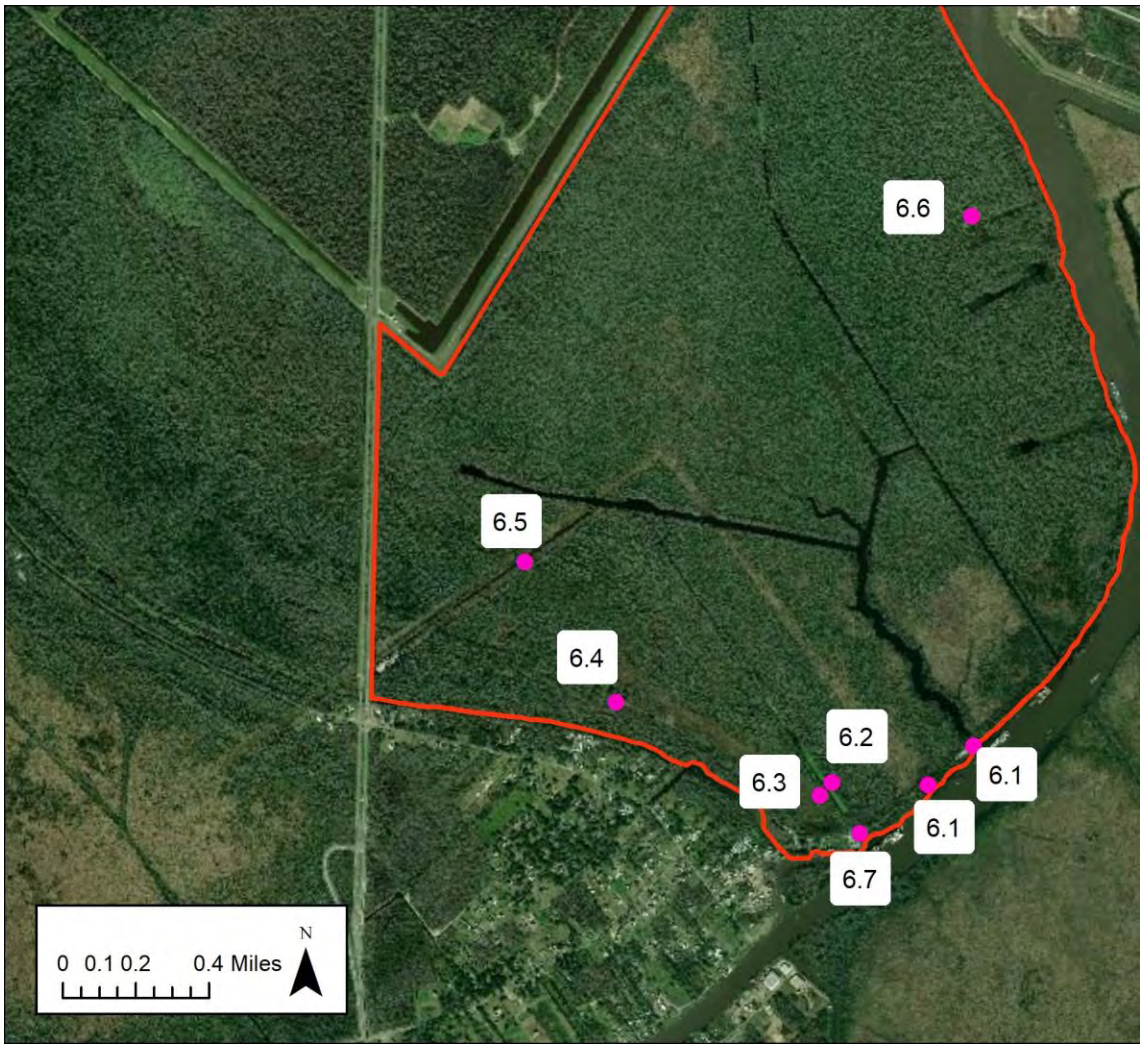

Figure 20. Measure 6 gap and/or degradation locations.

5.1 Initial Screening

The purpose of this section is to present the results of initial screening of the six augmentation measures from IER 12. Augmentation measures from IER 12 were initially screened for implementability and the potential to enhance the wetland functions and values of the BAC area. Screening occurred through various meetings with members of the IET and agency opinions were documented through email correspondence (Appendix 11). If results of this initial screening indicate a measure should be retained for further evaluation, then it was included in the final array of measures evaluated in Section 5.2.

5.1.1 Measure 1

Measure 1 could increase exchange between the OEPS outfall canal and the BAC site which could provide benefits to existing wetlands. It is also implementable, has no known landowner issues, or preliminary operations and maintenance issues that would preclude it from further evaluation. Further evaluation would be needed to determine whether it is likely to benefit existing wetlands. On March 14, 2013 the EPA, NPS, and USFWS stated this measure should be carried forward (Appendix 11). Measure 1 is retained for further evaluation as a part of the final array.

5.1.2 Measure 2

Measure 2 would gap the SNGP canal, which could provide increased sheet flow and provide hydrologic connectivity within the BAC Site. It is also implementable, has no known potential landowner issues, or preliminary operations and maintenance issues that would preclude it from further evaluation. On March 14, 2013 the EPA, NPS, and USFWS stated this measure should be carried forward (Appendix 11). Measure 2 is retained for further evaluation as a part of the final array.

5.1.3 Measure 3

Measure 3 would remove the shell plug at Bayou aux Carpes, increases hydrologic exchange between the BAC Site and the GIWW. This could restore a historic connection which could increase sheet flow and benefit wetlands within the BAC Site. It also is implementable, and has no preliminary operations and maintenance issues that would preclude it from further evaluation. There may be real estate issues associated with this measure, but these potential issues are expected to be minimal. On March 14, 2013 the EPA, NPS, and USFWS stated this measure should be carried forward (Appendix 11). Measure 3 is retained for further evaluation as a part of the final array.

5.1.4 Measure 4

Measure 4 would close an artificial connection at the SNGP canal and GIWW. It would also eliminate private landowner access to the Harvey Tract via the SNGP. EPA Region 6, NPS, and USFWS stated this measure should no longer be considered via email correspondence on March 14, 2013 (Appendix 11). As such, measure 4 is not further evaluated, and is not a part of the final array.

5.1.5 Measure 5

Measure 5 would gap keyhole canal(s) on the eastern edge of the BAC Site. The keyhole openings included in Measure 5 would likely involve some long-term maintenance. Concrete weir(s) with flap gate(s) or a concrete weir(s) with flashboard risers may be necessary and this structure would have to be maintained. EPA Region 6, NPS, and USFWS agreed to no longer consider this via email correspondence on March 14, 2013, because of an unwillingness to maintain structures (Appendix 11). Additionally, NPS had concerns that such gapping would allow saltwater intrusion into the adjacent swamp during storm events. As such, measure 5 is not further evaluated and is not recommended for further consideration.

5.1.6 Measure 6

Evaluation Result: Measure 6 (6.1 through 6.7) included one or more gaps and degradation of roads and other high ground (Table 3, Figure 20). The benefits of Measure 6 as a broad scale action were found to be limited. EPA Region 6, NPS, and USFWS agreed to no longer consider this measure, with the exception of measure 6.1, because of “unproven utility” via email on March 14, 2013 (Appendix 11). Measure 6.1 consisted of the removal of the shell plug at the confluence of Bayou aux Carpes and the GIWW, which is the same as Measure 3. As such, Measure 6 is not further evaluated and is not recommended for further consideration.

5.2 Final Array of Measures Evaluated

5.2.1 Final Array Evaluation Criteria

Three evaluation criteria were used to demonstrate the differences among measures in the final array (Risk and Reliability, Environmental, and Cost). Sub-criteria were developed for risk and reliability and environmental to focus the evaluation.

