SECTION 12

FISH AND WILDLIFE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
September 5, 2003

Colonel Peter J. Rowan
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Rowan:

Enclosed is our Fish and Wildlife Coordination Act Report on the Selected Plan for the Gulf Intracoastal Waterway, Bayou Sorrel Lock Replacement, Louisiana, feasibility study. That study evaluated alternatives for replacing the Bayou Sorrel Lock with a more efficient lock that would not be overtopped by a project flood in the Atchafalaya Basin Floodway. The Bayou Sorrel Lock provides vessel access to the Gulf Intracoastal Waterway, Morgan City - Port Allen Alternate Route, through the East Atchafalaya Basin Protection Levee in Iberville Parish, Louisiana. This report is transmitted under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and has been coordinated with the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service. Comments by those agencies on our draft report have been incorporated into our final report. Any further comments on this report by those agencies will be forwarded to your office under separate cover. The enclosed report constitutes the report of the Secretary of the Interior, as required by Section 2(b) of the Fish and Wildlife Coordination Act.

Should your staff have any questions regarding the enclosed report, please have them contact David Walther of this office at 337/291-3122.

Sincerely,

Russell C. Watson
Acting Supervisor
Louisiana Field Office

Enclosure
cc: FWS, Atlanta, GA (ES/HC)
NMFS, Baton Rouge, LA
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources, Atchafalaya Basin Program, Baton Rouge, LA

FISH AND WILDLIFE

COORDINATION ACT REPORT ON THE

GULF INTRACOASTAL WATERWAY,

BAYOU SORREL LOCK REPLACEMENT,

LOUISIANA,

FEASIBILITY STUDY

U.S. FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES

LAFAYETTE, LOUISIANA

September 2002

EXECUTIVE SUMMARY

This is a summary of the U.S. Fish and Wildlife Service's (Service) findings and recommendations relative to the Gulf Intracoastal Waterway, Bayou Sorrel Lock Replacement, Louisiana, feasibility study. Our findings and recommendations are presented in accordance with the Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). This report constitutes the report of the Secretary of the Interior, as required by Section 2(b) of the Fish and Wildlife Coordination Act.

The New Orleans District, Corps of Engineers (Corps) investigated several alternatives to improve the efficiency of passing tows through the Bayou Sorrel Lock in Iberville Parish, Louisiana, to ensure that lock walls would not be overtopped when a project flood (i.e., 1.5 million cubic feet per second) is passed through the Atchafalaya Basin Floodway Project (Basin), Louisiana and to reduce erosion from prop wash and moorings along the GIWW north of the lock. The Bayou Sorrel Lock provides vessel access to the Gulf Intracoastal Waterway (GIWW), Morgan City - Port Allen Alternate Route, through the East Atchafalaya Basin Protection Levee (EABPL). The Selected Plan involves the construction of a new lock through the EABPL, approximately 1,000 feet west of the existing lock. The EABPL borrow canal will be relocated approximately 2,200 feet to the west. Existing disposal sites and the tailbay, forebay, and lock chamber of the existing lock will be used for dredged material disposal. Rock armament and 13 mooring buoys would be placed along both banks of the GIWW from the Bayou Sorrel Bridge north for approximately one-half mile.

Although most construction would occur within existing developed areas, the project would directly impact bottomland hardwood and swamp habitat of moderate value for fish and wildlife. Those impacts would result from excavation of the new lock chamber, the GIWW and the EABPL borrow canal, and the disposal of that dredged material. Building the new lock would result in the loss of 174.6 acres disturbed forested wetlands (bottomland hardwoods and swamps), and the loss of flooding on an additional 20.3 acres of disturbed bottomland hardwoods. Construction of the rock armament and mooring buoys north of the lock would not result in any impacts to terrestrial habitat but would impact approximately 7.1 acres of water bottoms.

Project-related impacts to fish and wildlife resources were assessed with the Habitat Assessment methodology for bottomland hardwoods (Appendix A). Those analyses revealed that implementation of the Selected Plan (Plan 2) would result in the loss of 71 Average Annual Habitat Units. Disturbed bottomland hardwood habitats are of medium value to fish and wildlife resources; therefore, out-of-kind compensation for those habitats is acceptable. Impacts to aquatic resources should, however, be mitigated by or within similar aquatic habitat.

The Service and the Corps jointly developed a mitigation plan (Appendix B) consisting of restoration and management of forested wetlands, avoidance of disposal (associated with annual maintenance dredging of the lock bays) in bottomland hardwoods and swamp within the Basin for 35 years, and maintenance and restoration of water quality in the Bayou Sorrel Lock area. Implementing that plan would fully offset project-related habitat losses of fish and wildlife resource values in forested wetlands.

The Service does not oppose implementation of the Selected Plan, provided that the following

mitigation measures are implemented:

1. Maintain and restore headwater flows into Atchafalaya Basin swamps west of the disposal site to mitigate the loss of aquatic habitat functions of disturbed forested wetlands. To accomplish this, the effluent return ditch adjacent to the northern-most disposal area should be kept open to maintain the current hydrologic connection with the swamp west of that disposal site. A sediment trap should be excavated at the confluence of that ditch and the EABPL borrow canal. The sediment trap should be installed at a location that will allow yearly excavation by the equipment used to refurbish the confined disposal site dikes. Material removed from the sediment trap should be placed within the confined disposal site or on the containment levees. An additional gap should be excavated at the southern end of this disposal site. That gap should have a general east-west orientation, and should be approximately 50-feet-wide (top width), 1,300-feet-long (ending at the western levees of the disposal site), and a sediment trap should be constructed at the eastern end. The channel bottom elevation should be the same as that of the swamp floor.

2. Minimize dredged material placement on cypress-tupelo swamps, bottomland hardwoods, and open-water habitats in the Basin to the greatest extent feasible. Unavoidable project-related impacts on wildlife resources should be fully compensated by reforestation and management of 126.3 acres of bottomland hardwoods within the Bayou Sorrel Lock area of Iberville Parish, in accordance with the plan developed jointly by the Corps and the Service.

3. Acquire fee title to any mitigation lands not already owned in fee title by the Corps; those lands should be administered and managed in accordance with the Mitigation Plan detailed in Appendix B of this FWCA report. To ensure that the recommended mitigation values are maintained over the project life, the title for all mitigation lands should contain land-use restrictions (e.g., non-development provision). Costs for acquisition, operation and management, and monitoring of mitigation lands should be funded at project expense.

4. If additional disposal sites for this project are constructed within the Basin, limit those sites to 2,000 feet in length (as measured parallel to the EABPL borrow canal or GIWW). A 200-foot-gap should be left between adjacent disposal sites to maintain adequate overbank flows. Expansion of existing disposal sites should also adhere to the above length and gap specifications. During initial construction of confined disposal sites, all levee borrow should be excavated from outside the borrow pit. Outside borrow ditches or effluent return ditches should include a sediment trap that can be easily excavated with the equipment used to refurbish disposal site dikes. At all disposal sites, plugs should be installed in any inside borrow ditches to facilitate maximum sediment retention in the disposal areas prior to the effluent reaching the spill boxes.

5. To reduce the potential for re-exposing the aquatic ecosystem to harmful contaminants during dredging and disposal of material from the area north of the lock, the Corps should 1) ensure all applicable State non-point source regulations pertaining to construction sites are followed; 2) the Corps should sequence construction activities so that removal of the

top 5 feet of material from open-water areas or wetlands in the tailbay, forebay, lock chamber, and mooring areas will occur first, and place such material in the deepest disposal site(s) layers; 3) silt curtains should be used when dredging material from open-water areas or wetlands north of the lock, wherever practicable; and, 4) the Corps should implement all practicable measures (e.g., internal dikes, etc.) to ensure the maximum retention of contaminants within the dredged material disposal areas.

6. Prepare detailed design documents (e.g., design memoranda, plans and specifications, etc.) of the lock replacement and the mitigation features in consultation with the Service and the Louisiana Department of Wildlife and Fisheries. To ensure that no conflicts arise with the State of Louisiana's Master Plan for the Atchafalaya Basin, those features should also be coordinated with the Louisiana Department of Natural Resources' Atchafalaya Basin Program.

7. Implement mitigation simultaneously with other project features, to the extent feasible.

8. Continue to coordinate with the Service to ensure that construction activities do not impact any waterbird nesting colonies or any threatened or endangered species or their critical habitat.

9. Include budgets for development, operation and maintenance, and monitoring of the mitigation area in future project funding estimates and requests.

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INTRODUCTION

The New Orleans District, U. S. Army Corps of Engineers (Corps) is conducting the Gulf Intracoastal Waterway, Bayou Sorrel Lock Replacement, Louisiana, feasibility study. That study evaluated alternatives for replacing the Bayou Sorrel Lock in Iberville Parish, Louisiana, with a larger, more efficient lock that would not be overtopped by a project flood (i.e., 1.5 million cubic feet per second) in the Atchafalaya Basin Floodway System (Basin), Louisiana. The Bayou Sorrel Lock provides vessel access to the Gulf Intracoastal Waterway (GIWW), Morgan City - Port Allen Alternate Route, through the East Atchafalaya Basin Protection Levee (EABPL); that levee forms the eastern boundary of the Basin (Figure 1). The original study was authorized by resolutions adopted by the Committee on Public Works of the United States Senate, on September 29, 1972, and August 23, 1974, and by a resolution adopted by the Committee on Public Works of the United States House of Representatives on October 12, 1972.

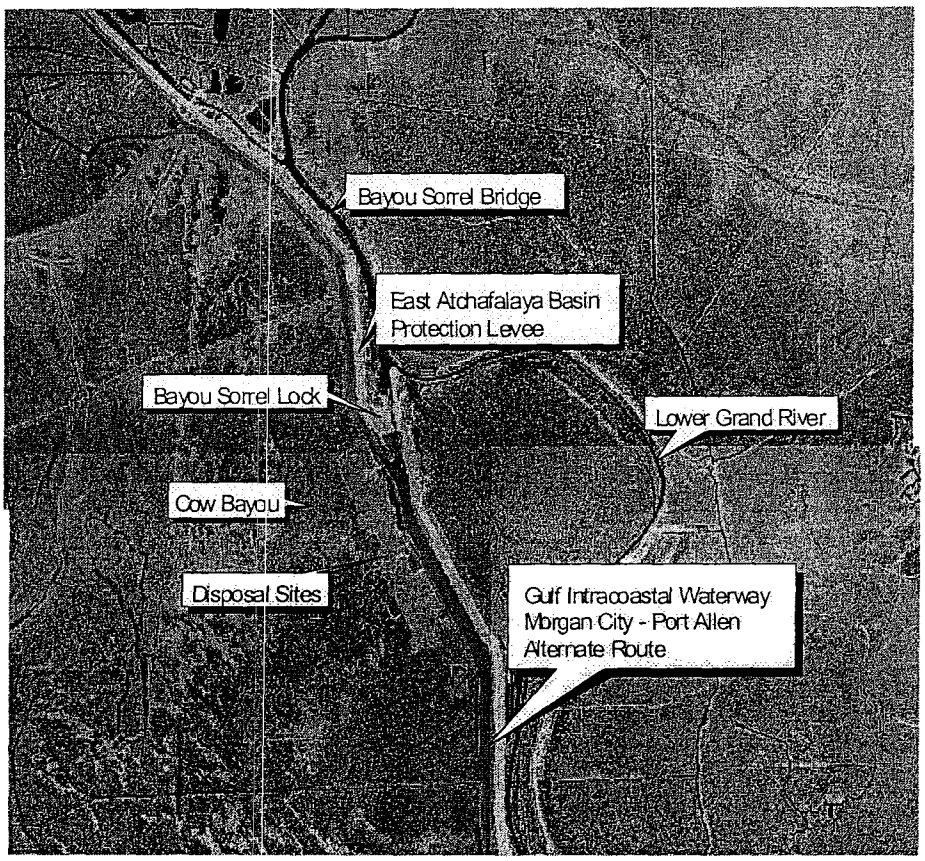
This report provides an analysis of impacts of the Selected Plan on fish and wildlife resources. Recommendations to mitigate adverse impacts on those resources are also presented. The Fish and Wildlife Service transmitted reports on this study to the Corps in April 1992, July 1997, January 2001, and August 2002. In addition, letters addressing dredging and disposal plans for the Bayou Sorrel Lock that are pertinent to this study were transmitted to the Corps in 1994 and 1995. This report constitutes the report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

DESCRIPTION OF SELECTED PLAN AND OTHER ALTERNATIVES

The Corps has evaluated four alternatives and a no-action alternative. The no-action alternative would require maintaining and operating the existing lock, which would not be replaced. The existing earthen-chamber lock is 56-feet-wide and 790-feet-long. Feasibility study alternatives included locks with either an earthen or concrete chamber ranging in width from 75 to 110 feet and up to 1,200-feet-long. Construction of a new lock, or refurbishing the existing lock, to allow passage of a project flood (i.e., no improvement for navigation) was also considered. Because most of the construction would occur on the lock grounds or previously impacted areas, the magnitude of fish and wildlife resource impacts does not vary significantly among alternatives. Additional lock and channel alignments that would reduce construction costs and/or environmental impacts were also investigated in earlier planning stages; portions of those plans have been included in the final alternatives array.

The Corps has designated Plan 2 as the Selected Plan (Figure 2). The dimension of the replacement lock would be 110-feet-wide, 1,200-feet-long, and 15-feet-deep and it would be constructed west of the existing lock. The GIWW and EABPL borrow ditch would be relocated west of their present location. For approximately one-half mile north of the Bayou Sorrel Bridge both banks of the GIWW would be covered with geotextile and rock. The area on the channel-side of the rock armament would be dredged to provide adequate water depths for mooring tows. Because this report discusses only the impacts resulting from the Selected Plan, any future reconsideration of the rejected plans or changes to the Selected Plan may require revision of our technical analysis, position, and recommendations.

