APPENDIX D
Fish and Wildlife Coordination

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

October 4, 2006

Planning, Environmental, and Regulatory Division

Catherin Yeargen
U.S. Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, Texas 77058

Dear Ms. Yeargen:

Please refer to your draft Fish and Wildlife Coordination Act Report (CAR) dated September 2006, sent to the U.S. Army Corps of Engineers (Corps), Galveston District regarding the Wharton Interim Feasibility Study from the U.S. Fish and Wildlife Service (Service). The Corps has only minor comments on the draft CAR. These comments are as follows:

1) Subsequent discussion with higher Corps review team members required the Corps District to reevaluate the proposed mitigation plan as a result of Corps Regulations. Since only approximately 148 AAHU of forest habitat and 12 AAHU of wetland habitat are negatively impacted, Corps regulations do not allow for recommended mitigation plans exceeding the impacts. Therefore, an incremental cost analysis was performed that showed that the impacts would be fully mitigated by performing riparian woodland mitigation within the Nanya Plastics, Wal-Mart, Baughman Slough Railroad, and Ford Street sumps. These sumps would produce approximately 151 AAHU of riparian habitat. In addition, wetland restoration in the Nanya Plastics sump would offset the wetlands impacts by producing 15.74 AAHU of wetland habitat. The Corps recognizes that the Service prefers preservation of existing riparian woodlands as documented on several pages within the draft CAR and summarized on page 23; however, as stated in the draft report on page 5-17, Corps regulations require implementation of the most cost effective and incrementally justified mitigation alternatives. Preservation of existing woodlands is not the most cost effective mitigation solution in this instance. As documented in the draft CAR, the Corps also recognizes that Riparian woodlands difficult to establish, and therefore we are implementing adaptive management strategies to ensure that these features succeed. In addition, the local sponsor will be required to perform operations and maintenance to ensure long term survivability of the mitigation features.

2) The habitat impacts shown in Table 4 on page 15 of the draft CAR was revised in the final report to include an additional column at the bottom entitled Disposal Areas and the size column states "65 ac. < 171 ac.". The forest, wetland, and residential habitat were indicated as impacting 0 acres and the grassland value showed

impacting 171 acres. The total grassland impact was increased to 299.6 ac. In addition, the discussion referenced on page 16 of the draft CAR was increased from 128.6 acres of grasslands to 299.6 acres in the final report.

3) On page 20 of the draft CAR, the service references that "if it is determined that the sump would alter the hydrology of the nearby wetlands, these impacts should also be mitigated". The detailed design will be implemented to ensure that these valuable wetlands would not be negatively impacted. In addition, the Service states that "in the event that it is later determined that the construction of the Wharton Flood Control Project will remove wetlands from jurisdiction, the USACE should fully compensate for the loss of these additional wetlands." The proposed project would not remove jurisdiction from any wetlands as currently proposed. If the plans change significantly during final design such that this determination would no longer be valid, then the project would have to undergo supplemental environmental documentation, which would be coordinated with the resource agencies at that time.

4) The final CAR should state the views of the State wildlife resource agency. Mr. Newman of my staff has forwarded an email from Texas Parks and Wildlife Department (TPDW), Austin Office, regarding the State's view on the proposed project. The Corps recognizes that additional TPWD staff has been involved with the project and welcomes additional views as appropriate within the timeframe allowed.

Due to the fact that the final Report must be reproduced and sent to the Corps' Headquarters Office on October 10, we are requesting an electronic copy of the final CAR by October 6, 2006, if at all possible. Please address any written correspondence or comments to Mr. Rob Newman, (817-886-1762), CESWF-PER-EE, PO Box 17300, 819 Taylor St, Fort Worth, Texas 76102-0300. For additional information on specific information for the Wharton component of the project you may also contact Dr. Terry Roberts at 409-766-3035. Thank you for your cooperation in this matter.

Sincerely,

William Fickel, Jr.
Chief, Planning, Environmental, and
Regulatory Division

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 / (FAX) 281/488-5882

October 16, 2006

Carolyn Murphy
Chief, Environmental Section
Department of the Army
Galveston District, Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

Dear Ms. Murphy:

This letter transmits our final Fish and Wildlife Coordination Act Report (FWCAR) for the Wharton Interim Feasibility Study: Phase II of the Lower Colorado River Basin Study. This document fulfills the Service's obligation to provide recommendations for this project to the U.S. Army Corps of Engineers–Galveston District under the Fish and Wildlife Coordination Act. As a final report, it is intended to aid in project planning for the Wharton Flood Control Project. Specifically, it provides the Service's analysis of fish and wildlife resources potentially affected, and recommendations for mitigation of project impacts.

The draft FWCAR was reviewed by the U.S. Army Corps of Engineers Fort Worth District and Texas Parks and Wildlife Department, and the final report incorporates changes from the reviewers. A copy of this final report is also being sent to the Texas Parks and Wildlife Department.

Please review these recommendations. If you have any questions, or if we can be of further assistance, please contact Catherine Yeargan at 281-286-8282. Thank you.

Sincerely,

Brian W. Cain

Brian W. Cain
Acting Field Supervisor, Clear Lake ES

cc
Mark Harberg, USACE Fort Worth District
Jarrett (Woody) Woodrow, Jr., TPWD

TAKE PRIDE IN AMERICA

Fish and Wildlife Coordination Act Report

Wharton Interim Feasibility Study:
Phase II of the Lower Colorado River Basin Study

Prepared by:

Catherine Yeargan

U.S. Fish and Wildlife Service

Clear Lake Ecological Services Field Office

October 2006

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INTRODUCTION TO STUDY

The Galveston and Fort Worth Districts of the U.S. Army Corps of Engineers (USACE) and the Lower Colorado River Authority (LCRA) initiated the Lower Colorado River Basin Study to investigate existing and projected flooding concerns along approximately 482 miles of the Colorado River, from San Saba to Matagorda Bay, Texas. The purpose of the Lower Colorado River Basin Study was to: assess flood elevations for the major urbanized areas along the Colorado River; examine existing economic flood damages along the river corridor; inventory existing environmental resources throughout the basin and identify potential restoration areas; assess recreational development and recreational needs within the basin; assess water supply needs and shortages within the region; and provide a hydrologic and hydraulic assessment of preliminary potential alternatives for reducing flood damages along the Colorado River. The results of this study are summarized in the *Lower Colorado River Basin Study Information Paper, Phase I: Problems, Needs, and Opportunities* (USACE 2003).

Phase II of the Lower Colorado River Basin Study consists of interim feasibility studies focusing on known problem areas. The Wharton Interim Feasibility Study was initiated to identify flood control measures that could be undertaken to address local flooding concerns in Wharton County, Texas. Because the City of Wharton is located along the Colorado River and parts of the city were built on top of and adjacent to Caney Creek and Baughman Slough, flooding in and around the city has been a recurring problem. In the Phase I evaluation, existing economic flood damages were computed for structures, structural contents, vehicles, and agricultural crops. Wharton County experienced the highest number of affected structures (5,290) and the greatest agricultural loss ($4.9 million) during the 100-year flood event (USACE 2003).

Authority for the study of the Colorado River and its tributaries is contained in the following Congressional authorizations:

1) Section 6 of the Flood Control Act, approved June 22, 1936, which authorizes and directs the Secretary of War "*to cause preliminary examinations and, surveys for*

flood control at the following named localities,…Colorado River, Texas, above the county line between Coke and Runnels Counties…Lower Colorado River, Texas."

2) Resolution by the Committee on Commerce, United States Senate, adopted August 4, 1936, which resolves that "*the board of Engineers for Rivers and Harbors created under Section 3 of the River and Harbor Act, approved June 13, 1902, be and is hereby, requested to review the reports on Colorado River, Texas, submitted in House Document Number 361, Seventy-first Congress, second session, and previous reports, with a view to determining if improvement in the interest of commerce and flood control is advisable at the present time."*

3) Section 4 of the River and Harbor Act, approved August 26, 1937, which authorizes and directs the Secretary of War "*to cause preliminary examinations and surveys to be made at the following named localities.....Colorado River, and its tributaries, Texas, with a view to its improvement in the interest of navigation and flood control."*

4) Section 6 of the River and Harbor Act, approved March 2, 1945, which authorizes and directs the Secretary of War "*to cause preliminary examinations and surveys to be made at the following named localities.....Colorado River, Texas."*

This report documents the U.S. Fish and Wildlife Service (Service) evaluation and recommendations for the Wharton Interim Feasibility Study pursuant to the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661, et seq.).