In brief, evaluation criteria reflect augmentation goals, but not constraints. For instance, if the mission is to buy a car, goals may be to have a low start-up and operating cost. This scenario would have the criteria of retail cost and gas mileage. Note that constraints are not considered as evaluation criteria (i.e. the retail cost of the car must be under $20,000) because measures cannot be compared based on this information; all measures considered should be designed to be under $20,000 before evaluation criteria are applied. For the purposes of Bayou aux Carpes 404(c) augmentation measures evaluation, the following has been proposed as evaluation criteria:

5.2.1.1 Risk and Reliability

Risk is defined as probability multiplied by consequences. An example of risk would be a calculation of the relative chance of saltwater intrusion multiplied by magnitude of anticipated plant mortality. Actions can be implemented to reduce risk, but because risk can never be completely eliminated, residual risk will remain. Reliability refers to the chance that a component of the system will fail to perform its intended purpose as a function of the forces placed upon it.

Since these two factors are similar, they will be considered together: Risk and Reliability. Five sub-criteria were used to evaluate the risk and reliability of each alternative measure considered:

1. Uncertainty Relative to Achieving Ecological Success;
2. Potential Need for Adaptive Management;
3. Uncertainty Relative to Implementability;
4. Self-Sustainability; and
5. Risk of Exposure to Physical Stressors (need probability and performance once exposed to measurements).

Relative qualitative scores for each risk and reliability sub-criteria are summarized in Table 4 for each measure in the final array. Each risk and reliability sub-criteria is further discussed in their respective sections for individual measures (Measure 1 – 5.2.2.2, Measure 2 – 5.2.3.2, and Measure 3 – 5.2.4.2).

Table 4. Summary results by Augmentation Measure for Risk and Reliability selection criteria.

Measure	*Uncertainty relative to achieving ecological success*	*Potential Need for Adaptive Management*	*Uncertainty Relative to Implementability*	*Self-Sustainability*	*Risk of Exposure to Stressors (need probability and performance once exposed measurements)*
1	- (no metric for ecological success established; partially re-establish sheet flow; unknown how it would affect nearby flotant marsh)	0 (may negatively affect nearby sensitive flotant marsh)	+ (publicly owned; may be difficult to access site for construction)	++ (debris removal unlikely)	++ (no expected physical stressors; e.g., wave action and boat wakes)
2	- - (no metric for ecological success; many gaps exist; may be redundant to canal backfilling project)	++ (unlikely for adaptive management action)	++ (spoil banks located on abandoned oil/gas pipeline canal)	++ (debris removal unlikely)	+ (limited boat traffic could, but not likely to influence gap geometry)
3	+ (no metric for ecological success established; partially re-establish sheet flow)	++ (unlikely for adaptive management action)	+ (may or may not be publicly owned; can design measure either way)	++ (debris removal unlikely)	0 (boat traffic and barge anchoring area may influence gap geometry; the likelihood of this is expected to be low to moderate; could design features to mitigate any potential future impacts)

*Evaluated as --. -, 0, +, ++ to indicate relative evaluations

5.2.1.2 Environmental

Seven sub-criteria were initially considered to evaluate the environmental impacts for the final array of augmentation measures:

1. Water Quality;
2. Habitat Impacts;
3. Wildlife Impacts;
4. Threatened and Endangered Species;
5. Aquatic / Fisheries;
6. Cultural Resources; and
7. Hazardous, Toxic, and Radioactive Waste

Threatened and Endangered Species (T&E) and hazardous, toxic and radioactive waste (HTRW) sub-criteria concerns were found to be similar across all Measures in the final array. Coordination with the USFWS regarding the ESA, MBTA, and BGEPA would continue if any measure(s) are further considered for construction. An HTRW Phase 1 evaluation would be conducted if any measure(s) are further considered for construction. Any required analyses and coordination would be documented in subsequent NEPA documentation.

There is no critical habitat for any Federally listed T&E species within the BAC Site. There were aerial surveys of the BAC Site conducted by LDNR for bald eagle nests and wading bird rookeries on March 16, 2010, April 12, 2010, February 18, 2011, May 7, 2013, March 7, 2013, and February 23, 2017. There were no wading bird rookeries and bald eagle nests observed during these surveys (Appendix 12). There are no known HTRW concerns within the BAC Site, but augmentation measures would have temporary direct impacts to air quality during construction. However, Jefferson Parish is currently in attainment of air quality standards. CEMVN would follow relevant environmental laws, procedures, and policy for any augmentation measure(s) further considered for construction, including the ESA, MBTA, BGEPA, CWA, CAA, and Engineer Regulation 1165-2-132.

For the reasons discussed in the paragraphs above, HTRW and T&E were not considered when evaluating augmentation measures in the final array. The remaining five environmental sub-criteria were used to evaluate environmental impacts for the final array:

1. Water Quality;
2. Habitat Impacts;
3. Wildlife Impacts;
4. Aquatic / Fisheries; and
5. Cultural Resources

Construction of each measure is expected to have temporary direct impacts (e.g., increased turbidity, vibrations, fugitive dust, noise, etc.). Similar to T&E and HTRW, these impacts are not further utilized for comparison of the measures because they are expected to be similar for all. Furthermore, all would be short-term and temporary during the period of construction after which sediment would settle and vegetate, stabilizing the area.

Augmentation measures would impact wetland habitat, fisheries, and wildlife. These impacts would include some adverse impacts due to the removal of earthen material (gapping or grading down) and habitat to restore the hydrology of the area. However, the measure(s) selected should restore hydrological exchange and improve water quality which should benefit fisheries and wildlife. With spoil banks gapped and canal plugs removed, fish and other aquatic species would have better, more direct access to resources and habitats that are currently inaccessible or otherwise circuitous and difficult to access. Any augmentation constructed would likely improve habitat conditions for fish, other aquatic, and wildlife species.

Overall, the environmental impacts of the selected augmentation measure(s) would restore a more natural hydrology while minimizing associated negative environmental impacts. Any initial adverse environmental impacts caused during construction (e.g., wetland fill) would be off-set by the long-term benefits to be realized, and therefore would not require additional compensatory mitigation. See methods sections (5.2.2.1, 5.2.3.1, 5.2.4.1) for more information on construction activities.

Relative scores for each environmental sub-criteria are summarized in Table 5 for each measure in the final array. Each environmental sub-criteria is discussed in their respective sections for individual measures (Measure 1 – 5.2.2.3, Measure 2 – 5.2.3.3, and Measure 3 – 5.2.4.3).

Table 5. Summary results by Augmentation Measure for Environmental selection criteria.

Measure	*Water Quality*	*Habitat Impacts*	*Wildlife Impacts*	*aquatic / fisheries*	*cultural resources*
1	- (slight long-term benefits in exchange flow possible; potential negative impacts from herbicide application and pollution from stormwater)	0 (1.4 - 3.1 ac of blh/swamp impacted from construction (50', 250' gap); success depends on operation of two structures; net benefit in flow exchange -7 ac to +23 ac; potential negative impact to flotant marsh)	0 (overall benefit likely limited and may have negative impacts to WQ and habitat)	0 (limited aquatic/fisheries impacts expected)	+ (likely would require limited further review)
2	0 (limited long-term benefits expected)	- (0.2 acres of ruderal forest / swamp impacted from construction; modeling suggested no net flow exchange benefit; limited anticipated benefits; may be redundant to canal backfilling project)	0 (limited to no benefit)	- (limited aquatic/fisheries impacts expected; may be redundant to canal backfilling project)	0 (would require further review; may be more extensive than M1)
3	++ (decreasing negative impacts of high salinity events; negative impacts associated with poor water quality in the GIWW expected to negligible and highly localized)	++ (0.7 acres of BLH / Swamp impacted from construction; modeling suggested highest net flow exchange benefit (+86 ac); increased exchange flow could improve wetland functions and values)	+ (most likely to have greatest wildlife habitat benefit)	+ (potential for net benefit to aquatic vegetation (with a risk of negative impacts to SAV); better access/habitat for estuarine transients)	0 (would require further review; may be more extensive than M1)

*Evaluated as - -. -, 0, +, ++ to indicate relative evaluations

5.2.1.3 Cost

Costs were divided into the following five sub-categories.

