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Sam Watson
Project Manager
U.S. Army Corps of Engineers
2000 Fort Point Road
Galveston, Texas 77550

Re: Prospectus for Houston/Conroe Mitigation Bank
Located in Liberty County, Texas

Dear Mr. Watson:

Attached please find the Mitigation Banking Prospectus for the Houston/Conroe Mitigation Bank located near Splendora, Liberty County, Texas. The bank consists of approximate 17,840 linear feet of stream restoration/enhancement, 150 acres of riparian buffer, and 97 acres of wetland restoration/preservation. The bank is part of a 3,505 acre tract of land which contains the potential for an additional 1,000 acres of wetland creation/restoration/enhancement. These additional opportunities may be included within the proposed mitigation bank at a later date pending USACE verification of the wetland delineation. The attached prospectus only pertains to the currently proposed 247 acre wetland and stream mitigation bank.

Should you have any questions, or require additional information, please do not hesitate to give me (936.366.0800) or Neil Boitnott (903.525.9838) with RS&H a call.

Sincerely,

William B. Goodrum, Sr.

Cc: Mr. Neil Boitnott (Reynolds Smith and Hills, Inc.)
Dr. Steve Jones (Meanders River Restoration, Inc.)

Houston/Conroe Mitigation Bank Prospectus

MITIGATION BANK SPONSOR:

Forestar (USA) Real Estate Group, Inc
6300 Bee Cave Road
Building 2, Suite 500
Austin, Texas 78746

SUBMITTAL TO:

United States Army Corps of Engineers
Galveston District
2000 Fort Point Road
Galveston, Texas 77550



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1.0 INTRODUCTION

This document has been submitted for consideration as a compensatory mitigation bank known as the Houston/Conroe Mitigation Bank (HCMB or hereafter referred to as the “Bank”) by the Bank Sponsor, Forestar (USA) Real Estate Group, Inc. (Sponsor). The intent of the Prospectus for the HCMB is to provide detailed spatial, environmental and legal information for the United States Army Corps of Engineers, Galveston District (USACE or the “District”) and Interagency Review Team (IRT) for evaluation of the potential of the HCMB as a compensatory mitigation bank.

The Bank consists of an approximate 17,840 linear feet (247 acre (Ac)) wetland and stream mitigation bank, located within the United States Geological Survey (USGS) East Fork San Jacinto 8-digit Hydrologic Unit Code (HUC) 12040103, near Splendora, Liberty County, Texas (Figures 1 & 2). The 247 Ac Bank is part of a larger approximate 3,530 Ac parcel of land which Forestar is the current owner (Figure 3). Additional mitigation opportunities have been identified within this larger tract outside of the boundaries of the currently proposed Bank. These additional mitigation opportunities may be included within the proposed mitigation bank at a later date as an additional phase; however this document currently only pertains to the previously identified 247 Ac bank.

The following paragraphs will not only provide the necessary information to assist in determining the suitability/need for the proposed Bank, but also act as the foundation for the formal Mitigation Banking Instrument (MBI). The Sponsor will develop and manage the Bank according to the approved banking instrument in order to maintain the integrity of the credited ecological function provided to its end users.

1.1 Location of the Mitigation Bank

The Bank is an approximate 247 Ac tract located east of Splendora, Texas and northeast of Plum Grove, Texas (Figure 1). Specifically, the proposed Bank site is located at Latitude 30.2406° North and Longitude 95.0596° West on the Plum Grove, USGS 7.5 minute quadrangle topographic map. The proposed Bank lies within the USGS’s 8-digit HUC 12040103, which is the East Fork of the San Jacinto River, and is approximately fifteen miles north of Lake Houston.

The Bank’s location would encompass the majority of the headwater region for multiple tributaries to the East Fork of the San Jacinto River and their associated riparian wetlands, specifically, the headwaters to Orange Branch. The East Fork of the San Jacinto River ultimately terminates into Galveston Bay and the Gulf of Mexico.

1.2 Mitigation Bank Purpose

Under directive of the *Compensatory Mitigation for Losses to Aquatic Resources*, it is recommended that approved mitigation banks be the preferred option to replace aquatic resource losses due to permitted, unavoidable impacts within the region. The purpose of the Bank is to provide the IRT with the necessary resources to allow for compensation of authorized/unavoidable impacts of aquatic resources within the Geographic Service Areas of the Bank (as defined in Section 6.0). Specifically, the purpose of the Bank is to provide regional mitigation credits for purchase by the public to meet the need for stream and wetland mitigation credits within the geographic service area of the mitigation bank. Credits generated by the Bank will (a) reduce any uncertainties on behalf of the District when gauging the ecological benefit and success of required mitigation, (b) decrease the time necessary to permit projects with aquatic resource impacts, and (c) reduce the strain on the limited resources of the agencies for review and compliance monitoring for non-bank mitigation credits.

The Bank will ultimately provide general use stream and wetland credits for sale to the public to mitigate for “In-Kind” and limited authorized “Out-of-Kind” unavoidable impacts to aquatic resources as approved by the USACE within the Geographic Service Areas.

1.3 Bank Sponsor Information

The Sponsor is the responsible entity for providing the necessary financial resources, the technical and scientific expertise for the design and implementation, and financial management and long-term maintenance for the Bank. The primary Bank Sponsor contact is:

Sponsor

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2.0 OBJECTIVES OF THE BANK

2.1 Addressing the Functional Needs

The Bank proposes three major objectives which would provide the necessary ecological and hydrological restoration efforts as required by USACE and the IRT. The measurable objectives of the HCMB are to:

1. Restore the natural hydrodynamics through restoration of the natural pattern, profile and dimension of the Orange Branch stream/fluvial system,
2. Preserve, enhance, and restore the native bottomland hardwood forest system within the riparian buffer,
3. Preserve, enhance, and restore the natural ecological condition of the “historical” predominately climax hardwood wetland communities. These areas are currently even-aged planted pine plantation monocultures established through mechanical and chemical site preparation methods. Site specific restoration treatments to restore these hydrologic conditions and ecological plant communities will be designed based on more detailed on-site evaluations.

By restoring the currently degraded, hydrologically impaired systems of Orange Branch, the Sponsor will provide functional hydrological and ecological lift to the stream as well as flora and fauna of the region. The perpetual benefit from the proposed Bank as defined in the sections hereafter would provide long-term ecological gains and sustainability to offset those losses from future permitted developments with authorized impacts.

2.2 Extent of Resources Provided by HCMB

The HCMB consists of a diverse mixture of linear, bottomland hardwood floodplain forests (PFOs), a variety of freshwater emergent marshes (PEM), and open water pond (PUB) areas as classified by Cowardin et al. (1979) (Figure 4). The surrounding lands consist of bottomland hardwood wetlands and intensely managed pine plantation uplands. The proposed Bank in its current, degraded condition contains ±17,840 linear feet of potentially jurisdictional intermittent and ephemeral streams (Table 1). Due to previous land uses, over 50 percent of the Bank’s streams, specifically Orange Branch and its tributaries, have aggraded to the point of the loss of a definable bed and bank channel system. The Bank also contains approximately 247 Ac of the above-referenced wetland systems (Table 2). Over 50-percent of the total wetland acreage have been impaired and diminished of its historical ecological functionality, due to previous agriculture and intensive pine plantation silvicultural activities.

Objectives of the Bank

Table 1: Steam Channels within Bank

Location	Intermittent Stream (In-ft)	Ephemeral Stream (In-ft)	Wetlands Classification of Stream Buffer
Orange Branch Main Stem	1,854	---	OB Floodplain (PFO1A)
Orange Branch East Fork	4,908	1,444	OB Floodplain (PFO1A)
Unnamed Trib. 1 of East Fork	---	1,894	(PEM1A)
Orange Branch West Fork	4,682	2,132	OB Floodplain (PFO1A)
Unnamed Trib. 1 of West Fork	---	752	(PEM1A)
Unnamed Trib. 2 of West Fork	---	174	(PEM1A)
TOTAL (STREAMS)	11,444	6,396	---

Table 2: Wetland Areas within Bank

Existing Wetland Condition	Proposed Activity	Acreage
Pine Plantation Monoculture	Restoration / Enhancement	73.3
Riparian Hardwood	Preservation	23.4
Riparian Corridor	Restoration / Preservation	150.3 ¹
Total		247.0

¹ Riparian corridor acreage is used in determining stream credits and does not qualify for wetland credit generation.

General Need and Technical Feasibility

3.0 GENERAL NEED AND TECHNICAL FEASIBILITY

As noted in more detail in subsequent paragraphs, the Houston Metropolitan area is one of the fastest growing areas in the nation. In addition, according to the current USACE's Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS), it does not appear there are enough currently permitted mitigation banks to provide credits for the anticipated needs of the area.

3.1 The Watershed's Anticipated Needs

The Houston/Conroe/Kingwood, Texas area is one of the most rapidly growing areas in the nation and is listed as having the second largest increase in growth rate percentage over the past decade (+24.2%). Regional analysis indicates that much of the population is emigrating from Harris County to the outlying counties (i.e. Liberty County), which make up the Greater Houston Area (GHA). This is further evidenced by the fact that Forestar's single and multi-family business segments have targeted this area for real estate development initiatives. The Houston-Galveston Area Council's *2025 Regional Growth Forecast* predicts this growth trend to continue through 2025, and at that point, the population of the GHA will surpass a population of 7.6 million residents. Transportation, commercial, industrial, and residential needs surrounding the greater Houston area will be in high demand to keep pace with the projected population growth. These necessary capital improvement projects will likely have unavoidable environmental impacts, which will require in-kind mitigation, particularly in the surrounding areas adjacent to Harris County, Texas.

3.2 Technical Feasibility of Scope of Work

The Bank would provide a combination of mitigation credits within the defined Geographic Service Areas (Figure 2) through commonly applied techniques and methodologies which have documented previous success.

As for the wetland enhancement and restoration efforts, landscape implementations proposed under the HCMB would provide the necessary hydrological regime to promote the restoration of existing, non-functional and otherwise impacted wetlands, and enhance degraded jurisdictional wetlands. A passive approach to the overall enhancement/restoration of the Bank's objective of conservation would be to preserve the Bank site from future developmental activities through legal documentation similar to conservation easements, restrictive covenants, and/or title transfers.

Stream restoration efforts would center on implementation of the natural channel design approach. Accessibility is excellent to all reaches of Orange Branch which is vital to the implementation of the restoration plan.

4.0 BASELINE CONDITIONS OF HCMB

A preliminary site feasibility and resources determination was performed utilizing field surveys and remote-sensing (IR) ortho-imagery, desktop elevation reconnaissance using 7.5 minute USGS topographic information, US Fish and Wildlife Service's (USFWS) National Wetland Inventory (NWI) maps, and Natural Resource Conservation Service (NRCS) soil survey data. The baseline data were compiled into a geo-referenced database system and were delineated based on the scientific interpretation of the data, including elevations and vegetative community signatures, hydric soil delineations, and infrared temperature changes.

Field surveys were conducted to gather on-site information regarding the vegetative community structure, the in-channel stream conditions, and the potential for success from the proposed mitigation activities. The following sections detail the existing site conditions prior to any proposed restorative efforts.

4.1 Vegetation

There are three distinct wetland habitat types that include depressional areas, flats, and riparian areas. The depressional areas are primarily forested and are periodically ponded throughout the year. Forested depressions within the Bank are typically represented by laurel oak (*Q. laurifolia*), Drummond's maple (*Acer rubrum var. drummondii*), Chinese tallow (*Triadica sebifera*), sweetgum, loblolly pine, common buttonbush (*Cephalanthus occidentalis*), and dwarf palmetto (*Sabal minor*). The "Flat" communities are low-lying wetland areas of less than one percent slope and are dominated by laurel oak, loblolly pine, Drummond's maple, Chinese tallow, and dwarf palmetto. These areas are associated with the upper regions of the Orange Branch system. The riparian and floodplain systems associated with Orange Branch consist of a mixture of large pine and hardwoods, including water oak, laurel oak, swamp chestnut oak (*Q. michauxii*), cherrybark oak (*Q. pagoda*), red maple (*Acer rubrum*), sweetgum, Chinese tallow, dwarf palmetto, and various understory species which tolerate moist environments (*Cephalanthus* spp., *Vaccinium* spp., *Viburnum* spp., *Morella* spp., etc.).

Much of the existing wetland habitats located within the bank, particularly in the northern portions, have been altered by previous agriculture and/or intensely managed pine plantation silvicultural practices and do not optimally function as compared to similarly classified reference ecosystems within the region.

4.2 Hydrology

The hydrology of the Bank consists of altered forested wetlands and intermittent and ephemeral streams, making up the Orange Branch drainage system. Orange Branch flows in a southwesterly direction and ultimately flows into the East Fork of the San Jacinto River south of Plum Grove, Texas. The East Fork of the San Jacinto merges with the West Fork and flows into Lake Houston and ultimately into Galveston Bay.

The 2008 Houston Galveston Area Council (HGAC) Light Detecting and Ranging (LiDAR) data verify the drainage patterns as described by the USGS topographic maps but with greater detail. The digital terrain model and 1-foot contours derived from the LiDAR data clearly define the boundaries of the north-south trending ridge as well as the depressions depicted on the USGS topographic maps. In addition, the LiDAR data reveals the micro-topography of the flats and mounds occurring across the site.

The Federal Emergency Management Agency's (FEMA) Flood Insurance Rate map for the project area indicates the 100-year floodplain extends approximately 0.4 miles along Orange Branch in the southern portion of the site (Figure 6). The remainder of the project site is shown to be located within Zone X. Zone X is described as those areas outside the 0.2 percent chance of annual flooding.

Given the historic land use, agricultural and silvicultural practices have adversely affected the natural hydrologic regime of this area. Specifically, the insertion of elevated roadways and drainage ditches, the alteration to topographic elevations via bedding and/or roller chopping site preparation, and the alteration of the native vegetation for intensive pine plantation management have altered the natural hydrology of the Bank. Sedimentation from overland sheet flow and/or reduced flow pulsations from hydrologic impediments have caused depositional aggradation within the stream channels of the East Fork, West Fork and mainstem of Orange Branch to the point where the natural channel is virtually non-existent. In addition, an existing channel in the upper West Fork has been channelized and converted to a drainage ditch. On the East Fork there are reaches of remnant channel that are classified as an aggraded C Rosgen stream type (Appendix B). In the valley reaches where the channel is non-existent due to aggradation, the flow occurs as sheet flow through the forested wetland valleys. Photo documentation of these areas may be referenced in Appendix A.

Due to the effects of the hydrologic alterations and native vegetative community manipulation, the existing streams and wetlands are not functioning as optimal sources of natural conveyances, aquatic storage, aquatic filters, and/or suitable aquatic habitat associated the natural and unaltered stream system.

Baseline Conditions of HCMB

4.3 Soils and Topography

Property elevations of the Bank are relatively low relief, sloping generally to the south towards the floodplains of Orange Branch. The 7.5' quadrangle (Plum Grove) lists the property elevation to be consistently between 95'-120' feet North American Vertical Datum (NGVD) contours above Mean Sea Level (MSL) (Figure 5).

A review of two versions of the Natural Resources Conservation Service (NRCS) Soil Survey of Liberty County, Texas, the 1996 published version and the 2009 unpublished update, indicates the site contains five (5) soil mapping units (Figure 6). The mapping unit Kirbyville fine sandy loam, 0-2% slopes (30) are moderately well drained soils located on the rise of flats. Sorter loam, 0-1% slopes (51) are poorly drained soils located on flats. Soils mapped as Sorter-Dallardsville complex, 0-1% slopes (52) are poorly drained soils located on the inter-mounds of flats containing mound/inter-mound complexes. Dallardsville are moderately well drained soils located on pimple (Mima) mounds of flats containing mound/inter-mound complexes. The Splendora fine sandy loam, 0-2% slopes (54) are somewhat poorly drained soils located on the foot slopes and base slopes of hills. Hatliff soils, of the Hatliff-Pluck complex frequently flooded (241), are moderately well drained soils located along floodplains. Pluck soils, of the Hatliff-Pluck complex frequently flooded, are poorly drained soils located along floodplains.

Table 3 provides a summary of some of the characteristics of each of the individual soil mapping units shown to occur within the project site boundaries, and may be geospatially referenced in Figure 6.

Table 3: Characteristics of Individual Soil Mapping Units within Bank

Soil Mapping Unit (Map Symbol)	SOIL CHARACTERISTICS					
	Drainage Class	Flooding	Potential for Wetland Plants	Potential for Wetland Wildlife	Hydric Soil Component ¹	Hydric Soil Inclusions ²
Kirbyville fine sandy loam, 0-2% slopes (#30)	Poorly	None	Fair	Fair	No	Sorter (5%) Waller (5%)
Sorter loam, 0-1% slopes (#51)	Poorly	None	Good	Good	Sorter (85%)	---
Sorter-Dallardsville complex, 0-1% slopes	Poorly	None	Good/Fair	Good/Fair	Sorter (55%)	---
Splendora fine sandy loam, 0-2% slopes (#54)	Somewhat Poorly	None	Fair	Fair	No	Sorter (5%)
Hatliff-Pluck complex, frequently flooded	Moderately Well/Poorly	Occasional/ Frequent	Poor/Good	Poor/Fair	Pluck	---

¹ Hydric Soils List of Texas (USDA-SCS,12/30/93)

² Soil Survey of Liberty County, Texas (USDA-SCS, 1991).