STUDY AREA

The feasibility study area is primarily focused within and around the City of Wharton, the local sponsor of the study. The study area extends from Glen Flora to downstream of the City of Wharton, and includes the floodplain of the Colorado River, Caney Creek, Baughman Slough, and Peach Creek (Figures 1 and 2).

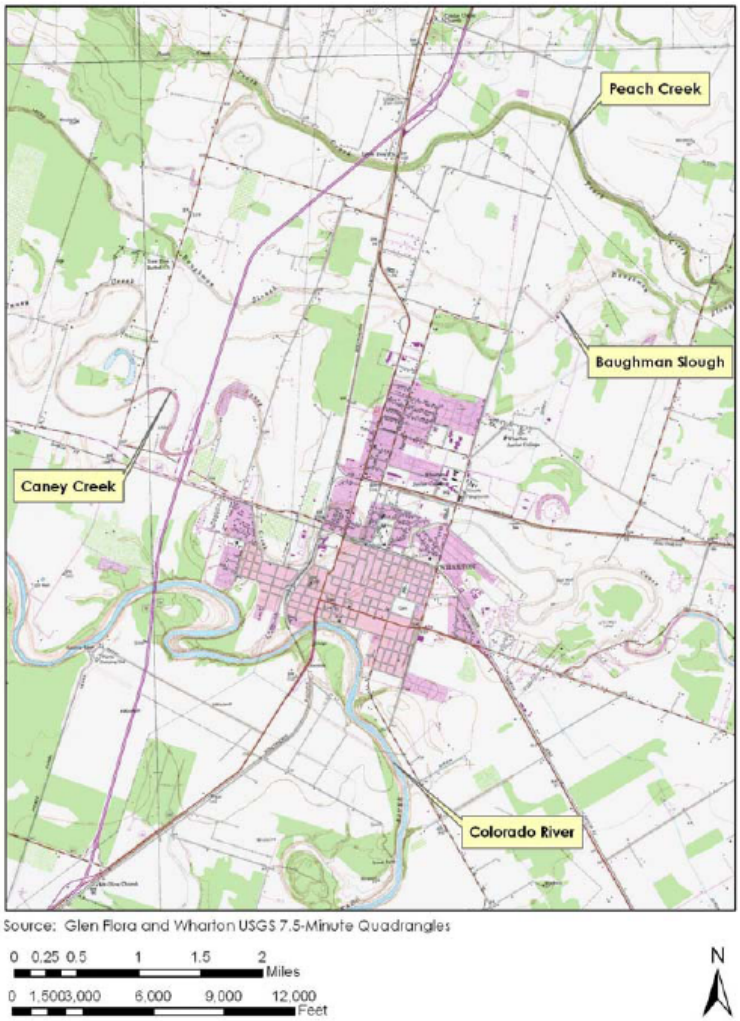


Figure 1: Topographic Map of the City of Wharton Study Area

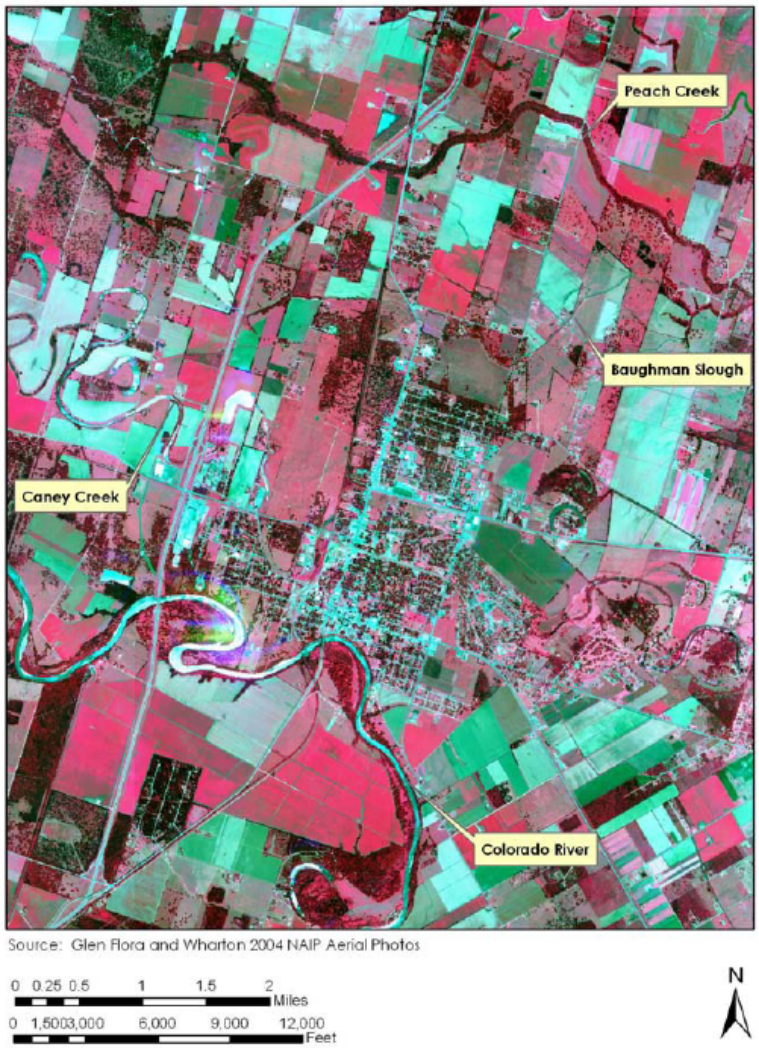


Figure 2: Aerial Photo Map of the City of Wharton Study Area

Colorado River

The Colorado River flows through the center of Wharton County, forming the southern boundary of the City of Wharton. The riparian vegetation along the river is a mix of black willow (*Salix nigra*), American sycamore (*Platanus occidentalis*), cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*), bald cypress (*Taxodium distichum*), box elder (*Acer negundo*), pecan (*Carya illinoinensis*), and hackberry (*Celtis laevigata*)(Figure 3a). The riparian woods are generally restricted to the immediate area along the river, although there are some remnant oxbows in the study area that remain heavily wooded. In addition, some areas along the river have been cleared of vegetation, and are therefore more vulnerable to erosion (Figure 3b). Much of the remaining land near the Colorado River is agricultural and rangeland.

(a)

(b)

Figure 3: Photographs of the Colorado River (a) near Elm Street and Business 59; and (b) near the wastewater treatment plant at County Road 188

Caney Creek

Caney Creek is an overflow tributary channel for the Colorado River. It splits from the Colorado River just south of Glen Flora, and flows through the City of Wharton as a poorly defined channel. Throughout most of Wharton County, Caney Creek resembles a series of storage ponds (Figure 4a). In many areas within the City of Wharton, the natural channel has been diverted, and the flow impeded by filling and grading of the channel. Since parts of the city were built on top of and adjacent to Caney Creek, the stream is a major source of flooding for the city. Vegetation along Caney Creek varies from a mix of black willow (*Salix nigra*), box elder (*Acer negundo*), and hackberry (*Celtis laevigata*) to mixed herbaceous cover, often mowed and maintained as a drainage swale (Figure 4b).

(a) (b)

Figure 4: Photographs of Caney Creek (a) east of County Road 235; and (b) near Mayfield Park

Baughman Slough

Baughman Slough is a tributary of Peach Creek, located north of the Wharton city limits. The headwaters of the slough are approximately 6 miles west of the city, just north of FM 102. Baughman Slough is a well-defined channel, and collects stormwater run-off via several natural and man-made diversion channels. Roads cross the slough at numerous locations along its length. Baughman Slough joins Peach Creek northeast of the city. Much of Baughman Slough more closely resembles a drainage swale or a roadside ditch than a natural stream (Figure 5a). However, near its confluence with Peach Creek, vegetation such as black willow (*Salix nigra)*, box elder (*Acer negundo*), and bald cypress (*Taxodium distichum)* can be seen (Figure 5b).