1. Construction
2. Real Estate
3. Operations, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R)
4. Monitoring
5. Adaptive Management (if the plan needs reversal; assumed same cost as original implementation plan)

Construction, OMRR&R, and real estate costs were estimated for each measure in November 2017 (Appendix 13). Real estate costs were updated in June 2019. Monitoring costs were estimated through coordination with USGS (Sarai Piazza, USGS, October 2017). Adaptive management costs were assumed to be equal to construction costs for each measure. The total construction cost was calculated by summing construction, real estate, and initial monitoring costs. Yearly monitoring and OMRR&R costs are presented as separate items from the total construction cost. The OMRR&R costs are anticipated to be similar for each measure.

Costs for each Measure in the final array are summarized in Table 6. Costs are discussed in their respective sections for individual measures (Measure 1 – 5.2.2.4, Measure 2 – 5.2.3.4, and Measure 3 – 5.2.4.4).

Table 6. Summary results of anticipated costs by Augmentation Measure. See Appendix 13.

Measure	***Construction***	***Real Estate***	***Monitoring***	***Adaptive Management (if plan needs reversal; assumes same cost as implementing plan)***	***TOTAL CONSTRUCTION COST (Not Including Adaptive Management)***	***OMRR&R***	***Monitoring Costs / year***
1	M1a - $211,912.50 M1b - $139,300	$5,000	initial - $10,000; $34,000/yr	M1a - $211,912.50 M1b - $139,300	***M1a - $226,912.50 M1b - $154,300***	not anticipated to be high; expected to be similar across projects; pending estimates	***$34,000****
2	$110,250	$10,000†	0	$110,250	***$120,250***	not anticipated to be high; expected to be similar across projects; pending estimates	***$0***
3	$119,875	$35,000†,‡	initial - $5,000; $17,000/yr	$119,875	***$159,875***	not anticipated to be high; expected to be similar across projects; pending estimates	***$17,000***

*This cost does not include an estimated cost for discrete water quality and soil porewater quality monitoring.
† This cost includes a special use permit from the Department of the Interior.
‡ This costs assumes the property is privately owned.

5.2.1.4 Flow Exchange

Solutions from a 2-D Hydrodynamic model were used to calculate flow exchange area for all Measures included in the final array as a proxy for estimating sheet flow (Section 2.2.5.3; Appendix 9, Annex 2). Increased flow exchange and sheet flow associated with benefits to water quality and plant health (Lane et al., 2015, Baustian et al., 2019). Table 7 summarizes flow exchange calculations by modeling scenario and augmentation measure. The results of these calculations are discussed throughout Sections 5.2.2, 5.2.3, 5.2.4.

Table 7. This table summarizes flow exchange acreages for simulations from The Bayou aux Carpes EPA designated 404c Wetland Model Study Revisions Study (Appendix 9, Annex 2).

Measure/Simulation Run	Description	Flow Exchange	Net Flow Exchange (Measure Implemented – Existing Conditions)
Measure 1: OEPS outfall canal spoil bank gapping			
Sluice gates open, no pumps operating	Existing condition	42 acres	
	75' gap	35 acres	-7 acres (-14 acres at existing gap and +7 acres at new gap)
	250' gap	50 acres	+8 acres (-30 acres at existing gap and +38 acres at new gap)
Sluice gates open, pumps operating at 256 cfs during peak condition after 6 hours.	Existing condition	618 acres	
	75' gap	633 acres	+15 acres
	250' gap	641 acres	+23 acres
Sluice gates closed, pumps operating at 256 cfs during peak condition after 6 hours.	Existing condition	661 acres	
	75' gap	664 acres	+3 acres
	250' gap	664 acres	+3 acres
Measure 2: Southern Natural Gas Pipeline canal spoil bank gapping			
Existing Condition		10 acres	
Gap Spoil banks in four locations (30 – 60 feet wide each)		10 acres	0 acres
Measure 3: Bayou aux Carpes plug removal			
Existing Condition		216 acres	
BAC plug removed only. *(no additional gaps)*		302 acres	+86 acres (Net flow exchange to SNGP canal area = +12 acres if plug is removed and no other changes to existing conditions)
BAC plug removed and gap spoil bank in two locations (30 – 60 feet wide each)		252 acres	+36 acres

5.2.2 Measure 1

5.2.2.1 Methods

Two options, a 250 foot and 75 foot gap in the OEPS outfall canal, were designed and evaluated for Measure 1. Either of these options would be constructed using similar methods. Earth moving equipment (such as a marsh buggy and backhoe) would be mobilized from the V-line levee access road north of the OEPS outfall canal (Figure 21). The berm on the northern side of the OEPS outfall canal would be used to transport this equipment to a location directly across from where the gap would be constructed. A 100 foot x 100 foot area would then be cleared of vegetation to stage the equipment. Downed vegetation could be stockpiled here, if necessary. The earth moving equipment would then be bridged or flexi-floated across the OEPS outfall canal and the proposed gap constructed. Vegetation would be allowed to regrow naturally in the temporary stockpiling area upon completion of construction. Access to the site to mobilize heavy machinery to construct this measure (and any potential future adaptive management work) may require crossing an existing WBV floodgate located on the north side of the OEPS outfall canal. Any damage to the floodgate resulting from construction would be repaired as part of the cost of implementing this measure.

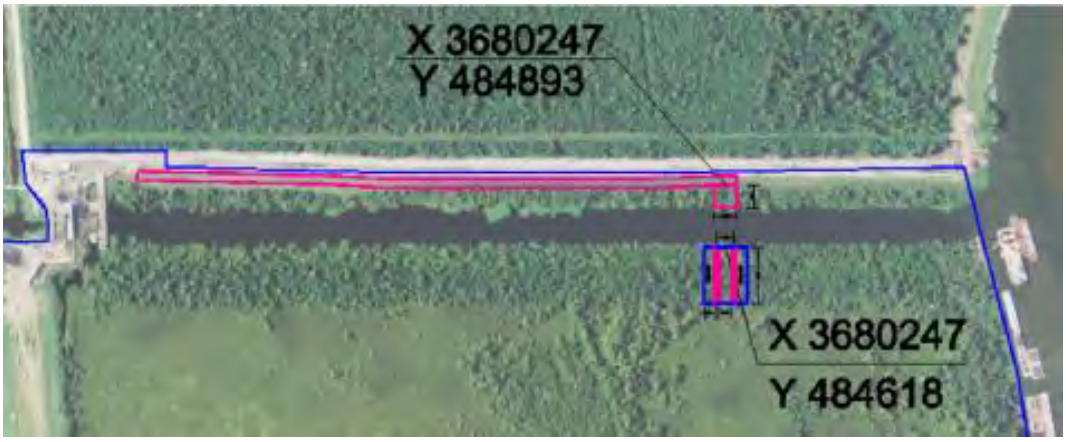

Figure 21. Plan view of the 75 foot wide alternative of Measure 1. The 250 foot wide alternative would use the same route and staging area, but larger gap ROW.

Several assumptions were made to facilitate preliminary engineering and design. The crown width of the existing spoil bank was assumed to be 100 feet with an elevation of approximately +3.0 feet NAVD88. The spoil bank would be degraded to the forest or marsh ground elevation, approximately +1.0 to 0.0 feet NAVD88. This would allow for water to enter from the canal, through the gap, and sheet flow through the BAC Site. Gap side slopes would be from 1:3 to 1:2. Excavated material would be placed on the existing spoil bank on either side of the gap to allow implementation of the adaptive management plan (Section 5.2.2.5), if necessary.