Baseline Conditions of HCMB

Soils of the proposed Bank are classified as loamy fluviomarine depositions from the early Pleistocene era. These depositions are characterized as having a loamy surface layer of siliceous or smectitic mineralogy (USDA, 2006). According to the Geologic Atlas of Texas map (Beaumont sheet), the majority of the site lies in an outcrop area of the Lissie Formation along the western side of a north-south trending ridge dividing the East Fork San Jacinto River and Tarkington Bayou. The Pleistocene age Lissie Formation conformably overlies the Willis Formation and includes the age-equivalent Montgomery and Bentley Formations. The formation is considered fluvial with suggested thicknesses from approximately 200 feet (Barnes, 1992) to 1,000 feet in near coast sections (Doering 1935). The Upper Lissie (formerly Montgomery Formation in southeast Texas) consists of clayey sands with silt, and minor amounts of siliceous gravel of granule and pebble sizes. The upper portion may be locally calcareous and commonly contains concretions of calcium carbonate, iron oxide, and iron-manganese oxides in the zone of weathering. The lower Lissie (formerly Bentley Formation in southeast Texas) contains slightly coarser gravel and is non-calcareous with slightly more abundant iron/iron-manganese concretions. In outcrop, surface expression is fairly flat and featureless, except for numerous, rounded, shallow depressions and pimple mounds (Barnes 1992). Soils that exhibit the primary hydric soil indicator A16: Coastal Prairie Redox occur mainly on depressions and portions of the inter-mound landforms of the Lissie Formation.

4.4 Threatened and Endangered Species

Review of the literature provided by the Texas Parks and Wildlife Department (TPWD) indicates several listed federally threatened and endangered species may be present (or potentially present) within the proposed Bank site. The Red-Cockaded woodpecker (*Picoides borealis*) is listed as a federally endangered species, and clusters have been identified in old growth pine stands north of the Bank's location, particularly in the Davy Crockett, Angelina and Sam Houston National Forests. However, no documentation was discovered of populations being observed or listed in the Trinity River Wildlife Refuge, which is just east of the Bank site. The high percentage of young pine plantation and pine plantation less than 29 years of age do not currently provide suitable nesting habitat for the Red-Cockaded woodpecker.

Other species of notable concern (including State-listed species, candidate species, etc.) which may be present on the Bank site based on habitat type, species distributions and migratory patterns include the Peregrine Falcon (*Falco peregrinus*), bald eagle (*Haliaeetus leucocephalus*), swallow-tailed kite (*Elanoides forficatus*), white-faced ibis (*Plegadis chinhi*), wood stork (*Mycteria americana*), Rafinesque's big-eared bat (*Corynorhinus rafinesquii*), Southeastern myotis bat (*Myotis austroriparius*), alligator snapping turtle (*Macrochelys temminckii*), and the timber rattlesnake (*Crotalus horridus*).

Baseline Conditions of HCMB

The Bank, as proposed, would provide a beneficial wildlife corridor and complimentary wildlife habitat to the nearby Sam Houston National Forest, the Lake Houston Park & Wildlife Area, and USFWS's Trinity River Wildlife Refuge. Further, it would provide permanent/perpetual benefit to the State-listed species that benefit from aquatic, mesic, and riparian habitat dominated by climax hardwood species (e.g. alligator snapping turtle, timber rattlesnake, white-faced ibis, wood stork, as well as the big-eared bat and southeastern myotis bat).

4.5 Cultural Resources Assessment

In an effort to comply with the National Historic Preservation Act of 1966, a cultural resource records review was conducted by Power Engineers, Inc. The findings of this records review indicated that there are no recorded archeological sites, State Archeological Landmarks, Historic Texas Cemeteries, cemeteries or National Register of Historic Places-listed properties located within the boundaries of the HCMB. Please see Appendix D for a copy of this records review.

There are no documented sites associated with the Bank, but if any archeological objects are discovered during the course of this process, the Sponsor will disseminate any and all information to the Texas Historical Commission for further review.

5.0 ECOLOGICAL SUITABILITY OF HCMB

5.1 Physical Suitability of Bank

The proposed Bank is a viable option to provide a successful compensatory mitigation option for future authorized aquatic resource impacts within the Houston-Conroe area. The physical location of the proposed Bank site would not only act as an undisturbed buffer to the headwater region of important aquatic resources such as the San Jacinto River and Lake Houston, but would also benefit the regional watershed by providing a greenway corridor for the utilization of wildlife with the adjacent federal, state, and local lands like Trinity Wildlife Refuge, Sam Houston National Forest, and Lake Houston Park/Wildlife Area.

The physical properties (topographic, geologic, and hydrologic) of the Bank are optimal to support restoration and enhancement efforts as historic anthropogenic manipulation has altered and degraded the ecological and hydrological functionality of the site. By restoring the natural hydroperiods of the degraded wetlands and increasing the stream's functionality through natural morphology restoration, the benefit to local flora and fauna would be enhanced and restored to pre-disturbance conditions. From a Nature Serve ecological classification prospective, the plant community present before disturbance can be described as the following:

The predominant plant association within the bank consisted of the West Gulf Coastal Plain Small Stream and River Forest. The association likely present in pre-disturbance conditions and currently partially intact is classified as the *Pinus taeda* - *Liquidambar styraciflua* - *Quercus (nigra, phellos)* / *Carpinus caroliniana* - *Crataegus marshallii* Stream Bottom Forest. This community is located along floodways and drainages within the bank.

The second plant association is the Upper West Gulf Flatwoods Forest Upper West Gulf Coastal Plain Diamondleaf Oak Flatwoods Forest. The dominant association is classified as the *Quercus laurifolia* - *Quercus phellos* - *Quercus nigra* / *Viburnum dentatum* - (*Sebastiania fruticosa*) / *Carex glaucescens* Upper West Gulf Flatwoods Forest or Upper West Gulf Coastal Plain Diamondleaf Oak Flatwoods Forest. This community is located in the swales or low, wet areas throughout the Bank.

The third plant association is the West Gulf Coastal Plain Mima Mound Forest. It occurs on the drier mounds within the surrounding low areas. This plant association is described as the *Quercus alba* - *Carya alba* / *Symplocos tinctoria* / *Mitchella repens* Forest or West Gulf Coastal Plain Mima Mound Forest. This plant community is located on small mima mounds within floodplains or flatwoods environments of the Upper West Gulf Coastal Plain of Arkansas, Texas, and possibly Louisiana. These mounds are

Ecological Suitability of HCMB

topographically higher than the surrounding landscape and are found on somewhat coarser-textured soils.

5.2 Chemical Suitability of Bank

The proposed Bank would be a suitable option for the restoration of the chemical processes within the watershed, through the spatial and temporal hydrologic enhancements which would allow for an improvement in the natural chemical processes associated with wetlands, floodplains, and naturally buffered stream systems. Long-term protection for the quality of the waters of the State would be gained through proposed water attention recharge areas with natural infiltration, improved chemical processes from reestablished hydric soil conditions, nutrient acquisition and sequestration, and reduced habitat and water quality impairments from surface water runoff through the restoration of the stream channel/system and enhancements of riparian buffer areas within HCMB.

The proposed Bank is located within the watershed of the East Fork of the San Jacinto River. This segment of the East Fork of the San Jacinto River (from its confluence with Caney Creek just north of Lake Houston upstream to Walker County) is currently listed as a Category 5a segment on the 2008 303(d) impaired waters for bacterial impairment. While currently there are no active agricultural operations contributing to bacterial impairment (i.e. cattle ranching) at the proposed Bank site, the potential for future degradation and/or impairment without the Bank is present due to the existing condition of the stream as well as the high potential for change in land use and/or ownership. The restoration and enhancement of Orange Branch would improve the stream's natural ability to both filter potential pollutants through an improved riparian buffer area as well as improve the hydraulics of the stream system.

The proposed Bank would also provide treatment to existing waters through the restoration, enhancement, and preservation of approximately 247.0 Ac of wetlands and riparian zones. Where applicable, These areas will be restored to their natural ecological condition of predominately climax hardwood community, including a diversity of gap phase conditions consisting of early succession species such as pine and sweetgum in a seedling/scrub/sapling state. These areas are currently even-aged planted pine plantation monocultures established through mechanical and chemical site preparation methods. Site specific restoration treatments to restore these hydrologic conditions and ecological plant communities will be designed based on more detailed on-site evaluations.

5.3 Biological Suitability of Bank

The proposed Bank is suitable to provide biological enhancements to habitat and utilization for the aquatic, herpetofauna, and terrestrial communities. Based on the Bank's proposed location, the Bank would be located twelve miles west of the Trinity River National Wildlife Refuge and would be ten miles northeast of the 5,000 Ac Lake Houston Wilderness Park. The Sam Houston National Forest would be approximately 25 miles to the northwest of the proposed Bank location. The adjacency of the proposed Bank site to these natural areas would provide a linkage for wildlife utilization between these aforementioned areas and would increase the opportunities for native fauna to rest, nest, forage, and breed in these areas. It would also provide additional "stop-over" habitat for neo-tropical migrant songbirds due the bank's forested condition and proximity to the coast and other protected natural areas noted above.

On-site, the proposed hydrologic and vegetative communities vertical structure improvements would create a more diverse habitat regime, increase the linear edge-effect by expanding the boundaries between wetlands and uplands, and provide more aquatic resources for nesting, breeding and feeding of many wildlife species. The proposed in-stream channel restoration would also provide an aquatic environment at times of discharge that would benefit aquatic organisms such as benthic invertebrates and fishes as well as also provide an enhanced habitat for upland, herpetofauna, and avian wildlife that would utilize the site.

Since the contribution to overall biodiversity from the herpetofauna and avian fauna segment of the wildlife population is asserted to be extraordinary from this site, a preliminary survey was conducted. A complete copy of the report will be provided in the Bank Prospectus. The survey included four primary methods: turtle trapping with hoop nets, aquatic amphibian trapping with minnow traps, walking searches, and road cruising. Field herpetologists expended approximately 140 person hours via walking and vehicular transects. Walking searches consisted of walking through habitat and turning any sort of natural or manmade debris likely to house amphibians and reptiles. Hoop nets were out for 26 trap nights (13 traps x 2 nights) and minnow traps were out for 36 trap nights. Species by category observed on the bank and those herpetofauna expected to be found in Liberty County are shown below (Tables 4 – 7, respectively).

Ecological Suitability of HCMB

Table 4: Herpetofauna Observed During Herpetofauna and Avian Survey

Amphibians Observed	
Rio Grande Chirping Frog (<i>Syrhophus cystignathoides</i>)	Eastern Narrowmouth Toad (<i>Gastrophryne carolinensis</i>)
Gray Tree Frog (<i>Hyla versicolor</i>)	Gulf Coast Toad (<i>Bufo nebulifer</i>)
Green Tree Frog (<i>Hyla cinerea</i>)	Red-spotted Newt (<i>Notophthalmus viridescens</i>)
Squirrel Tree Frog (<i>Hyla squirella</i>)	Bronze Frog (<i>Rana clamitans</i>)
Cricket Frog (<i>Acris crepitans</i>)	Bullfrog (<i>Rana catesbeiana</i>)
Spring Peeper (<i>Pseudacris crucifer</i>)	Cajun Chorus Frog (<i>Pseudacris fouquettei</i>)
Southern Leopard Frog (<i>Rana sphenoccephala</i>)	
Reptiles Observed	
Red-eared Slider (<i>Trachemys scripta</i>)	Louisiana Milksnake (<i>Lampropeltis triangulum</i>)
Alligator Snapping Turtle (<i>Macrolemys temmincki</i>)	Yellow-bellied Watersnake (<i>Nerodia erythrogaster</i>)
Broad-headed Skink (<i>Eumeces laticeps</i>)	Diamondback Watersnake (<i>Nerodia rhombifer</i>)
Ground Skink (<i>Scincella lateralis</i>)	Broad-banded Watersnake (<i>Nerodia fasciata</i>)
Green Anole (<i>Anolis carolinensis</i>)	Ribbon Snake (<i>Thamnophis proximus</i>)
Brown Snake (<i>Storeria dekayi</i>)	Buttermilk Racer (<i>Coluber constrictor</i>)
Rough Earth Snake (<i>Virginia striatula</i>)	Copperhead (<i>Agkistrodon contortrix</i>)
Texas Rat Snake (<i>Elaphe obsoleta</i>)	Cottonmouth (<i>Agkistrodon piscivorus</i>)

Table 5: Avian Species Observed During Herpetofauna and Avian Survey

Birds Observed			
Great Blue Heron	Mourning Dove	Yellow-throated Vireo	Pine Warbler
Great Egret	Yellow-billed Cuckoo	Red-eyed Vireo	Prothonotary Warbler
Snowy Egret	Barred Owl	Blue Jay	Kentucky Warbler
Little Blue Heron	Chuck-will's-widow	American Crow	Common Yellowthroat
Cattle Egret	Ruby-throated Hummingbird	Carolina Chickadee	Hooded Warbler
Green Heron	Red-bellied Woodpecker	Tufted Titmouse	Yellow-breasted Chat
Black Vulture	Downy Woodpecker	Carolina Wren	Summer Tanager
Turkey Vulture	Pileated Woodpecker	Blue-gray Gnatcatcher	Northern Cardinal
Cooper's Hawk	Acadian Flycatcher	Northern Mockingbird	Indigo Bunting
Red-shouldered Hawk	Great Crested Flycatcher	Northern Parula	Brown-headed Cowbird
Peregrine Falcon	White-eyed Vireo	Yellow-throated Warbler	Least Bittern (E. Keith observation)

Ecological Suitability of HCMB

Table 6: Order Odonata Observed During Herpetofauna and Avian Survey

Odonates Observed	
Ebony Jewelwing (<i>Calopteryx maculata</i>)	Faded Pennant (<i>Celithemis ornata</i>)
Swamp Spreadwing (<i>Lestes vigilax</i>)	Amanda's Pennant (<i>Celithemis amanda</i>)
Turquoise Bluet (<i>Enallagma divagans</i>)	Halloween Pennant (<i>Celithemis eponina</i>)
Orange Bluet (<i>Enallagma signatum</i>)	Eastern Pondhawk (<i>Erythemis simplicicollis</i>)
Rambur's Forktail (<i>Ischnura ramburii</i>)	Little Blue Dragonlet (<i>Erythrodiplax miniscula</i>)
Citrine Forktail (<i>Ischnura hastata</i>)	Golden-winged Skimmer (<i>Libellula auripennis</i>)
Fragile Forktail (<i>Ischnura posita</i>)	Slaty Skimmer (<i>Libellula incesta</i>)
Southern Sprite (<i>Nehalennia integricollis</i>)	Painted Skimmer (<i>Libellula semifasciata</i>)
Blue-tipped Dancer (<i>Argia tibialis</i>)	Great Blue Skimmer (<i>Libellula vibrans</i>)
Swamp Darner (<i>Epiaeschna heros</i>)	Roseate Skimmer (<i>Orthemis ferruginea</i>)
Comet Darner (<i>Anax longipes</i>)	Blue Dasher (<i>Pachydiplax longipennis</i>)
Common Green Darner (<i>Anax junius</i>)	Eastern Amberwing (<i>Perithemis tenera</i>)
Ashy Clubtail (<i>Gomphus lividus</i>)	Common Whitetail (<i>Plathemis lydia</i>)
Bayou Clubtail (<i>Arigomphus maxwellii</i>)	Carolina Saddlebags (<i>Tamea carolina</i>)
Stillwater Clubtail (<i>Arigomphus lentulus</i>)	Calico Pennant (<i>Celithemis elisa</i>)
Arrowhead Spiketail (<i>Cordulegaster obliqua</i>)	

Avian species observed along the transects were also recorded. Although this was only one “seasonally limited” survey effort, twenty nine (29) herpetofauna species out of the 70 species known to occur (or to formerly occur) in Liberty County were identified. In addition, 44 bird species and 31 Odonata species were observed. The main limitation of this survey was the duration. Different amphibians and reptiles are more or less active in different seasons, and the lack of salamanders is one example of this. Because they are more likely observed in the winter breeding months, numbers of salamanders recorded were less than anticipated. This is also true of some of the frog species. Although members of Odonata found on the property were recorded, any future survey efforts of macroinvertebrates will likely include Ephemeroptera, Plecoptera, and Trichoptera orders among others.