(a)

(b)

Figure 5: Photographs of Baughman Slough (a) near County Road 235; and (b) near its confluence with Peach Creek

Peach Creek

Peach Creek is a tributary of the San Bernard River and flows north of the City of Wharton, with headwaters approximately 13 miles northwest of the City of Wharton. The Peach Creek Channel is well-defined, and densely vegetated. Peach Creek retains most of its natural characteristics and remains an important habitat for wildlife. Bald cypress (*Taxodium distichum),* green ash (*Fraxinus pennsylvanica*), pecan (*Carya illinoinensis*), and box elder (*Acer negundo*) are common (Figures 6a and 6b).

Due to its relatively undisturbed state and importance as wildlife habitat, any modification to Peach Creek was discounted early in project planning.

(a)

(b)

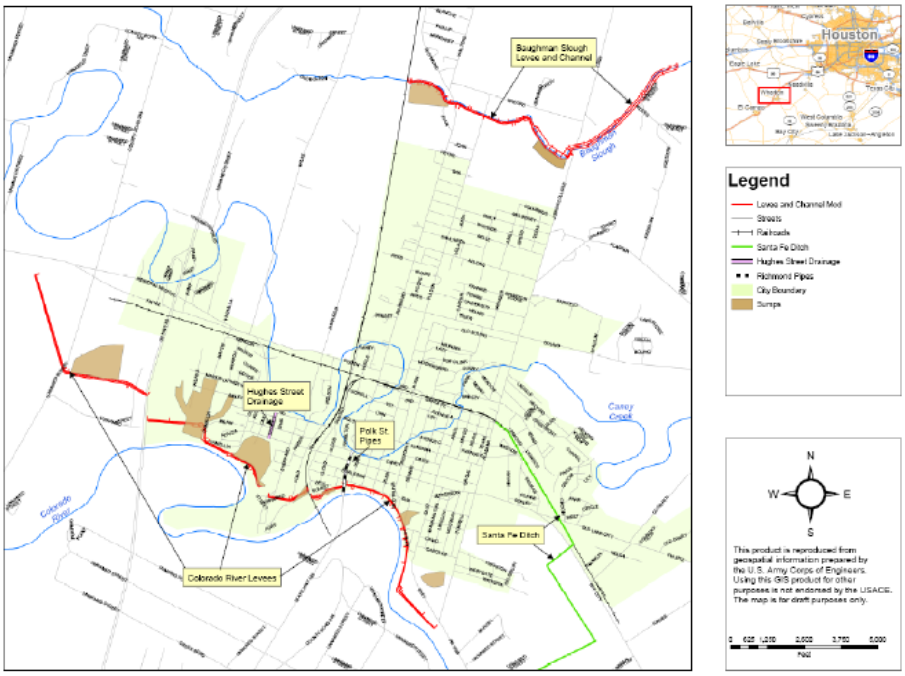
Figure 6: Photographs of Peach Creek (a) west of County Road 235 and north of County Road 231; and (b) at Lee's Lane

THREATENED AND ENDANGERED SPECIES

The federally listed threatened bald eagle (*Haliaeetus leucocephalus*) is known to nest in Wharton County. Two pairs of bald eagles are known to nest along the Colorado River, approximately 3 miles west of Glen Flora, upstream of the City of Wharton.

Bald eagles nest along river systems, or within 1-2 miles of some other large body of water, such as a lake or reservoir. Nests are often located in areas where forest, marsh, and water meet. Once a suitable breeding territory is found, breeding pairs will return to the same area year after year, often using alternate nests within the territory during different breeding years. Although a given nest or nest tree may be lost, a pair often returns to the same territory to begin another. Nesting territories can even be inherited by subsequent generations. Individual bald eagles exhibit considerable variation in their responses to human activity, depending upon the type, frequency, and duration of activity; the extent of environmental modification; the point in time of the bird's reproductive cycle; and various other factors not well understood. Eagles are particularly vulnerable to disturbance throughout the nesting period (October to July).

Under Section 7(a)(2) of the Endangered Species Act (ESA), the Federal action agency is responsible for determining the effects of their actions on listed species or critical habitat (50 CFR § 402.14 [a]) and is ultimately responsible for section 7 obligations. In a letter dated June 26, 2006 the USACE provided the Service with a biological assessment documenting the project's potential impact on listed species, and the USACE's determination that this project will have no effect on the bald eagle. Over time, additional species may be listed, new individuals of listed species may be found, additional information may become available, etc. Therefore, the USACE should periodically review the available information and, if necessary, re-evaluate the potential impacts of the project upon federally listed species. If the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.



Source: USACE 2006

Figure 7: Wharton Interim Feasibility Study Recommended Plan

WHARTON FEASIBILITY STUDY RECOMMENDED PLAN

Potential flood control alternatives were initially identified during a June 17, 2003 study team meeting, and included options for the Colorado River downstream of Business 59, the Colorado River upstream of Business 59, Caney Creek, Baughman Slough, and Peach Creek. The recommended plan to address flooding in the city of Wharton consists of structural features in the form of earthen levees and accompanying sumps, floodwalls, a channel enlargement, storm drain type drainage structures, and an open cut ditch (Figure 7).

Colorado River

During a flood event the Colorado River overflows into the City of Wharton and the surrounding area. Therefore, one of the first alternatives investigated was a series of levees and/or floodwalls placed along the Colorado River to prevent floodwaters from reaching the city. Construction of a levee and floodwall system along the left (northeast) bank of the river would protect the low-lying areas along the river, and cut-off overflows from the river into the Caney Creek and Baughman Slough drainage basins. This levee system would be designed to tie-in with existing embankments and levees at the highway, the railroad, and the landfill. The proposed levees/floodwalls along the river can be divided into seven distinct segments (Table 1). All levee segments have a similar general template, with a 12 foot top width, and 1 foot vertical to 3.5 foot horizontal side slopes.

Table 1: Recommended Plan Levees and Floodwalls Along the Colorado River

Reach Name	Average Height (FT)	Reach Description
CR-1	4	Levee from FM 102 to US Hwy 59 embankment along the Colorado River.
CR-2	4	Levee from US Hwy 59 embankment to Station 42+50
CR-2A	6	Floodwall from Station 42+50 to landfill berm
CR-3	5	Levee from landfill berm to abandoned RR embankment
CR-4	8	Levee from abandoned RR embankment to Richmond Street
CR-5	3	Floodwall from Richmond St to park area
CR-5A	4	Levee from park area to Alabama Street (end)

Source: USACE 2006

Baughman Slough

Baughman Slough is the flow path that provides drainage to the north side of Wharton. During Colorado River events larger than the 25-year storm, some water escapes into Peach Creek well upstream of Wharton. Water escaping from Peach Creek then spills into Baughman Slough, exceeding the channel capacity of Baughman Slough. Analysis has shown that an earthen levee or floodwall constructed along the southern bank can effectively reduce the flooding risk attributed to Baughman Slough. The proposed levees/floodwall and channel modifications along the slough can be divided into seven segments (Table 2). Earthen levees have a top width of 12 feet, and side slopes of 1 foot vertical to 3.5 feet horizontal. All segments have only a modest average height of 3-4 feet. At Fulton Street, the earthen levee changes to a floodwall for a distance of 400 feet, so that there is sufficient clearance between the wall and a residential structure (segment BS-3). In addition to the levees/floodwall feature, channel modification is recommended for the lower reach of Baughman Slough. The proposed earthen channel modification has a bottom width of 75 feet, with 1 foot vertical to 3.5 foot horizontal side slopes. Average depth of the channel is estimated to approach 4 feet.

Table 2: Recommended Plan Levees, Floodwalls and Channel Modifications Along Baughman Slough

Reach Name	Reach Description
BS-1	Levee from abandoned RR embankment to Richmond St along Baughman Slough
BS-2	Levee from Richmond Street to Fulton Street
BS-3	Flood wall from Fulton Street to past the home east of Fulton and south of Baughman Slough.
BS-4	Levee from flood wall to Junior College Blvd
BS-4A	75 foot bottom modified channel begins. Continuation of levee from Station 49+50
BS-5	75 foot modified channel from Junior College Blvd. to County Road 150
BS-6	75 foot modified channel from County Road 150 to end

Source: USACE 2006

Caney Creek

Hughes Street Drain

This feature consists of three 60-inch reinforced concrete pipes run in parallel under Hughes Street, and would replace the current single 48-inch reinforced concrete pipe. The inlet structure for the system would be located just north of the T-intersection of Hughes Street with Spanish Camp Road. The pipes would extend southward under Hughes Street for about 1300 feet, which is beyond the intersection of Hughes and Milam Streets. The pipes would then connect to an existing open outfall channel. The area in and near the outlet structure is also being proposed for a sump area.