Figure 1. Bayou Sorrel Lock, Iberville Parish, Louisiana

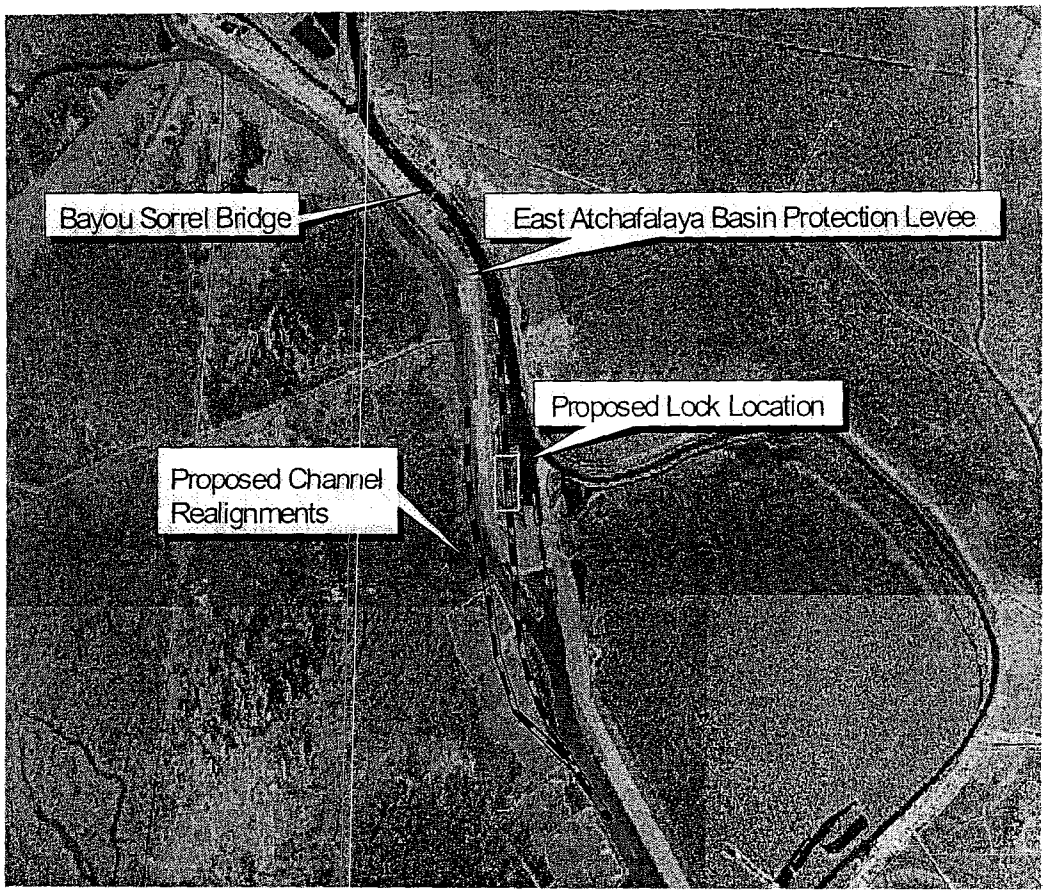


2 0 2 4 Miles

N

Gulf Intracoastal Waterway
Bayou Sorrel Lock Replacement
Feasibility Study

Figure 2. Bayou Sorrel Lock, Iberville Parish, Louisiana Plan 2 (Tentatively Selected Plan)



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Gulf Intracoastal Waterway
Bayou Sorrel Lock Replacement
Feasibility Study

DESCRIPTION OF THE STUDY AREA

The study area is located in south-central Louisiana and within the southern portion of the Lower Mississippi River Ecosystem. The study area contains portions of the Atchafalaya and Mississippi River basins; it is bordered by the Mississippi River to the north, the Atchafalaya River to the west, the Mississippi River and Bayou Lafourche to the east, and the Gulf of Mexico to the south. The eastern part of the study area is located in the Lake Verret watershed within the Mississippi River Basin. The study area is relatively flat; the major natural topographic features are the natural levees of Upper Grand River and Cow Bayou. Natural elevations range from slightly below sea level to approximately 5 feet National Geodetic Vertical Datum.

Bayou Sorrel Lock (Figure 1) is currently located on 262 acres of Federally (Corps) owned land on both sides of the EABPL. The Basin is the largest river swamp in North America, and contains some of the largest remaining tracts of bottomland hardwoods and cypress-tupelo swamps in the Lower Mississippi River Ecosystem. In addition, the freshwater fish habitats in the Basin are among the most productive of those in the southeastern United States. The aquatic habitats of the Lake Verret Basin support one of the largest commercial fisheries for catfish in Louisiana. The low areas on the Lake Verret side of the levee are also dominated by bottomland hardwoods and cypress-tupelo swamps; agriculture (primarily sugarcane production) and commercial and residential development are the most prevalent land uses on the higher elevations. Contaminants have been found in sediments north of the Bayou Sorrel Lock in the GIWW. Those contaminants may have come from the documented leakage that occurred at the Bayou Sorrel Superfund Site (i.e., a former chemical waste dump located upstream of the lock) prior to remediation.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

Description of Habitats

Habitat types in the study area can be generally classified as developed lands, forested wetlands, (swamps and bottomland hardwoods) and aquatic habitats (riverine, lacustrine, and seasonally flooded woodlands). Developed lands include residential, commercial, and industrial areas, as well as roads, existing levees, and other frequently maintained areas (e.g., pastures). Those areas generally do not provide important wildlife habitat (with the exception of flooded pastures and fallow fields). Pasture occurs in the study area as mowed levees, and mowed wetland and nonwetland areas in areas that were formerly bottomland hardwoods. Pastures are vegetated with goldenrod, elderberry, blackberry, thistle, fall aster, rushes, smartweed, bluestems, and other grasses. Wading birds and shorebirds often utilize such mowed wetlands for feeding purposes. Wading birds expected to occur in wetland pastures include great egret, cattle egret, tricolored heron, and white ibis. Shorebirds that often utilize wetland pastures during migration include common snipe, greater yellowlegs, lesser yellowlegs, dowitchers, and sandpipers. American woodcock also feed nocturnally in wet pastures during the winter.

Bottomland hardwood wetlands within the Basin are subject to inundation by the Atchafalaya River, while those outside the Basin are flooded via both rainfall runoff and the backwaters of the Atchafalaya River. Dominant woody vegetation typically includes Nuttall oak, red maple, baldcypress, water tupelo, and black willow. Common overstory and mid-story associates

include American elm, wax myrtle, common buttonbush, green ash, sugarberry, swamp dogwood, boxelder, American sycamore, and eastern cottonwood. Shrubby and herbaceous vegetation typically include elderberry, rattan vine, peppervine, Virginia creeper, poison ivy, blackberry, and lizard's tail.

Swamp sites commonly exhibit an overstory dominated by Drummond red maple, with baldcypress, pumpkin ash, tupelo, black willow and green ash as associates. The shrub layer is moderately developed; buttonbush, wax myrtle, and red maple are dominant. Due to the extended hydroperiod, ground cover is very sparse, and usually consists of lizard's tail, hydrocotyl, and alligator-weed.

Terrestrial Habitats

Flooding is a primary factor governing plant species composition within bottomland hardwood forests. Project-area lands outside the Basin (i.e., those protected by the EABPL) are no longer subject to the annual overflow of Atchafalaya River; thus, soil and plant communities differ from those on lands within (i.e., floodside) the Basin. Flooding of project lands outside the Basin primarily results from rainfall within that watershed and from the backwater influence of the Lower Atchafalaya River. Flooded Sharkey clay and Fausse soils are the two principal soil types found within the project area outside the Basin. Sharkey clays are highly fertile, poorly drained, low-permeability soils composed of clayey alluvium. At the project site, Sharkey clays occur along the banks of Lower Grand River and the protected side of the EABPL. Fausse soils are also composed of clayey alluvium and are very fertile; they are very poorly drained and have very slow permeability. Fausse soils flood more frequently than Sharkey clays and may be inundated throughout the year.

Convent and Fausse soils are found within the Basin (i.e., floodside of the EABPL). Convent soils consist of loamy alluvium, and are characterized as somewhat poorly drained, moderately permeable, and fertile. Convent soils are found along the EABPL, along the natural levees of distributaries, and on spoilbanks. The proportion of Convent soils and associated vegetation is increasing due to the annual (or nearly annual) deposition of floodwater-borne sediments; thus, the proportion of Fausse soils and their associated vegetational communities are decreasing within this portion of the project area. Fausse soils in the Basin have the same characteristics as those found outside the Basin (U. S. Department of Agriculture 1977).

Bottomland hardwood tree species observed growing on Sharkey soils in the project area include sugarberry, Drummond red maple, black willow, sycamore, and live, water, and Nuttal oaks. Other bottomland hardwood species commonly found growing on Sharkey soils include green ash, water hickory, overcup oak, common persimmon, sweetgum, and honey locust. Levee construction, maintenance activities, and deposition of maintenance dredging material have set back bottomland hardwood succession in most of the small forested tracts on the lock grounds. Dominant species on those tracts include sugarberry, black willow, rough-leaf dogwood, and red maple. Less-disturbed forested areas are vegetated with sweetgum, green ash, sugarberry, and live, water, and Nuttal oaks. Understory vegetation is composed primarily of blackberry, poison ivy, and grass-leaf groundsel. Vegetation growing in open areas on this soil type includes morning glory, poison ivy, blackberry, bushy bluestem, elderberry, grass-leaf groundsel, and ragweed. Throughout the project area, Fausse soils support baldcypress, water tupelo, red maple, and black willow. Other species that are found on Fausse soils include green and pumpkin ash,

water and honey locust, water elm, and sweetgum. Understory vegetation found on Fausse soils includes buttonbush, swamp privet, blackberry, smartweed, poison-ivy, grass-leaf groundsel, water hyacinth, alligator weed, and duckweed.

Vegetation commonly found on project-area Covent soils includes black willow, sycamore, sugarberry, and red maple. Other species found on this soil type include baldcypress, sweetgum, eastern cottonwood, water elm, and green ash. Understory vegetation includes poison ivy, blackberry, grass-leaf groundsel, smartweed, common cocklebur, and greenbriar.

Soils within the Bayou Sorrel confined disposal area are classified as Convent, although areas that have received small amounts of disposal material support plant associations that resemble those found on the Fausse soils (i.e., baldcypress and button bush). Areas subject to recent disposal activities are vegetated primarily with young black willow in addition to common cocklebur, goldenrod, and giant ragweed. Areas that have received large amounts of dredged material in the past are characterized by numerous dead baldcypress and black willows, and live young black willows and rough-leaf dogwoods. Some older disposal areas are still in a herbaceous successional stage, with vegetation on the sites often comprising a mixture of species found on both Convent and Sharkey soils (e.g., bushy bluestem, blackberry, common cocklebur, greenbriar, morning glory, poison ivy, and ragweed).

Convent and Sharkey soil types are found on the floodside and protected side of the EABPL, respectively. Because the levee has been planted and is mowed, vegetation on both soil types is very similar. Plants found on the levee include sedges, fall panicum, horned beak rush, plume grass, bushy bluestem, Bahia grass, grass-leaf groundsel, golden rod, evening-primrose, and various clovers.

Aquatic Habitats

The diversity of freshwater environments in the project area ranges from riverine habitat to seasonally flooded woodlands, all of which provide important escape, feeding, spawning, and nursery habitat for a variety of fishes and other aquatic organisms (Bryan et al. 1975, Lambou 1990, U.S. Department of the Interior 1974, 1975, 1976). Many of those aquatic organisms are important from a recreational and/or commercial standpoint, and all are important components of the aquatic food web.

Aquatic habitats within the project area can be classified as riverine, lacustrine, and seasonally flooded woodlands. Riverine habitat within the project area includes the GIWW, Lower Grand River, and the EABPL borrow pit. Those water bodies are characterized by the presence of flowing water throughout most of the year, high turbidity, good water quality, high dissolved oxygen levels, steep banks, and a substrate composed of sand or hard clay (U.S. Fish and Wildlife Service 1981).

Lacustrine habitat within the project area is provided by borrow pits along Lower Grand River, and various lakes, bayous, and sparsely vegetated cypress-tupelo swamps that remain flooded during low river stages. Lacustrine habitats within the Basin are subject to two major flooding types, i.e., headwater flooding and backwater flooding. Headwater lakes are seasonally

inundated by Atchafalaya River overflow, and often function as riverine habitat during high river stages (U.S. Fish and Wildlife Service 1981). During high river stages, dissolved oxygen levels are generally good; during falling river stages, however, water draining from adjacent swamps may depress dissolved oxygen levels below those capable of supporting commercial and recreational fishes (Bryan and Sabins 1979, Gelwicks 1996).

Backwater lakes are influenced primarily by backwater flooding, although precipitation during low river stages may also be an important hydrological factor. Backwater lakes receive headwater flows only during the greatest floods. During low river stages, backwater lakes in the Basin may become completely dry, depending on rainfall. In backwater lakes, water quality is generally good throughout the fall, winter, and early spring; however, low dissolved oxygen levels are experienced during the late spring and early summer, during high and falling river stages. Low dissolved oxygen levels in lacustrine habitat reduce the production of many commercial and recreationally important fishery species (Gelwicks 1996); those lower levels primarily occur in areas that do not receive riverine flows or where phytoplankton production is insufficient to elevate and/or maintain dissolved oxygen levels. The substrate in lacustrine habitat is largely composed of detritus, although some headwater lakes can have a large proportion of silt and clay (U.S. Department of the Interior 1976). Lacustrine habitat in the borrow pits connected to Lower Grand River outside the Basin is similar to that of headwater lakes. During falling stages, backwater habitat conditions can prevail in borrow pits that receive flows from backwater swamp areas.