Ecological Suitability of HCMB

Table 7: Herpetofauna species known from Liberty County

Lesser Siren (<i>Siren intermedia</i>)*	Three-toed Amphiuma (<i>Amphiuma tridactylum</i>)*
Marbled Salamander (<i>Ambystoma opacum</i>)*	Smallmouth Salamander (<i>Ambystoma texanum</i>)*
Tiger Salamander (<i>Ambystoma tigrinum</i>) (This species has not been seen in Texas since the mid 90's)	Southern Dusky Salamander (<i>Desmognathus auriculatus</i>)
Dwarf Salamander (<i>Eurycea quadridigitata</i>)*	Red-spotted Newt (<i>Notophthalmus viridescens</i>)
Rio Grande Chirping Frog (<i>Syrrophus cystignathoides</i>)	Cricket Frog (<i>Acris crepitans</i>)
Gray Tree Frog (<i>Hyla versicolor</i>)	Green Tree Frog (<i>Hyla cinerea</i>)
Squirrel Tree Frog (<i>Hyla squirella</i>)	Strecker's Chorus Frog (<i>Pseudacris streckeri</i>)
(Extirpated from much of its range in east Texas)	Cajun Chorus Frog (<i>Pseudacris fouquettei</i>)
Spring Peeper (<i>Pseudacris crucifer</i>)	Gulf Coast Toad (<i>Bufo nebulifer</i>)
Woodhouse's Toad (<i>Bufo woodhousii</i>)*	Bullfrog (<i>Rana catesbeiana</i>)
Bronze Frog (<i>Rana clamitans</i>)	Southern Leopard Frog (<i>Rana sphenoccephala</i>)
Pickerel Frog (<i>Rana palustris</i>)*	Eastern Narrowmouth Toad (<i>Gastrophryne carolinensis</i>)
Great Plains Narrowmouth Toad (<i>Gastrophryne olivacea</i>)	Alligator Snapping Turtle (<i>Macrolemys temminckii</i>)
Common Snapping Turtle (<i>Chelydra serpentina</i>)*	Mississippi Mud Turtle (<i>Kinosternon subrubrum</i>)*
Razorback Musk Turtle (<i>Sternotherus carinatus</i>)*	Chicken Turtle (<i>Deirochelys reticularia</i>)*
Mississippi Map Turtle (<i>Graptemys pseudogeographica</i>)	Diamondback Terrapin (<i>Malaclemys terrapin</i>)
River Cooter (<i>Pseudemys concinna</i>)*	Three-toed Box Turtle (<i>Terrapene carolina</i>)*
Ornate Box Turtle (<i>Terrapene ornata</i>)	Red-eared Slider (<i>Trachemys scripta</i>)
Smooth Softshell Turtle (<i>Apalone mutica</i>)	Spiny Softshell Turtle (<i>Apalone spinifera</i>)*
American Alligator (<i>Alligator mississippiensis</i>)*	Green Anole (<i>Anolis carolinensis</i>)
Texas Horned Lizard (<i>Phrynosoma cornutum</i>) Extirpated in most of east and central Texas.	Fence Lizard (<i>Sceloporus undulatus</i>)*
Five-lined Skink (<i>Eumeces fasciatus</i>)*	Broad-headed Skink (<i>Eumeces laticeps</i>)
Ground Skink (<i>Scincella lateralis</i>)	Six-lined Racerunner (<i>Cnemidophorus sexlineatus</i>)*
Slender Glass Lizard (<i>Ophisaurus attenuatus</i>)	Buttermilk Racer (<i>Coluber constrictor</i>)
Texas Rat Snake (<i>Elaphe obsoleta</i>)	Mud Snake (<i>Farancia abacura</i>)*
Eastern Hog-nosed Snake (<i>Heterodon platirhinos</i>)*	Speckled King Snake (<i>Lampropeltis getula</i>)*
Louisiana Milksnake (<i>Lampropeltis triangulum</i>)	Coachwhip (<i>Masticophis flagellum</i>)*
Green Watersnake (<i>Nerodia cyclopion</i>)	Yellow-bellied Watersnake (<i>Nerodia erythrogaster</i>)
Broad-banded Watersnake (<i>Nerodia fasciata</i>)	Diamondback Watersnake (<i>Nerodia rhombifer</i>)
Rough Green Snake (<i>Opheodrys aestivus</i>)*	Gulf Crayfish Snake (<i>Regina rigida</i>)*
Graham's Crayfish Snake (<i>Regina grahami</i>)*	Brown Snake (<i>Storeria dekayi</i>)
Flatheaded Snake (<i>Tantilla gracilis</i>)	Ribbon Snake (<i>Thamnophis proximus</i>)
Eastern Garter Snake (<i>Thamnophis sirtalis</i>)	Rough Earth Snake (<i>Virginia striatula</i>)
Coral Snake (<i>Micrurus tener</i>)*	Copperhead (<i>Agkistrodon contortrix</i>)
Cottonmouth (<i>Agkistrodon piscivorus</i>)	Timber Rattlesnake (<i>Crotalus horridus</i>)*
Pygmy Rattlesnake (<i>Sistrurus miliarius</i>)*	

* Denotes species expected to occur on the site from other "season" surveys

6.0 GEOGRAPHIC SERVICE AREAS

The Sponsor is requesting the designation of the Bank as a unique, high-quality wetland and stream restoration area to provide compensatory mitigation credits for the Lake Livingston, Lake Houston and Galveston Bay geographic areas. The Bank is located within the East Fork San Jacinto Watershed (8-digit HUC 12040103), which is a sub-basin of the San Jacinto Watershed (6-digit HUC 120401).

The following guidelines were utilized in the designation of primary and secondary service areas. All service area designations are limited to the Galveston District of the USACE. The primary service area is the Lake Houston Watershed comprised of three (3) 8-digit HUCs within the San Jacinto River Basin (6-digit HUC 120401). The secondary service area is any 8-digit HUC that is adjacent to the primary service area AND eventually flows into Galveston Bay. Figure 2 illustrates the proposed service area. For proposed mitigation ratios refer to Section 6.1.

The Primary Service Area is the Lake Houston Watershed which includes the following sub-basins (8-Digit HUCs):

- East Fork San Jacinto (8-digit HUC 12040103)
- West Fork San Jacinto (8-digit HUC 12040101)
- Spring (8-digit HUC 12040102)

The Secondary Service Area includes the following sub-basins (8-digit HUCs) adjacent to the primary service area:

- Buffalo-San Jacinto (12040104)
- Lower Trinity-Kickapoo (HUC 12030202)
- Lower Trinity (HUC 12030203)
- North Galveston Bay (12040203)

The Secondary Service Area as proposed would only provide “In-Kind” compensatory mitigation unless otherwise approved by the USACE due to the fact that portions of the area are outside the South Central Plains (Piney Woods) Ecoregion. The rationale is outlined below.

6.1 Rationale for Service Area Determination

The MBI will provide more detailed description, documentation and references that will further support the following general description of the Bank service area rationale. Example references include NRCS soil classification; Rosgen stream classification/type; EPA, USACE, and USGS stream classification systems; USFWS stream classification and ecological classification systems; State Natural Heritage, Nature Serve, & TNC

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ecological classification systems/databases, and USFS ecological classification systems.

The Geographic Service Areas were determined by utilizing the watershed approach combined with ecological, hydrological, and economic considerations for compensatory mitigation. It is also relevant that the Bank is a combination of stream and wetland mitigation credits therefore watershed, hydrological connectivity, and ecological “In Kindness” are all equally critical and justified rationale considerations.

The following sections will demonstrate the rationale for determination of the service area for HCMB in these ways:

- Service areas were chosen based on a watershed approach as all watersheds within the proposed service area flow into the same waterbodies: Lake Houston (Primary) and Galveston Bay (Secondary).
- The unique and critical nature of forested wetlands and streams found within the HCMB.
- Ecological “in-kindness” and significance extends beyond the bounds of the mapped ecoregion boundaries, especially with regard to stream type.
- The necessity of the proposed service area to the economic feasibility of the proposed bank. In order to establish a mitigation bank of this scope, a significant financial investment is necessary, while demand for mitigation credits is largely uncertain. The final mitigation banking rule published in April of 2008 states “We believe it is necessary to allow economic factors to be taken into account, so that the environmental benefits of third-party mitigation discussed in §§ 332.3(a) and (b) [§§ 230.93(a) and (b)] can be realized” (P. 19654). Based on the significant financial investment necessary and the uncertainty of the mitigation credit market, it is imperative that the HCMB service area is approved as proposed for the economic viability of the bank.

6.1.1 Primary Service Area – Lake Houston Watershed

The primary service area is the Lake Houston watershed which consists of the East Fork San Jacinto Sub-basin (8-digit HUC 12040103) (resident watershed), the West Fork San Jacinto Sub-basin (8-digit HUC 12040101), and the Spring Sub-basin (8-digit HUC 12040102); which are sub-basins of the San Jacinto River Basin (6-digit HUC 12401). The primary service area is proposed to provide an estimated 1:1 ratio for “In-Kind, In-Basin” Mitigation Credits. The rationale for the designation of these three 8-digit HUCs as the Primary Service Area, is significantly based on the following: 1) being hydrologically within the same 6-digit HUC “AND” draining into the same major water body (Lake

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Houston) as the resident watershed, 2) having ecological units/systems identical, or very similar to, that of the resident watershed, 3) has streams of the identical classification (hydrological and geomorphological) AND exhibiting the same hydrologic engineering modifications as the resident watershed, which pose the same or greater need for appropriate/desired mitigation solutions, and 4) being essential for the economic viability of the proposed HCMB.

Watershed Approach

The Federal Compensatory Mitigation Rule, which was published in April of 2008, requires that a watershed approach is utilized in determining compensatory mitigation needs. “The ultimate goal of a watershed approach is to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites.” Using a watershed approach ensures that compensatory mitigation project are located within watersheds where they will be most beneficial to water resources and where they can appropriately compensate for past and future degradations to water resources. If an appropriate watershed plan is available, the watershed approach should be based on that plan.

On April 6, 2011 the TCEQ adopted Total Maximum Daily Loads (TMDLs) for indicator bacteria in the watersheds of the Lake Houston Area. The purpose of a TMDL is to determine the amount of a particular pollutant, in this case bacteria, that a water body can receive and still meet the state water quality standards. The mitigation goals of the HCMB are consistent with goals of the TMDLs which are to improve the water quality of Lake Houston and its tributaries. The restoration and enhancement goals of the HCMB will provide water quality benefits to the Lake Houston Watershed in the following ways:

1. Long-term protection of the mitigation bank through a third party conservation easement will ensure that land conversion to industrial or agriculture uses will not occur within the mitigation bank.
2. Restoration and enhancement of the streams and wetlands located within the HCMB will provide additional buffering capacity to filter and reduce pollutant loads through reestablishment of healthy, functioning wetlands, riparian corridors and stream channels.

“Lake Houston serves as source water for a large population, and therefore elicits special attention for water quality protection efforts” (HGAC, 2010). An excerpt from the Water Quality Planning Guide for the 13-County Houston-Galveston Area clearly shows the need to restore, enhance, and protect aquatic resources within the Lake Houston Watershed.

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Ecological Significance and Land Use

The proposed HCMB site will restore, enhance, and preserve ecologically sensitive and significant aquatic resources including ephemeral, intermittent, and perennial streams, as well as bottomland forested riverine wetlands. The majority of the Lake Houston Watershed is situated within the South Central Plains (35) level III ecoregion. Also known as the Pineywoods, the South Central Plains were once dominated by a mix of pine and hardwood forests, but much of the region has now been converted to pine plantations. Other predominant land uses within the region include agricultural pastureland, oil and natural gas production, as well as ever-increasing residential and commercial developed land expanding from Houston and its suburbs.

In a report published by Texas Parks and Wildlife Department (Land and Water Resources Conservation and Recreation Plan, 2005), the Pineywoods was listed as a secondary priority for conservation efforts. This ecoregion is not ranked higher (primary) due to the relatively high percentage of publicly owned lands and lands under wildlife management plans. The Pineywoods are however significantly threatened due to high population growth, land fragmentation and land conversion. The report states “for instance the consolidation of timber interests around the country has led to sales of large tracts in east Texas which may be converted to other uses”. This is certainly the case with the tract of land which the HCMB resides. Initial plans for the bank were to include an additional approximate 1,000 Ac of wetland creation, restoration, enhancement and preservation. However, due to the time and budget constraints associated with establishing a mitigation bank, and a potential willing land buyer, the land outside of the existing bank boundary was offered for sale. That land sale is not final to date and this land could still be included within the bank if favorable feedback is received from the IRT.

Also of significance within the HCMB and surrounding area are riparian habitats. The TPWD report recognized that “despite the many positives associated with the ecoregion scale, the very real and often critical conservation needs of some habitats, communities and species can be missed by this approach.” The report went on to say “that native prairies and grasslands, riparian habitats that cross ecoregion boundaries are the most important to wildlife habitats, contain the highest number of rare species, and are often the most threatened” (TPWD, 2005). This clearly demonstrates the connectivity and ecological significance of aquatic resources that cross ecoregion boundaries. Based on these facts, the primary service area, in limited areas, extends beyond the bounds of the resident ecoregion (South Central Plains).

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Economic Viability

The approval of the primary service area as proposed is essential to the economic viability of the HCMB. According to the final mitigation banking rule published in April of 2008, economic factors should be taken into account when determining service area designation. Economic viability for a mitigation bank can be addressed by looking at the current and future demand for credits as well as how those demands will be met.

The demand for compensatory mitigation credits can be a difficult market to quantify; however by looking at broad regional scale market drivers such as population growth and infrastructure development, one can get a general idea of potential credit demand. The Houston metropolitan area is the 6th largest metropolitan area in the country and is home to the 3rd most populated county (Harris) and 4th most populated city in the country (GCEDD, 2009). According to 2010 US Census Bureau Data, the counties within the Houston metropolitan area experienced significant population increases from 2000. Montgomery County, which is centrally located within the primary service area, experienced a 55% population increase from 2000 to 2010. Additional population increases by counties fully or partially within the primary service area can be found in Table 8 below.

Table 8: Population and growth of counties within primary service area

County	Population in 2010	Percent Change Since 2000
Harris	4,092,425	+20.3%
Liberty	75,643	+7.8%
Montgomery	455,746	+55.1%
San Jacinto	23,384	+18.6%
Walker	67,861	+9.9%
Waller	43,205	+32.2%

In addition to population growth in the general vicinity of the proposed HCMB, there are several local infrastructure expansion projects that represent a threat to aquatic resources within the general area, a demand for compensatory credits that currently may not be met within existing credit markets, and will provide an avenue for additional development and land conversion.

One such infrastructure expansion project is Segment H of the Grand Parkway outer loop roadway project. Current proposed alignments have the Grand Parkway crossing I 69 roughly 10-miles south of the HCMB and will come as close as 6-miles. Although most compensatory mitigation needs for TXDOT related projects are met through TXDOT sponsored mitigation banks, the

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expansion of infrastructure and resulting access into previously isolated areas will likely spur additional residential and commercial development.

The future demands for compensatory mitigation, as outlined in previous paragraphs, may not be met if the HCMB is not permitted as proposed, particularly in regards to stream mitigation credits. There are currently two mitigation banks providing stream credits to the Galveston District (Katy Prairie Stream Mitigation Bank, and Mill Creek Mitigation Bank). The service areas for these banks do not service the East Fork San Jacinto Sub-basin (HUC 1204103), and no primary service areas for the previously mentioned banks service the West Fork San Jacinto Sub-basin (HUC 1204101). This shows a clear need for additional stream credits within these sub-basins, and with the anticipated credit demand in other portions of the primary service area of the HCMB, potential credit sell-out of existing banks is possible before the HCMB is permitted.

The current needs of wetland compensatory mitigation are likely being met within the HCMB primary service area; however, there are no currently permitted banks that have primary service areas within the East Fork San Jacinto Sub-basin (HUC 1204103) or the Spring Sub-basin (12040102). This combined with the anticipated future needs of the area clearly demonstrates the need for the HCMB to have a primary service area as proposed.

6.1.2 Secondary Service Area

The Secondary Service Area includes the following sub-basins (8-digit HUCs) adjacent to the primary service area, Buffalo-San Jacinto (12040104), Lower Trinity-Kickapoo (HUC 12030202), Lower Trinity (HUC 12030203), and North Galveston Bay (12040203). The Buffalo-San Jacinto is a sub-basin of the San Jacinto River Basin (6-digit HUC 120401), the Lower Trinity-Kickapoo and Lower Trinity are sub-basins of the Lower Trinity River Basin (6-digit HUC 120302), and the North Galveston Bay is a sub-basin of the Galveston Bay-Sabine Lake Basin (6-digit HUC 12040). The rationale for this secondary service area designation is significantly based on the following: 1) being comprised of the 8-digit HUCs adjacent to the primary service area, and flowing into the same common waterbody (Galveston Bay), 2) ecosystems identical, or similar to, that of the resident watershed, 3) has streams of the identical classification (hydrological and geomorphological) AND exhibiting the same hydrologic engineering modifications as the primary service area, which pose the same or greater need for appropriate/desired mitigation, and 4) being essential for the economic viability of the proposed HCMB.

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Watershed Approach

The secondary service area was chosen using a watershed approach. The Federal Compensatory Mitigation Rule, which was published in April of 2008, requires that a watershed approach is utilized in determining compensatory mitigation needs. Using a watershed approach ensures that compensatory mitigation project are located within watersheds where they will be most beneficial to water resources and where they can appropriately compensate for past and future degradations to water resources. If an appropriate watershed plan is available, the watershed approach should be based on that plan.

The TCEQ is in the process of developing four different TMDLs for the Houston Ship Channel and Galveston Bay areas to address toxins such as Dioxins, PCBs and Nickel. While the goals for the HCMB will not directly address these toxins, the long-term protection of the mitigation bank through a third party conservation easement will ensure that land conversion to industrial or agriculture uses will not occur within the mitigation bank. The development of these TMDLs also shows a need to restore, enhance, and preserve aquatic resources that flow into Galveston Bay.

There will also be a direct hydrologic connection between the Trinity River and Lake Houston with the construction of the Luce Bayou Interbasin Transfer Project (SWG-2009-00188). The purpose of the project is to transfer 450,000 acre-feet per year from the Trinity River to Lake Houston. A draft Environmental Impact Statement (EIS) has been posted for public review and comment. Project completion will depend on timing of construction and permit acquisition, but some estimates have the project completed by 2020.

Ecological Significance

As previously stated, the proposed HCMB site will restore, enhance, and preserve ecologically sensitive and significant aquatic resources including ephemeral, intermittent, and perennial streams, as well as bottomland forested riverine wetlands. The secondary service area is dissected primarily by two ecoregions, the South Central Plains (Pineywoods) and the Western Gulf Coastal Plains.

The South Central Plains were once dominated by a mix of pine and hardwood forests, but much of the region has now been converted to pine plantations. Other predominant land uses within the region include agricultural pastureland, oil and natural gas production, as well as ever-increasing residential and commercial developed land expanding from Houston and its suburbs. In a report

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published by Texas Parks and Wildlife Department (Land and Water Resources Conservation and Recreation Plan, 2005), the Pineywoods was listed as a secondary priority for conservation efforts. The Pineywoods are significantly threatened due to high population growth, land fragmentation and land conversion. The report states “for instance the consolidation of timber interests around the country has led to sales of large tracts in east Texas which may be converted to other uses”.