Vegetation would be cleared on either side of the gap to stockpile this material. The total cleared ROW, to include the gap, side slopes, and material storage area would be approximately 500 feet x 100 feet for the 250 foot gap and 200 feet x 100 feet for the 75 foot gap. Approximately 5,500 cubic yards of material would be dredged to create a 250 foot gap,

and approximately 1,500 cubic yards of material would be dredged to create a 75 foot gap. Figures 22 and 23 show the cross sectional views of the 250 foot and 75 foot gaps, respectively.

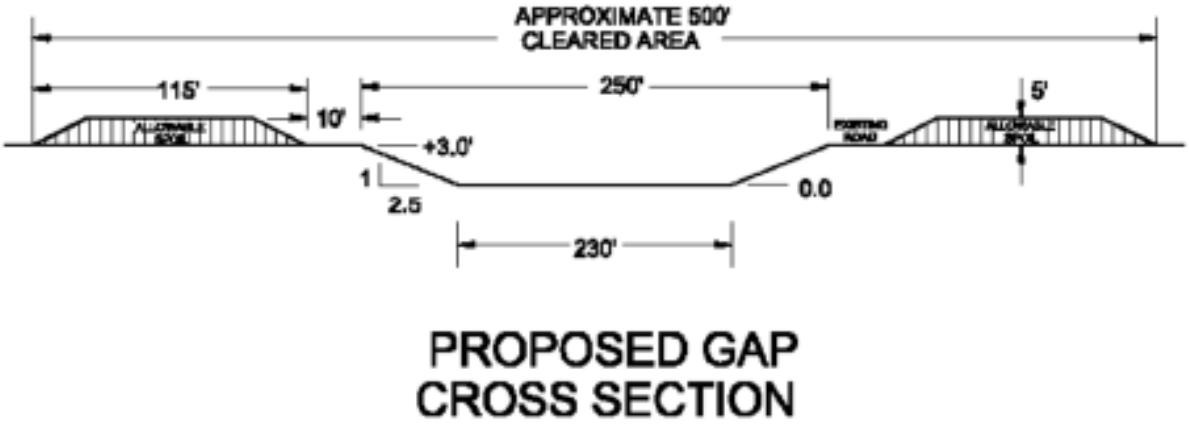

Figure 22. Cross section of proposed 250 foot gap for Measure 1.

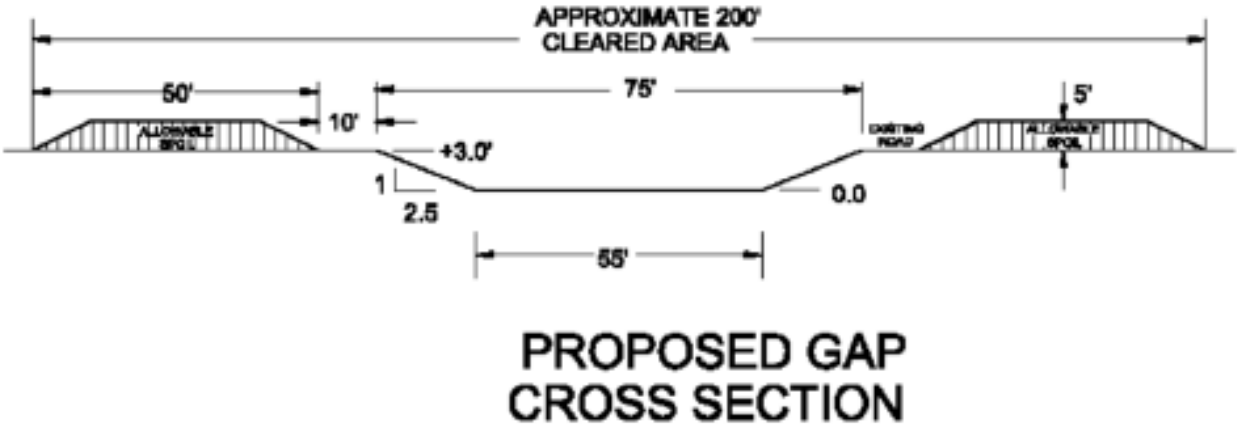

Figure 23. Cross section of proposed 75 foot gap for Measure 1.

5.2.2.2 Risk and Reliability

5.2.2.2.1 Uncertainty relative to ecological success

Ecological success for this and other measures designed may be difficult to measure. There have been no specifically measurable and/or quantifiable ecological outcomes identified by the IET. While there is general consensus that degrading spoil banks and increasing water exchange can be effective restoration tool for wetlands, flotant marshes exhibit unique properties and are sensitive to hydrologic changes. There is evidence that marsh soils closest to and most likely influenced by waters from the OEPS outfall canal are degraded (Appendix 8; Section 2.2.5.2).

The hydrodynamic modeling report showed that net differences in exchange flow would be positive, but relatively low for this measure (Table 7; Appendix 9, Annex 2). Furthermore, modeled changes in exchange flow were highly dependent on rainfall and storm water management. The report indicates that Measure 1 would produce the highest net change in exchange flow if there was rainfall over the area, the OEPS was operating, and the Old Estelle Flood Gate – South was closed (Table 7, Appendix 9, Annex 2). Even under this unlikely scenario, modeling suggests it would not perform as well as Measure 3 (Table 7, Appendix 9, Annex 2), but would be more effective than Measure 2.

The area immediately influenced by this measure has been undergoing a transition from marsh to wooded vegetation (Appendix 10; Section 3.2). It would be difficult to determine the impacts of this measure in an area that may be transitioning from one habitat type to another.

Any net increase in flow exchange also includes a net decrease in flow exchange within the existing approximately 100 foot wide channel between the OEPS outfall canal and the BAC Site (Table 7; Appendix 9, Annex 2). The impacts on the sensitive flotant marsh from reducing flow in this location and providing flow at the gap location are unknown.

For these reasons, Measure 1 has the most uncertainty relative to achieving ecological benefit (Table 4).

5.2.2.2.2 Potential need for adaptive management

Measure 1 is the most likely measure to need an adaptive management action due to the uncertainty over whether positive or negative impacts would be realized from implementation (See Section 5.2.2.2.1).

5.2.1.2.3 Uncertainty relative to implementability

Measure 1 would be easily implementable in terms of real estate requirements, because the land is publically owned. However, access may be difficult because there is no direct waterborne access for construction.

5.2.2.2.4 Self-sustainability

Measure 1 would likely be self-sustaining. There is a low risk associated with debris accumulation and removal. The OEPS outfall canal does accumulate FAV, but such

accumulation is unlikely to impact gap performance as Jefferson Parish uses herbicides to control unwanted FAV in the canal. It is expected that Jefferson Parish would continue this maintenance. Additionally, there is no apparent evidence that FAV is adversely impacting exchange at the existing 100 foot gap.

5.2.2.2.5 Risk of exposure to physical stressors

The risk of exposure to physical stressors is expected to be low for Measure 1. There are no expected physical stressors associated with wind or boat induced wave action. The area does not have a large fetch perpendicular to where the feature would be constructed, and there is little motorized water traffic anticipated based on limited access.

5.2.2.3 Environmental

5.2.2.3.1 Water quality

Increasing water exchange between the OEPS outfall canal and the BAC Site could cause negative impacts to wetland soils in the BAC Site. Herbicides are applied by Jefferson Parish in OEPS outfall canal three times per year. Increasing exchange flow with OPEDS Canal may increase marsh exposure to herbicides. Additionally, evidence suggests that source water from the OEPS outfall canal water may currently be negatively impacting marsh soils (Appendix 8, Section 2.2.5.2). Furthermore, there could be water quality impacts associated with introducing stormwater through the OEPS outfall canal into the BAC Site. However, this is not anticipated to be a major issue, because several analytes were tested within the BAC Site and vicinity, and none within the OEPS outfall canal and the BAC site were found to have levels that could adversely affect wetland plants and macroinvertebrates (Appendix 8). There would also be some temporary direct negative impacts to water quality associated with construction. Localized increases in turbidity could occur during construction, but would be temporary.