Polk Street Pipes

The area along Caney Creek incurring the most damages is located in and around downtown Wharton. Potential flood damages would be addressed by installation of three 60-inch reinforced concrete pipes below the surface of Polk Street. The headwall inlet would be located immediately beyond the intersection of Polk and Caney Streets, in the northeast quadrant. The three pipes would extend 1400 feet southward, where they would outfall into the Colorado River. An outfall structure with flap gates would be located at the terminus of the pipes.

Santa Fe Ditch

The inlet of the ditch would be located near the intersection of Alabama Road and the old Santa Fe Railroad. For the upper portion, the ditch would have 1 foot vertical on 4 foot horizontal side slopes and an 8 foot bottom width, and follow the old railroad right-of- way until State Highway 60 is reached, which is a distance of approximately 5000 feet. The ditch would then turn southward, cross SH 60, and continue to the Colorado River, a distance of about 5700 feet. For this reach, the side slope would steepen to 1 foot vertical on 3 foot horizontal.

Detention Basins or Sumps for Interior Drainage

Feasibility level designs have been developed for a series of seven sump areas along the Colorado River levees and two along the Baughman Slough levees to address the interior drainage issues associated with a levee project (Appendix A). The size of the required sumps ranges from fairly minimal near the old downtown area to significant in the Nanya Plastics, Walmart and Hughes Street sump areas (Table 3).

Table 3: Recommended Plan Proposed Sumps for Interior Drainage

Name	Associated Waterway	Area (ac)	Capacity (ac-ft)
Wal-Mart Sump	Colorado River	32.3	250
Nanya Plastics Sump	Colorado River	41.7	356
Hughes Street Sump	Colorado River	28.0	353
Ford Street Sump	Colorado River	3.2	9
Sunset Street Sump	Colorado River	1.7	14
Black/Rusk Street Sump	Colorado River	3.8	21
Alabama Road Sump	Colorado River	9.3	185
BS Railroad Sump	Baughman Slough	34.5	182
Ahldag Sump	Baughman Slough	8.4	250

Source: USACE 2006

HABITAT IMPACTS

The habitat impacts of the levees, floodwalls, channel modifications and sumps that are proposed for the Recommended Plan are summarized below (Table 4). These impacts were calculated by the USACE using USFWS National Wetland Inventory maps, aerial photos, and GIS mapping.

Table 4: Habitat Impacts of the Recommended Plan

Feature	Length(ft)/Size(ac)	Habitat Impacts			
		Forest	Grassland	Wetland	Residential
Colorado River Levee	20,310 ft. (earth) 1,910 ft. (floodwall)	14.9 ac.	14.1 ac.	1.4 ac.	0
Baughman Slough Levee	6,610 ft. (earth) 380 ft. (floodwall)	7.6 ac.	14.5 ac.	0	0
Baughman Slough Channel Modification	6,830 ft. (75 ft. wide)	0	0	5.0 ac.	0
Walmart Sump	32.3 ac.	11.2 ac.	21.1 ac.	0	0
Nanya Plastics Sump	41.7 ac.	22.5 ac.	17.7 ac.	1.5 ac.	0
Hughes Street Sump	28.0 ac.	6.0 ac.	22.0 ac.	0	0
Ford Street Sump	3.2 ac.	0.2 ac.	2.6 ac.	0	0.4 ac.
Sunset Street Sump	1.7 ac.	0.8 ac.	0.2 ac.	0	0.7 ac.
Black/Rusk Street Sump	3.8 ac.	1.0 ac.	2.8 ac.	0	0
Alabama Road Sump	9.3 ac.	0	7.3 ac.[1]	2.0 ac.	0
BS Railroad Sump	34.5 ac.	0	25.2 ac.	0	9.3 ac.
BS Ahldag Sump	8.4 ac.	0	8.4 ac.	0	0
CC Outfall Storage Drainage	300 ft.[2]	0.4 ac.	0	0	0
CC Wharton Storage Drainage	0	0	0	0	0
CC Crestmont Storage Santa Fe Ditch	250 ft.*	0.3 ac.	0	0	0
Disposal Areas	65 ac. < 171 ac.	0	171 ac.	0	0
Total		**64.9 ac.**	**299.6 ac**	**9.9 ac.**	**10.4 ac.**

Source: USACE 2006

[1] The Alabama St. Sump is located in a cropland and does not contain grassland, except a small amount in a ditch.

[2] Distance from levee/road to river that crosses forest or wetland habitat.

Habitat in the study area was mapped from 1996 and 2004 aerial photos, and can be separated into three general categories: forest, grassland, and wetland.

Forest

This habitat type includes riparian forest found along the upper banks of the Colorado River and Baughman Slough, bottomland hardwood forests found in remnant oxbows, and upland woods. Carolina chickadees (*Poecile carolinensis*), yellow-billed cuckoo (*Coccyzus americanus*), yellow-bellied sapsucker (*Sphyrapicus varius*), and red-bellied woodpecker (*Melanerpes carolinus)* were seen in the upland pecan forest located on the proposed Walmart sump area during a site visit. White-eyed vireos (*Vireo griseus),* yellow-rumped warblers (*Dendroica coronata),* a red-shouldered hawk (*Buteo lineatus*) and turkey vulture (*Cathartes aura)* were seen in the riparian forest near the proposed Nanya Plastics sump area, and a red-shouldered hawk, red-tailed hawk (*Buteo jamaicensis)* and vermillion fly catcher (*Pyrocephalus rubinus)* were seen near the riverbank.

Approximately 64.9 acres of forest will be removed during construction of the levee and sump system.

Grassland

Grasslands include those areas that are maintained as rangeland and regularly grazed, manicured lawns, and maintained highway rights-of-way. American crows (*Corvus brachyrhynchos*), savannah sparrows (*Passerculus sandwichensis*), mourning doves (*Zenaida macroura*), and a Mississippi kite (*Ictinia mississippiensis*) were seen during a site visit to the proposed Hughes Street sump location. Eastern meadowlarks (*Sturnella magna*) and scissor-tailed flycatchers (*Tyrannus forficatus*) are also common in this habitat type.

Approximately 128.6 acres of grasslands will be removed during construction of the levee and sump system, with up to an additional 171 acres of grassland required for placement of excess material removed from the sumps. Therefore, a maximum of 299.6 acres of grassland would be impacted by construction of the project.

Wetland

The USFWS National Wetland Inventory maps for the project area show scattered wetlands along parts of the Colorado River, in Baughman Slough, in tributaries feeding Baughman Slough, in Caney Creek, in old oxbows of the Colorado River and Caney Creek, and in some swales and ditches draining some of the pastures and woodland areas outside the city. Wetlands in the study area include emergent herbaceous and forested wetlands, often associated with remnant oxbows. The Nanya Plastics sump area has a remnant oxbow forested wetland of bald cypress, black willow, hackberry and pecan. This wetland remains relatively undisturbed due to its location, and is connected by hydrology to emergent wetlands and an existing borrow pit that has begun to naturalize. White-eyed vireos, Carolina chickadees, belted kingfishers (*Ceryle alcyon*), a green heron (*Butorides virescens*) and brown creeper (*Certhia americana*) were observed using the forested wetland during site visits. Snowy egrets (*Egretta thula*), little blue herons (*Egretta caerulea*), great egrets (*Ardea alba*), tricolor herons (*Egretta tricolor*) and a lesser yellowlegs (*Tringa flavipes*) were seen at the borrow pit wetland. Additional wetlands include the stream channel in the Alabama sump area, and wetland fringe vegetation along Baughman Slough and Caney Creek.

Wetlands in the study area total about 118 acres, and direct project impacts on wetlands are estimated at 9.9 acres.