Forested wetlands in the project area include cypress-tupelo swamps and bottomland hardwoods that are inundated by high river stages; those wetland types occur in both headwater and backwater floodplains. Surface water in headwater floodplains retains many characteristics found in the riverine habitat (e.g., high dissolved oxygen content, higher conductivity, etc.); thus, water quality is generally good. The water quality of backwater floodplains (e.g., lower dissolved oxygen content, lower conductivity, etc.) does not resemble that found in the riverine or headwater floodplain habitats. Backwater areas are characterized by little water flow, except during high river stages. Water quality and dissolved oxygen levels vary with the river stage; higher river stages generally provide better water quality due to riverine water inflows. Poor water quality (primarily low dissolved oxygen levels in swamps and flooded bottomland hardwoods) reduces the production of many commercial and recreationally important fishery species. Poor water quality occurs in those areas that do not receive riverine flows, or where phytoplankton production is insufficient to elevate and/or maintain dissolved oxygen levels. The substrate in forested wetlands usually contains a large amount of detrital material (U.S. Fish and Wildlife Service 1981).

As part of early project development the Corps routinely analyzes water and sediment samples from the project area. Contaminants known to have increased in elutriate samples taken from north of the lock included B-BHC, dibutylphthalate, and butylbenzlphthalate. Those compounds may have come from the documented leakage that occurred at the Bayou Sorrel Superfund Site (i.e., a former chemical waste dump) located upstream of the lock before remediation was completed. However, the detection limits used in those analyses often exceeded the chronic

effects criteria, and sometimes exceeded the acute effects criteria. Thus, the relatively high detection limits in the Corps' elutriate analyses may have precluded accurate assessment of the potential for re-exposing the aquatic ecosystem to harmful contaminant levels during construction.

Fishery Resources

Numerous commercially and recreationally important species are produced in the Basin, primarily as the result of seasonal flooding of forested wetlands. More than 100 species of finfish and commercially important shellfish have been collected from the diverse aquatic habitats in the Basin (U.S. Fish and Wildlife Service 1981). Standing crop values and species diversity are among the highest found in the southeastern United States (Bryan and Sabins 1979, Lambou 1990, Sabins 1978). More than 1,000 pounds of finfish per acre have been documented in water bodies just south of the project area (Sabins 1978). Studies have shown that most of the sport and commercial finfish collected are of harvestable size (Lambou 1959, Lantz 1974, Sabins 1978). Unpublished Louisiana Department of Wildlife and Fisheries data documented standing crops of 300 pounds of finfish per acre in the Lake Verret Basin, which compares favorably to standing crop estimates from many reservoirs. Recreationally harvested finfish in the project area include yellow bass, largemouth bass, white crappie, black crappie, warmouth, bluegill, redear sunfish, and various catfishes. A survey of freshwater fishermen ranked the Atchafalaya and Lake Verret basins as the first and third favorite fishing spots in Louisiana, respectively (Kelso et al. 1999). The commercial fishery resources of the Atchafalaya and Lake Verret basins are of high economic importance, with catfishes, buffalo fishes, and freshwater drum comprising most of the commercial finfish landings.

Available information indicates that standing crops of more than 1,000 pounds of crawfish per acre occur in the Basin during the high-water season (Thompson 1973). During low water conditions, the standing crop of crawfish has been measured at 375 pounds per acre. Commercially harvested shellfishes in the Basin include red swamp crawfish, white river crawfish, river shrimp and blue crab. Red swamp crawfish are also commercially harvested in flooded forests and fields in the Lake Verret Basin, while blue crabs are harvested in canals, bayous, and lakes.

Excessive sedimentation and poor water quality pose the greatest threats to the Basin's fishery resources. Sedimentation has substantially reduced the acreage of open-water habitat and cypress-tupelo swamps in the Basin; through time, those habitats will become even more scarce. Poor water quality in the Basin is a direct result of isolation from, or limited introduction of, headwater flows (i.e., riverine water) and/or insufficient primary production. Construction of spoil banks, shoaling, natural levee deposition, and construction of the Bayou Sorrel disposal sites have isolated floodplain forests from headwater flows. Implementation of the Flat Lake Water Management Unit, a project feature of the Atchafalaya Basin Floodway Multi-purpose Plan, would potentially help to reduce sedimentation and improve water quality in the project area. Implementation of that project feature is contingent upon funding and substantial completion of the Buffalo Cove Water Management Unit. Authorized in 1985, detailed planning

of the Buffalo Cove Water Management Unit has just been initiated. Significant improvements in water quality and reduction of sedimentation within the project area resulting from implementation of the Flat Lake Water Management Unit are, therefore, not anticipated in the immediate future.

Sedimentation in the Lake Verret Basin is also occurring, but at a much slower rate. The most pronounced sedimentation occurs in the large waterways and the confluences of waterways and lakes. The sedimentation in the northern portion of the Lake Verret Basin is primarily from agricultural fields; in the southern portion, backwater flooding from the Atchafalaya Basin is the primary sediment source. Water quality in the Lake Verret Basin has been assessed by the Louisiana Department of Environmental Quality (1990). Water within that area only partially meets the designated use standards for drinking water, and does not meet the designated standards for fish and wildlife propagation. Further, those waters are marginal for primary contact recreation. Suspected causes of poor water quality include pesticides, organic enrichment, pathogens, and excessive dissolved solids. Suspected sources of pollutants include non-irrigated crop land, spills, in-place contaminants, and untreated sewage discharges. In addition, fish production is impacted by poor water quality (primarily low dissolved oxygen) caused by the interruption of surface flow patterns by spoilbanks and canals, especially in backwater areas.

Wildlife Resources

Bottomland hardwood forests, wooded swamps, and the margins of permanent water bodies provide valuable wildlife habitat in the project area. The wildlife resources of the project area have historically been recognized for their diversity and abundance, largely due to the variety and magnitude of available habitats. Wildlife species include game animals, fur animals, game and non-game migratory birds, endangered species, and numerous other non-game species (U.S. Fish and Wildlife Service 1981).

Project-area forested wetlands inside and outside of the Basin provide prime habitat for a variety of wading birds including green-backed heron, little blue heron, snowy egret, yellow-crowned night heron, and white ibis (Kennedy 1977, Martin and Lester 1990). An active wading bird colony is located southeast of the existing lock. Species found in that colony during the 1996 nesting season included little blue heron, great egret, snowy egret, and great blue heron. Other species that have nested at that site in the past include tricolored heron, cattle egret, yellow-crowned night heron, and anhinga. The size of the rookery has varied from more than 15,000 individuals in 1983 to approximately 100 individuals in 2000 (Louisiana Natural Heritage Program 2000). Because rookery locations often change, the Corps should continue to coordinate with the Service regarding the status of that rookery. Various construction activities occurring near rookeries may cause abandonment; accordingly, we also recommend that such activities be scheduled to avoid conflicts during the nesting season, as shown in Table 1.

The study area also provides important habitat for other resident and migratory bird species. Mature bottomland hardwood forests support resident and migratory hawks, owls, woodpeckers, and perching birds. Typical resident species include red-tailed hawk, barred owl, red-bellied woodpecker, blue jay, Carolina chickadee, and northern cardinal. Wintering birds include yellow-bellied sapsucker, blue-headed vireo, hermit thrush, yellow-rumped warbler and white-throated sparrow. During periods of winter flooding, bottomland hardwoods support significant numbers of resident and migratory waterfowl that utilize such habitat for feeding, resting, and courtship.

More than 170 bird species, or approximately 40 percent of the birds listed by the Louisiana Ornithological Society as occurring in Louisiana, have been observed in the Atchafalaya and Lake Verret basins. Some non-game species have also been identified as species of special management concern by the Service (U.S. Fish and Wildlife Service 1995). Species of concern include all species that are Federally listed as threatened or endangered; species that are candidates for listing; species that are on the Blue list (a list of species that the National Audubon Society believes are experiencing a population decline); species for which widespread, documented declines have occurred within the Southeast Region; and species that have received legitimate attention over their status within the Southeast Region. Some of the species of concern that are found in the project area include the American bittern, wood stork, Mississippi kite, swallow-tailed kite, bald eagle, yellow-billed cuckoo, chuck-will's-widow, whip-poor-will, red-headed woodpecker, eastern wood peewee, wood thrush, loggerhead shrike, hooded warbler, golden-winged warbler, ovenbird, Kentucky warbler, and painted bunting.

Nearctic-neotropical migratory birds that breed in the region during summer include Mississippi kite, ruby-throated hummingbird, Acadian flycatcher, red-eyed vireo, and hooded warbler. Breeding bird survey data collected since 1966 indicate that populations of approximately half the nearctic-neotropical migratory bird species are declining. Among those, bottomland hardwood forest-interior and area-sensitive breeding birds, such as swallow-tailed kite, cerulean warbler, and Swainson's warbler, are of particular concern in the Mississippi Alluvial Valley (MAV). Forest conversion and the resultant fragmentation of historically vast forested tracts has exposed those species to elevated levels of nest parasitism and predation, and is believed to be an important contributing factor to their population declines in the MAV. Concern over declining population trends for many of those nearctic-neotropical migrants in the MAV has led scientists to conclude that conservation and restoration of large (10,000- to 100,000-acre) forested tracts in the region are essential to the long-term survival of those species.

The study area is within the boundaries of a larger area identified in the Partners in Flight Bird Conservation Plan for the Mississippi Alluvial Valley as a potential 100,000-acre forested wetland patch (Twedt et al. 1999). The largest of three patch sizes identified in the plan as capable of supporting breeding by certain priority land bird species, a 100,000-acre forested patch is hypothesized to be sufficient to support a breeding population of 500 pairs of swallow-tailed kites.

The Basin is also an important wintering area for waterfowl in the Mississippi Flyway (U.S. Fish and Wildlife Service 1981). Both the Mississippi and Atchafalaya Basins provide the forested wetlands and shallow margins of permanent water bodies that are excellent feeding and resting areas for significant numbers of dabbling ducks, such as mallard, gadwall, Northern pintail, and American coots. Diving ducks such as lesser scaup are most common in the larger lakes and streams. Other game birds found in the project area include American woodcock and common snipe.

Table 1. Annual Construction Activity Windows and Critical Nest/Construction Site Distances for Protection of Colonial Waterbirds

Species	Nesting Season[1]	Activity Window [2]	Critical Distance
American anhinga	15 Mar - 15 Apr	1 Jul - 1 Mar	1,500 feet
great blue heron	1 Mar - 30 Apr	1 Aug - 15 Feb	1,500 feet
great egret	1 Mar - 31 May	I Aug - 15 Feb	1,500 feet
snowy egret	16 Mar - 15 Jun	1 Aug - 1 Mar	1,500 feet
little blue heron	16 Mar - 15 Jun	1 Aug - 1 Mar	1,500 feet
tricolored heron	16 Mar - 15 Jun	1 Aug - 1 Mar	1,500 feet
yellow-crowned night heron	1 Apr - 15 Jun	1 Sep - 15 Mar	1,500 feet
cattle egret	16 Apr - 30 Jun	1 Sep - 1 Apr	1,500 feet

[1] Source: Martin and Lester 1990.
[2] Period when disturbances are not expected to negatively affect nesting or fledgling activities.

The only big game species in the project area is the white-tailed deer. The relative abundance of deer is greatest in mid/late successional bottomland hardwoods and least in baldcypress-tupelo gum cover types; however, seasonal variation in habitat preference has been noted (Evans 1976). Deer hunters annually expended 75,000 man-days in the Basin during the early 1970's (Thompson 1973). Important small game mammals include fox squirrel, swamp rabbit, eastern cottontail and raccoon. On the average, hunters spent more than 37,000 man-days per year in the

early 1970's pursuing small game mammals and birds in the Basin (U.S. Army Corps of Engineers 1975).

Wildlife species of commercial importance include fur animals such as: otter, mink, nutria, muskrat, raccoon, and beaver. In recent years, low fur prices have reduced the economic importance of this industry. The American alligator, which is Federally listed as threatened due to its similarity of appearance to other crocodilians, is commercially harvested in Louisiana. Tags are issued by the Louisiana Department of Wildlife and Fisheries to regulate the alligator harvest; the number of tags issued is dependent on the carrying capacity of habitats in the harvest area. Alligator harvest is only permitted on land considered by the Louisiana Department of Wildlife and Fisheries to be permanently flooded. Permanently flooded areas in the Basin are further divided into "swamp habitat" or "lake habitat." Within that area, one tag is issued per 1,280 acres of "swamp habitat" and one tag is allowed per 100 acres of "lake habitat." Overall, the Basin is relatively poor alligator habitat when compared with coastal marshes and other cypress-tupelo swamps outside of the Basin (Noel Kinler, Louisiana Department of Wildlife and Fisheries, pers. comm.).

Threatened or Endangered Species

Threatened bald eagles (*Haliaeetus leucocephalus*) nest in Louisiana from October through mid-May. Eagles typically nest in baldcypress trees near fresh to intermediate marshes or open water in the southeastern parishes. Eagles also winter and infrequently nest near large lakes in central and northern Louisiana. A survey conducted by the Louisiana Department of Wildlife and Fisheries during the 2001-2002 nesting season revealed approximately 10 productive eagle nests in the Basin and 26 in the Lake Verret Basin. One nest in the Basin is located approximately 1 mile southeast of the project area. Major threats to this species include habitat alteration, human disturbance, and environmental contaminants (i.e., organochlorine pesticides and lead). Because the bald eagle population is expanding, the Corps should continue to consult with the Service regarding project effects on bald eagles during future project planning and implementation.

The Louisiana black bear is primarily associated with forested wetlands; however, it utilizes a variety of habitat types, including marsh, spoil banks, and upland forests. Within forested wetlands, black bear habitat requirements include soft and hard mast for food, thick vegetation for escape cover, vegetated corridors for dispersal, large trees for den sites, and isolated areas for refuge from human disturbance. Remaining Louisiana black bear populations occur in the Tensas River Basin, the Upper Atchafalaya River Basin, and coastal St. Mary and Iberia Parishes. The primary threats to the species are continued loss of bottomland hardwoods, fragmentation of remaining forested tracts, and human-caused mortality (e.g., illegal killing and accidental collisions with motor vehicles).