5.2.2.3.2 Habitat impacts

There would be between approximately 1.4 and 3.1 acres of ruderal forest and/or swamp impacted from construction of this feature (50 foot versus 250 foot gap). Measure 1 would not be implemented unless it is found to produce an overall benefit to the BAC Site through increased exchange flow. The USACE Model Study Revisions Report suggests that the maximum net habitat benefits, in terms of exchange flow, would be realized during a rain event when Jefferson Parrish operates the pump at OEPS and the Old Estelle Flood Gate – South is closed (Table 7; Appendix 9, Annex 2). This pumping station is operated infrequently, 16 days from 1 January 2016 through 30 September 2017 for a total of 52 hours of operation. The Old Estelle Flood Gate – South structure is usually open, unless there is an impending tropical storm, in accordance with the approved water control manual. Therefore, the maximum net benefits (i.e., increased exchange flow) would be nominal, may not provide incremental benefits, would not likely be realized, and would require close coordination between Jefferson Parish and SLFPA-W for operation of the OEPS and the Old Estelle Flood Gate – South.

5.2.2.3.3 Wildlife impacts

This feature would have limited benefits to wildlife through the enhancement of existing habitats. Benefits to wildlife habitat would mirror benefits to wetlands that are described in Sections 5.2.2.3.1 and 5.2.2.3.2. The loss of ruderal forest and swamp habitats would decrease the habitat available for certain species, however, these impacts would be offset by benefits to other wetlands within the BAC Site (See sections 5.2.2.3.1 and 5.2.2.3.2).

5.2.2.3.4 Aquatic resources and fisheries

Measure 1 is expected to have positive impacts to aquatic resources and fisheries by providing increased access. This increased access is expected to be minimal, because the gap would be dug to existing marsh elevation and the OEPS outfall canal has reduced connectivity with other major waterways outside of the BAC Site. That is, all surface water connections with waterways outside of the BAC Site are through water control structures. Aquatic habitats could be benefited through increased flow and exchange provided by this measure. However, there could be some negative impacts associated with the introduction of potentially poor water quality into the area which could harm BAC Site aquatic resources and fisheries (Section 5.2.2.3.1).

5.2.2.3.5 Cultural resources

A review of Measure 1 indicates that only assessment or reconnaissance level survey of the project area has been previously conducted and would require additional review to determine if this action would require consultation under Section 106 of the NHPA. The CEMVN will follow Section 106 review procedures if this measure is carried forward.

5.2.2.4 Cost

The total estimated construction and monitoring costs for Measure 1 were the highest among the final array (Table 7). Estimated construction costs were $139,300 for a 75 foot gap and $211,912.50 for a 250 foot gap. Real estate costs were estimated at $5,000, which was the lowest. Costs for OMRR&R were assumed to be low and similar across all measures in the final array. Initial monitoring costs were estimated to be $10,000 for the installation of two continuous water quality stations (one in the OEPS outfall canal, and one within the BAC Site marsh benefited by the newly created gap). Yearly monitoring costs were estimated to be $34,000 for the maintenance of the two continuous water quality stations.

5.2.2.5 Adaptive Management and Monitoring

The adaptive management and monitoring plan would be further developed between the NPS, EPA, CPRA, and CEMVN if this measure is selected for construction. A generalized adaptive management and monitoring approach is discussed, which would be used to kick off a more detailed adaptive management and monitoring plan discussion with the agencies.

Measure 1 would remove material from the spoil banks between the OEPS outfall canal and the BAC Site. The excavated material would be stockpiled adjacent to the gap on the existing spoil bank. The recommended adaptive management action would be to reclose the gap using the stockpiled material excavated during construction.

Baseline monitoring of vegetation and water quality data has been collected for the BAC Site. The USGS performed some preliminary porewater monitoring for marsh sites within the BAC Site from 2009 to 2012 (Appendix 8). Post construction monitoring in the area of influence of Measure 1 and at appropriate reference locations would be performed at an interval mutually agreed upon by the IET. Analytes specific to porewater and soil health would be prioritized, because source water from OEPS outfall canal may be associated with poor soil health in marsh habitats. The USFWS has vegetation monitoring sites within the BAC Site (Appendix 15). Relevant vegetation monitoring would continue within the effect area, if constructed. To supplement the USGS water and soil quality metrics, CEMVN recommends that two continuous water quality stations be installed and maintained with implementation of this measure. One station would be in the OEPS outfall canal and another would be inside the BAC Site in the effect area of the new gap.

Field visits to view site conditions (e.g., scouring and debris) and meetings between USACE, CPRA, NPS, and EPA should be held on a mutually agreed upon interval. During these meetings, monitoring reports, current conditions, and other relevant data (e.g., imagery or CRMS Station 0185 data) would be discussed and decisions made regarding whether implementation of adaptive management actions are necessary.

5.2.3 Measure 2

5.2.3.1 Methods

Measure 2 would include up to four gaps, two on the east bank, and two on the west bank of the existing SNGP canal (Figure 24). While the general location of each gap is defined below, the specific location would be determined in the field to avoid and minimize the felling of trees. The first west bank gap would be located approximately 1,250 feet interior from the GIWW, a paired east bank/west bank gap combination would be located approximately 2,340 feet interior from the GIWW, and the most interior east bank gap would located approximately 7,300 feet interior of the GIWW.

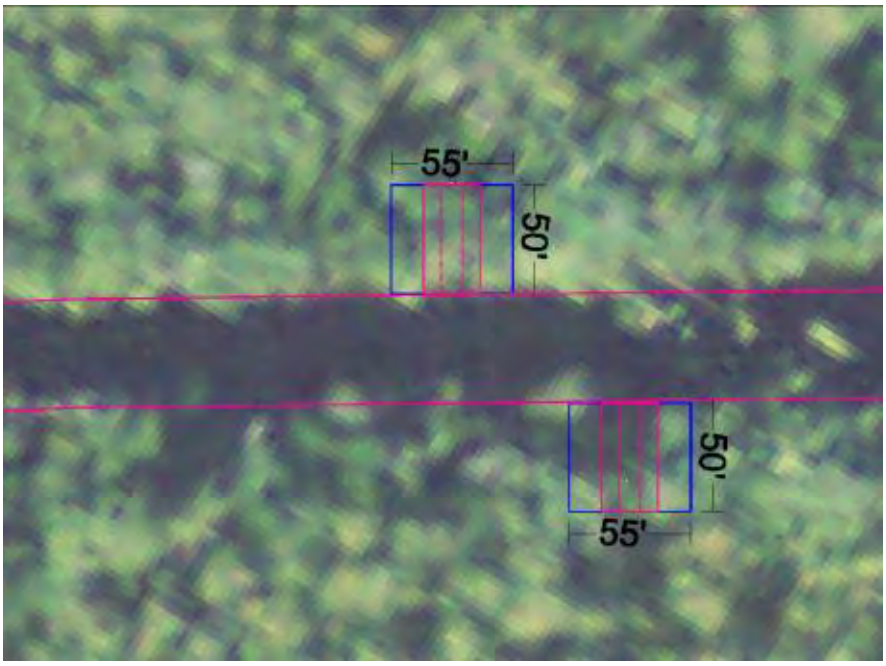

Figure 24. Plan view of paired gaps along the SNGP canal. The design of all four gaps would be similar to this.

Spoil bank ridges exist on both banks of the SNGP canal. In general, the east bank ridge is slightly higher in elevation than the west bank ridge. The east bank ridge was assumed to have a crown elevation of approximately +3.0 feet. The west bank ridge crown elevation was assumed to be approximately +2.0 feet.

Each gap would have 10 foot bottom width with side slopes ranging from 1:3 to 1:2 to accommodate a top width of approximately 25 feet (Figure 25). The gaps would be excavated to the forest ground, which is estimated to be 0.0 - +1.0 feet in elevation. This would allow for sheet flow from the canal, through the gap, and over the swamp. Each gap would require removal of approximately 50 cubic yards of excavated material which would be stockpiled adjacent to the gap. Each respective gap, including, clearing, excavation, and disposal, encompasses an area of approximately 0.05 acres.