The USACE has determined that all of the wetlands that currently have jurisdictional status under Section 404 of the Clean Water Act will remain jurisdictional after the project is completed, even though they will be removed from the 100-year floodplain. The wetlands in Caney Creek and its old oxbows will remain jurisdictional because they will retain their hydraulic connection to the Caney Creek watershed. The remaining wetlands that drain into Baughman Slough or the Colorado River will retain their hydraulic connections because the tributaries and drainages will be allowed to pass under the levees through culverts with flapgates on the river or slough side. The flapgates will prevent water from backing up into the city during a river rise, but the connection and jurisdiction will remain.

Figure 8: Proposed Mitigation Tract Identified in the Preliminary Mitigation Plan, and Additional Mitigation Tracts Considered

SERVICE RECOMMENDATIONS AND CONCLUSIONS

In early project planning, the USACE developed a preliminary mitigation plan in cooperation with the Service and the Texas Parks and Wildlife Department (TPWD). The preliminary mitigation plan included the planting of native trees on a channel bench within the channelized reach of Baughman's Slough, creating an estimated seven acres of habitat. In addition, approximately 50 acres of land located in a bend in the river just upstream of the city landfill between the river levee and the river was identified for acquisition (Figure 8). Existing habitat on this land was proposed for enhancement through the planting of native trees and shrubs as mitigation for the loss of riparian areas from project construction. The Service recommends that the preliminary mitigation plan be refined and implemented to offset project impacts.

Conservation of Bottomland Hardwood and Riparian Forest Habitat

The Service's primary recommendation to offset project impacts to forested areas is the acquisition, enhancement and conservation of one or more existing, contiguous tracts of riparian or bottomland hardwood forests within the Colorado floodplain.

The loss of bottomland hardwood forests is estimated at five times higher than the loss of any other major forest type in the United States (Abernethy and Turner 1987). The diversity of habitats within bottomland hardwood forest provide for increased avian species richness (Antrobus et al. 2000). Microhabitat features that are important in influencing the distribution and abundance of neo-tropical migrants in bottomland hardwood forests include the presence of Spanish moss, scour channels, canebrakes, bald cypress, vine tangles and palmetto thickets (Pashley and Barrow 1993). These types of microhabitats are difficult to reproduce through re-forestation efforts.

Riparian woods likewise are well documented to be extremely rich in terms of fish and wildlife habitat, providing important wildlife corridors in otherwise fragmented landscapes. In a study of neo-tropical migrants in the interior Columbia River basin, riparian vegetation was used by more species than any other habitat (Saab and Rich 1997).

These woods and forests provide important stopover habitat for the vast numbers of neo-tropical migrant songbirds that funnel through the Texas coast during both the autumn and spring migrations to and from wintering areas in Central and South America (USFWS 1997). Dr. Sidney Gauthreaux, Jr. of Clemson University has determined that the riparian woods and bottomland forests along the Texas coast provide important habitat to trans-Gulf migratory birds due to their close proximity to the Gulf of Mexico, and their maturity and diversity of vegetation (Gauthreaux and Besler 2005, USFWS 1997).

The bottomland forests of the Brazos, San Bernard and Colorado Rivers, collectively known as the Columbia Bottomlands, provide habitat for approximately 237 species of birds totaling 29 million individuals during migration (USFWS 1997). Approximately 70 species of birds have been found to breed regularly in bottomland hardwood forests, of which 30 are neo-tropical migrants (Pashley and Barrow 1993). In a study of woodland birds in three different forest types in Eastern Texas, bottomland hardwood forests were found to contain the greatest number of bird species (Shackelford and Connor 1996).

Mitigation of Wetland and Grassland Impacts

The Service supports the USACE's proposal to mitigate herbaceous wetland and grassland impacts within the project's sumps (USACE 2006). In addition, the Service recommends planting native trees on a channel bench within the channelized reach of Baughman Slough, as discussed in early project planning and in the USACE's preliminary mitigation plan.

The Service supports mitigation of all wetland impacts – direct, indirect, and cumulative. If it is determined that construction of the sump areas would alter the hydrology of nearby wetlands (such as the forested cypress wetland near the Nanya Plastics sump area), these impacts should also be mitigated. In the event that it is later determined that construction of the Wharton Flood Control project will remove wetlands from jurisdiction, the USACE should fully compensate for the loss of these additional wetlands.

Opportunities for Restoration

The *Lower Colorado River Basin Study Information Paper, Phase I: Problems, Needs, and Opportunities* (USACE 2003) identified potential restoration projects in the Colorado River watershed that could be incorporated into the interim feasibility studies. Although many of these restoration opportunities identified are more applicable to the more northern reaches of the Colorado River, a few of them could be used to off-set the fish and wildlife impacts of Wharton's proposed flood control measures.

Sand and Gravel Mining Ecosystem Restoration Projects

Although numerous abandoned sand and gravel strip-mining operations have been identified south of Austin along the Colorado River, the opportunity for this type of habitat restoration is limited in Wharton County.

Abandoned Oxbows

There are several sites along the Colorado River where oxbows have been cut off from the main river channel. Establishing a hydrologic connection to the oxbows and reestablishing the riparian woodland vegetation to these areas has been identified as a possible restoration opportunity. If a hydrologic connection is restored, these areas could serve as backwaters, and would benefit the fish and wildlife by serving as a spawning and rearing area for fish during times of high water. These areas also have the potential to serve as resting and nesting habitat for migratory waterfowl and shore birds.

Riparian Habitat Improvement

Riparian woodlands along some areas of the Colorado River have been removed, with agricultural farming and ranching encroached upon the river's edge throughout much of the basin. In addition to farming and ranching, urban development in general has caused riparian vegetation destruction. Removal of riparian vegetation in these areas cause a decrease in fish and wildlife habitat, an increase in erosion, and a decrease in water quality. Restoration of riparian vegetation and a 300-foot vegetative buffer zone would improve the valuable riparian fish and wildlife habitat of the Colorado River, slow bank erosion and improve water quality.

Wetland Restoration/Creation

The bottomland hardwood forests, riparian forests, and wetlands that were lost or converted along the river due to farming and mining activities could be converted back to bottomland hardwood forests, riparian forested, or wetlands by acquiring the land and re-establishing the habitats that are native to the respective areas. The edges of the water could be made into aquatic wetland habitat for migratory waterfowl and shorebirds. With the gravel point bars in the river nearby, there is potential for creating/protecting least tern habitat. These areas could be restored to greatly improve fish and wildlife habitat along the Colorado River. In addition, creating wetlands in the watershed of Caney Creek, along drainage district easements, parks or other publicly owned properties could reduce non-point source pollution from entering the creek and the Colorado River. An additional restoration opportunity includes re-establishing the natural flow of Caney Creek through the City of Wharton, and/or increasing the storage capacity of ponds along Caney Creek that currently trap stormwater. There are many areas along Caney Creek that could be restored to concurrently provide fish and wildlife habitat, recreation opportunities, and increased stormwater storage.

Invasive Species Management

Another restoration opportunity would be the development of a program to ensure that salt cedar and other invasive species do not establish in the lower Colorado River basin. Invasive species management could be incorporated into abandoned oxbow, riparian habitat improvement, and/or wetland restoration/creation projects.

Summary

The USACE's current proposal to mitigate all project impacts within the project's sumps (USACE 2006) will not adequately mitigate project impacts to riparian and bottomland hardwood forests. Restoration of bottomland hardwood forests is not easy, and requires on-going management to be successful (Stanturf et al. 2001). Loss and fragmentation of bottomland hardwood forest habitat continues to be one of the greatest threats for bird species of the West Gulf Coastal Plain, and forest bird communities are influenced by forest age, structure, and tree species composition (Connor and Dickson 1997).

Management recommendations for bottomland hardwood forests for the benefit of migratory birds call for very large forested tracts with a natural disturbance regime that maintains a mosaic of diverse habitats (Pashley and Barrow 1993). Additional recommendations call for a diversity of ecologically intact forest types, as well as protection of bottomland hardwood forests and riparian areas to encourage a diversity of bird species (Shackelford and Connor 1996).