The Western Gulf Coastal Plains consists of a flat strip of land running adjacent to the Gulf of Mexico. This ecoregion is characterized by its relatively flat topography and mainly grassland vegetation. Dissecting this ecoregion however are numerous riverine floodplains and low terrace deposits which were historically characterized by bottomland forests. Much of the forested land has been converted to cropland and pasture within these areas. The presence of these floodplains and previously forested riverine systems further justifies our inclusion of this ecoregion within portions of the secondary service area. Impacts will be mitigated for in-kind at the proposed HCMB, so impacts to tidal marshes, estuaries, bays etc. will not be compatible with compensatory mitigation credits offered by the HCMB unless authorized by the IRT. Additionally, the stream channels present in much of the Western Gulf Coastal Plain exhibit the same low gradient characteristics as streams within the Flatwoods Level IV ecoregion in which the proposed HCMB resides.

Economic Viability

The approval of the secondary service area as proposed is essential to the economic viability of the HCMB. According to the final mitigation banking rule published in April of 2008, economic factors should be taken into account when determining service area designation. Economic viability for a mitigation bank can be addressed by looking at the current and future demand for credits as well as how those demands will be met.

As previously stated, the Houston Metropolitan area is one of the largest and fastest growing areas in the country. See Table 9 below for the population and growth based on 2010 census data for counties within or partially within the proposed secondary service area.

Geographic Service Areas

Table 9: Population and growth of counties within secondary service area

County	Population in 2010	Percent Change Since 2000
Chambers	35,096	+34.8%
Fort Bend	585,375	+65.1%
Hardin	54,635	+13.7%
Harris	4,092,425	+20.3%
Liberty	75,643	+7.8%
Polk	45,413	+10.4%
San Jacinto	23,384	+18.6%
Trinity	14,585	+5.8%
Walker	67,861	+9.9%
Waller	43,205	+32.2%

In addition to population growth in the general vicinity of the proposed HCMB, there are several local infrastructure expansion projects that provide a threat to aquatic resources within the secondary service area, a demand for compensatory credits that currently may not be met within existing credit markets, and will provide an avenue for additional development and land conversion.

One such infrastructure expansion project is the Grand Parkway outer loop roadway project. Current proposed alignments have the Grand Parkway passing through significant portions of the proposed secondary service area. Although most compensatory mitigation needs for TXDOT related projects are met through TXDOT sponsored mitigation banks, the expansion of infrastructure and resulting access into previously isolated areas will likely spur additional residential and commercial development.

The future demands for compensatory mitigation, as outlined in previous paragraphs, may not be met if the HCMB is not permitted as proposed, particularly in regards to stream mitigation credits. There are currently two mitigation banks providing stream credits to the Galveston District (Katy Prairie Stream Mitigation Bank, and Mill Creek Mitigation Bank). The service areas for these banks do not service the Lower Trinity-Kickapoo (HUC 12030202), Lower Trinity (HUC 12030203) or North Galveston Bay (HUC 12040203) sub-basins. This shows a clear need for additional stream credits within these sub-basins. Additionally, with the anticipated credit demand in other portions of the secondary service area of the HCMB, potential credit sell-out of existing banks is possible before the HCMB is permitted.

The current needs of wetland compensatory mitigation are likely being met within the majority of the HCMB secondary service area; however, there are no

Geographic Service Areas

currently permitted banks that service the North Galveston Bay sub-basin (HUC 12040203). The proposed HCMB will provide a direct ecological benefit to Galveston Bay by protecting and enhancing aquatic resources that flow into the bay. Additionally, the outlet point for the San Jacinto River, which the HCMB flows into, and Cedar Bayou (main waterbody for the North Galveston Bay subwatershed) are less than 3-miles apart at the confluence with Galveston Bay. This combined with the anticipated future needs of the area clearly demonstrates the need for the HCMB to have a secondary service area as proposed.

7.0 Establishment and Operations of HCMB

7.1 Proposed Bank Type

The Bank would provide both stream (linear foot) and wetland (unit-acre) type credits for USACE-authorized “In-Kind” and approved “Out-of-Kind” aquatic resource losses within the defined Geographic Service Areas. The proposed Bank would provide credits to the general public (private and public sectors) for general use. The Sponsor requests the right to allow “Out-of-Basin” credit sales if sufficient evidence of compensatory mitigation is provided and is approved by the USACE.

7.2 Site Selection and Evaluation

The establishment of the Bank incorporates a tiered approach to provide the most effective and efficient methodologies to identify and evaluate suitable Bank sites, which would provide the highest yields of ecological functional gain. Foremost, a landscape-level geographic information system (GIS) evaluation and technical investigations (soils, hydrology, floral/faunal community assessments, rare and endangered species, critical habitat, etc.) were performed to determine site selection and the potential feasibility. After the site selection process identifies a potential area, an in-depth analysis to determine the Bank’s restoration/enhancement/preservation potential is completed. (All previously mentioned actions have been completed with the submission of this PROSPECTUS).

7.3 Credit Determinations (Proposed)

In order to provide a unified method of accounting for the offsets and impacts of aquatic resources an accounting system with quantifiable values of the resources will be employed. “Credits” will be determined and generated to account for the positive ecological gain (or “benefit”) from aquatic resources while “Debits” would be generated from authorized impacts (or ecological loss) throughout the Geographic Service Area from authorized Section 10/404 impacts/permits. In order to equitably offset these authorized losses, a functional assessment will score the value of credits and debits equally, as to compensate for any losses. Depending on the type and method of credit generated (wetland restoration vs. wetland preservation) differing ratios may be derived. These ratios would be a mutual determination between the IRT and the Bank Sponsor and would be finalized within the Mitigation Plan of the Final MBI.

The compensation ratio methodology will take into account multiple variables. Foremost, raw land has an established value that is strongly dependent on various economic and regional pressures. Local economic conditions and susceptibility for future development can alter the end value of compensation for individual credits.

Establishment and Operation of HCMB

Furthermore, the quantitative success of the restoration efforts may also affect the value of the credits, in as such that there are optimal, sub-optimal, and other index categories which may affect the credit compensation calculations. All variables will be discussed and agreed upon prior to the initiation of the MBI by both the Sponsor and the IRT.

7.3.1 Functional Assessment Methodologies (Stream and Wetlands)

Given the diversity of the Bank's aquatic resources, a multi-faceted assessment methodology will be employed to fully evaluate the existing aquatic resources available on-site. Credit determinations will be divided and scored based on the three ecological types: riverine riparian, depressional wetlands, and/or in-stream channel. Separate functional assessment methodologies would be applied to each specific area to provide a valid scoring determination.

The HCMB would propose using the District's Standard Operating Procedure for an Interim Stream Condition Assessment for all in-stream channels and associated riparian buffer credits associated with the restoration of Orange Branch. It is the Bank Sponsor's understanding that the Galveston District considers this functional assessment a multi-level assessment that takes into account the size of the watershed and drainage characteristics to be restored. The Bank would propose a Level I assessment (for intermittent streams) which would evaluate the conditions and functionality of the channel, the riparian buffers (up to 200' from each bank), and in-stream habitat as well as any anthropogenic alterations to the channel or hydrologic regime.

As for the floodplains along the riverine systems, HCMB would propose to assess the effectiveness of the restorative efforts for the wetlands located along the floodplains and/or floodways located along the riparian corridors of Orange Branch in accordance to the Interim SWG Forested Riverine iHGM. This hydrogeomorphic model (HGM)/assessment focuses on three main categories which will evaluate (a) the functional lift to the hydrologic regime of the area, (b) the maintenance of the wildlife habitat of the area, and (c) the maintenance of the nutrient cycling ability of the area.

For any remaining areas generating credits (i.e. depressional wetlands not associated with a riverine riparian area or any restored/created wetlands), the Bank would propose to use the Texas Interim Functional Assessment Procedure: Gulf Coast Depressional Wetlands West of Houston. This assessment also focuses on three main categories which will evaluate (a) the functional lift to the hydrologic regime of the area, (b) the maintenance of the nutrient cycling ability of the area, and (c) the maintenance of the wildlife habitat of the area.

Establishment and Operation of HCMB

These evaluations would conceptually determine ecological lift from any improvements over time, and proposed annual monitoring strategies would verify the success of the criteria. Once a quantifiable value of ecological lift has been determined, a unit ratio (linear feet or acre) would be determined based on the anticipated ecological gain from the Mitigation Plan. Both entities (Sponsor and the IRT) would have the option to revise the credit values depending on the results of the annual monitoring evaluations if sufficient evidence warrants an adjustment.

7.3.2 Proposed Credit Release Schedule

The Bank Sponsor is requesting the proposed Credit Release Schedule as outlined in Table 10 based on the Bank's projected milestones of establishment and operations. This credit release schedule is synonymous with release schedules previously authorized under prior mitigation banking prospectuses and final banking instruments.

Table 10: Proposed Credit Release Schedule

Task Completion	Verification Metric	Credit Release (%)
Task 1: Preconstruction	Execution of MBI ¹	30%
Task 2: Construction	USACE-IRT Approved Inspection	40%
Task 3: Yr 1 Monitoring	Yr 1 Mon. Report to IRT	5%
Task 4: Yr 2 Monitoring	Yr 2 Mon. Report to IRT	5%
Task 5: Yr 3 Monitoring	Yr 3 Mon. Report to IRT	5%
Task 6: Yr 4 Monitoring	Yr 4 Mon. Report to IRT	5%
Task 7: Yr 5 Monitoring	Yr 5 Mon. Report to IRT	10%
Total:		100%

¹ -Task 1 includes the execution of the MBI, IRT's approval of Mitigation Plan, delivery of the financial assurances, documentation of a recorded conservation easement, and delivery of the title option to the IRT.

7.4 Accounting Information (Proposed)

The Bank Sponsor, Forestar, will be the responsible party for the management of the compensatory mitigation credit accounting system that would document all transactions of the credits generated under the Bank. All credit and debit transactions would be recorded in a ledger database and submitted to the appropriate agencies (i.e. IRT) upon sale/receipt.

Establishment and Operation of HCMB

7.5 Mitigation Plan Development

The Bank Sponsor will develop a Mitigation Plan for IRT approval which details the proposed establishment, operations, and other mechanisms involved with the permitting of a compensatory mitigation bank. The Mitigation Plan would also include a detail of the restoration activities and routine maintenance activities for the Bank, including measurable, detailed monitoring requirements with performance standards and specific adaptive management strategies to insure long-term sustainability of the Bank. The Final Mitigation Plan will be submitted to the IRT during the submission of the final MBI.

As a preliminary plan, stream restoration/enhancement activities will involve natural channel morphology restoration and in-stream enhancements based on the Rosgen approach to improve water quality, aquatic habitat, and restore natural hydro-periods to the area. Wetland restoration activities will include restoring the altered hydrology combined with restoration of the natural hardwood and mixed hardwood/pine ecology of the site. This includes removal of mono-cultured pine plantations that were established using mechanical and chemical site preparation treatments. Hardwood re-establishment will be accomplished using a combination of replanting and natural regeneration. To ensure adequate hardwood seedling establishment/survival as well as minimize threats of invasive species sufficient regeneration density will also be incorporated into planting/survival specifications.

7.6 Monitoring and Reporting (Proposed)

In order to provide documentation of success of the restorative efforts, the Bank Sponsor will perform routine monitoring of the ecological conditions of the proposed Bank Site. Specifically, periodic reassessments of functional value of the site's hydrology, vegetative community stabilization, and wildlife utilization would provide data for trend analysis to evaluate the success (or trending success) of the Bank. The monitoring stations, parameters for assessment, and the frequency of the assessment will be established in the Mitigation Plan approved by the IRT.

7.6.1 Performance Standards

Performance standards will be developed describing, at a minimum, the standards of success based on the proposed mitigation activities. Specifically, the performance standards would include documentation of the recorded conservation easement or other protective measurements, the discontinuance of incompatible surrounding land uses, demonstrable improvements in hydrologic inundation/hydroperiods and water quality chemistry, and/or improvements in the biological communities as defined by stream/wetland condition indices. These

Establishment and Operation of HCMB

performance standards will be finalized and approved under the final MBI submitted to the IRT.

7.6.2 Monitoring Schedule (Proposed)

The monitoring schedule and frequency proposed for the Bank will include annual assessments for a minimum of five years, per the criteria established in the USACE Guidance Letter (08-03), Minimum Requirements for Compensatory Mitigation Projects involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources. This proposed schedule will reduce the risk of adverse site conditions that could limit the success potential of the Bank, yet maintain an efficient monitoring schedule. Rapid response for the implementation of an adaptive management plan will provide greater success potential for the Bank, and thereby reduce the USACE's risk considerations.

7.6.3 Reporting

The reporting process is an invaluable component in maintaining effective communication between the Bank management entity (i.e. the Sponsor) and the regulatory agencies. While it doesn't constitute a replacement for compliance inspections, it will provide the necessary information to the review agencies to monitor the progression of the Bank site as it develops to the desired target resources.

All monitoring reports submitted to the IRT will be in compliance with the *Minimum Requirements for Compensatory Mitigation Projects involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources*. The Annual Monitoring Reports will include an evaluation of restoration and enhancement activities to insure that those activities are meeting (at a minimum) the performance standards defined in the final MBI. Any recommendations for future evaluations or permit modifications congruent to the regulatory guidance will be included within these reports when appropriate. Reports will be submitted to the IRT review team by 31 January of the first of the following year for each of the five-year monitoring periods.

7.7 Financial Assurances (Proposed)

The Sponsor, Forestar, would be the primary responsible party for the financial assurances of the Bank. These assurances would be of sufficient substance to insure that the proposed compensatory mitigation would be successfully completed in a manner consistent with the performance standards agreed upon by the IRT and the Bank Sponsor. The type of assurance (escrow account, casualty insurance, letter of

Establishment and Operation of HCMB

credit, or other appropriate instrument) will be determined by the IRT and the Bank Sponsor, and clearly identified in the final MBI. Any financial instrument will be in place prior to commencement of any permitted activity associated with the Houston/Conroe Mitigation Bank.

Ownership and Long-Term Management of HCMB

8.0 OWNERSHIP AND LONG-TERM MANAGEMENT OF HCMB

The Sponsor is proposed to be the official “Owner” and Sponsor of the Bank throughout the duration of permitting, development and restoration phases, and the establishment of the long-term management program. As a condition of the Compensatory Rule, it is the primary responsibility of the Sponsor to provide a comprehensive long-term management strategy to insure the longevity of the ecological benefit generated from the proposed Bank.

8.1 Site Protection

Since mitigation credits are being sold to third-party entities with the understanding of perpetual conservation, legal documentation of both credit sales and long-term perpetuity are important factors in the process of establishing a mitigation banking site. A Conservation Easement or legally-binding equivalent will act as a real estate instrument to ensure the land would remain in a state of conservation for perpetuity. A copy of a draft Conservation Easement will be provided as a reference of the legal documentation intended to be implemented.

8.2 Sustainability

The primary long-term strategy of the Bank is self-sustainability with relatively low maintenance. This management strategy is directly linked to the development stage of the mitigation banking process, particularly in the design and establishment of the Bank. Natural stream channel design and increased natural flood attenuation would provide these ecological benefits with minimal routine maintenance or attention after their establishments.

The Sponsor recognizes that some Adaptive Management strategies may need to be addressed based on previous knowledge and experiences with other mitigation bank scenarios. If the proposed Bank is underperforming and is not meeting the proposed performance standards, the Sponsor will provide additional management strategies to address the ecological benefit. These strategies will be defined in the final MBI, but may include prescribed burn management, riparian buffer vegetative management, or easement enforcement actions.

8.3 Transferability

If the Sponsor requests transfer of ownership and operations of the Bank the Sponsor recognizes that such a transfer would require supplying the pertinent third-party entity information to the IRT. Further, the IRT retains the right to approve, and/or modify any agreements to transfer the Bank from the Sponsor to another entity or organization.

Qualifications of Sponsor

9.0 QUALIFICATIONS OF SPONSOR

The Sponsor has been actively involved in the development of successful aquatic mitigation sites throughout the southern United States for over the past decade. The Sponsor has prior experiences in selecting high-quality sites with excellent potential for restoration success. By employing accomplished designers and regional technical experts, the success rate for these banks has been unprecedented. The table below highlights the projects and locations of the Sponsor's experience with compensatory mitigation banking.

Table 11: Sponsor's Mitigation Type Experience, Project History, and Bank Status

Project	State	Year Initiated	Status	Mitigation Type	Credits/Acres/Feet
Tower Road	GA	1995	Monitoring Year 2	Stream	33,000 Credits
Tower Phase II	GA	2011	Design/Permitting	Stream & Wetland	TBD
Messer Creek	GA	2011	Design/Permitting	Stream & Wetland	TBD
Good Neighbor Creek	GA	2009	Permitted (6/2012)	Stream	470,000 Credits
Cochran's Creek	GA	2009	Permitted 2010/Purchased 2012	Stream	212,000 Credits
Tallapoosa	GA	2012	Design/Permitting	Stream & Wetland	TBD
Houston/Conroe Mitigation Bank	TX	2010	Design/Permitting	Stream & Wetland	TBD
Upper Neches Mitigation Bank	TX	2011	Design/Permitting	Stream & Wetland	TBD
Lufkin Stream Mitigation Bank	TX	2012	Design/Permitting	Stream	TBD
Sabine Investment Project Specific Mitigation	TX	1996	Completed	Wetland	14 Acres
Humble Independent School District Project Specific Mitigation	TX	2005	Completed	Wetland	50 Acres
Silver Stone III Project Specific Mitigation	TX	2006	Completed	Wetland	15 Acres
Home Depot, Lufkin Project Specific Mitigation	TX	2007	Completed	Stream	5,000 Feet
242-LLC Project Specific Mitigation	TX	2008	Completed	Wetland	190 Acres
Lufkin Garden District Project Specific Mitigation	TX	2010	Completed	Stream	5,600 Feet

10.0 ASSURANCE OF WATER RIGHTS

The water rights within the State of Texas are complex as they recognize both right of capture of groundwater, and prior appropriation rights. Texas Water Code, however, does provide the rights to provide in-stream flow for environmental protection (TWC Section 11.02235 and Senate Bill 3, 2007). In an effort to provide protection to the Sponsor, the Texas Commission on Environmental Quality (TCEQ) does reference that the State's climatic conditions do not guarantee any user the rights to surface water if the surface waters are unavailable with inadequate rainfall and spring flows.