Louisiana black bears, particularly pregnant females, normally den from December through April. To further protect denning bears, the Service, through the final listing rule (Federal Register, January 7, 1992, Volume 57, No. 4), has extended legal protection to candidate and actual den trees. Candidate den trees are defined in the final rule as bald cypress (*Taxodium*

distichum) and tupelo gum (also known as water-tupelo, *Nyssa aquatica*) with visible cavities, having diameters at breast height of 36 inches or greater.

The pallid sturgeon (*Scaphirhynchus albus*) is an endangered fish found in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure) and possibly in the Red River. It is adapted to river conditions that can be described as large, free-flowing, turbid water with a diverse assemblage of physical habitats that are in a constant state of change. Detailed habitat requirements of this fish are not known but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has affected this species throughout its range.

FISH AND WILDLIFE CONCERNS IN THE STUDY AREA

Within the last 20 years, approximately 20,000 acres of bottomland hardwoods in the Lake Verret Basin have converted to an early bottomland hardwood successional stage, with relatively few hardmast tree species present. Contributing factors responsible for that conversion include subsidence, sea level rise, and increased backwater flooding from the Atchafalaya River. Other losses of forested wetlands have occurred as a result of canal and levee construction, urban and agricultural expansion, and navigation and flood-control projects. Such wetland losses have resulted in serious biological and socioeconomic impacts. Terrestrial animals are adversely affected by the loss of cover, nesting, and feeding habitat. Many of the above-listed factors have also resulted in decreased availability of merchantable timber.

Within the Atchafalaya Basin, sedimentation is accelerating the conversion of aquatic habitats to early sucessional bottomland hardwood forests. Those forests are replacing some of the most productive aquatic habitats within the southeastern United States. Those sedimentation patterns often exacerbate existing water quality problems within the Basin. Even relatively small or localized habitat losses (aquatic or terrestrial) can, when combined with other such events, have significant, long-term impacts to fish and wildlife resources on a regional scale.

Urban and agricultural expansion has led to increased eutrophication of streams located in and around that portion of the project area within the Lake Verret Basin. Important factors in that process include increased volume of urban and agricultural runoff, decreased acreage of wetlands that filter nutrients emanating from urban and agricultural areas, and increased structural flood control and drainage measures which shunt runoff into downstream aquatic systems, bypassing adjacent wetlands. Consequently, degraded water quality in the Lake Verret Basin is of increasing concern relative to fish and wildlife resources.

EVALUATION METHODOLOGY

To quantify anticipated project impacts to fish and wildlife resources, the Service used the Habitat Assessment (HA) methodology (Appendix A). The Habitat Assessment (HA) models for swamp and bottomland hardwoods within the Louisiana Coastal Zone utilized in this evaluation are a modification of the Fish and Wildlife Service's (Service) Habitat Evaluation Procedures

(HEP). For each habitat type evaluated, those models define an assemblage of variables considered important to the suitability of an area to support a diversity of fish and wildlife species (Louisiana Department of Natural Resources 1994; U.S. Fish and Wildlife Service 1980). The models were developed in order to complement the Wetland Value Assessment Methodology (WVA) models for fresh, intermediate, brackish, and saline marsh developed for Coastal Wetlands Planning, Protection and Restoration Act project evaluation. The model concepts and methodologies used for this analysis are almost identical to those comprising the WVA. The HA is similar to the Habitat Evaluation Procedures (HEP), in that habitat quality and quantity are measured for baseline conditions, and changes are predicted for future without-project and future with-project conditions. The HA, however, utilizes a community-level evaluation instead of the species-based approach used with HEP. As with HEP, the HA allows a numeric comparison of each future condition, and provides an estimate of project-related effects on fish and wildlife habitat quality and quantity.

The habitat unit is the basic unit of the HA for measuring project effects on fish and wildlife. Habitat units are the product of a habitat suitability index (HSI) and the acreage of available habitat at a given target year. The HSI is derived from a mathematical model developed specifically for each wetland type; that model incorporates ecological variables important in characterizing fish and wildlife habitat. The HA models for bottomland hardwoods consist of seven variables: tree species composition, stand maturity, understory/midstory percentage, hydrology, size of contiguous forested area, suitability and traversability of surrounding land uses, and disturbance. The HA model for swamp consists of six variables: stand structure, stand maturity, hydrology, size of contiguous forested area, suitability/traversability of surrounding habitat, and disturbance. An HSI is calculated by measuring habitat variable data from each sample site and mathematically combining them to obtain a value between 0.0 and 1.0, with 0.0 representing no habitat value and 1.0 representing optimum habitat value. The resulting index is linear, with the degree of difference between 0.0 and 0.1 being the same as the degree of difference between 0.9 and 1.0.

Habitat units fluctuate in response to changes in habitat quality (HSI) and/or quantity (acres); those changes are predicted for various target years over the project life (i.e., 50 years), for future without-project and future with-project scenarios. Target years (TY) selected for this analysis varied for each site because of the differences in time of impacts and the occurrence of important biological events (e.g, maturation of oaks to mast-producing age). Target years common to all analysis were 0 (baseline) and 50. Values for model variables were obtained from site visits to the area, other wetland assessments in similar habitats, communication with personnel knowledgeable about the study area and similar habitats, and review of aerial photographs and reports documenting fish and wildlife habitat conditions in the study area and similar habitats. The products of the resulting HSI values and acreage estimates were then summed and annualized to determine the average annual habitat units (AAHUs) available for each habitat type. The net change (increase or decrease) in AAHUs under future with-project conditions, compared to future without-project conditions, provides a quantitative comparison of anticipated project impacts/benefits. An explanation of the assumptions affecting HSI values for each target year is available for review at the Service's Louisiana Field Office.

Examination of 1971 and 1995 aerial photography revealed no significant loss of forested habitat on the lock grounds during that period. Therefore, future with-project conditions do not consider any induced clearing or development on the lock grounds. Estimates of habitat acreage changes (e.g., cypress swamp to early successional stage bottomland hardwoods, and early successional bottomland hardwood to mid-successional bottomland hardwoods) within the disposal area under future without-project conditions were assumed to occur at a rate that was based upon previous dredging and disposal operations and the rate of natural succession that has occurred in those disposal areas. Those same dredging and disposal operation estimates were used to calculate the acreage impacted under future without-project conditions.

The Habitat Assessment methodology and assumptions are discussed in Appendix A. A man-day/monetary analysis of project impacts on fish and wildlife resources was not performed due to the relatively small impact area involved.

PROJECT IMPACTS

Construction of the Bayou Sorrel replacement lock would directly impact fish and wildlife resources, primarily by excavating new channels and disposing spoil on forested habitats outside of, and within, existing disposal sites, and on former lock grounds. Construction-induced turbidity is expected to be temporary and should not have any long-term impact to fishery resources. Indirect project impacts to fish and wildlife resources would be associated with the increased tow size that will be accommodated by a larger lock. Those larger tows have the potential to increase erosion of channel banks, resulting in an additional long-term loss of forested wetland habitat. Those indirect impacts, however, are unquantifiable when comparing future-with project and future-without project. Larger tows are also expected to result in temporary increased turbidity levels; however, those levels are not expected to result in any significant impacts to aquatic resources.

The Service considers disturbed bottomland hardwood and disturbed swamp habitat to have medium fish and wildlife resource values, primarily due to reduced functional capability in terms of detrital export, fish/shellfish nursery habitat, and habitat diversity. The overall impact assessment combines those two habitats (disturbed bottomland hardwood and disturbed swamp), due to the relatively small area of disturbed swamp habitat to be impacted by the project, and the conversion of the swamp habitat to bottomland hardwood habitat under future-with out project conditions.

Construction of the new channels, levees, and lock walls will result in the direct and permanent loss of 229.9 acres of disturbed bottomland hardwood habitat, and will alter hydrology on 10.5 acres of that habitat. Those impacts would result in the loss of 70.1 AAHUs in bottomland hardwoods (Table 2). Upgrading and realigning levees will utilize material excavated for the new channels and lock in the Bayou Sorrel Lock area. Approximately 7.1 acres of water bottoms would be covered with stone to prevent bank erosion north of the Bayou Sorrel bridge.

Contaminants detected in the Corps' elutriate samples may have originated from the documented leakage at the upstream Bayou Sorrel Superfund Site before remediation was completed. During dredging and disposal operations, those contaminants could potentially be resuspended and become available for bio-uptake in the aquatic ecosystem

Table 2. Impacts associated with Plan 2, Gulf Intracoastal Waterway, Bayou Sorrel Lock Replacement, Louisiana, feasibility study.

Project Feature	Habitat	Acres Affected	AAHUs*
Channels	Bottomland hardwoods	88.9	-43.46
Disposal Sites	Bottomland hardwoods	113.4	-10.3
Lock Grounds	Bottomland hardwoods	27.6	-15.77
Altered hydrology	Bottomland hardwoods	10.5	-0.57
Total		240.4	-70.1

*AAHU - Average Annual Habitat Units

FISH AND WILDLIFE CONSERVATION MEASURES

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

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

The Service supports and adopts this definition of mitigation, and considers its specific elements to represent the desirable sequence of steps in the mitigation planning process.

Project-induced impacts could be avoided altogether by selection of the No Action alternative. The benefits, however, (in terms of navigation and human safety) gained by improving lock efficiency and correcting elevation deficiencies for flood control are substantial. The Corps will minimize impacts by limiting work to existing lock lands, channels, and disposal sites.

The confined disposal sites at the project site have severely restricted historic overbank headwater flows into the swamps west of those areas. Increased flows into those semi-isolated areas during high river stages would help maintain and improve water quality by introducing

river water having higher dissolved oxygen levels than that of the swamps. Increased flows would also flush organic debris from the swamp floor, reducing biological oxygen demand during warm weather and improving water quality for fish and shellfish species. The Service previously recommended that the Corps take material to repair/enlarge the confined disposal sites dikes from outside the existing disposal sites, in order to increase flows through the existing outside borrow ditches, and to partially mitigate the adverse water quality impacts caused by the disposal sites.

Future expansion of the existing disposal sites will cause further losses of bottomland hardwood and swamp habitats and reduced water quality in adjacent aquatic and flooded bottomland hardwood habitats. Accordingly, measures to maintain water quality should be incorporated into the proposed project. Infrared aerial photographs of the disposal sites indicate that spill boxes have previously failed to retain sediment. The temporary and long-term impacts include reduced productivity associated with reduced flooding, and increased turbidity and siltation. The Service previously recommended that the Corps construct plugs across the inside borrow ditches to allow the spill boxes to function correctly (i.e., by routing effluent flow through a greater portion of the disposal area). The water quality impacts of the existing disposal areas would be minimized by continuing to construct plugs across all interior borrow ditches.

Evaluations of the lock replacement alternatives addressed the problem of sedimentation in the Basin. In keeping with the purpose of other Atchafalaya Basin project features (i.e., water management units, channel training, distributary realignment, etc.), plans were developed to temporarily reduce the amount of dredged material deposited in the Basin from construction of the new locks and future maintenance dredging. The Service recognizes that use of the existing Bayou Sorrel disposal area was addressed in the Environmental Impact Statement for the Atchafalaya Basin Floodway System. Reasonable alternatives to the continued disposal of dredged material into productive swamps, bottomland hardwoods, and aquatic habitats in the Basin have been evaluated, and measures to avoid those impacts developed. Material dredged to construct the channels and lock will be placed in existing disposal sites. Once the new lock is operational, the tailbay, forebay, and lock chamber of the old lock will be used as dredged material disposal sites for approximately 35 years.

If the above-referenced borrow pits and existing disposal sites do not provide sufficient area to retain all excess material during lock construction or they become filled by maintenance dredging material, the Service recommends that several measures be included in the design and location of any additional confined disposal sites. Those new sites should not exceed 2,000 feet in length (as measured parallel to the EABPL borrow canal). A 200-foot gap should be left between adjacent disposal sites to maintain adequate overbank flows. Expansion of existing disposal sites should also adhere to the above length and gap limits. During initial construction of confined disposal sites, all borrow material for retention dikes should be excavated from outside the borrow pit, and such outside borrow ditches or effluent-return ditches should include a sediment trap that can be excavated with the equipment used to refurbish the disposal site dikes. At all disposal sites, plugs should be installed within any inside borrow ditches to facilitate maximum sediment retention in the disposal area prior to the effluent reaching the spill boxes.

Opportunities also exist to rectify the impacts of the Selected Plan by repairing portions of the affected habitat. Approximately 45.8 acres of disposal sites should be reforested and managed to mitigate impacts to disturbed bottomland hardwoods on those disposal sites. Remaining significant impacts to fish and wildlife resources should be fully compensated by implementing a mitigation plan to restore or manage bottomland hardwoods and restore water quality at project expense. The Service's Mitigation Policy (Federal Register, Vol. 46, pp. 7644-7663, January 23, 1981) provides guidance to ensure that the level of mitigation recommended by the Service is consistent with the value and scarcity of the affected fish and wildlife resources.

The Service considers the disturbed bottomland hardwood and swamp habitat in the study area to have medium value to fish and wildlife resources, due to previous hydrological modification/isolation, and proximity to human disturbances (borrow pits, landfills, pasture, and residences). The growing scarcity of bottomland hardwood forest habitat, however, is still a major Service concern. The mitigation goal for disturbed bottomland habitats in the study area is no net loss of habitat value while minimizing loss of in-kind value; thus, replacement of habitat values need not be restricted to disturbed bottomland forest habitat types and can include preservation, restoration, or management of other wetland habitats of equal or greater value to fish and wildlife resources.