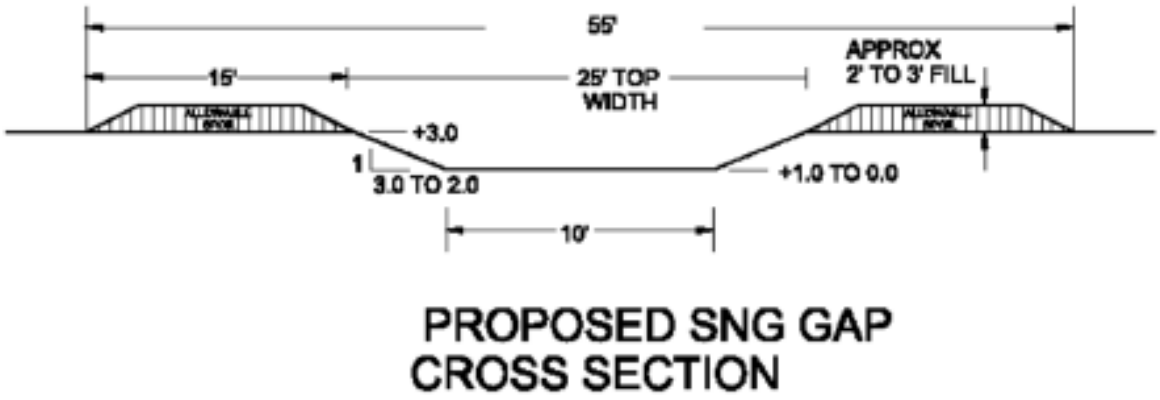

Figure 25. Representative cross section of a gap for Measure 2.

5.2.3.2 Risk and Reliability

5.2.3.2.1 Uncertainty relative to ecological success

Ecological success for this and other measures may be difficult to quantify as explained in Section 5.2.2.2.1. While there is general consensus that degrading spoil banks and increasing exchange flow can be an effective restoration tool for wetlands, there are already extensive existing gaps present on both banks of the SNGP canal (Figure 7) that already allow exchange between the canal and the BAC. As such, it is questionable whether additional benefits would result from additional gaps. Currently, the NPS has plans to degrade the entire SNGP canal spoil bank on their property (Appendix 16). The existing gaps and the NPS plan to degrade the spoil banks on their property would reduce or potentially eliminate any long-term net benefits from this measure.

5.2.3.2.2 Potential need for adaptive management

It is unlikely that there would be a need for adaptive management as a result of construction of Measure 2. There are many existing gaps along the BAC Site, and they do not appear to be resulting any negative impacts to adjacent habitat. In addition, it would be difficult to determine if this measure contributed to any potential post construction changes, because there are many nearby gaps, and modeling results indicate no net change in flow exchange (Table 3; Appendix 9).

5.2.3.2.3 Uncertainty relative to implementability

There are no known major uncertainties relative to implementability. This measure would be easily implementable, because it is publically owned and there is relatively easy public access to the site via watercraft.

5.2.3.2.4 Self-sustainability

There could be future issues of self-sustainability related to debris removal. Though rafts of water hyacinth and debris can be found in SNGP, debris removal is not anticipated to be a major issue as debris did not appear to be affecting existing gaps within the SNGP canal during

recent field visits. If debris removal proves necessary, then the cost associated with this would be minimal and infrequent.

5.2.3.2.5 Risk of exposure to physical stressors

The risk of exposure to physical stressors is expected to be low. The area does not have a large fetch perpendicular to where the feature would be constructed. Also, the existing gaps along the SNGP canal spoil banks do not exhibit any signs of erosion or other negative impacts resulting from boat traffic, or any other such stressors.

5.2.3.3 Environmental

5.2.3.3.1 Water quality

There would be some temporary negative water quality impacts associated with construction. Localized increase in turbidity would occur, but would return to normal after construction. There are no permanent direct, indirect, or cumulative negative impacts to water quality anticipated for Measure 2. Though there is a potential to realize some water quality benefits from implementation of this measure, the hydrodynamic modeling results (Appendix 9) did not demonstrate an increase in net flow exchange. Moreover, Jean Laffite Canal Backfilling Project is planning to degrade the SNGP canal spoil banks, including the areas that would be gapped by Measure 2. If constructed by the NPS, this project would eliminate the need for and the benefits of this measure.

5.2.3.3.2 Habitat impacts

This measure is predicted to have the lowest initial construction related negative impacts to habitat, approximately 0.2 acres of ruderal forest and/or swamp would be negatively impacted. This measure is not predicted to increase the flow exchange, as hydrodynamic modeling suggests no net increase or decrease of flow exchange (Table 3; Appendix 9, Annex 2).

5.2.3.3.3 Wildlife impacts

Ruderal forest and swamp habitat would be directly impacted during construction (i.e., clearing, grading and excavating). This would eliminate nesting and foraging habitat for wildlife in the project area and disrupt similar activities adjacent to the project area during construction. However, these adverse impacts to wildlife would be negligible as little existing habitat would be impacted and the construction duration would be short. Benefits to wildlife would be experienced through potential benefits to adjacent swamp associated with minor increases in hydrologic connection. However, modeling suggests no net increase or decrease of flow exchange for this measure.

5.2.3.3.4 Aquatic resources and fisheries

Measure 2 is expected to have limited positive aquatic and fisheries impacts associated with increased access. Benefits are anticipated to be limited to access and relatively small for two reasons

1. Modeling results indicate no net increase in water exchange (Appendix 9).

2. The SNGP canal spoil bank has many existing gaps on both sides (Figure 7).

Additionally although gapping the spoil banks would allow for better organism access, both spoil banks may be completely degraded via the Jean Laffite Canal Backfilling Project (Appendix 16).

5.2.3.3.5 Cultural resources

A review of Measure 2 indicates multiple previously recorded archaeological sites within the vicinity and would require additional review to determine if this action would require consultation under Section 106 of the NHPA. The CEMVN will follow its Section 106 review procedures, if this measure is carried forward.

5.2.3.4 Costs

Costs associated with Measure 2 were found to be the lowest among the three considered (Table 5). Construction costs were estimated to be $110,250, real estate costs were estimated at $10,000, and OMRR&R costs were assumed to be low and similar across all measures considered. There was no pre-construction monitoring specific to this measure. There is a nearby monitoring station (CRMS 0185) that reports water, vegetation, and spatial data (Figure 4). These data could be used for monitoring. There would be no yearly monitoring costs anticipated for this measure if CRMS 0185 is maintained.

5.2.3.5 Adaptive Management and Monitoring

The adaptive management and monitoring plan would be further developed between the NPS, CPRA, EPA, and CEMVN if this measure is selected for construction. In this section, a generalized adaptive management and monitoring approach is discussed. This generalized approach would be used to kick off a more detailed adaptive management and monitoring plan, if this measure is constructed.

Measure 2 would excavate material from the SNGP canal spoil banks to increase hydrologic connection. The suggested adaptive management plan would be to place material to reclose any gaps, effectively reversing construction. Material removed during construction would be stockpiled nearby to facilitate this adaptive management action, if needed.

Baseline monitoring of vegetation and water quality data has been collected for the BAC Site. USFWS has vegetation monitoring sites within the BAC Site (Appendix 15). Relevant vegetation monitoring would continue near the effect area of this measure, if constructed.

Field visits to view site conditions (e.g., scouring and debris) and meetings between USACE, CPRA, NPS, and the EPA would be held on a mutually agreed upon interval. During these meetings current conditions and other relevant data (e.g., imagery, CRMS Station 0185 data) would be discussed and decisions regarding adaptive management would be made.