Mitigation within the project's sumps should be limited to herbaceous wetland and grassland impacts. In addition, the Service supports planting native trees on a channel bench within the channelized reach of Baughman Slough, as discussed in early project planning and in the USACE's preliminary mitigation plan. To ensure the greatest probability of success, the Service strongly recommends monitoring all mitigation sites a minimum of two and five years after completion. At these benchmarks, mitigation sites should be evaluated for plant survival, soil drainage, wetland function, and control of invasive species such as giant salvinia (*Salvinia molesta*), water hyacinth (*Eichhornia crassipes*) and deep-rooted sedge *(Cyperus entrerianus)*. The USACE should correct any problems identified during monitoring.

The Service continues to recommend mitigation of forested areas through acquisition and conservation of existing, contiguous tracts of riparian and bottomland hardwood forests within the Colorado River floodplain, as discussed in the preliminary mitigation plan. Conservation of existing habitat provides an immediate benefit to fish and wildlife resources, and provides an additional benefit through the incorporation of the local sponsor as a steward for long-term conservation. Mitigation of forested areas within the project's sumps would be hampered by the variability, uncertainty, and chances for failure inherent in forested habitat creation.

Finally, the Service and TPWD should be fully involved with the USACE in the development, design and monitoring of the mitigation plan for this project. TPWD's comments on the Service's *Draft Fish and Wildlife Coordination Act Report for the Wharton Interim Feasibility Study* are included in Appendix B.

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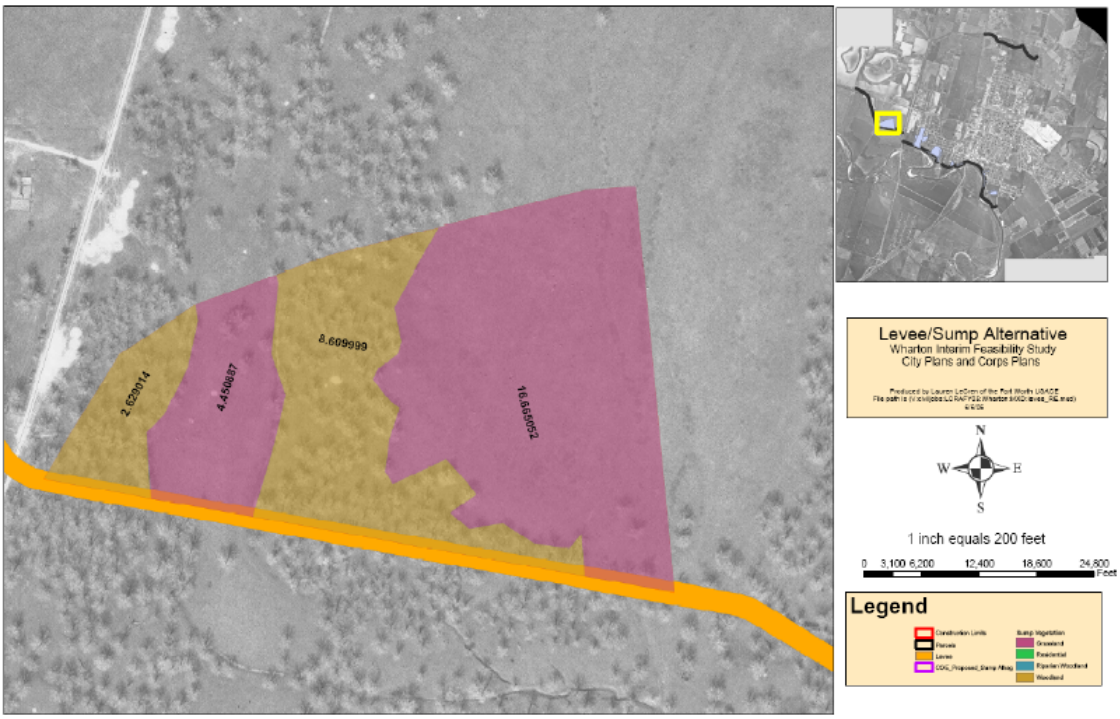
Appendix A: Proposed Sump Locations for Interior Drainage



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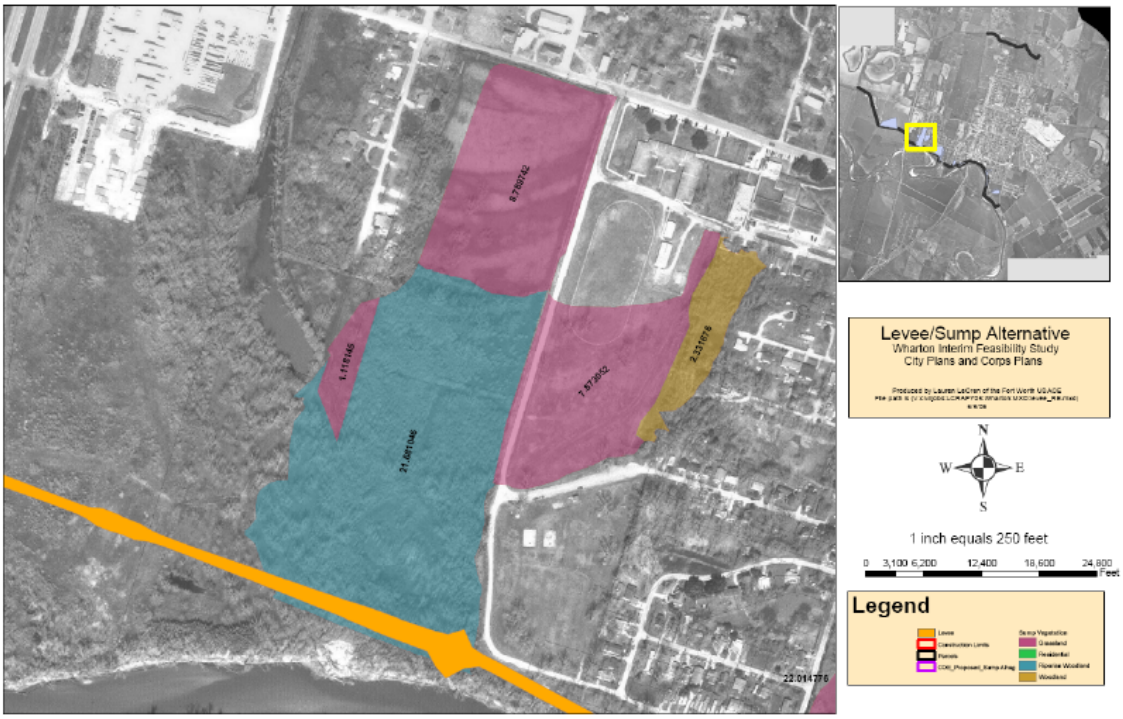

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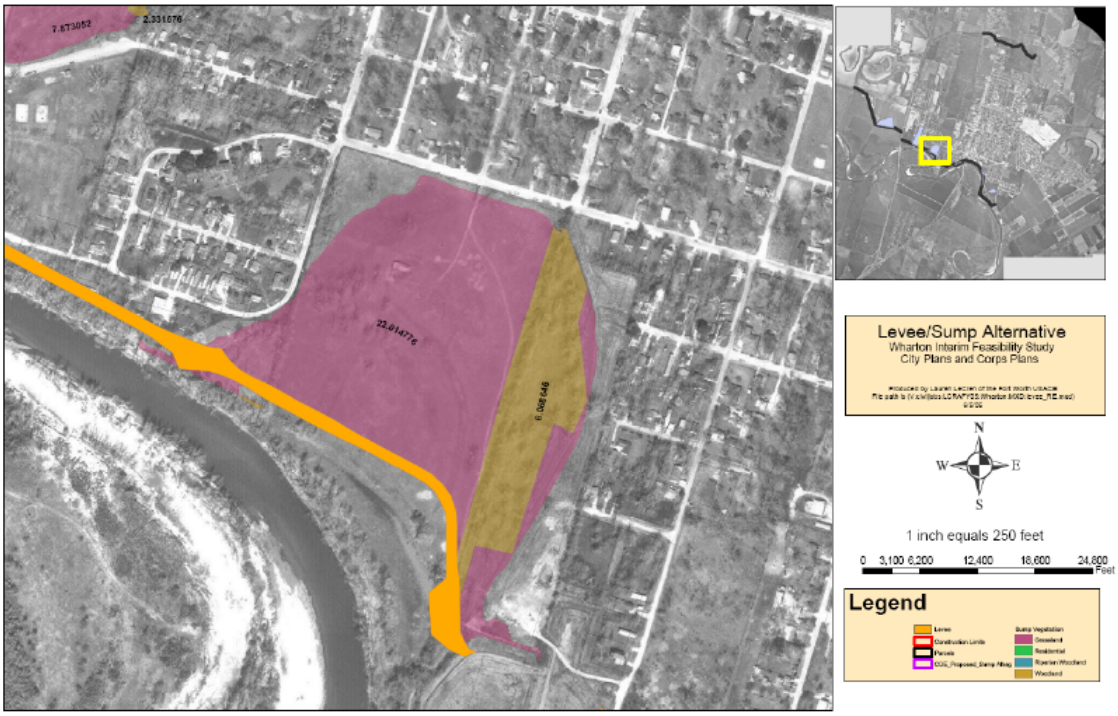