The Service estimates that reforestation and management of approximately 126.3 acres of bottomland hardwoods would be required to offset the wildlife habitat losses associated with the Selected Plan. Reforestation and management of such land should begin simultaneously with project implementation. The mitigation plan proposed in this report consists of reforestation and management of bottomland hardwoods, and restoration of water quality in the Bayou Sorrel area of Iberville Parish (Figure 3). The proposed mitigation plan is described in detail in Appendix B.

Mitigation for unavoidable aquatic habitat impacts should include constructing a sediment trap (i.e., a deepened and widened area in the effluent ditch) that would be located at the entrance to the effluent return ditch at the northern-most disposal site (its hydrological connection to the swamp would be maintained) and the construction of an additional channel with a sediment trap at the southern boundary of this same disposal site. Maintenance dredging of the sediment trap could be coordinated with the annual maintenance dredging at the Bayou Sorrel Lock; sediment removed from the traps would be placed in the adjacent existing dredged material disposal sites. The proposed additional channel should be approximately 50-feet-wide (top width) and 1,300-feet-long (ending at the western levees of the disposal site) with a sediment trap at the entrance.

Some contaminated sediments found in the GIWW north of the lock may have come from the documented leakage that occurred at the Bayou Sorrel Superfund Site before remediation was complete. Because the aquatic ecosystem could potentially be re-exposed to residual contaminants during dredging and disposal of material taken from north of the lock, the Service recommends that the following precautions be implemented to minimize contaminant exposure to fish and wildlife resources: 1) all applicable State non-point source regulations pertaining to construction sites should be followed; 2) the Corps should sequence construction activities so

that removal of the top 5 feet of material from open-water areas or wetlands in the tailbay, forebay, lock chamber, and mooring areas will occur first, and place such material in the deepest layers of the disposal site(s); 3) silt curtains should be used when dredging material from open-water areas or wetlands north of the lock, wherever practicable; and, 4) the Corps should implement all practicable measures (e.g., internal dikes, etc.) to ensure the maximum retention of contaminants within the dredged material disposal areas.

SERVICE POSITION AND RECOMMENDATIONS

Based on our review of current project plans, the Service does not oppose implementation of the Selected Plan, provided that the following mitigation measures are implemented in the interest of equal consideration for fish and wildlife resources:

1. Maintain and restore headwater flows into Atchafalaya Basin swamps west of the disposal site to mitigate the loss of aquatic habitat functions of disturbed forested wetlands. To accomplish this, the effluent return ditch adjacent to the northern-most disposal area should be kept open to maintain the current hydrologic connection with the swamp west of that disposal site. A sediment trap should be excavated at the confluence of that ditch and the EABPL borrow canal. The sediment trap should be installed at a location that will allow yearly excavation by the equipment used to refurbish the confined disposal site dikes. Material removed from the sediment trap should be placed within the confined disposal site or on the containment levees. An additional gap should be excavated at the southern end of this disposal site. That gap should have a general east-west orientation, and should be approximately 50-feet-wide (top width) and 1,300-feet-long (ending at the western levees of the disposal site), and a sediment trap should be constructed at the eastern end. The channel bottom elevation should be the same elevation as the swamp floor.

2. Minimize dredged material placement on cypress-tupelo swamps, bottomland hardwoods, and open-water habitats in the Basin to the greatest extent feasible. Unavoidable project-related impacts on wildlife resources should be fully compensated by reforestation and management of 126.3 acres of bottomland hardwoods within the Bayou Sorrel Lock area of Iberville Parish, in accordance with the plan developed jointly by the Corps and the Service.

3. Acquire feet title to any mitigation lands not already owned in fee title by the Corps; those lands should be administered and managed in accordance with the Mitigation Plan detailed in Appendix B of this FWCA report. To ensure that the recommended mitigation values are maintained over the project life, the title for all mitigation lands should contain land-use restrictions (e.g., non-development provision). Costs for acquisition, operation and management, and monitoring of mitigation lands should be funded at project expense.

Figure 3. Bayou Sorrel Lock, Mitigation Areas

0.9 0 0.9 1.8 2.7 3.6 Miles

N

Aquatic Habitat Mitigation Channel
Avoidance Mitigation Area
Managed Disposal Area
Reforested Disposal Areas

4. If additional disposal sites for this project are constructed within the Basin, limit those sites to 2,000 feet in length (as measured parallel to the EABPL borrow canal or GIWW). A 200-foot-gap should be left between adjacent disposal sites to maintain adequate overbank flows. Expansion of existing disposal sites should also adhere to the above length and gap specifications. During initial construction of confined disposal sites, all levee borrow should be excavated from outside the borrow pit. Outside borrow ditches or effluent return ditches should include a sediment trap that can be easily excavated with the equipment used to refurbish disposal site dikes. At all disposal sites, plugs should be installed in any inside borrow ditches to facilitate maximum sediment retention in the disposal areas prior to the effluent reaching the spill boxes.

5. To reduce the potential for re-exposing the aquatic ecosystem to harmful contaminants during dredging and disposal of material from the area north of the lock, the Corps should 1) ensure all applicable State non-point source regulations pertaining to construction sites are followed; 2) the Corps should sequence construction activities so that removal of the top 5 feet of material from open-water areas or wetlands in the tailbay, forebay, lock chamber, and mooring areas will occur first, and place such material in the deepest disposal site(s) layers; 3) silt curtains should be used when dredging material from open-water areas or wetlands north of the lock, wherever practicable; and, 4) the Corps should implement all practicable measures (e.g., internal dikes, etc.) to ensure the maximum retention of contaminants within the dredged material disposal areas.

6. Prepare detailed design documents (e.g., design memoranda, plans and specifications, etc.) of the lock replacement and the mitigation features in consultation with the Service and the Louisiana Department of Wildlife and Fisheries. To ensure that no conflicts arise with the State of Louisiana's Master Plan for the Atchafalaya Basin, those features should also be coordinated with the Louisiana Department of Natural Resources' Atchafalaya Basin Program.

7. Implement mitigation simultaneously with other project features, to the extent feasible.

8. Continue to coordinate with the Service to ensure that construction activities do not impact any waterbird nesting colonies or any threatened or endangered species or their critical habitat.

9. Include budgets for development, operation and maintenance, and monitoring of the mitigation area in future project funding estimates and requests.

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GULF INTRACOASTAL WATERWAY,

BAYOU SORREL LOCK REPLACEMENT, LOUISIANA

FEASIBILITY STUDY

APPENDIX A

HABITAT ASSESSMENT ANALYSIS AND RESULTS

The Habitat Assessment (HA) models for swamp and bottomland hardwoods within the Louisiana Coastal Zone were utilized in this evaluation, and are a modification of the Fish and Wildlife Service's (Service) Habitat Evaluation Procedures (HEP). For each habitat type evaluated, those models define an assemblage of variables considered important to the suitability of an area to support a diversity of fish and wildlife species (Louisiana Department of Natural Resources 1994; U.S. Fish and Wildlife Service 1980). The models were developed to complement the Wetland Value Assessment Methodology (WVA) models for fresh, intermediate, brackish, and saline marsh developed for Coastal Wetlands Planning, Protection and Restoration Act project evaluations. The model concepts and methodologies used for this analysis are almost identical to those comprising the WVA.

Both the HA and the WVA models operate under the assumption that optimal conditions for fish and wildlife habitat within a given wetland type can be characterized, and that existing or predicted conditions can be compared to that optimum to provide an index of habitat quality. Habitat quality is estimated and expressed through the use of a mathematical model developed specifically for each wetland type. Each model consists of: 1) a list of variables that are considered important in characterizing fish and wildlife habitat; 2) a Suitability Index graph for each variable, which defines the assumed relationship between habitat quality (Suitability Index) and different variable values; and, 3) a mathematical formula that combines the Suitability Indices for each variable into a single value for wetland habitat quality, which is referred to as the Habitat Suitability Index (HSI). Both the HA and WVA models assess the suitability of each habitat type for providing resting, foraging, breeding, and nursery habitat to a diverse assemblage of fish and wildlife species. Using the HA models, habitat quality and quantity in a given area can be measured for baseline conditions, and can be predicted for future without-project and future with-project scenarios. This standardized, multi-species, habitat-based methodology allows a numerical comparison of each future condition, hence providing an estimate of project-induced impacts on fish and wildlife resources. A detailed discussion of the HA methodology is provided in the bottomland hardwood and fresh swamp models on file at the Service's Louisiana Field Office.

This analysis addresses the habitat types present in the project area, including disturbed bottomland hardwood forest and disturbed swamp, as described in the main report. The Corps of Engineers' New Orleans District (Corps) provided the acreage estimates within the project area under existing conditions, the rate of habitat change throughout the project area for future without-project scenarios, and the acreage estimates for construction-related impacts (Table 2, main report). Estimates of habitat acreage changes within the project area under future without-project conditions were assumed to occur only within the disposal areas and at a rate based upon previous dredging and disposal operations. Those same dredging and disposal operation estimates were used to calculate the acreage impacted under future without-project conditions.

Several sample sites, representative of bottomland hardwoods and swamps, were inspected on April 28 and March 4, 1998, by Corps and Service biologists. Records of sample site locations, individual sample site scores, and related data are on file in the Service's Louisiana Field Office.

Data collected at each sampling site were used in conjunction with the above-discussed mathematical models to compute an HSI value, for each target year (TY), for bottomland hardwood and swamp habitat types throughout the project life. Target years were established to illustrate significant changes in habitat quality or quantity at specific points over the 50-year project life, under future with-project conditions and future without-project conditions.

The Habitat Unit (HU) is defined by the HA as the basic unit for measuring project effects on wildlife habitat. Habitat Units are the product of a HSI value and the acreage of available habitat at a given target year. Future HUs change according to changes in habitat quality and/or quantity. Results are annualized over the project life to determine the Average Annual Habitat Units (AAHUs) available for each habitat type. The change (increase or decrease) in AAHUs for each future with-project alternative compared to future without-project conditions, provides a quantitative measure of anticipated project impacts. A net gain of AAHUs indicates that the project is beneficial to an array of fish and wildlife habitat values; a net loss of AAHUs indicates that the project is damaging to those values.

Separate analyses were conducted to evaluate direct impacts due to project construction and improvements to the mitigation sites (a total of 126 acres at Bayou Sorrel Lock). All direct impacts were assumed to have occurred by Target Year 3. Once construction is complete, proposed lock-maintenance activities are not expected to directly affect any additional wetlands. Annual maintenance dredging of the Bayou Sorrel lock forebay and periodic maintenance of the tailbay will continue. Placement of dredged material on the new disposal sites constructed at the existing lock site will allow a delay in deposition of material in the Basin's swamp and bottomland hardwoods for approximately 35 years. Project-related impacts to 240.4 acres of forested wetlands would result in the loss of 70.1 AAHUs (Table 1).

Table 1. Impacts associated with Plan 2, Gulf Intracoastal Waterway Bayou Sorrel Lock Replacement, Louisiana, feasibility study.

Project Feature	Habitat	Acres	AAHUs*
Channels	Bottomland hardwoods	88.9	-43.46
Disposal Sites	Bottomland hardwoods	113.4	-10.3
Lock Grounds	Bottomland hardwoods	27.6	-15.77
Altered hydrology	Bottomland hardwoods	10.5	-0.57
Total		240.4	-70.1

*AAHU - Average Annual Habitat Units

The future without project HSI values for the disposal areas within the Basin were assumed to reflect their continued use (e.g., disposal resulting in the elimination of trees within the site) and

construction of a new disposal site during the 50-year project life. That continued use and expansion of the disposal sites would result in the loss of bottomland hardwoods. Conversely, portions of the disposal areas that have been filled to capacity and are no longer used were assumed to undergo natural succession towards a bottomland hardwood community. That bottomland hardwood community would not experience natural flooding because of the elevation of the deposited material. In addition, poor soil conditions and other conditions unfavorable for seed recruitment would retard natural succession, slowing the development of a high-quality bottomland hardwood forest. The net change in future without-project AAHUs was deducted from the future with-project AAHUs to determine project mitigation needs.

Analysis of the Corp's potential 126-acre mitigation scenario indicates that 22.6 AAHUs would be accrued by restoration and management of a bottomland hardwood forest on existing and newly created disposal sites; 49.7 AAHUs would be achieved by avoiding impacts to bottomland hardwoods for 35 years for a total of nearly 72 AAHUs mitigated. Comparison of this figure to the 70 AAHUs lost to direct project impacts indicates this mitigation plan would fully offset the wildlife habitat impacts expected to result from project implementation. A total of approximately 10.5 acres of disturbed bottomland hardwoods would have their value as aquatic habitat eliminated and an additional 34.6 acres (for a total of 45.1 acres), would be converted to a less water-tolerant bottomland hardwood community; replanting and management of bottomland hardwoods on the disposal sites would not mitigate those lost habitat functions. To offset those aquatic habitat impacts fully, maintenance of a dredged material effluent return canal north of the area and construction of a small channel that would restore headwater flows to the area west of the existing disposal site are recommended. The HA model lacked the sensitivity to adequately assess aquatic habitat values affected by the project, and other habitat and species models examined also lacked the necessary suitability indices to accurately quantify changes in aquatic habitat values; however, the proposed maintenance of the existing canal and construction of a new channel is expected to fully compensate or offset those impacts. Based on studies of similar measures to improve water quality, we estimate that maintaining the existing effluent return ditch and constructing a sediment trap for that ditch, constructing an additional ditch with a sediment trap between the disposal sites will improve water quality on approximately 1,000 acres of aquatic habitat within the Basin.

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GULF INTRACOASTAL WATERWAY,

BAYOU SORREL LOCK REPLACEMENT, LOUISIANA

FEASIBILITY STUDY

APPENDIX B

MITIGATION PLAN FOR RESTORATION AND MANAGEMENT OF FISH AND WILDLIFE COMPENSATION LANDS, DETERMINATION OF COMPENSATION NEEDS, AND CALCULATION OF BENEFITS FROM COMPENSATION LANDS

MITIGATION PLAN

To compensate for unavoidable project impacts to fish and wildlife resources, the Service recommends acquisition, reforestation and management of forested wetlands and construction and maintenance of channels to restore headwater flows to the swamps west of the dredged material disposal sites within the Bayou Sorrel Lock area of Iberville Parish (Figure 2, Main Report).