5.2.4 Measure 3

5.2.4.1 Methods

The plug at the juncture of Bayou aux Carpes and the GIWW (Figure 27) would be removed. Construction access is available by road or water. Construction equipment and personnel could access the site by travelling Hwy 3134 to Barataria Blvd to Orleans Way in Crown Point, Louisiana. Once at the Crown Point boat launch, an existing private shell road would provide access to the plug. This road would be bisected by removal of the plug as it currently uses the plug to traverse Bayou aux Carpes. Water access would also be available directly from the GIWW.

Figure 27. Representative plan view of Measure 3.

Removing the plug would involve excavating a 40 foot bottom width gap, with 1:2.5 side slopes to an elevation of -4.0 feet NAVD88. The resulting top width of excavation would approximately 75 feet based on an assumption that the existing plug crown elevation is +3.0 feet NAVD88. An additional 100 feet of vegetation would be cleared along the shell road to stockpile excavated material. Stockpiled material is estimated to be approximately 1,700 cubic yards. The proposed plug removal (clearing, excavation, and disposal) encompasses an area of approximately 0.7 acres (Figure 28).

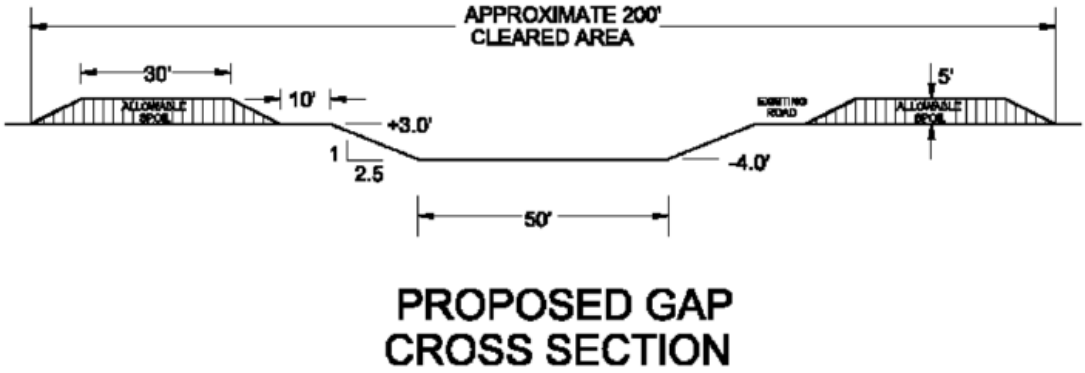

Figure 28. Cross section of a gap for Measure 3.

5.2.4.2 Risks and Reliability

5.2.4.2.1 Uncertainty relative to ecological success

Modeling results show that Measure 3 would provide the highest net increase in flow exchange of all measures (Table 7; Appendix 9, Annex 2). As such, this measure has the lowest uncertainty to achieving ecological success. This measure would also restore historic connectivity between the GIWW and Bayou aux Carpes.

5.2.4.2.2 Potential need for adaptive management

Measure 3 scored lowest for potential need for adaptive management (Table 4). This measure would restore historic connectivity between the BAC and the GIWW. The GIWW experiences periodic spikes in salinity and periodically conveys Mississippi River fresh water which may be of poor quality that could affect Bayou aux Carpes and its adjacent wetlands. However, the area affected by this measure is already exposed to water from the GIWW via oil and gas canals that connect Bayou aux Carpes to the SNGP. These canals allow GIWW water to enter Bayou aux Carpes, but may inhibit the draining of the area due to the circuitous route the water has to take.

5.2.4.2.3 Uncertainty relative to implementability

At the time of this writing, it is uncertain if the property where the Bayou aux Carpes plug is located is owned by the NPS, the State of Louisiana, or a private land owner. Further investigation is required to determine whether ownership could affect implementability of Measure 3. Variation in the location and design of the gap could be considered to alleviate this issue.

5.2.4.2.4 Self-sustainability

Measure 3 is expected to be self-sustaining, because it would be similar to the existing SNGP canal, making the need for OMRR&R activities unlikely. There are no anticipated issues related to FAV or other debris as described for Measures 1 and 2.

5.2.4.2.5 Risk of exposure to physical stressors

The risk of exposure to physical stressors is expected to be low to moderate. The area does not have a large fetch perpendicular to where the feature would be constructed, but boat traffic and wind in the GIWW, a major navigable waterway, may produce waves that reach the gap location and recreational boaters will likely use the gap to access Bayou aux Carpes more directly. The SNGP is less than 0.5 miles downstream and experiences similar boat traffic and appears to be stable. Currently there are commercial mooring dolphins with frequent barge tie-ups along the GIWW in the vicinity of the SNGP canal and the Bayou aux Carpes plug, which could dampen wave energy from the GIWW such as watercraft wakes. If physical stressors are anticipated to be a problem (e.g., erosion), design features such as adding sinuosity to the channel and/or stabilizing the gap would be considered if this measure is selected. Therefore, the risk of this is low to moderate, but should be considered during further design.

5.2.4.3 Environmental

5.2.4.3.1 Water quality

There would be some temporary negative water quality impacts associated with construction of Measure 3. Localized increase in turbidity could occur, but is likely to be temporary. The long-term water quality impacts are expected to be positive, because reconnecting Bayou aux Carpes with GIWW would likely increase flow exchange and allow for better drainage.

High salinity events in the GIWW can elevate both surface and porewater salinities within the BAC Site. The increased drainage in areas that are more hydraulically connected to the GIWW may allow porewater salinities to quickly return to normal levels following these events, while the lack of drainage in areas more hydraulically isolated from the GIWW may allow porewater salinities to remain elevated for extended durations. High porewater salinities were measured following high surface water salinities in the SNGP canal, which is more hydraulically connected to the GIWW than the Bayou aux Carpes plug. Porewater salinities at this site normalized a few months after surface water salinities decreased. In comparison, all porewater salinity observations were high (quarterly samples for a year) at a site near the Bayou aux Carpes plug. Implementation of Measure 3 would allow for better drainage of an area with high porewater salinities. This could potentially decrease soil porewater salinities and decrease the negative effects of future spikes in surface salinities.

Measure 3 could increase the influence of Mississippi River water in Bayou aux Carpes, however the water quality impacts associated with this are unknown and the Mississippi River water likely already impacts Bayou aux Carpes. Many studies have documented Mississippi River water quality issues (e.g., Turner and Rabalias, 1991, Boyd et al., 2003, Zhang et al., 2012), and these issues may negatively impact vegetation (Swarzenski et al., 2008). However, other studies suggest that restoring flow from the Mississippi River can benefit coastal wetlands in Louisiana (e.g., Lane and Day, 1999, Allison and Meselhe, 2010, Shaffer et al., 2016, Baustian et al., 2019). Mississippi River water from the GIWW is openly connected to Bayou aux Carpes through the SNGP canal and other oil and gas canals. Therefore, any increased Mississippi River influence as a result of Measure 3 may be limited to the area immediately surrounding the newly created gap.

5.2.4.3.2 Habitat impacts

There would be approximately 0.7 acres of shell road and ruderal forest and swamp impacted from construction of Measure 3. Measure 3 would not be implemented unless it is expected to produce overall benefits to the wetlands of the BAC Site through increased exchange flow. Modeling suggests the largest net increase of flow exchange area for this measure, which could benefit an additional 86 acres compared to existing conditions (Table 7, Appendix 9, Annex 2). This could reduce soil porewater salinity in an area with high porewater salinity (Section 2.2.5.2; Section 5.2.4.3.1; Appendix 8). This measure would also increase connectivity with Mississippi River water which other studies have found to benefit coastal wetland habitats (e.g., Lane and Day, 1999, Allison and Meselhe, 2010, Shaffer et al., 2016, Baustian et al., 2019).