Given the variety of enhancement opportunities to multiple areas throughout the project site, the Sponsor proposes to restore ecological value to the habitat and surrounding environment while minimizing (if affecting at all) the negative impacts to the natural or historic water courses on-site. Any alteration to existing courses of water would only enhance the presumed natural course or historic nature of water prior to anthropogenic alteration. Specifically, the in-stream channel restoration would have no activities or engineering actions which would affect the in-stream water flow rights of downstream water users or citizens, although the modification of its flow patterns would result in a more natural environment. No diversion of water from the downstream users is proposed under the Bank stream restoration, although the surface runoff would be channelized through the design and restoration of the historic native channel.

11.0 LITERATURE CITED

- Barnes, V.E., Bureau of Economic Geology, 1992. *Geologic Atlas of Texas: Beaumont Sheet*. University of Texas at Austin, Austin, TX, USA.
- Cowardin, L. M., V. Carter, F.C. Golet, E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of Interior, Fish and Wildlife Service, Washington, D.C., USA.
- Compensatory Mitigation for Losses to Aquatic Resources, *Federal Register*, Thursday, April 10, 2008, Vol. 73, No. 70, pp. 19670-19705.
- Doering, J., 1935. *Post-Fleming surface formations of Coastal Southeast Texas and South Louisiana*. Bulletin of American Association of Petroleum Geologists, Vol. 19, pp. 651-688.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi, USA.
- Griffith, G. E., S.A. Bryce, J.M Omernik, J.A. Cornstock, A.C. Rogers, B. Harrison, S. Hatch, D. Bezanson. 2004. *Ecoregions of Texas*. U.S. Environmental Protection Agency. Corvallis, OR.
- Gulf Coast Economic Development District (GCEDD), 2009. *2009-2011 Comprehensive Economic Development Strategy*.
- Houston-Galveston Area Council, 2012. *Wastewater Planning for the 13-County Houston-Galveston Area*.
- Minimum Monitoring Requirements for Compensatory Mitigation Projects involving Restoration, Establishment, and/or Enhancement of Aquatic Resources, *Regulatory Guidance 08-03*, October 10, 2008, U.S. Army Corps of Engineers.
- Soil Survey of Liberty County, Texas*. 1996. U.S. Department of Agriculture Soil Conservation Service in cooperation with the Texas Agriculture Experiment Station and the Harris County Flood Control District.
- Texas Parks and Wildlife Department, 2005. *Land and Water Resources Conservation and Recreation Plan*

Literature Cited

United States Department of Agriculture, Natural Resources Conservation Service. 2006. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. U.S. Department of Agriculture Handbook 296.

APPENDIX A – PROJECT PHOTOGRAPHS



Photograph 1: Aggraded channel of Orange Branch, downstream of the confluence of East and West Forks.



Photograph 2: Aggraded channel of Orange Branch, East Fork.



Photograph 3: Sheet Flow of Orange Branch, East Fork.



Photograph 4: Channelized reach of Orange Branch, West Fork.

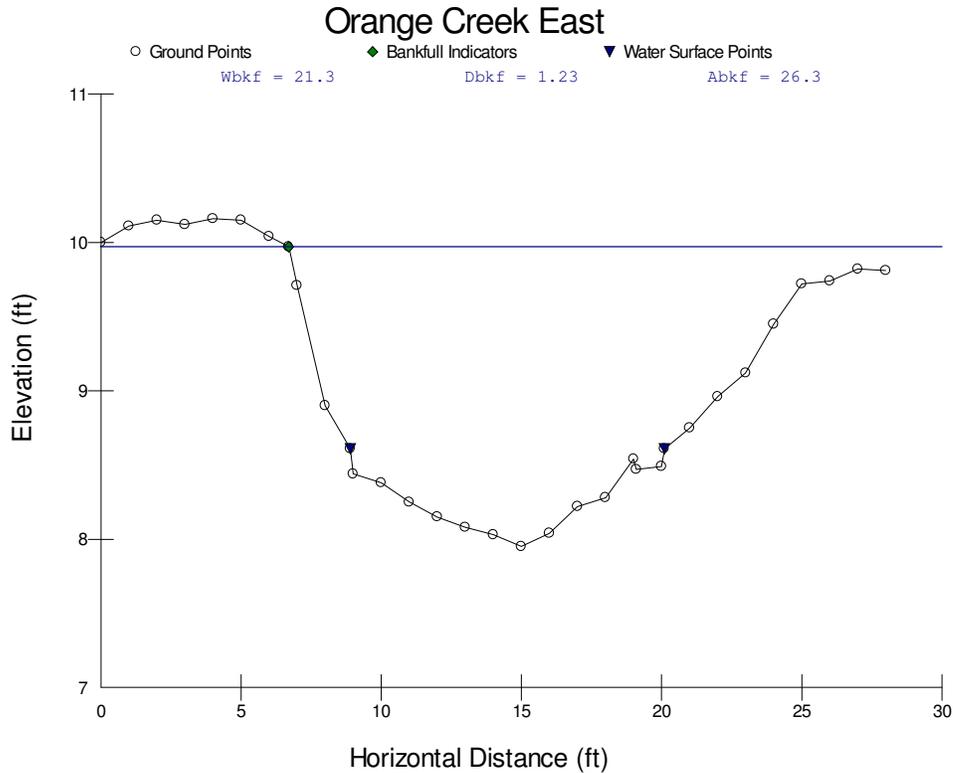


Photograph 5: Sheet Flow of Orange Branch, West Fork

APPENDIX B – STREAM CROSS SECTIONS

Stream Cross Sections

Orange Branch East Cross Section

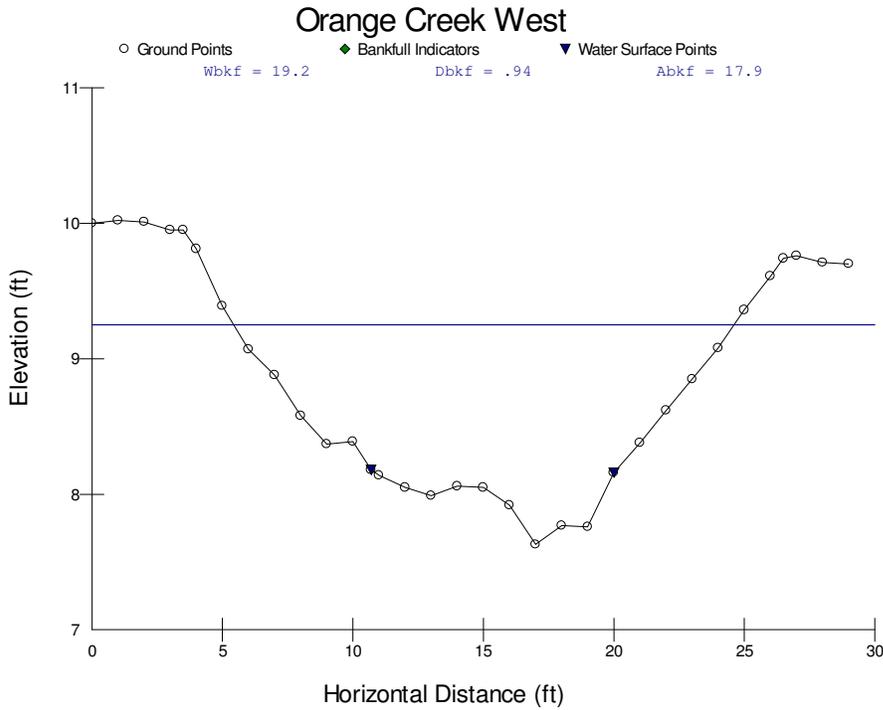


Cross Sectional Geometry

	Channel	Left	Right	Regional Curve
Floodprone Elevation (ft)	11.99	11.99	11.99	
Bankfull Elevation (ft)	9.97	9.97	9.97	
Floodprone Width (ft)	400	----	----	
Bankfull Width (ft)	21.3	8.03	13.27	21.2
Entrenchment Ratio	18.78	----	----	
Mean Depth (ft)	1.23	1.51	1.06	1.3
Maximum Depth (ft)	2.02	2	2.02	2.1
Width/Depth Ratio	17.32	5.32	12.52	
Bankfull Area (sq ft)	26.26	12.13	14.13	30.6
Wetted Perimeter (ft)	22.28	10.58	15.7	
Hydraulic Radius (ft)	1.18	1.15	0.9	
Begin BKF Station	6.7	6.7	14.73	
End BKF Station	28	14.73	28	

Stream Cross Sections

Orange Branch West Cross Section

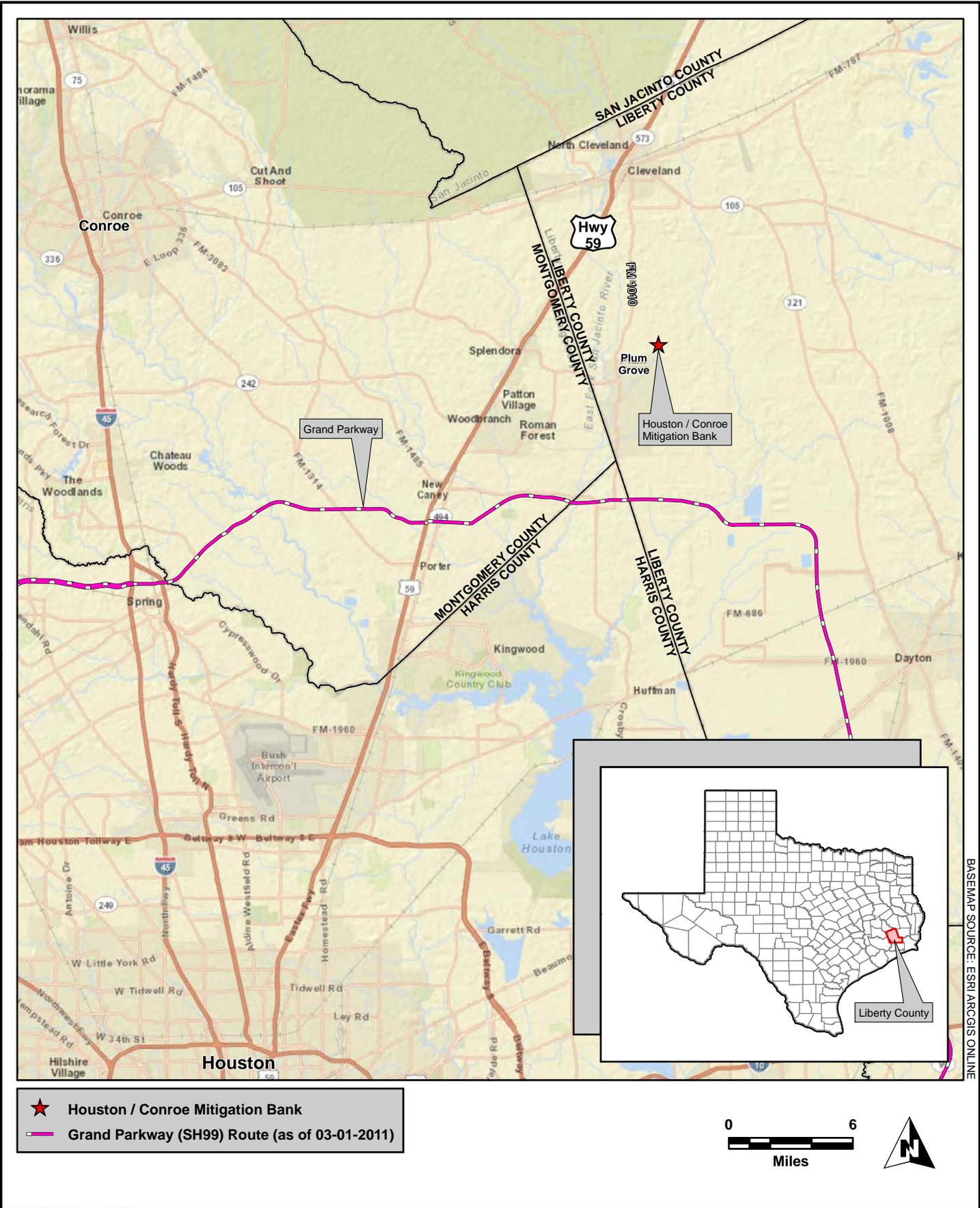


Cross Sectional Geometry

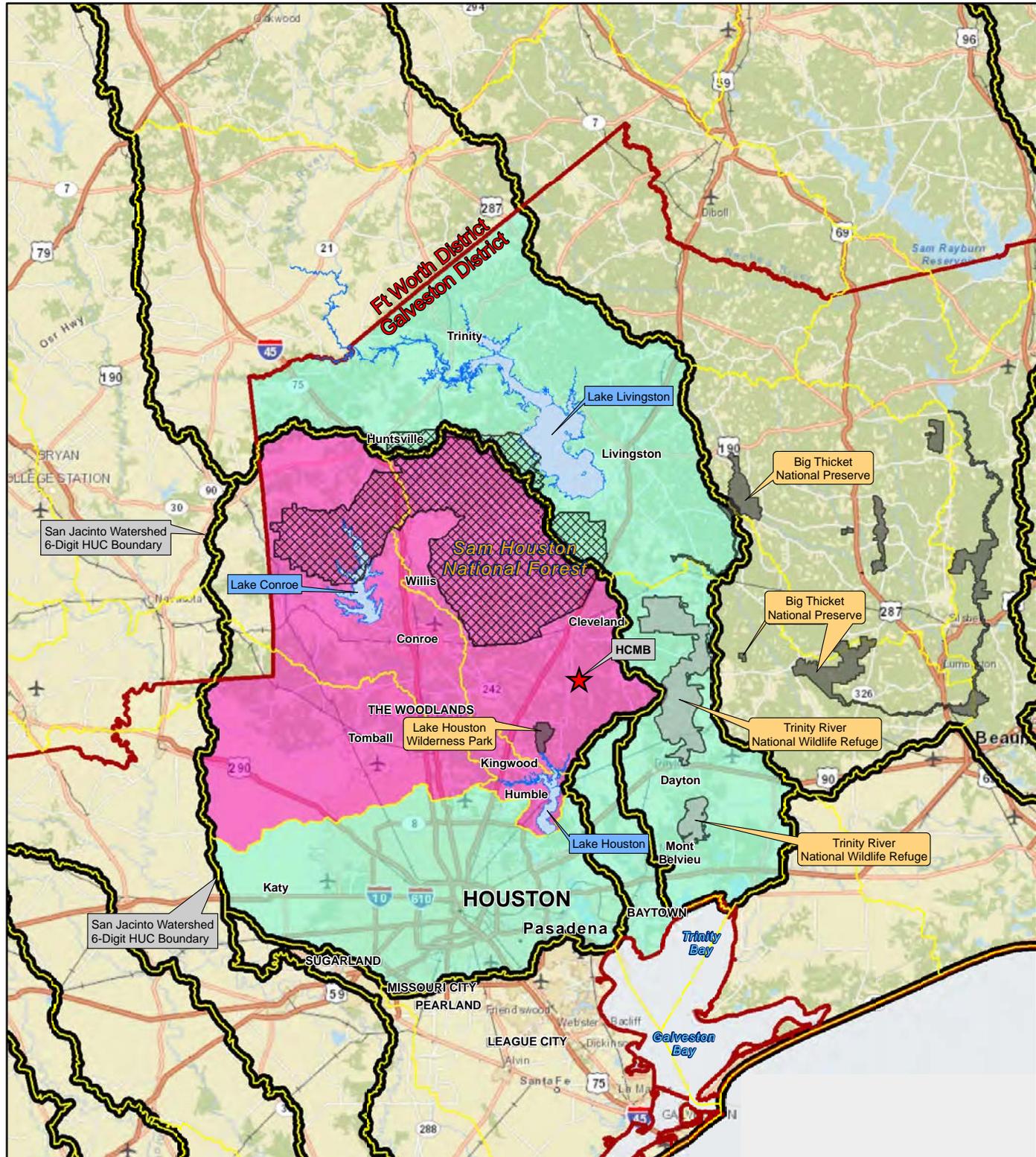
	Channel	Left	Right	Regional Curve
Floodprone Elevation (ft)	10.87	10.87	10.87	
Bankfull Elevation (ft)	9.25	9.25	9.25	
Floodprone Width (ft)	400	-----	-----	
Bankfull Width (ft)	19.17	9.57	9.6	16.9
Entrenchment Ratio	20.87	-----	-----	
Mean Depth (ft)	0.94	0.87	1	1.0
Maximum Depth (ft)	1.62	1.26	1.62	1.6
Width/Depth Ratio	20.39	11	9.6	
Bankfull Area (sq ft)	17.94	8.31	9.63	18.8
Wetted Perimeter (ft)	19.59	10.93	11.06	
Hydraulic Radius (ft)	0.92	0.76	0.87	
Begin BKF Station	5.44	5.44	15.01	
End BKF Station	24.61	15.01	24.61	



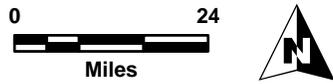
APPENDIX C – PROJECT FIGURES



BASEMAP SOURCE: ESRI, ARGIS ONLINE. HYDROLOGIC UNIT BOUNDARIES PROVIDED BY USGS



	Houston / Conroe Mitigation Bank		Primary Service Area
	USACE District Boundary		Secondary Service Area
	Sub-Basin Boundary		Basin Boundary