The proposed mitigation area consists of disposal sites vegetated by bottomland hardwoods in various stages of succession, lock grounds and open water areas that will be filled with dredged material and reforested with bottomland hardwood species, and forested wetlands that experience poor water quality during medium and high river stages. Construction of previous disposal sites has isolated forested wetlands from headwater flows, resulting in poor water quality. Mitigation will consist of planting and management of bottomland hardwood species on portions (45.8 acres total) of existing disposal sites, reforestation of the new disposal sites (80.5 acres) following lock construction, and maintaining and restoring headwater flows to forested wetlands (approximately 1000 acres) west of the disposal site. Under future without-mitigation conditions, the existing disposal site mitigation areas would remain in private ownership, with continued placement of dredged material and very slow natural succession occurring, such that only low-value bottomland hardwoods would become established. Under the future without-mitigation scenario, approximately 175.5 acres of the existing disposal site mitigation area is predicted to receive dredged material over the project life. It is also anticipated that construction of another disposal site would be necessary, impacting an additional 104.3 acres of bottomland hardwoods. No improvements to water quality would occur under future without-mitigation conditions and expansion of disposal sites would likely increase the extent of poor water quality conditions within the adjacent forested wetlands.

Reforestation and Mitigation Measures

Mitigation activities under future with-mitigation conditions would be designed and implemented with the goal of establishing a bottomland hardwood forest and increasing the habitat value of bottomland hardwood forests and swamps. The mitigation objectives on the existing disposal sites would be to establish and maintain a high diversity of mast- and fruit-producing trees and shrubs. Long-term objectives would be to establish and maintain a diversity of age classes within the overstory (slightly skewed toward the older age classes) and some herbaceous and shrub cover while maintaining a semi-mature to mature bottomland hardwood timber stand with some snags present. The aquatic habitat mitigation objective would be to restore water quality, thus improving aquatic habitat values.

Bottomland hardwood reforestation objectives would be accomplished by clearing existing vegetation and planting seedlings of desirable tree species. Forested wetland tree species that should be planted include sweet pecan, sugarberry, American elm, sweetgum, willow oak, and water oak. This suggested species list can be modified to more precisely meet the limitations of each specific site, or to account for seedling availability limitations that may arise as mitigation

planning proceeds. Before planting, site preparation (e.g., mowing, leveling, etc.) should be conducted as needed. Tree seedlings should be planted on 10-foot centers (to attain a density of approximately 435 trees per acre) during the dormant season (i.e., December 15 to March 15). To fully mitigate the loss of bottomland hardwoods, a minimum of 50 percent (or 217 seedlings per acre) must survive through the end of the third growing season following planting; if less than 50 percent survival is attained, all dead and missing seedlings should be replaced during the next planting season. Replanting should continue until at least 50 percent (or 217 trees per acre) survive through the end of the third growing season after planting. Natural regeneration of any of the tree species planted could be counted towards attaining the 50 percent survival rate. The Service increased the planting density above those recommended in our draft report (i.e., 302 trees per acre) to reduce potential competition from the exotic Chinese tallow-tree. Monitoring would require documentation of the number and species of surviving seedlings or natural regeneration, and evaluation of the site condition on at least 5 percent of the mitigation area at the end of the third post-planting growing season. Monitoring would also determine the need for predator guards in future planting efforts. Copies of all monitoring reports should be provided to the Service and Louisiana Department of Wildlife and Fisheries.

Aquatic habitat mitigation objectives would be achieved by maintaining and constructing channels to reestablish headwater flows west of the disposal sites; this flow restoration would improve water quality. An existing effluent return ditch would be maintained to provide headwater flows, while the other channel would be constructed to reestablish headwater flows. Each channel will have a sediment trap at its entrance to minimize sedimentation impacts to aquatic habitats. Sediment traps would be inspected each year prior to maintenance dredging of the Bayou Sorrel Lock tailbay and forebay areas, and would be dredged in conjunction with that annual maintenance dredging, if necessary. Monitoring of sedimentation should also be conducted at the end of the water quality improvement channels to help determine the need to maintain sediment traps at the channel entrances.

The proposed mitigation plan was formulated to compensate for bottomland hardwood and swamp losses on the project site with similar habitats on the mitigation site. Improvements to water quality within forested wetlands were formulated to compensate for loss of flooded wetland functions (i.e., aquatic habitat).

ANTICIPATED BENEFITS

Bottomland hardwood and swamp compensation benefits were evaluated using Habitat Assessment (HA) models. Those models were used to evaluate the benefits accrued through reforestation of the compensation lands described above.

Implementation of the proposed mitigation plan is predicted to improve the value of the bottomland hardwoods to wildlife as some stands are established and others are enhanced. Through time, habitat values for species that ultilize hard and soft mast within diverse forest habitats would increase, due to the increased quantity and quality of mast-producing trees.

Habitat quality for some forest floor species (e.g., swamp rabbit) would increase due to moderate increases in shrub cover and temporary increases in herbaceous cover.

HSI values under future with-mitigation conditions were projected based on the following scenario:

Year 0 - Existing conditions. Most bottomland hardwoods consist of an early successional stage (e.g., scrub-shrub) bottomland hardwood forest; the remaining bottomland hardwood forests have very few hard-mast species. Most of the bottomland hardwoods are subject to flooding for only very brief periods during the growing season. Hard mast trees are almost nonexistent and few soft mast trees are present. The swamps are composed predominately of baldcypress and water tupelo, with scattered red maple, green ash, and black willow. Poor water quality exists throughout most of the swamps west of the disposal sites.

Years 1 through 2 - Project is under construction.

Year 3 - Project construction is complete. Overstory canopy closure and basal area have been reduced over a limited area on the 45 acres of disposal area through selective cutting and/or clearing. Those areas have been planted with bottomland hardwood species. Herbaceous and shrub vegetation increases in those areas. Mitigation channels and sediment traps have been constructed, restoring the water quality in the adjacent swamps.

Years 4 through 5 - Approximately 18 acres within the old lock site that have been used as a disposal site are filled to capacity. That area is planted with bottomland hardwood species. Herbaceous and shrub vegetation has increased in all planted areas; however, competing vegetation within the 45 acre reforested disposal site is reduced (e.g., mowing, etc.). Re-planting continues where necessary to ensure an adequate density of mast producing species and a high species diversity. Water quality improvements continue to benefit aquatic species.

Years 6 through 10 - Seedling planting is conducted on 14.9 acres of the former lock grounds that have been used as a disposal site. Additional planting continues where necessary to ensure an adequate density of mast producing species and a high species diversity. Herbaceous and shrub cover has increased slightly; however, vegetation control is conducted on the last 18 acres reforested. Maintenance of sediment traps allows the water quality improvements to continue.

Years 11 through 25 - In year 13, vegetative competition is reduced on the 14.9 acres planted in year 10. Re-planting continues where necessary to ensure an adequate density of mast producing species and a high species diversity. Some saplings and young trees established begin to die as a result of canopy closure, creating small snags. Shrub and herbaceous cover also decrease slightly due to increased canopy closure. Mast-producing tree species become increasingly dominant in the overstory canopy. Water quality improvements continue to benefit aquatic and some terrestrial species.

Years 26 through 35 - Bottomland hardwood seedlings have been planted on 47.4 acres of lock grounds that have been filled with dredged material. Oak seedlings planted 25 years earlier begin producing mast. Basal area continues to increase slowly, and the average diameter of overstory trees also increases. The number of mast-producing species has increased, and larger diameter snags are present. Herbaceous cover continues to slowly decline. Shrub cover does not significantly change, though some loss occurs. Benefits from water quality improvements continue.

Years 36 through 50 - Vegetation competing with bottomland hardwood species planted on the 47.4 acres would be reduced in year 38. Re-planting continues where necessary to ensure an adequate density of mast-producing species and a high species diversity on the 47.4 acres. The bottomland hardwood stands have increased in average tree age and diameter, but a variety of age and diameter classes are now represented. Overstory canopy closure and the number of hard-mast species has increased. The increased canopy closure results in some saplings and young trees dying and becoming snags. Hard-mast trees planted in 25 years earlier begin to produce mast. Continued maintenance of sediment traps allows water quality improvements to continue.

Habitat Assessment Analysis of Compensation Needs

An HSI value was developed for the bottomland hardwoods and swamps of the proposed mitigation area based on predicted future with-mitigation and future without-mitigation habitat conditions. The HSI value for each target year was multiplied by the corresponding acreage value to obtain a habitat unit value. These values were annualized over all target years to obtain Average Annual Habitat Unit values for each area. The difference between future with-mitigation and future without-mitigation Average Annual Habitat Units values expected to result from the above-described mitigation scenario reflect the net benefit of the mitigation actions.

The goal of the mitigation plan is to provide for equal replacement of habitat unit losses associated with Plan 2. An equal replacement compensation plan would provide an increase in Habitat Units equal in magnitude to Habitat Unit losses. The equal replacement compensation goal specifies that the gain of one Habitat Unit can be used to offset the loss of one Habitat Unit for any habitat type. In this case, the compensation acreage required for equal replacement would be 126.3 acres.

Costs

The first cost of the proposed mitigation area is estimated to be $157,110. That cost does not include developmental or annual operation and management costs, because over half the acreage is owned by the Corps, and existing Corps facilities and personnel are at the site. In addition, remaining mitigation acreage would be purchased as a project expense because those areas would be considered non-economic remnants. The mitigation management work would consist of clearing or thinning of existing vegetation which would cost $1,500 per acre, reforestation at a cost of approximately $200 per acre, and monitoring, reducing competing vegetation, and replanting which would cost about $500 per acre. All costs should be borne as project expenses.

Bayou Sorrel Lock, Louisiana

Final Feasibility Report

Real Estate Plan

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

November 2003

REAL ESTATE PLAN
BAYOU SORREL LOCK, LOUISIANA
4 NOVEMBER 2003

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1. **Introduction**: This Real Estate Plan supports the Feasibility Report for the Bayou Sorrel Lock, Louisiana study in Iberville Parish, Louisiana.

2. **Authorization**: This is a dual-purpose project, serving both a flood control and a navigation function. Authorization for the flood control portion of the project is contained in the Flood Control Act of 1928, as amended; while authorization for the navigation portion is contained in a Resolution adopted by the Committee on Public Works of the United States Senate on 29 September 1972, and in a Resolution adopted by the Committee on Public Works of the United States House of Representatives on 12 October 1972.

3. **Project Description**: The purpose of the flood control portion of this project is to modify the Bayou Sorrel Lock to accommodate the current project flood flowline in the Atchafalaya Basin Floodway. The purpose of the navigation portion of this project is to reduce delays to navigation on the Gulf Intracoastal Waterway (GIWW) -Port Allen to Morgan City Alternate Route.

In May 1992, the New Orleans District produced a Reconnaissance Report on the replacement of five locks along the GIWW in Louisiana: Algiers, Bayou Boeuf, Bayou Sorrel, Calcasieu, and Port Allen. Bayou Sorrel Lock is the first structure selected for further action as a result of that report. The existing Bayou Sorrel Lock is located along the GIWW-Port Allen to Morgan City Alternate Route in Iberville Parish, Louisiana.

The Alternate Route runs from the Mississippi River at Port Allen, Louisiana to the main route of the GIWW at Morgan City, Louisiana and provides a short-cut for traffic moving between the north and the west by by-passing New Orleans. It is 64 miles long, with a 12x125-foot channel; and includes two locks, at Port Allen and Bayou Sorrel. Port Allen Lock is located at the north end of the Alternate Route, where it connects with the Mississippi River. Bayou Sorrel Lock is located 27 miles from Port Allen Lock. It enables the waterway to pass through the East Atchafalaya Basin Protection Levee and into the Atchafalaya Basin, so this lock performs a flood control function as well as a navigational one.

The existing Bayou Sorrel Lock was completed in October 1952. It is 56 feet wide and has a usable length of 797 feet. As a comparison, Port Allen Lock is 84 feet wide and has a usable length of 1,202 feet. This comparison shows the adverse effect Bayou Sorrel Lock has on traffic using the Alternate Route. The proposed project will replace the existing lock with a new lock measuring 75 feet by 1,200 feet. The new lock will reduce delays to navigation and also accommodate the higher flow line of the Atchafalaya Basin Floodway.

4. **Project Location**: The project is located in a rural area of Iberville Parish, Louisiana near the small community of Bayou Sorrel (population 400) and about 25 miles southwest of Baton Rouge. Iberville Parish is located south and west of Baton Rouge, and has a population of 32,000. The Parish Seat is the Town of Plaquemine, with 8,600 inhabitants. Other communities in the Parish include White Castle (2,100), Maringouin (1,150), Bayou Goula (600), Bayou Pigeon (600), Grosse Tete (540), St. Gabriel (500), and Iberville (350). As these numbers indicate, the character of the Parish is quite rural. The Parish's largest employers are several large chemical plants located along the Mississippi River. Agriculture is also a major component

of the Parish economy. The topography of the area is flat and low, with typical elevations of 5 to 25 feet.

5. **Pre-existing Interests within the Project Area**: There are three existing Corps of Engineers projects in the immediate vicinity of the proposed project: the existing Bayou Sorrel Lock (262 acres of fee owned land), the GIWW-Port Allen to Morgan City Alternate Route (channel easement and disposal easement), and the East Access Channel (channel easement). This last project is a 12-mile long navigable waterway between the Atchafalaya Basin Main Channel and the Alternate Route. The Atchafalaya Basin Levee District has an easement for the East Atchafalaya Basin Protection Levee through the project area.