5.2.4.3.3 Wildlife impacts

Approximately 0.7 acres of ruderal forest and swamp habitat would be directly negatively impacted during construction (i.e., clearing and excavating). This would eliminate nesting and foraging habitat for wildlife in the project area and disrupt similar activities adjacent to the project area during construction. However, these adverse impacts to wildlife would be small as little existing habitat would be impacted and the construction duration is so small. Wildlife would benefit from enhancement of adjacent swamp and aquatic habitat through the restoration of hydrologic connection and water exchange with the GIWW.

5.2.4.3.4 Aquatic resources and fisheries

The resulting plug removal is expected to increase flow exchange in the vicinity where SAV and FAV have been observed. Overall net impacts to aquatic vegetation could be positive with any negative impacts to SAV expected to be minimal or negligible. SAV and FAV were sampled every spring and fall from 2010 through 2012 near the BAC plug (Weston Solutions Inc., 2015). Up to four species of SAV were observed at a site in the Bayou aux Carpes plug vicinity (*Najas guadalupensis, Hydrilla verticillata, Ceratophyllum demersum,* and *Cabomba caroliniana*), with the lowest species diversity occurring in the 2012 samples (0 species for Spring of 2012 and *C. demersum* only for Fall of 2012). FAV was recorded during each survey with greater than 75% cover recorded from Spring 2011 through Spring 2012. This increase in flow exchange could have negative impacts associated with a decrease in SAV cover and positive impacts associated with decreased FAV cover. FAV species in the BAC Site are mostly nuisance species that can negatively impact aquatic resources, including SAV. Furthermore, Measure 3 may be the best opportunity for long-term benefits with respect to water quality, which could benefit aquatic resources and fisheries (Section 5.2.4.3.1). Gap design would be optimized to result in maximum benefits and minimize impacts to ecologically valuable aquatic vegetation to the extent possible.

Overall, it is expected that net positive impacts to aquatic and fisheries resources would result if this measure is constructed for four reasons.

1. Long-term negative impacts to SAV are expected to be minimal or negligible.
2. It would increase aquatic organism access and restore natural estuarine connectivity.
3. It would have the largest (relative to other measures considered) habitat benefit in terms of flow exchange and soil health.

5.2.4.3.5 Cultural resources

A preliminary review of potential cultural resources related to Measure 3 indicates multiple previously recorded archaeological sites within the vicinity and would require additional review to determine if this action would require consultation under Section 106 of the NHPA. The CEMVN will follow its Section 106 review procedures if this measure is carried forward.

5.2.4.4 Costs

Costs associated with Augmentation Measure 3 were found to be the higher than Measure 2, but lower than Measure 1 (Table 6). Construction costs were estimated to be $119,875. Real estate costs were estimated at $35,000, but may be lower due to land ownership uncertainty (See Section 5.2.4.2.3). Anticipated OMRR&R costs were assumed to be low and similar across all measures considered. Initial monitoring costs were estimated to be $5,000 (installation of a continuous water quality station near the confluence of Bayou aux Carpes and the GIWW). Yearly monitoring costs were estimated to be $17,000 for the maintenance of the water quality station.

5.2.4.5 Adaptive Management and Monitoring

The adaptive management and monitoring plan would be further developed between the NPS, EPA, CPRA, and CEMVN if this measure is selected for construction. In this section, a generalized adaptive management and monitoring approach is discussed. This generalized approach would be used to kick off a more detailed adaptive management and monitoring plan, if this measure is constructed.

Measure 3 would remove material from a shell road at the junction of Bayou aux Carpes and the GIWW to increase water flow exchange. The suggested adaptive management action would be to place material to reclose any gaps, effectively reversing construction. Material removed during construction would be stockpiled nearby to facilitate this adaptive management action, if needed.

Baseline monitoring of vegetation and water quality data has been collected for the BAC Site. USFWS has vegetation monitoring sites within the BAC Site (Appendix 15). USGS performed some preliminary porewater monitoring for marsh sites within the BAC Site from 2009 to 2012 (Appendix 8). Monitoring of soil porewater salinity in the immediate effect area of Measure 3 and at appropriate reference locations would continue on a mutually agreed upon interval, because of the high soil porewater salinity measured previously (Appendix 8). Water level, and conductivity and temperature meters were installed approximately 650 feet upstream of the Bayou aux Carpes plug in April 2018 for pre-construction monitoring. These data are recorded at hourly intervals and would continue through construction if this measure is carried forward. These instruments could be replaced by a permanent station (similar to CRMS) to collect continuous conductivity, water surface elevation, and temperature data. In addition, vegetation monitoring and soil porewater salinity could be measured discretely as part of this permanent station. Other permanent stations could be used as reference sites, such as CRMS 0185.

Field visits to view site conditions (e.g., scouring and debris) and meetings between USACE, NPS, CPRA, and the EPA would be held on a mutually agreed upon interval. During these

meetings, monitoring reports, current conditions, and other relevant data (e.g., imagery) would be discussed and decisions regarding adaptive management actions would be made.

6.0 Discussion

Measure 3 appears to offer the best opportunity to produce overall benefits to BAC Site wetlands through the restoration of historic connectivity and water exchange with the GIWW. The high porewater salinities measured in the vicinity of this measure could be improved with the restoration of historic flow regimes. There may also be some negative impacts to SAV that could be avoided or minimized by adding some sinuosity to the gap, although, this could result in additional direct impacts to other wetlands. Adaptive management and monitoring would help ensure the effectiveness of this measure by determining if unacceptable impacts from installing the gap are occurring and providing for the replacement of the plug if necessary.

Measure 1 may benefit BAC Site wetlands, however net benefits, in terms of increased flow exchange, are expected to be low to negligible, and it has the highest relative risk. Hydrodynamic modeling indicates this measure could increase exchange flow in the area, but the extent of this is dependent on the management of two structures with two different operators. Source waters from the OEPS outfall canal and the stormwater pumped into the canal may be associated with poor soil health. If this is true, increasing exchange could be detrimental to wetland soil health. Measure 1 is also predicted to have the highest construction related negative impacts to wetlands. Adaptive management and monitoring of this measure would be very important to ensure water quality and the condition of the soil do not produce negative impacts to marsh within the affected area. Adaptive management and total construction costs are predicted to be the highest for Measure 1.

Measure 2 is estimated to be the least expensive and least risky measure evaluated. A continuous water quality and vegetation monitoring station (CRMS 0185) station exists along the SNGP canal. This measure is unlikely to have any net negative impacts to wetlands, and would require the least monitoring. The most likely problem may be debris accumulation at the gaps, but this is not anticipated to be a major issue. However, adaptive management and monitoring would still need to be considered for this measure if it is constructed.

Measure 2 is also expected to have little environmental benefits. There are many existing gaps along the SNGP canal which reduce the net benefits of any additional gaps. Hydrodynamic modeling supports this by showing no net increase in exchange as compared to existing conditions. This measure may also be unnecessary, because the NPS has plans to degrade both spoil banks along the SNGP canal.

7.0 Conclusions

Measure 3 was found to be the highest performing measure with an acceptable level of risk. Measure 1 may provide some environmental benefits, but there are potentially unacceptable risks associated with this measure. Measure 2 is likely to have a limited impact to the BAC Site.

8.0 Recommendation(s)

Measure 3 is recommended as the only augmentation feature for implementation. It would restore a more natural connection between Bayou aux Carpes and the GIWW. Hydrodynamic modeling results suggest it would have the highest positive impact. There may be some porewater salinity problems in the vicinity that could be ameliorated by the increased drainage provided by this measure. Associated risks would be addressed during advanced engineering and design and/or through further development of an adaptive management and monitoring plan.

Measure 1 is not recommended because of potential risks. If this measure were to be constructed, robust adaptive management and monitoring program would be necessary to ensure negative impacts to the BAC are not realized.

Measure 2 is not recommended because it is likely to have limited to no environmental impacts, since it has little effect BAC Site hydrology. This measure may also be unnecessary if the Jean Laffite Canal Backfilling Project moves forward as expected.

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