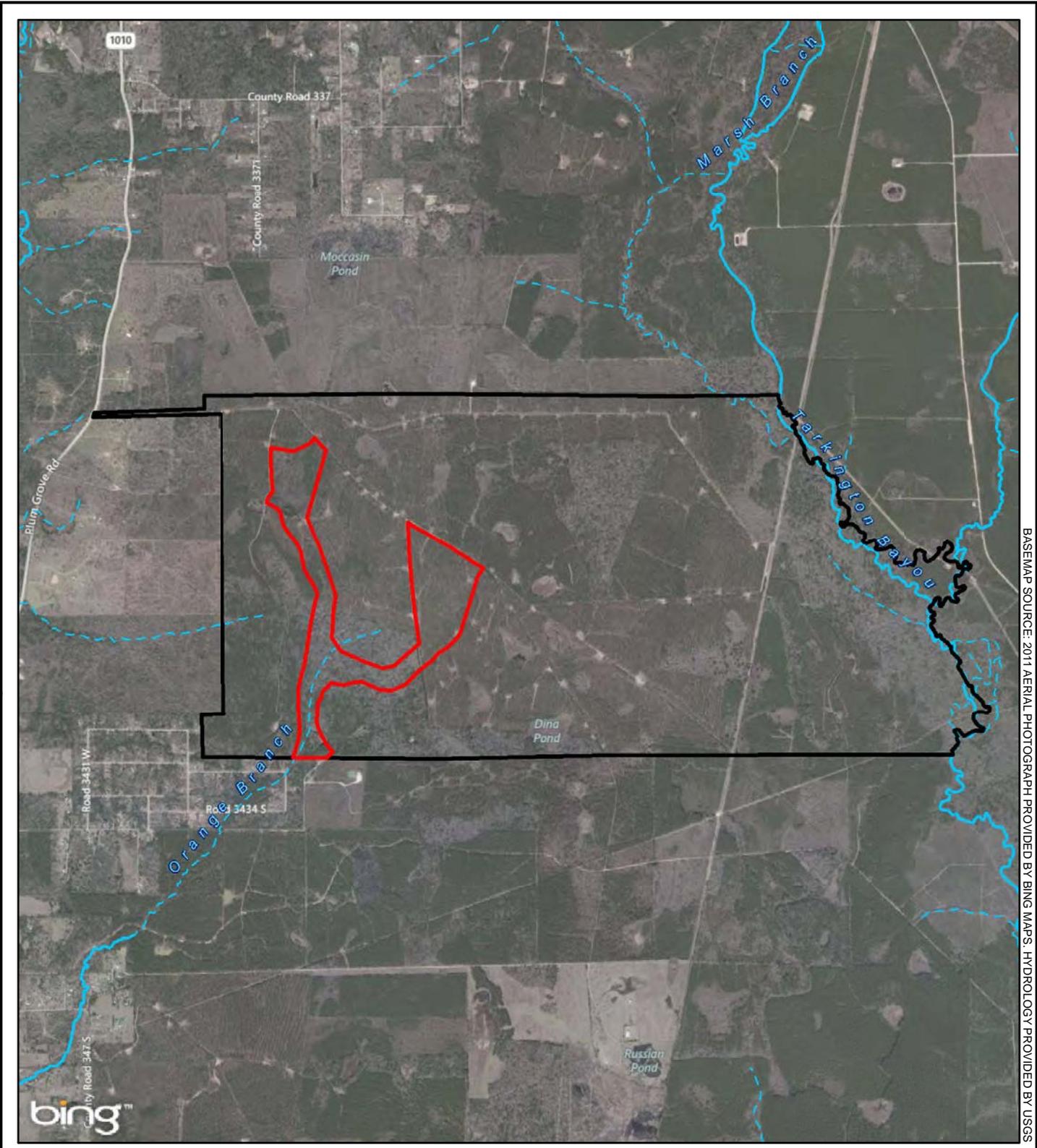


Hydrex
 ENVIRONMENTAL, INC.
 1120 NW Stallings Drive
 Nacogdoches, Texas 75964
 936-568-9451 Fax: 936-568-9527

FIGURE 2
GEOGRAPHIC SERVICE AREA MAP

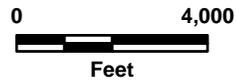
Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus

Map Revised: 11/15/2012	Project Number: A-12-614	GIS Analyst: JFC
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BASEMAP SOURCE: 2011 AERIAL PHOTOGRAPH PROVIDED BY BING MAPS. HYDROLOGY PROVIDED BY USGS

- | | |
|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
|  Houston / Conroe Mitigation Bank |  USGS Intermittent Stream |
|  Parent Tract Boundary |  USGS Perennial Stream |



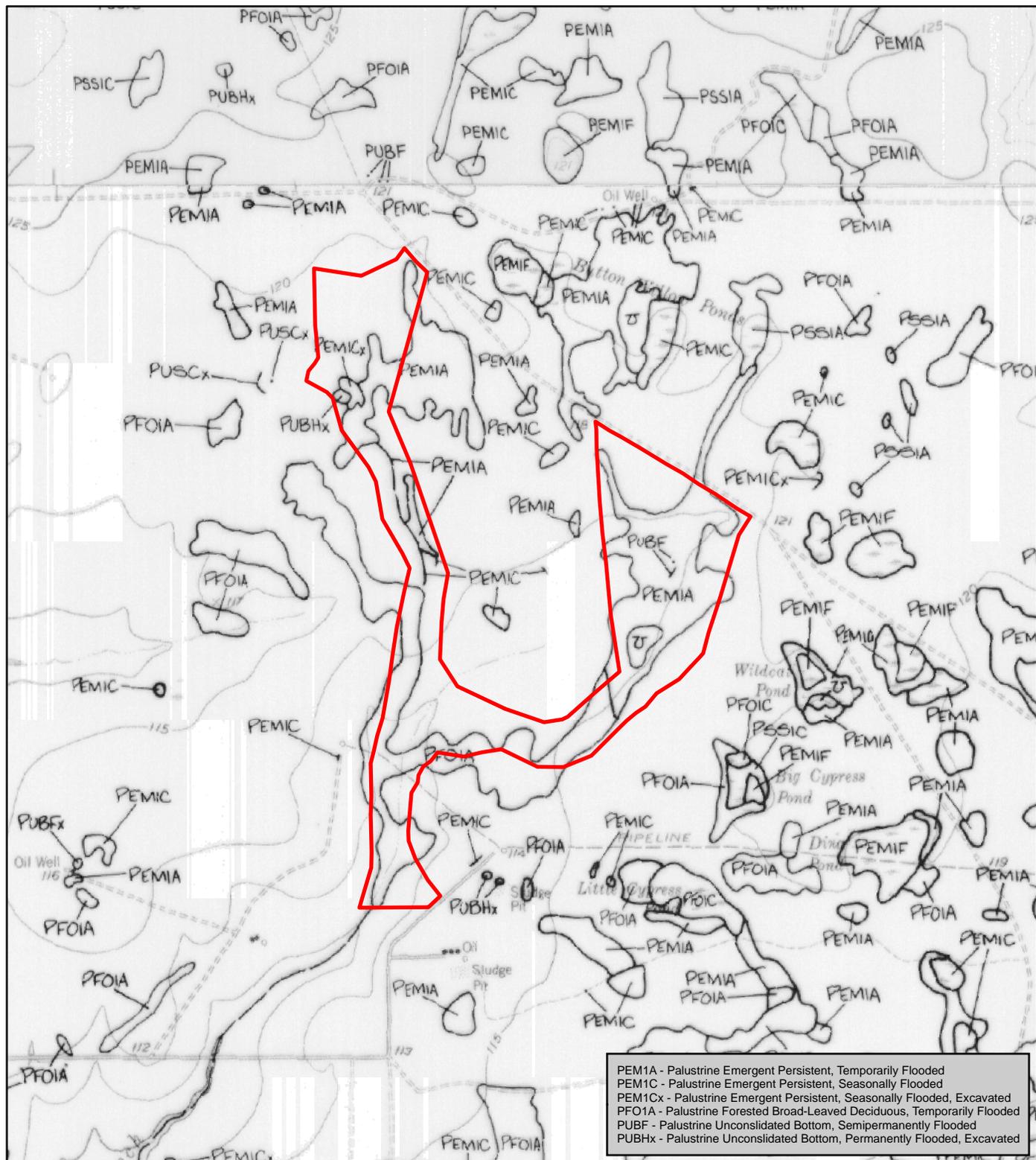
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FIGURE 3
 MITIGATION BANK WITHIN PARENT TRACT

**Houston / Conroe Mitigation Bank
 Liberty County, Texas
 Draft Prospectus**

Map Revised: 11/15/2012	Project Number: A-12-614	GIS Analyst: JFC
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BASMAP SOURCE: USFWS NMI MAP (PLUM GROVE, TX 1988; CLEVELAND, TX 1988)



PEM1A - Palustrine Emergent Persistent, Temporarily Flooded
 PEM1C - Palustrine Emergent Persistent, Seasonally Flooded
 PEM1Cx - Palustrine Emergent Persistent, Seasonally Flooded, Excavated
 PFO1A - Palustrine Forested Broad-Leaved Deciduous, Temporarily Flooded
 PUBF - Palustrine Unconsolidated Bottom, Semipermanently Flooded
 PUBHx - Palustrine Unconsolidated Bottom, Permanently Flooded, Excavated

 Houston / Conroe Mitigation Bank



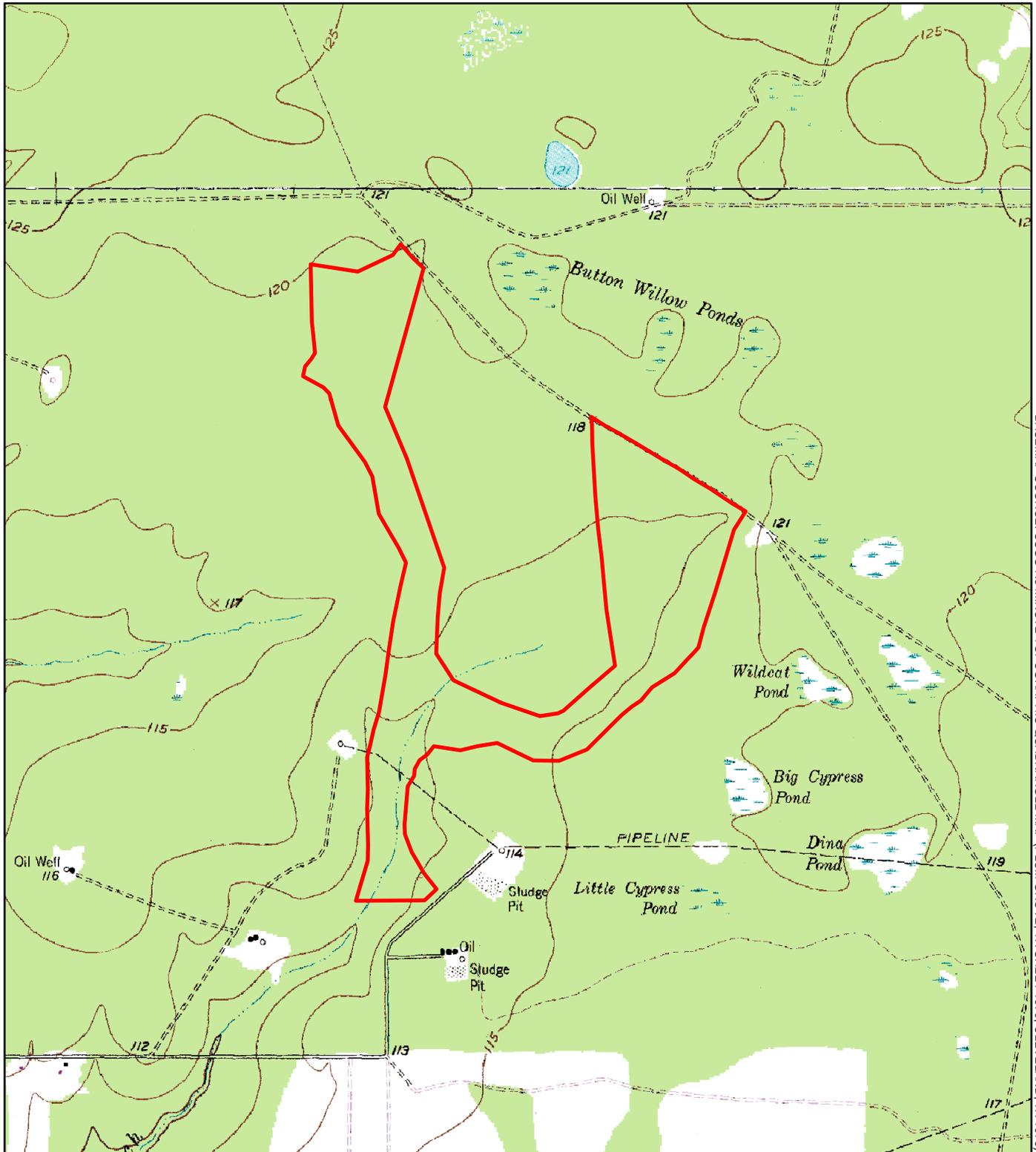
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FIGURE 4
 NATIONAL WETLANDS INVENTORY MAP

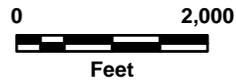
Houston / Conroe Mitigation Bank
 Liberty County, Texas
 Draft Prospectus

Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASEMAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP (PLUM GROVE, TX SHEET 1979; CLEVELAND, TX 1976)



 Houston / Conroe Mitigation Bank



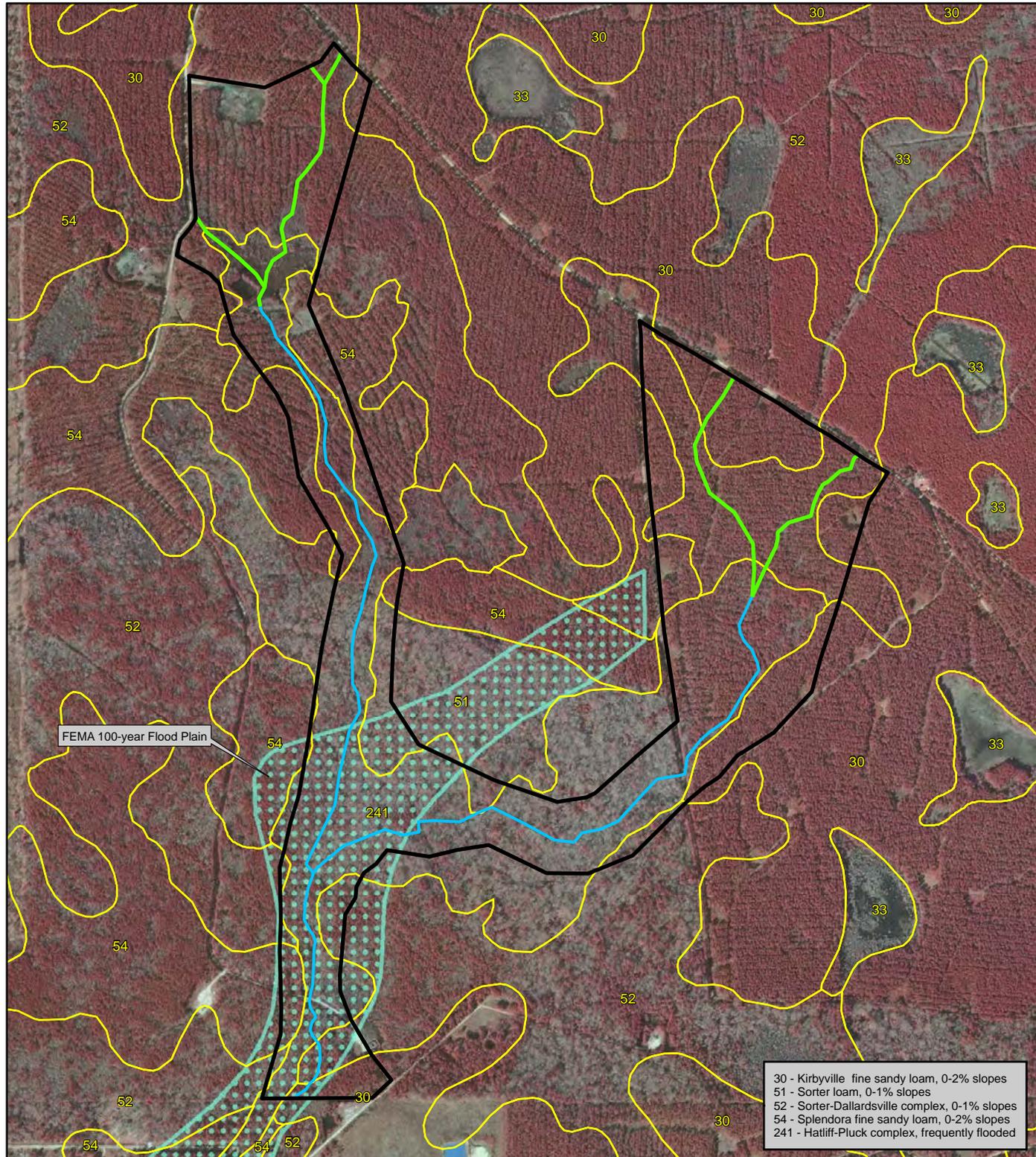
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← **FIGURE 5** →
USGS TOPOGRAPHIC MAP

Houston / Conroe Mitigation Bank
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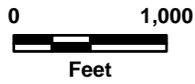
Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASEMAP SOURCE: 2008 AERIAL PHOTOGRAPH PROVIDED BY T.S. SOIL SURVEY DATA PROVIDED BY NRCS (2009 UNPUBLISHED UPDATE), FLOOD DATA PROVIDED BY FEMA