6. **Acquisition Criteria**: The construction of this project will require 273.2 acres of new fee-owned land and 102.4 acres of easement, as indicated below. All of the new right-of-way is owned by one landowner. All of the land which will be acquired in fee is already encumbered with Corps of Engineers easements for the Gulf Intracoastal Waterway-Alternate Route or the East Access Channel, or with a levee easement held by the Atchafalaya Basin Levee District.

New fee over existing channel and levee easements	111.8
New fee over existing disposal easement	73.2
New fee over existing levee and disposal easements	39.1
New fee over existing levee easement	31.2
New fee over existing levee, channel and disposal easements	11.6
New fee over existing channel easement	6.3
Total new fee land	**273.2**
New perpetual channel easement	5.6
New 4-year disposal easement	83.5
New 4-year work area easement	13.3
Total new easement land	**102.4**

The new lock will be built on existing fee-owned land, just west of the existing lock. New approach channels, approximately 4,000 feet long on the north end of the new lock and 5,000 feet long on the south end, will be excavated. These channels will be on existing fee-owned land, on existing GIWW channel easement, on existing GIWW disposal easement, and on existing levee easement. We will purchase fee ownership over most of this easement land.

The East Access Channel project connects with the GIWW just south of the existing lock. This connection will be realigned with the excavation of approximately 6,000 feet of new channel to the west and south of the new lock. Some of this will be on existing channel easement for the East Access Channel project and some will be on existing GIWW disposal easement. We will purchase fee ownership over most of this easement land and acquire channel easement over 5.6 acres of currently-unencumbered land.

Much of the excavated material will be placed into the approach channels of the existing lock; however, 83.5 acres of temporary disposal easement will be acquired over borrow pits which were created by the Corps during several enlargements of the East Atchafalaya Basin Protection

Levee (Item E-58) in the in the vicinity of the existing lock. A 13.3-acre temporary work area easement will be acquired for access to some of the disposal area.

We propose to purchase fee ownership over an extensive area where easement interests might seem adequate. Here are the reasons for our position. The construction of the south approach channel and the realignment of the East Access Channel will require us to acquire – *as a minimum* –a perpetual channel easement over approximately 65 acres of existing disposal easement. This construction would also create a 45-acre area which will only be accessible from our existing fee-owned land. This 45-acre area is privately-owned, but it is already encumbered with a disposal easement for the GIWW. The construction of the new lock and channels would also create approximately 8 acres of land on existing East Access Channel channel easement and approximately 12 acres of land on existing GIWW channel easement.

The current patchwork of easement estates which the Corps currently holds over dozens of projects in this area, especially along the GIWW and in the Atchafalaya Basin, has made management and control of these rights-of-way extremely difficult. Acquiring strips of channel easement over an existing disposal easement and creating land in existing channels – which will be used for future channel maintenance – will only add to the management problems we are encountering.

To address these management problems, we propose to acquire 273.2 acres of fee ownership on land over which the Corps of Engineers and/or the Atchafalaya Basin Levee District already holds an interest. ER 405-1-12 paragraph 12-9 a. states that a greater interest may be appropriate under some circumstances, and we believe that this is clearly the case here. Acquiring fee ownership over this area will have an insignificant effect on the total cost of the project and will greatly improve future management of the lock reservation. Approval of this Real Estate Plan will allow us to acquire this land in fee without the approval of HQUSACE.

7. **Estates**: The project will utilize three standard estates and one approved non-standard estate. The standard estates are Fee Excluding Minerals, Channel Improvement Easement, and Temporary Work Area Easement. The non-standard estate – Dredged Material Disposal Easement – which was approved for the Brunswick Harbor Project in October 1990.

8. **Local Cooperation**: There is no local sponsor for this project. The required rights-of-way will be acquired by the Corps of Engineers.

9. **Number And Costs of PL 91-646 Relocations**: The proposed project does not entail any PL 91-646 relocations. There are four or five improvements, consisting of mobile homes and small wood frame structures, located on land over which the United States holds a perpetual channel easement for the GIWW. This area is just north of the existing lock, and we will purchase this land in fee for the construction of the new lock. Our legal staff has rendered an opinion (Exhibit B) that the owners of these improvements are not entitled to compensation for them; therefore, no PL 91-646 costs will be incurred.

10. **Number And Costs Of Other Relocations**: A 10-inch gas pipeline owned by Florida Gas Transmission Co. crosses under the GIWW 250 feet north of the new fee land. The pipeline is

under existing channel easement for the GIWW and some excavation for the north approach channel will take place above this pipeline; however, our current plans do not require the relocation or adjustment of this line.

11. **Towns**: The proposed project is located in a rural area, near the small community Bayou Sorrel (population 400), and is not expected to have an adverse impact on that community. There is no zoning in this area. The nearest town is Plaquemine – population 8,400 – approximately 15 miles to the northeast, and the nearest major city area is Baton Rouge– population 220,000–approximately 25 miles to the northeast.

12. **Schools, Cemeteries and Churches**: No schools, cemeteries or churches will be affected by this project.

13. **Section 404 Evaluation**: A Section 404 Evaluation is being prepared and will be completed before the preparation of Plans and Specifications

14. **Environmental Compliance**: Prior to initiation of construction, all environmental compliances will be accomplished. This includes preparation and public review of an Environmental Impact Statement, signed Record of Decision (ROD), Cultural Resources Investigations, Coastal Zone Management Consistency Determination, Initial HTRW Assessment, Section 404(B)(1) Evaluation and Water Quality Certification and related public notices, and coordination with the Natural Resource Conservation Service regarding prime and unique farmlands. No land acquisition will take place until all HTRW investigations have been completed and any problems resolved.

15. **Threatened and Endangered Species Coordination**: Three Federally-designated threatened or endangered species occur, or may be expected to occur, in the vicinity of the proposed action. The endangered pallid sturgeon is a species of primitive fish found in the Mississippi, Missouri, and Atchafalaya Rivers. Small congregations of pallid sturgeon have been documented near the Old River Control Structure at the head of the Atchafalaya River, but there are very few reports from elsewhere within the Atchafalaya Floodway, and none from the vicinity of Bayou Sorrel. The threatened Louisiana black bear is found in the Atchafalaya Floodway. Only roaming male bears have been documented near Bayou Sorrel. Since there are no female bears occupying the area around Bayou Sorrel, the area is not considered to be occupied by the black bear. The threatened bald eagle is occasionally found in the Bayou Sorrel area, and has even been observed feeding near the Bayou Sorrel Lock. The closest eagle nest to the Bayou Sorrel Lock is about 11 miles away.

Biological assessments have been prepared for these species. The conclusions of the assessments are that the proposed action is not likely to adversely affect any listed species or their critical habitats.

16. **Minerals**: The Government will not acquire mineral rights to any of the required property.

17. **Timber**: A value of $50/acre has been placed on the timber on 5.6 acres of woodland over which we will acquire a perpetual channel easement. The rest of the land is either devoid of timber, or the amount of timber is not significant enough to contribute any value to the land.

18. **Access**: Access to the construction area will be over existing public roads and navigable waters.

19. **Navigational Servitude**: The existing channel is a man made waterway. Comprehensive easements were acquired for the project that extend beyond the waterway. These easements include both the right to construct, operate and maintain a channel and the right to deposit dredged material on the part not cut away. Further, the authorizing legislation for this project included the provision that the waterway would become part of the waters of the United States. Accordingly, besides being able to assert the rights acquired through the easements, the waterway is also subject to the navigational servitude. In either case, sufficient rights exist in the waterway for those portions of the project that are located therein

20. **Induced Flooding**: The construction, operation, and maintenance of the new lock will not induce any flooding.

21. **Landowners' Attitudes**: All of the additional rights-of -way required for this project are owned by one landowner, A. Wilbert's Sons Limited Partnership. This is a major landowner in this area, with approximately 9,000 acres of land in the Atchafalaya Basin and even more in the surrounding area. The landowner has not been contacted about this project and our need for additional rights-of-way.

22. **Contracts**: At the present time, we anticipate building this project under one contract. Construction is currently projected to begin in 2005 and should take three years to complete.

23. **Cost Estimates**: Date of valuation–May 2000

(a) Lands and Damages

Fee (excluding minerals)		
Levee right-of-way	31.20 acres x $200/acre	$ 6,240
Former disposal land	112.30 acres x $ 30/acre	3,369
Channel Easement	129.70 acres x $ 1/acre	130
Perpetual Channel Easement		
Woodland	5.60 acres x $455/acre	2,548
Temporary Disposal Easement (4-year)		
Borrow (lake) area	83.45 acres x $200 x .10 x 3.6299	6,058
Temporary Work Area Easement (4-year)		
Existing Road	13.30 acres x $200 x .10 x 3.6299	966
Severance Damages		0

Total Rounded	19,000
(b) Contingency (25%)	5,000
(c) Total Lands, Easements and Rights-of-Way	24,000
(d) Acquisition Costs	(R) 30,000
(e) PL 91-646	0
(f) TOTAL ESTIMATED REAL ESTATE COSTS	$ 54,000

24. **Acquisition Schedule**:

ORG	MILESTONE	TIME	SCHED BEGIN	SCHED END	ACTUAL BEGIN	ACTUAL END
RE-P	Property Ownership Map Prepared	2 mos	1-Jan-04	1-Mar-04		
RE-P	Legal Descriptions Prepared	1½ mos	1-Jan-04	15-Feb-04		
RE-M	Title Insurance Contract	1 mo	1-Mar-04	1-Apr-04		
RE-E	Appraisal Reports Prepared, Reviewed, and Approved	2 mos	1-Apr-04	1-Jun-04		
RE-A	Negotiations	3 mos	1-Jun-04	1-Sep-04		
RE	Condemnation (if needed)	9 mos	1-Sep-04	1-Jun-05		
RE-A	Issue Right-of-Entry (without condemnation)	2 wks	1-Oct-04	15-Oct-04		
RE-A	Issue Right-of-Entry (with condemnation)	2 wks	1-Jun-05	15-Jun-05		

25. **Chart of Accounts**: See Exhibit C.

Michael M. Palmieri — 4 NOV 2003

Prepared by: Date
Michael M. Palmieri, Realty Specialist

Yvonne P. Barbier — 5 Nov 2003

Reviewed by: Date
Yvonne P. Barbier, Review Appraiser

Jack C. J. Bene for — 5 Nov 2003

Recommended by: Date
William C. Lewis, Jr.; Chief, Real Estate Division

EXHIBIT A

ESTATES

FEE EXCLUDING MINERALS
(With Restrictions on Use of the Surface)

The fee simple title to (the land described in Schedule A) (Tracts Nos. ___, ___ and ___), subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines; excepting and excluding from the taking all oil and gas in and under said land and all appurtenant rights for the exploration, development, production and removal of said oil and gas, but without the right to enter upon or over the surface of said land for the purpose of drilling and extracting therefrom said (coal) (oil and gas).

CHANNEL IMPROVEMENT EASEMENT

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works on, over and across (the lands described in Schedule A) (Tracts Nos. ___, ___ and ___) for the purposes as authorized by the Act of Congress approved _____, including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions therefrom; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or excavated material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

DREDGED MATERIAL DISPOSAL EASEMENT
(Approved for Brunswick Harbor – October 1990)

An assignable right and easement in, on, over and across (See Schedule A), for a period not to exceed four (4) years, beginning with the date of this instrument, to construct, operate and maintain a dredged material disposal area on the land hereinafter described, including the right to construct dikes, to deposit dredged material thereon, to accomplish any alterations of contours on said land for the purpose of accommodating the deposit of dredged material as necessary in connection with such works, to borrow, excavate and remove soil, dirt and other materials, including dredged material, from said land; to undertake any management practice designed to enhance use of or extend the life of said land for the deposit of dredged material; to clear, cut, fell and remove any and all trees, timber, underbrush or other obstructions therefrom; and for such other purposes as may be required in connection with said works; provided that no structures for human habitation shall be constructed or maintained on the land, and that no other structures shall be constructed or maintained on the land except as may be approved in writing by the District Engineer of the U.S. Army Engineer District, New Orleans; subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the Grantors, (their heirs) (its successors) and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the project for the purposes authorized by Congress or abridging the rights and easements herein conveyed.

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across (the lands described in Schedule A) (Tracts Nos. ___, ___ and ___), for a period not to exceed four (4) years, beginning with the date possession of the land is granted to the United States, for use by the United States, its representatives, agents and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the Bayou Sorrel Lock Replacement Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and any other vegetation, structures or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

EXHIBIT B

ATTORNEY'S OPINION DATED 27 APRIL 2000

ON THE

LEGAL STATUS OF STRUCTURES

ON A

U.S. CHANNEL EASEMENT

AT

BAYOU SORREL LOCK

CEMVN-RE (405-90h)

27 April 2000
Marco Rosamano/2877

MEMORANDUM FOR Chief, Planning and Control Branch Attn: (M. Palmieri)

SUBJECT: Legal Status of Encroachments on Government Servitudes at Bayou Sorrel Lock

1. Questions have arisen regarding the legal status of some habitable structures on property adjacent to our Bayou Sorrel Lock over which the Government owns a channel easement.

2. The channel easement does not contain any prohibition against the construction by the underlying owner of habitable structures on this property.

3. NOD is presently planning a replacement and realignment of this lock that would require that some of the channel easement be exercised. Specifically, the land that these structures sit on will become an open channel. Some small portions that do not now have structures on them will remain after the project.

4. Real Estate Division has recommended, as part of the planning for the new lock, that all remaining interest in this land be acquired, i.e., the United States would have full ownership of the property. This recommendation is based upon the determination that what interest remaining within project boundaries would be uneconomic remnants.

5. This would not be a new start project, i.e., no additional authorization is needed to construct the project. However, it will require an appropriation of funds beyond the ordinary O&M funds for the GIWW in order to construct the project.