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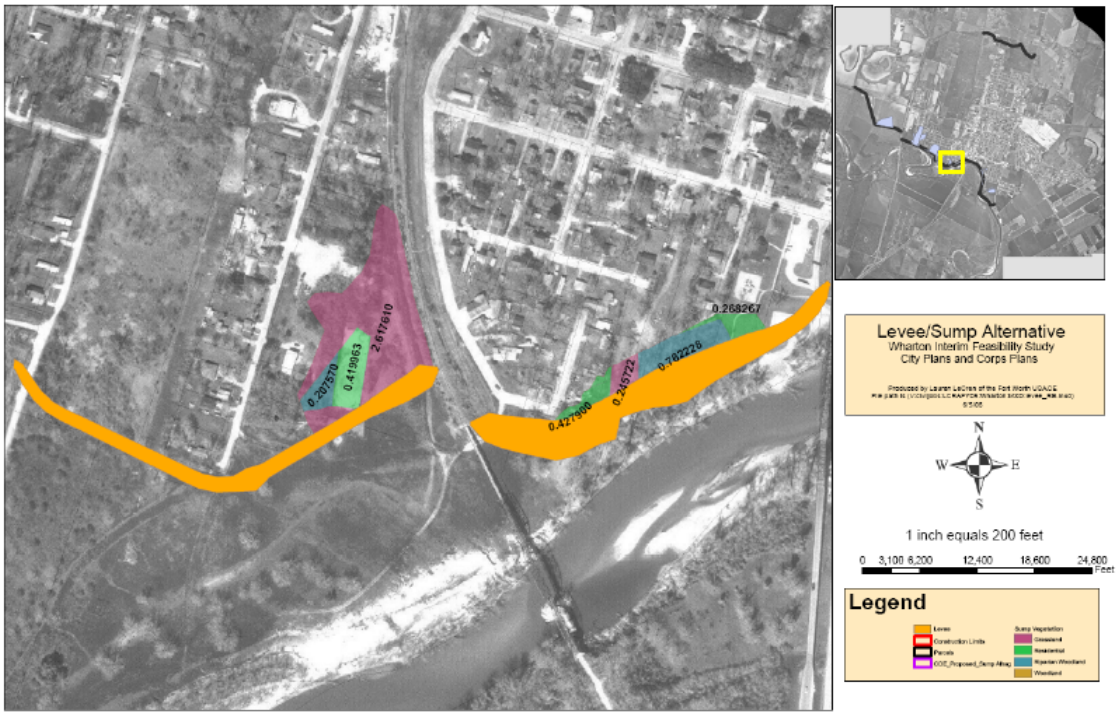

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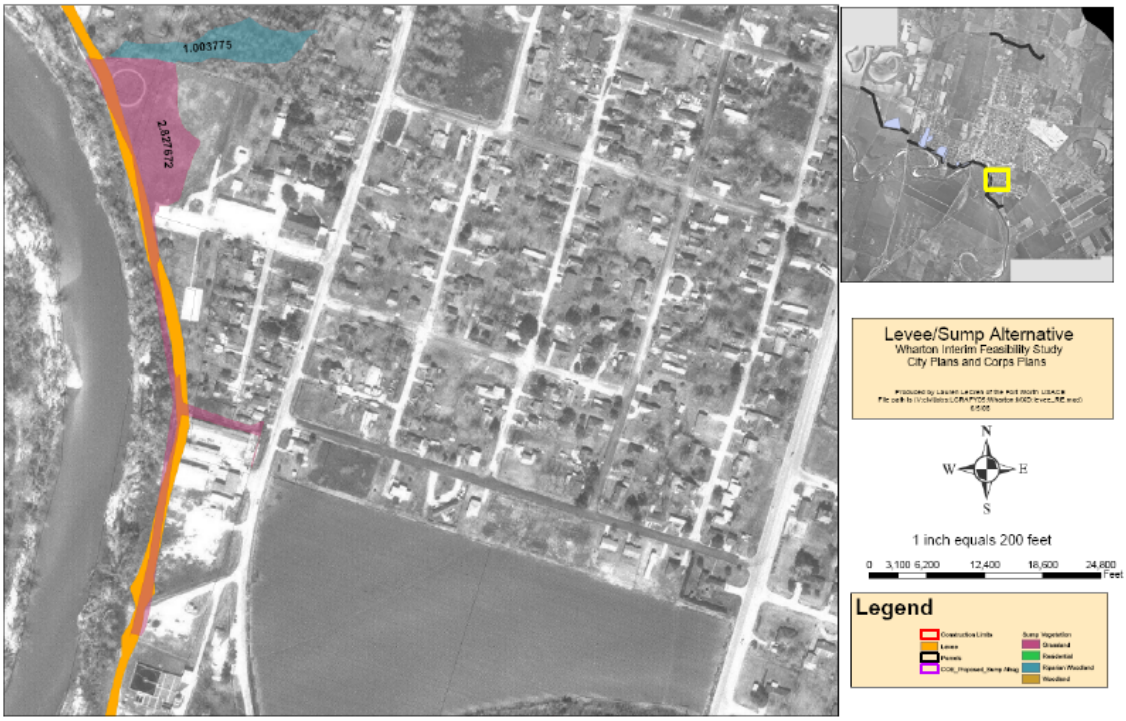

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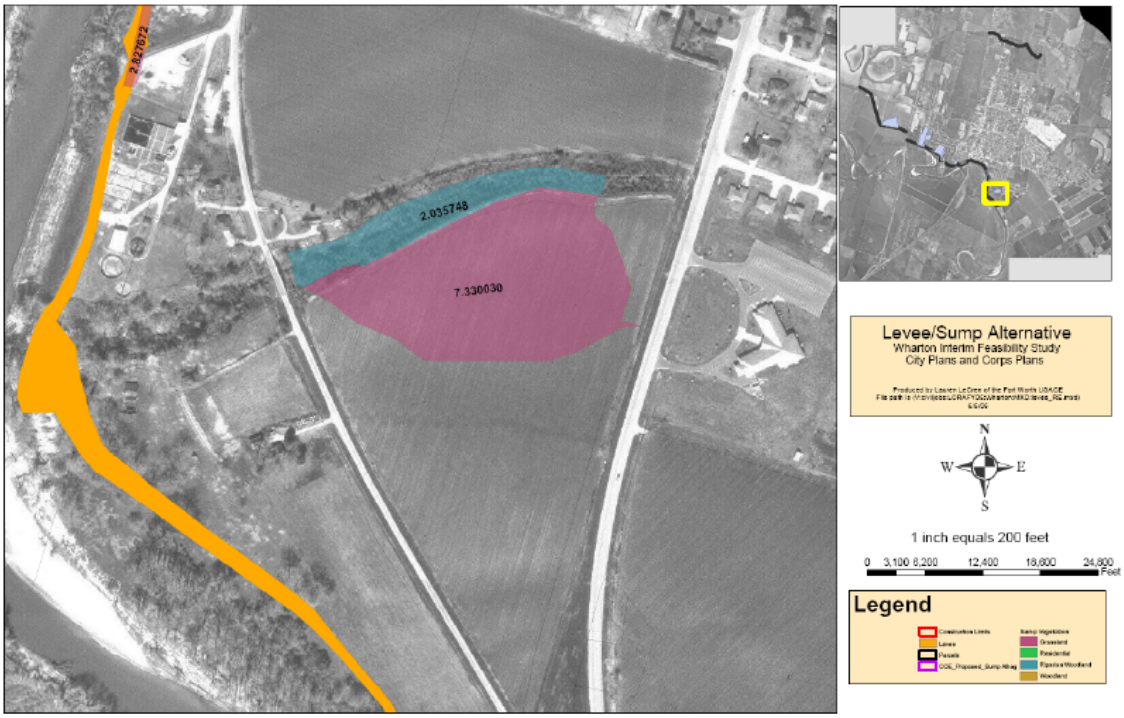