30 - Kirbyville fine sandy loam, 0-2% slopes
 51 - Sorter loam, 0-1% slopes
 52 - Sorter-Dallardsville complex, 0-1% slopes
 54 - Splendora fine sandy loam, 0-2% slopes
 241 - Hatliff-Pluck complex, frequently flooded

Houston / Conroe Mitigation Bank	Intermittent Stream
NRCS Soil Mapping Unit	Sheet Flow through Wetlands
FEMA 100-year Flood Plain	

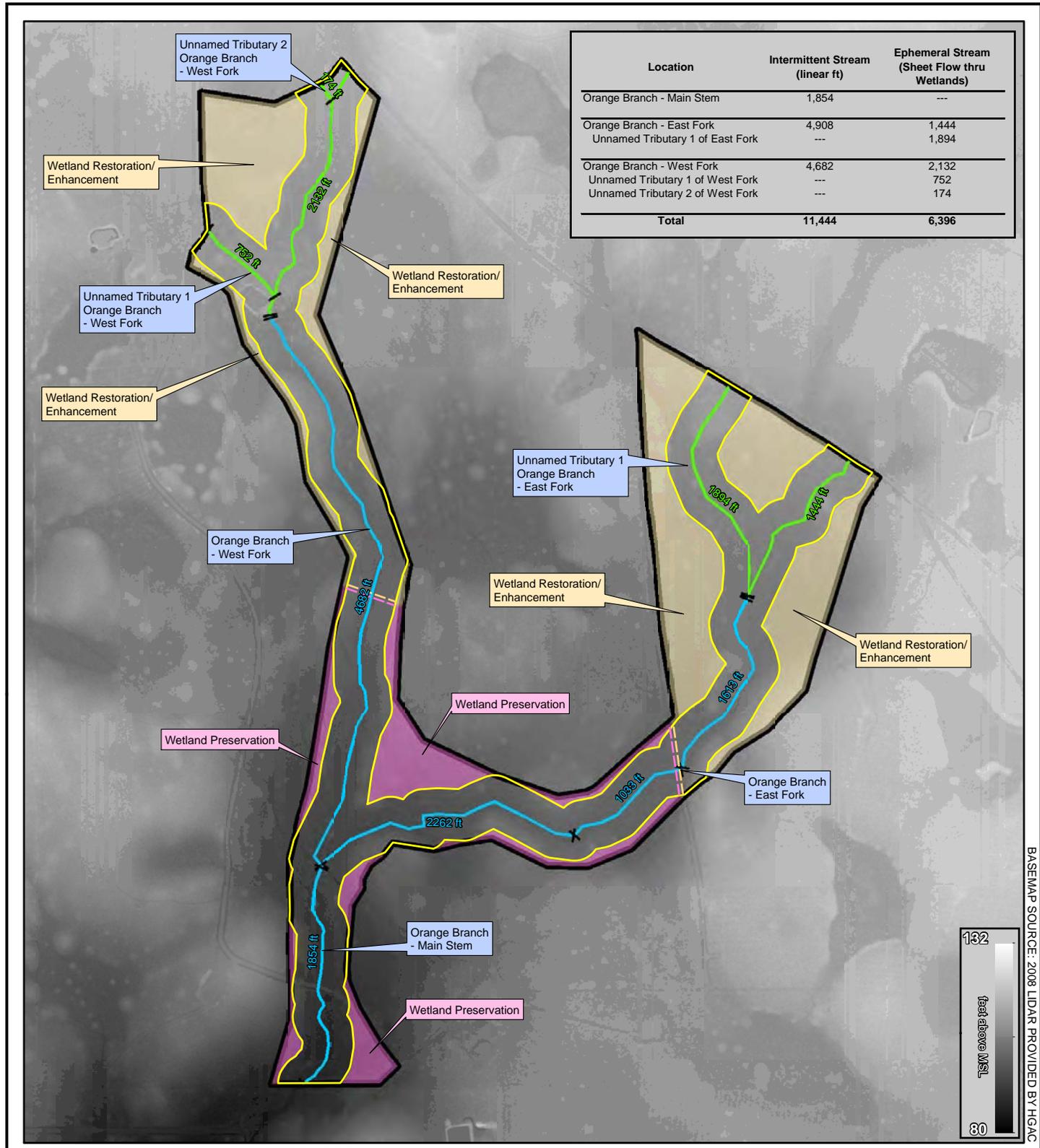


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FIGURE 6
 NRCS SOIL SURVEY MAP
 AND FEMA FLOOD INSURANCE RATE MAP

**Houston / Conroe Mitigation Bank
 Liberty County, Texas
 Draft Prospectus**

Map Revised: 11/15/2012	Project Number: A-12-614	GIS Analyst: JFC
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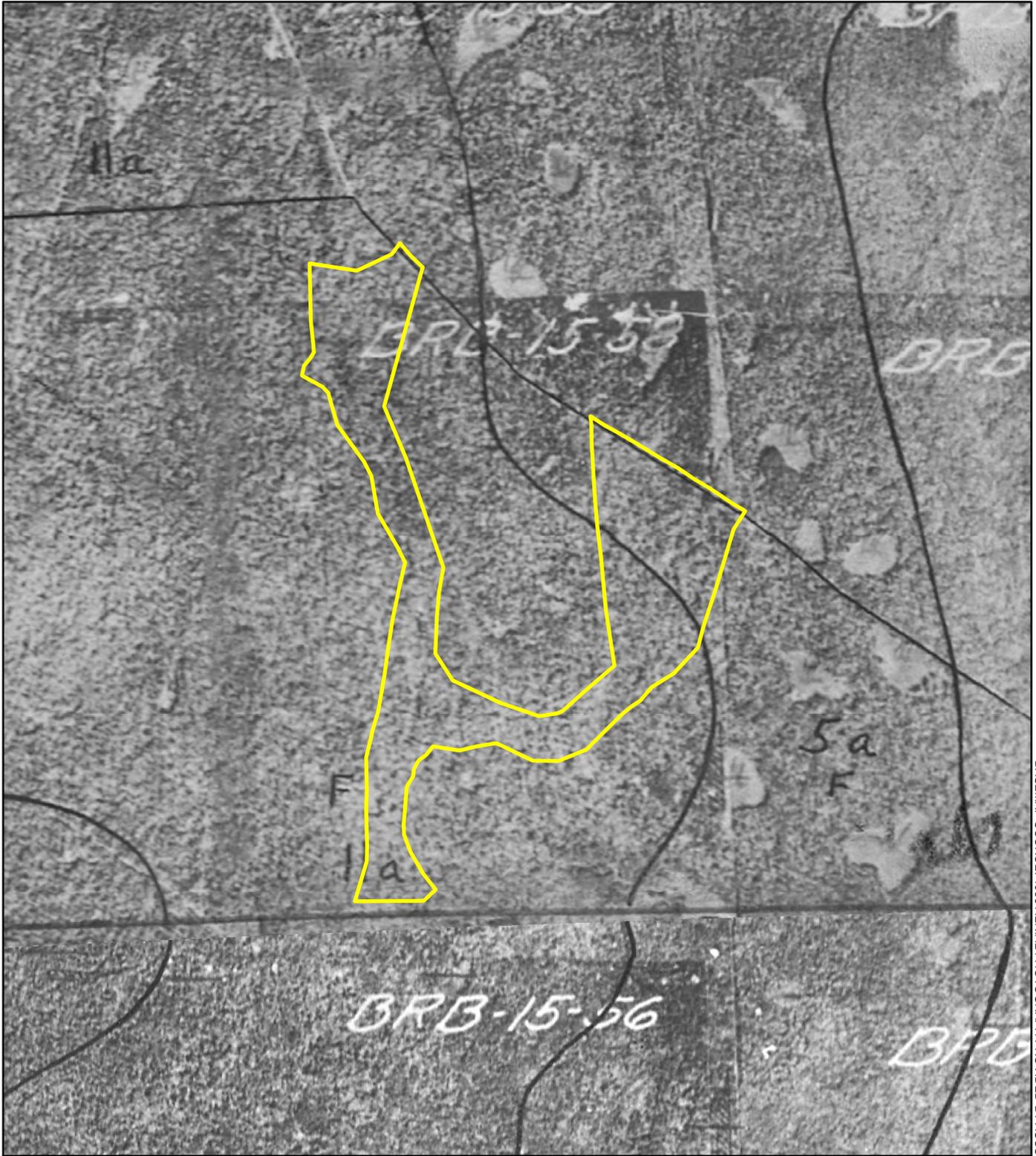
Location	Intermittent Stream (linear ft)	Ephemeral Stream (Sheet Flow thru Wetlands)
Orange Branch - Main Stem	1,854	---
Orange Branch - East Fork	4,908	1,444
Unnamed Tributary 1 of East Fork	---	1,894
Orange Branch - West Fork	4,682	2,132
Unnamed Tributary 1 of West Fork	---	752
Unnamed Tributary 2 of West Fork	---	174
Total	11,444	6,396

Houston / Conroe Mitigation Bank	Intermittent Stream
Wetland Restoration/Enhancement: 73.3 acres	Ephemeral Stream (Sheet Flow thru Wetlands)
Wetland Preservation: 23.4 acres	Stream Buffer (200-ft each side): 150.3 acres

0 1,000 Feet

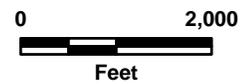


BASEMAP SOURCE: 2008 LIDAR PROVIDED BY HGAC



BASEMAP SOURCE: 1938 AERIAL PHOTOGRAPH PROVIDED BY ASCS

Houston / Conroe Mitigation Bank



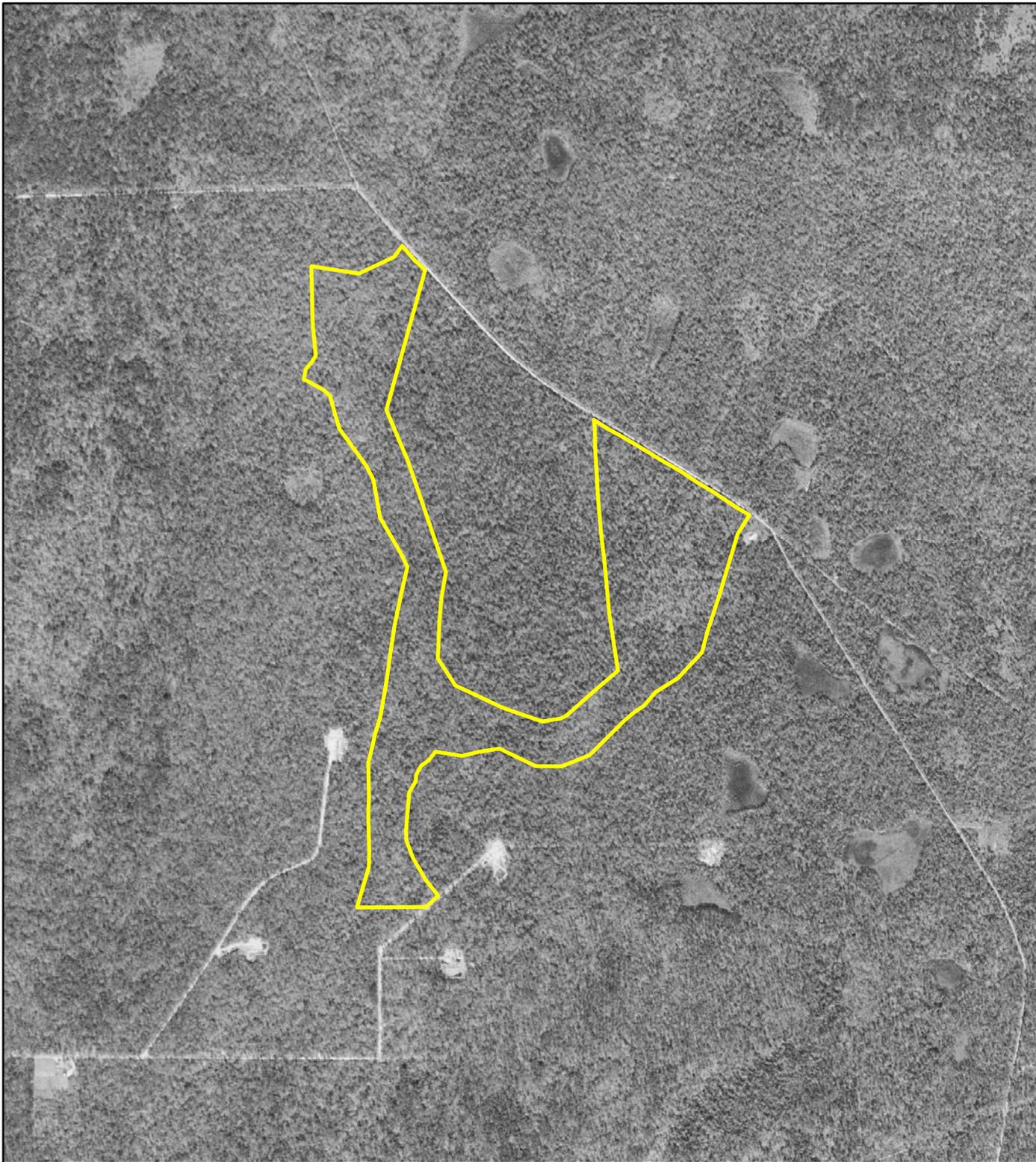
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← **FIGURE 8** →
1938 AERIAL PHOTOGRAPH

**Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus**

Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASEMAP SOURCE: 1952 AERIAL PHOTOGRAPH PROVIDED BY USGS



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0 2,000
Feet

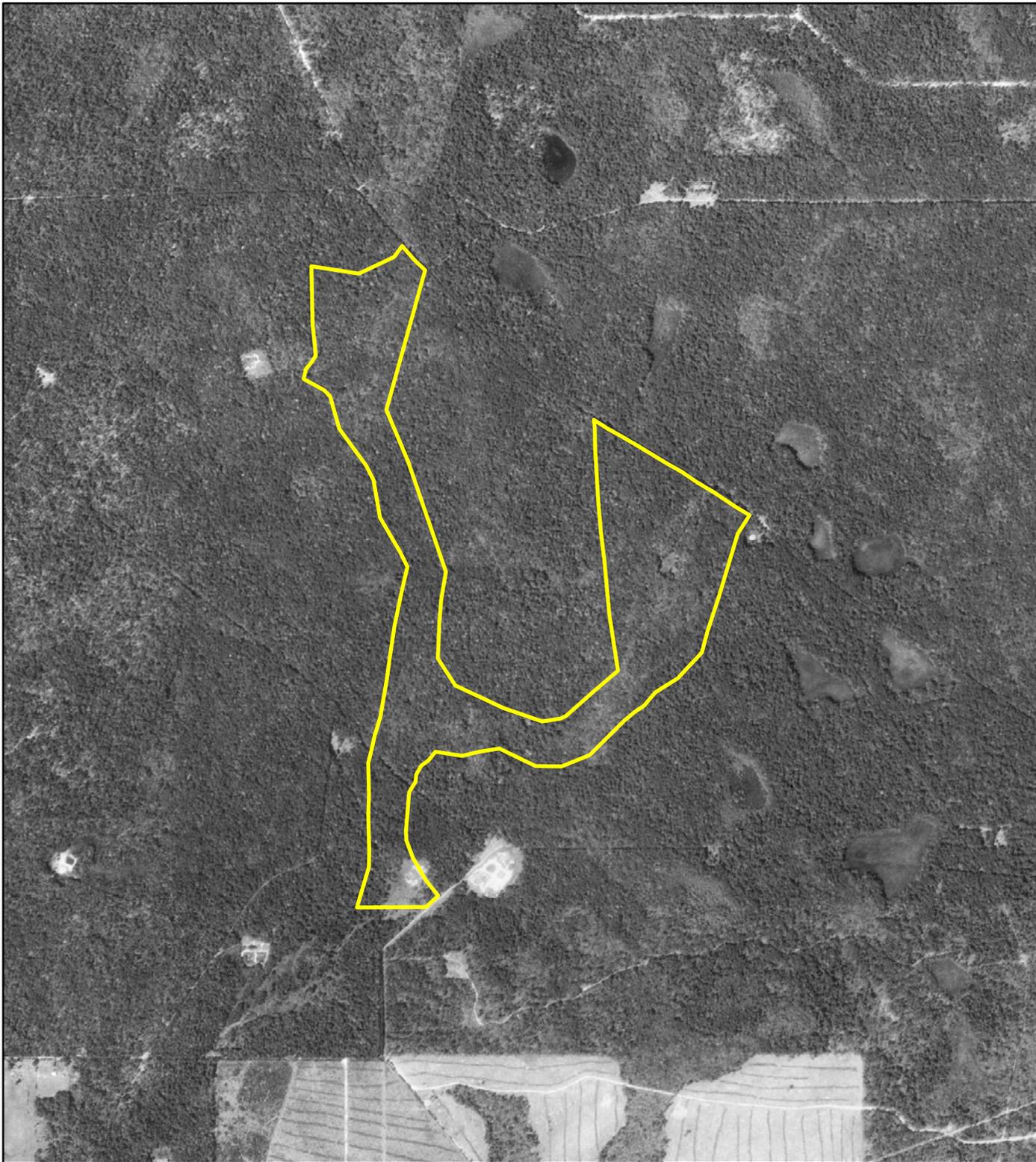


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FIGURE 9
1952 AERIAL PHOTOGRAPH

Houston / Conroe Mitigation Bank
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Draft Prospectus
Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASEMAP SOURCE: 1977 AERIAL PHOTOGRAPH PROVIDED BY USSS