6. MVD has issued an opinion on disposal easements that do not have a prohibition in them against the construction of habitable structures (enclosure 1). That opinion concludes that such structures are not encroachments on Government property. However, it goes on to state that should disposal material need to be placed on the property, it could also be placed on the camps if necessary.

7. This opinion does have an impact on our situation. Accordingly, I think these structures are not encroachments on Government land and we have no authority to seek their removal. However, the owners located them there precariously. They do not affect our ability to exercise our easement. When we have need to cut away this land to form a channel, the structures can be cut away along with the land if necessary.

8. I cannot specifically address the appraisal problem of how to value these structures. The law states that property should be appraised in the before and after position, and should not take into account the project for which the appraisal is being done. Therefore, the property should be appraised as improved with the knowledge that those improvements, and the suitability of the land for other improvements, are precarious. What would a willing purchaser pay a willing seller for this property, knowing its burdens and precarious nature (although not its eminent ruin)?

9. If at all possible, I think we should stay away from valuing the structures. I do not think that the owner is entitled to the value of the structures, as they are precarious.

10. I also do not think that the tenants are entitled to URA benefits. These individuals moved onto the property after the Government acquired its interest. In Lewis v. Brinegar, 372 F. Supp. 424 (Dist. Ct. Mo. 1974) the court held that the purpose of the URA statues is to protect people who are necessarily and unavoidably uprooted from their homes and businesses. It went on to state that a person who moves onto property after the Government has acquired its interest is not necessarily or unavoidable uprooted. Their ties to the dwelling are at best temporary. The Congressional history of the Act does not show that Congress meant to cover such individuals.

1 Encl

Marco Rosamano
Attorney - Advisor

CF (w/encl):
CEMVN-RE-A
CEMVN-RE-M

EXHIBIT C

CHART OF ACCOUNTS

BAYOU SORREL LOCK REPLACEMENT
REAL ESTATE CHART OF ACCOUNTS

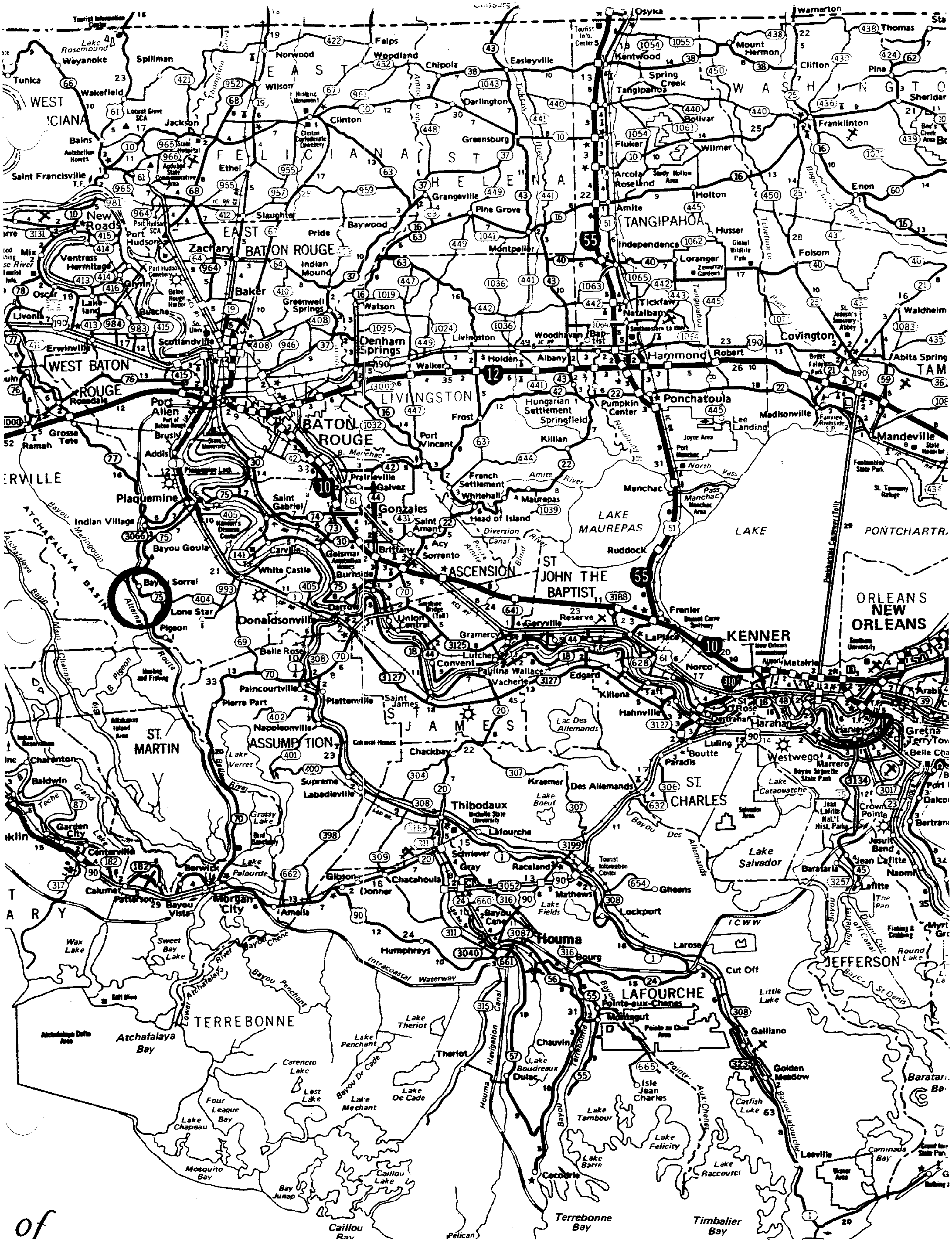
01G30	BY GOVT ON BEHALF OF LS		0	0			
01G40	REVIEW OF LS		0	0			
01G50	OTHER		0	0			
01G60	DAMAGE CLAIMS		0	0			
01H	**AUDITS**						
01H10	BY GOVERNMENT		0	0			
01H20	BY LS		0	0			
01H30	BY GOVT ON BEHALF OF LS		0	0			
01H40	REVIEW OF LS		0	0			
01J	**ENCROACHMENTS AND TRESPASS**						
01J10	BY GOVERNMENT		0	0			
01J20	BY LS		0	0			
01J30	BY GOVT ON BEHALF OF LS		0	0			
01J40	REVIEW OF LS		0	0			
01K	**DISPOSALS**						
01K10	BY GOVERNMENT		0	0			
01K20	BY LS		0	0			
01K30	BY GOVT ON BEHALF OF LS		0	0			
01K40	REVIEW OF LS		0	0			
01L00	**REAL PROPERTY ACCOUNTABILITY**		0	0			
01M00	**PROJECT RELATED ADMINISTRATION**		0	0			
01N00	**FACILITY/UTILITY RELOCATIONS**		0	0			
01P00	**WITHDRAWALS (PUBLIC DOMAIN LAND)**		0	0			
01Q00	**RESERVED FOR FUTURE HQUSACE USE**		0	0			
01R	**REAL ESTATE PAYMENTS**						
01R1	**LAND PAYMENTS**						
01R1A	BY GOVERNMENT	24,000	0	24,000			
01R1B	BY LS		0	0			
01R1C	BY GOVT ON BEHALF OF LS		0	0			
01R1D	REVIEW OF LS		0	0			
01R2	**PL 91-646 ASSISTANCE PAYMENTS**						
01R2A	BY GOVERNMENT		0	0			
01R2B	BY LS		0	0			
01R2C	BY GOVT ON BEHALF OF LS		0	0			
01R2D	REVIEW OF LS		0	0			
01R3	**DAMAGE PAYMENTS**						
01R3A	BY GOVERNMENT		0	0			
01R3B	BY LS		0	0			
01R3C	BY GOVT ON BEHALF OF LS		0	0			
01R3D	REVIEW OF LS		0	0			
01R9	**OTHER**		0	0			

BAYOU SORREL LOCK REPLACEMENT
REAL ESTATE CHART OF ACCOUNTS

01S	**DISPOSAL RECEIPTS**						
01S10	DISPOSAL RECEIPTS - REIMBURSEMENTS (CR) - LANDS		0	0			
01S20	DISPOSAL RECEIPTS - GENERAL FUND (CR) - LANDS		0	0			
01T	**LERRD CREDITING**						
01T10	LAND PAYMENTS		0	0			
01T20	ADMINISTRATIVE COSTS		0	0			
01T30	PL 91-646 ASSISTANCE		0	0			
01T40	ALL OTHER		0	0			
01U00	**ALL OTHER REAL ESTATE ANALYSES**						
01V00	RESERVED FOR FUTURE HQUSACE USE		0	0			
01W00	RESERVED FOR FUTURE HQUSACE USE		0	0			
01X00	RESERVED FOR FUTURE HQUSACE USE		0	0			
01Y00	RESERVED FOR FUTURE HQUSACE USE		0	0			
01Z00	RESERVED FOR FUTURE HQUSACE USE		0	0			
02	**RELOCATIONS**				0	0	0
02100	RELOCATION OF ROADS (INCLUDING BRIDGES)		0	0			
02200	RELOCATIONS OF RAILROADS (INCLUDING BRIDGES)		0	0			
02300	RELOCATION OF CEMETERIES, UTILITIES AND STUCTURES		0	0			
30BP*	**PROJECT COOPERATION AGREEMENT (PCA)**		0	0	0	0	0
			0		0		
51	**OPERATION AND MAINTENANCE DURING CONSTRUCTION**		0		0		
51A	REAL ESTATE - LEASING		0	0	2,000	500	2,500
51A10	INLEASING		0	0			
51A20	RELOCATION ASSISTANCE		0	0			
51A30	DISPOSAL ASSISTANCE		0	0			
51A40	RELOCATION ASSISTANCE PAYMENTS (PL 91-646)		0	0			
51A50	RENTS, INITAIL ALTERATIONS AND RESTORATIONS		0	0			
51B	REAL ESTATE - MANAGEMENT SERVICES	2,000	500	2,500			
51B10	COMPLIANCE INSPECTIONS		0	0			
51B2	OUTGRANTS		0	0			
51B21	REGULAR		0	0			
51B22	OIL AND GAS		0	0			
51B30	DISPOSALS		0	0			
51B40	ENCROACHMENTS AND TRESPASS		0	0			
51C00	OTHER OPERATION AND MAINTENANCE EXPENSES		0	0			
51D00	REVENUES DERIVED FROM OUTLEASING RETURNED TO STATES		0	0			
51E00	AUDITS		0	0			
51F00	TIMBER HARVEST		0	0			
51G00	REPAYMENTS AND COST DISTRIBUTIONS		0	0			
51H	MISCELLANEOUS RECEIPTS		0	0			
51H10	REAL ESTATE MANAGEMENT INCOME		0	0			
51H90	OTHER INCOME		0	0			

EXHIBIT D

PLATES


WEST FELICIANA
EAST FELICIANA
ST HELENA
WASHINGTON
TANGIPAHOA
EAST BATON ROUGE
WEST BATON ROUGE
LIVINGSTON
IBERVILLE
ASCENSION
ST JOHN THE BAPTIST
ST. JAMES
ASSUMPTION
ST. MARTIN
ST. CHARLES
ORLEANS
JEFFERSON
LAFOURCHE
TERREBONNE
Tunica
Wakefield
Saint Francisville
New Roads
Port Hudson
Zachary
Baker
Clinton
Jackson
Norwood
Wilson
Chipola
Greensburg
Darlington
Easleyville
Osyka
Kentwood
Tangipahoa
Fluker
Amite
Independence
Loranger
Tickfaw
Natalbany
Hammond
Ponchatoula
Franklinton
Covington
Abita Springs
Mandeville
Madisonville
Denham Springs
Walker
Holden
Albany
Livingston
Baton Rouge
Port Allen
Plaquemine
Brusly
Addis
Grosse Tete
Rosedale
Erwinville
Prairieville
Gonzales
Saint Gabriel
Sorrento
Geismar
Carville
White Castle
Donaldsonville
Bayou Goula
Bayou Sorrel
Lone Star
Pigeon
Indian Village
Gramercy
Lutcher
Convent
Vacherie
Garyville
Reserve
LaPlace
Norco
Kenner
Metairie
NEW ORLEANS
Harahan
Westwego
Marrero
Gretna
Luling
Boutte
Paradis
Des Allemands
Hahnville
Taft
Edgard
Killona
Thibodaux
Raceland
Mathews
Lockport
Houma
Bourg
Gray
Schriever
Chacahoula
Gibson
Donner
Amelia
Morgan City
Berwick
Patterson
Calumet
Centerville
Garden City
Franklin
Baldwin
Charenton
Napoleonville
Labadieville
Supreme
Chackbay
Plattenville
Paincourtville
Pierre Part
Belle Rose
Cut Off
Larose
Galliano
Golden Meadow
Leeville
Montegut
Pointe-aux-Chenes
Chauvin
Dulac
Cocodrie
Isle Jean Charles
Theriot
Humphreys
Lafitte
Barataria
Crown Point
Jean Lafitte
LAKE MAUREPAS
LAKE PONTCHARTRAIN
Lake Salvador
Lake Verret
Lake Palourde
Grassy Lake
Lac Des Allemands
Lake Boeuf
Atchafalaya Bay
Terrebonne Bay
Timbalier Bay
Caillou Bay
Four League Bay
Lake Chapeau
Lake Mechant
Lake De Cade
Lake Penchant
Lake Theriot
Lake Boudreaux
Lake Tambour
Lake Felicity
Lake Barre
Lake Raccourci
Catfish Lake
Little Lake
Wax Lake
Sweet Bay Lake
Mosquito Bay
Bay Junap
Caillou Lake
Lost Lake
Carencro Lake
Lake Fields
Intracoastal Waterway
ICWW
Houma Navigation Canal
Bayou Lafourche
Bayou Terrebonne
Atchafalaya Basin
Mississippi River

of