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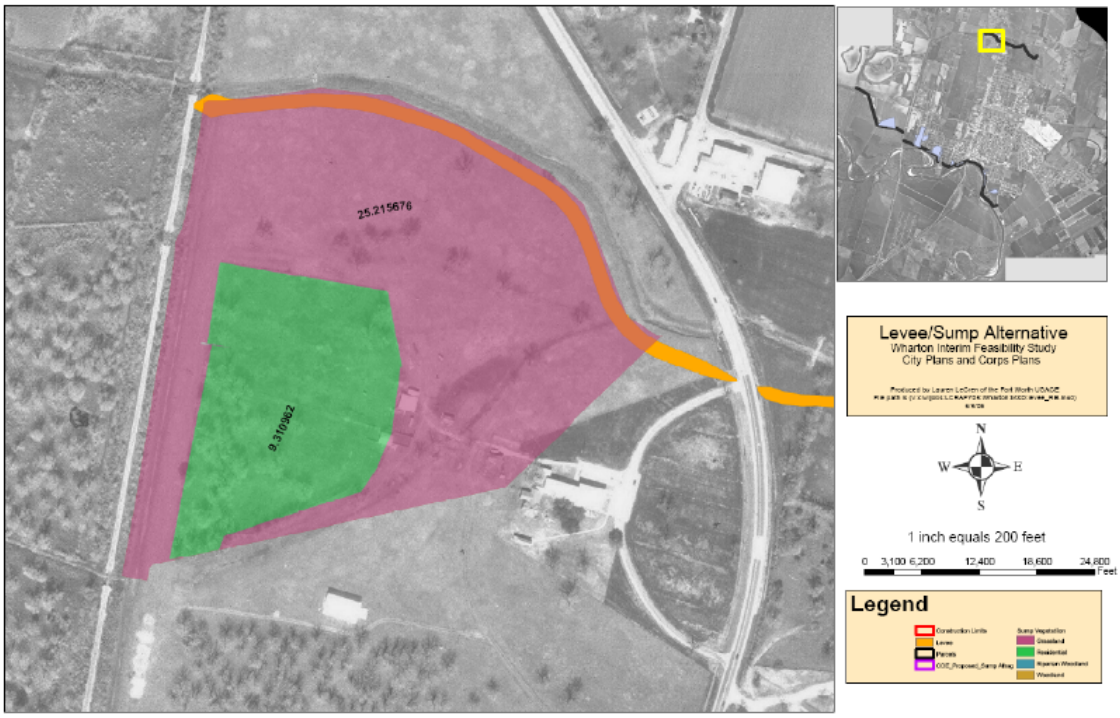

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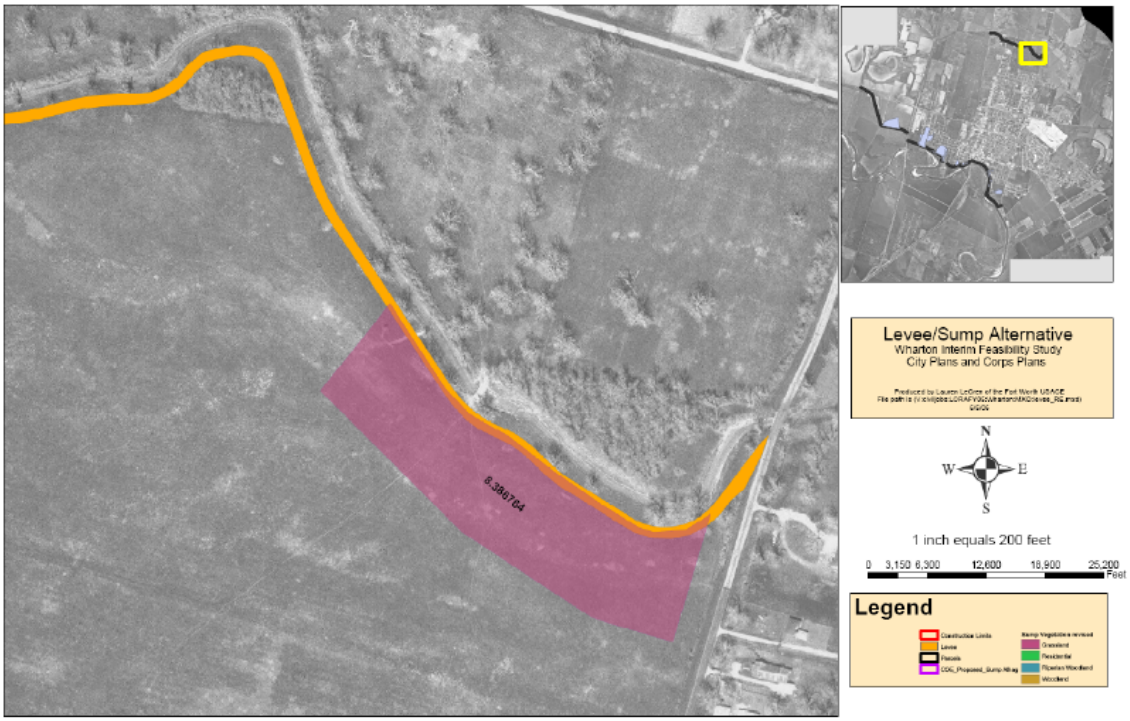

Source: USACE 2006

Appendix B: Coordination with Texas Parks and Wildlife Department

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HOUSTON, TEXAS

October 6, 2006

Mr. Brian Cain
U. S. Fish and Wildlife Service
Clear Lake Ecological Services Field Office
17629 El Camino Real # 211
Houston, Texas 77058

Re: Fish and Wildlife Coordination Act Report for the Wharton Interim Feasibility Study.

Texas Parks and Wildlife Department (TPWD) appreciates the opportunity to review the U.S. Fish and Wildlife Service's (FWS) Fish and Wildlife Coordination Act Report for Wharton Interim Feasibility Study: Phase II of the Lower Colorado River Basin Study.

Overall, TPWD agrees with the information provided in this report. Project design features have been developed that reduce and minimize impacts to fish and wildlife resources. TPWD does agree with the FWS's Recommendations and Conclusions, with the exception of the use of detention basins for mitigation. In general, TPWD does not support the use of detention basins for mitigation of fish and wildlife resources. Traditional detention basins are managed for detaining stormwater runoff and this management use often conflicts with fish and wildlife uses. For example, basins have severe flooding or dry periods rather than natural hydroperiods. Detention basins require excavation to maintain capacity. These management constraints alone inhibit development of climax vegetation communities. TPWD recommends that no mitigation be performed within the detention basins and that placing habitat in long-term conservation is a more effective tool for compensating unavoidable impacts.

The use of Habitat Evaluation Procedure (HEP) analysis to justify the use of detention basins for impacts to fish and wildlife resources is contradictory to the philosophy of using these habitat assessment tools. HEP analyses uses subjective criteria to evaluate habitat quality, therefore the project team must be in consensus when developing this tool and how it is to be applied on the project. The time devoted to the project team to complete this project is inconsistent with the level of coordination required to comply with the intent of the Fish and Wildlife Coordination Act. As a result, the Department is not sure that the assessment tool was applied properly and that the results of the HEP analysis are accurate. TPWD is concerned that habitat assessment tools will continue to be misused to justify inadequate mitigation.

The Corps of Engineers continues to emphasize ecosystem restoration as a tool in its approach to projects. The continued disassociation between traditional

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project objectives and restoration will always be a barrier to multi-purpose projects that could provide a broad spectrum of public services that include: their primary purpose (flood mitigation in this case), fish and wildlife resources, public recreation, and water quality benefits.

Thank you again for the opportunity to review the document. If you have any questions please do not hesitate to call me at (281) 534-0131.

Sincerely,

for

Jarrett (Woody) Woodrow, Jr.
Coastal Conservation Program Director
Coastal Fisheries Division