 Houston / Conroe Mitigation Bank

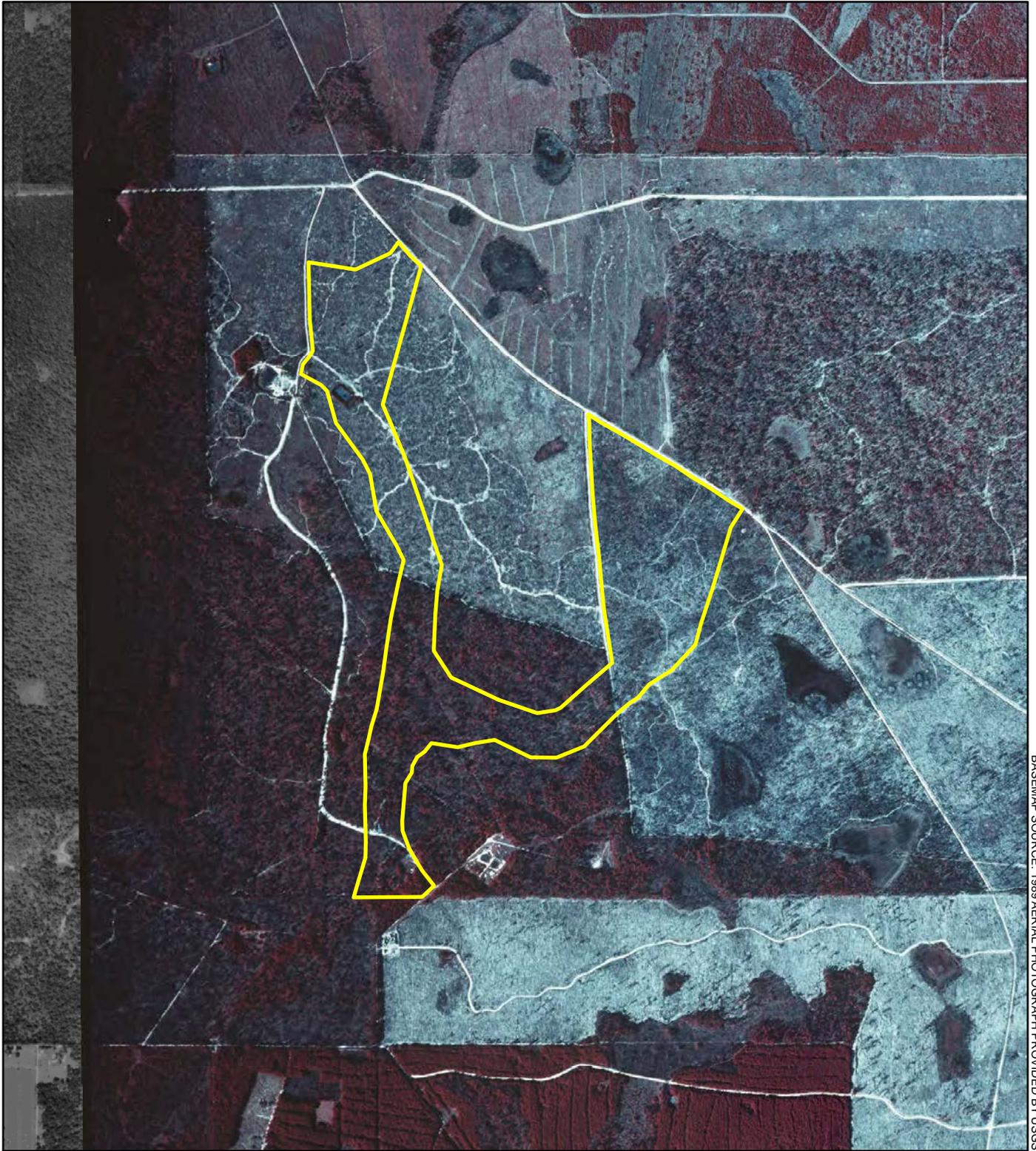


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← **FIGURE 10** →
1977 AERIAL PHOTOGRAPH

**Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus**

Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC



BASMAP SOURCE: 1989 AERIAL PHOTOGRAPH PROVIDED BY USSS

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0 2,000
Feet



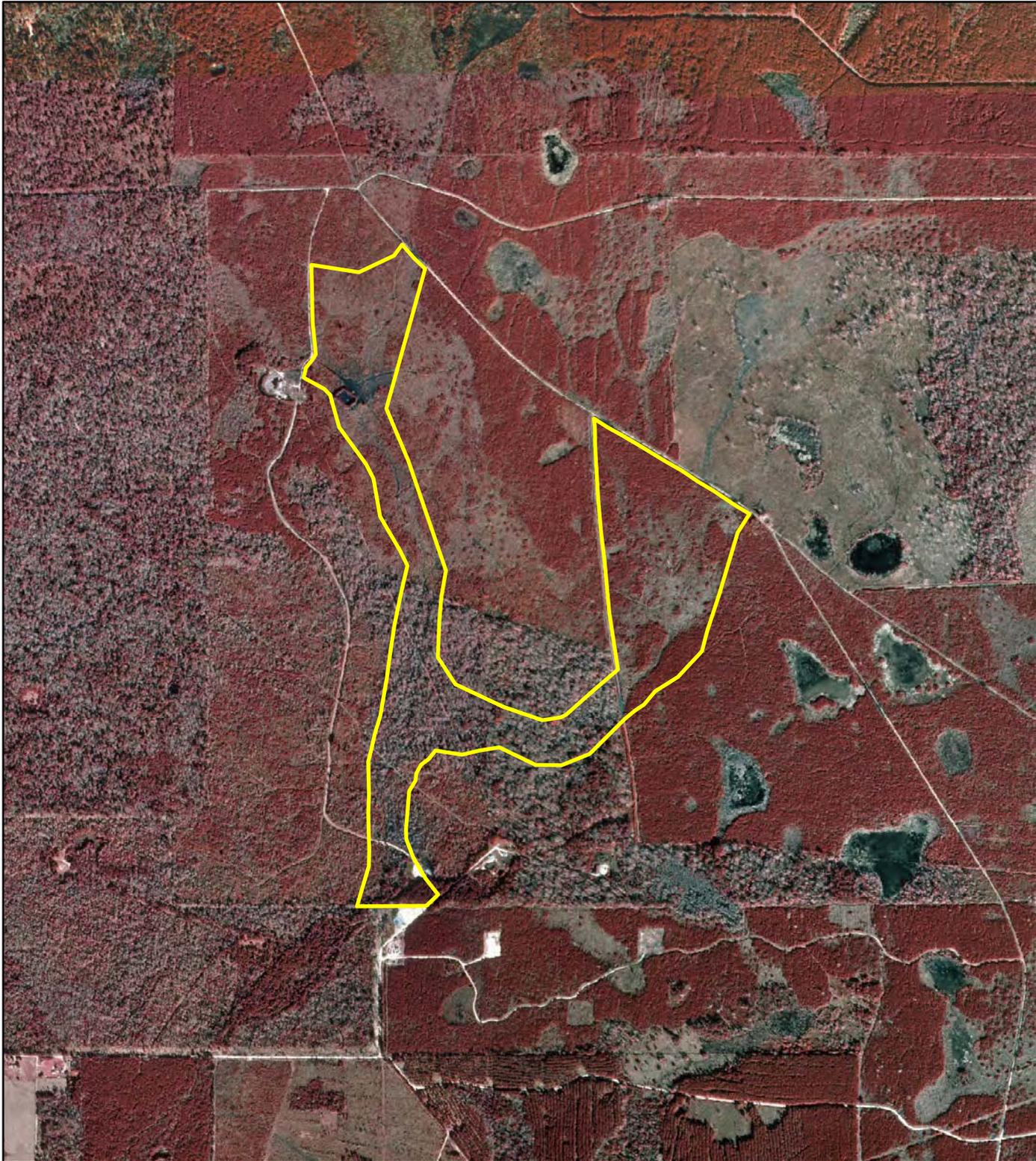
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← **FIGURE 11** →
1989 AERIAL PHOTOGRAPH

**Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus**

Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASMAP SOURCE: 1996 AERIAL PHOTOGRAPH PROVIDED BY USGS



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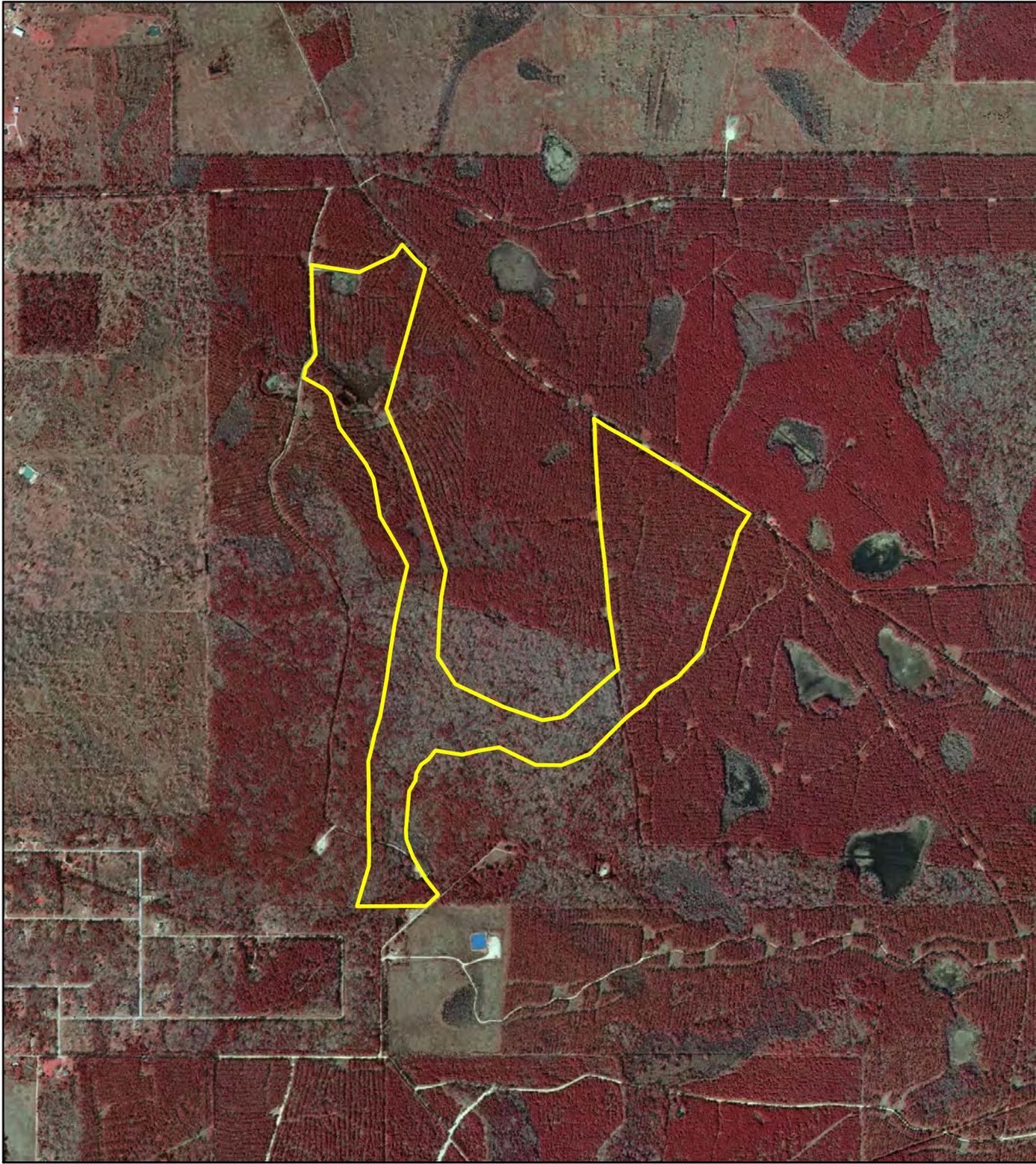


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← **FIGURE 12** →
1996 AERIAL PHOTOGRAPH

Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus
Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC

BASMAP SOURCE: 2008 AERIAL PHOTOGRAPH PROVIDED BY TTS



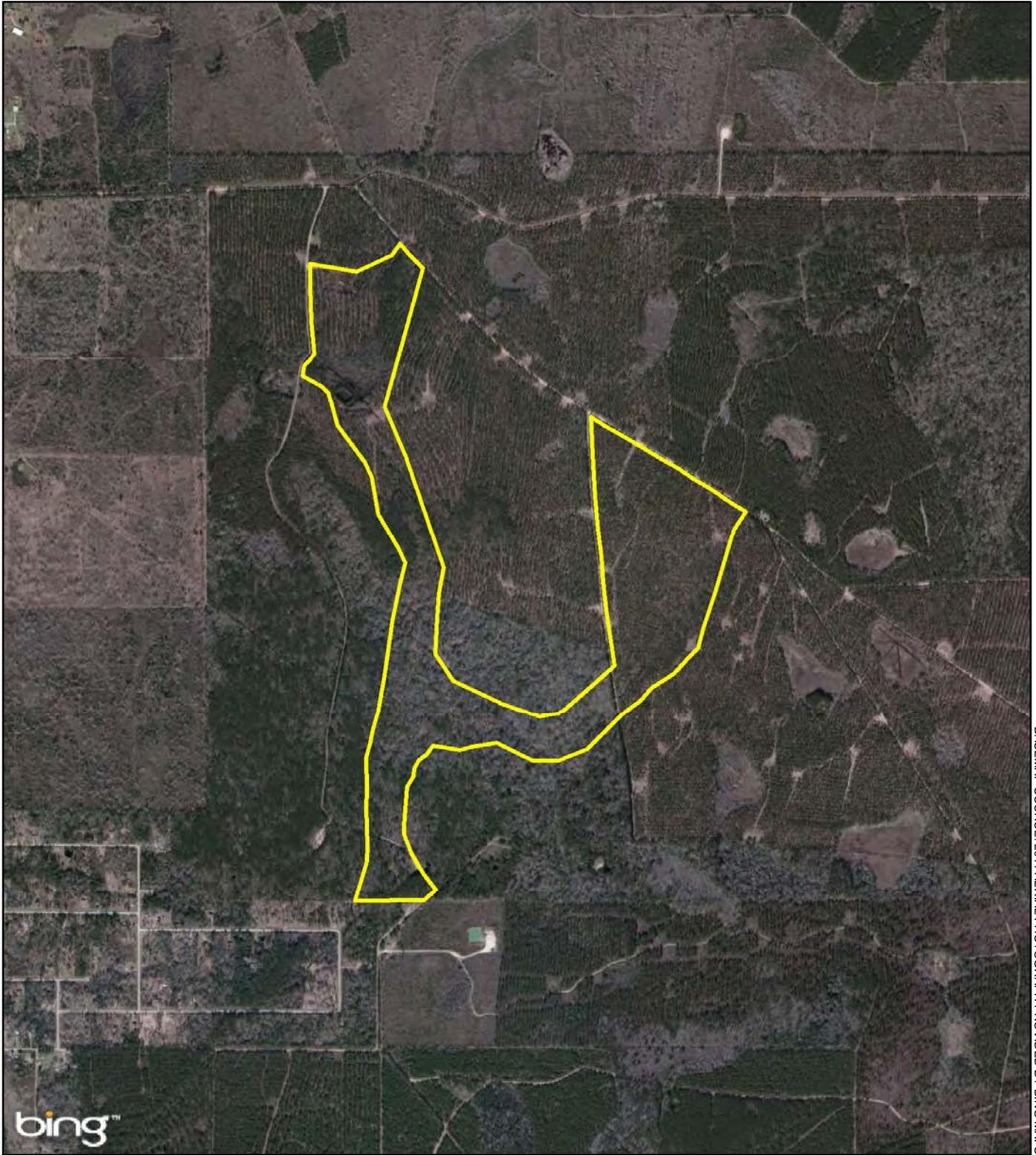
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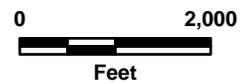
FIGURE 13
2008 AERIAL PHOTOGRAPH

Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus
Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC



BASEMAP SOURCE: 2011 AERIAL PHOTOGRAPH PROVIDED BY BING MAPS

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FIGURE 14
2011 AERIAL PHOTOGRAPH

Houston / Conroe Mitigation Bank
Liberty County, Texas
Draft Prospectus

Map Revised: 11/15/2012 Project Number: A-12-614 GIS Analyst: JFC



APPENDIX D – CULTURAL RESOURCE RECORDS REVIEW



January 10, 2013
(Via Email)

ENERGY

FACILITIES

COMMUNICATIONS

ENVIRONMENTAL

Neil Boitnott
Reynolds, Smith and Hills, Inc.
100 E Ferguson, Suite 420
Tyler, TX 75702

Subject: Cultural Resource Records Review for Houston-Conroe Mitigation Bank, Liberty County, Texas

Dear Mr. Boitnott:

This letter provides the results of a cultural resource records review performed for the subject project by POWER Engineers, Inc. (POWER), as authorized by you under the terms and conditions of POWER's Master Services Agreement with Reynolds, Smith and Hills, Inc. (RS&H).

The records review was conducted on January 9, 2013, by POWER's professionally qualified archeological staff and documents the presence or absence of archeological and historical sites recorded in or near the subject study area as of that date. Official cultural resource record sources consulted include the Texas Historical Commission Online Restricted-Access Archeological Sites Atlas, Texas Archeological Research Laboratory site location data and the National Park Service National Register of Historic Places Focus Database. The accuracy and extent of cultural resource location data obtained in this records review is limited to that inherent in the data sets consulted.

Based on the review, there are no recorded archeological sites, State Archeological Landmarks, Historic Texas Cemeteries, cemeteries, or National Register of Historic Places-listed properties located within the subject property boundaries. One archeological site, 41LB96, is mapped immediately across Tarkington Bayou near the northeastern corner of the subject property. 41LB96 is a prehistoric archeological site recorded during the survey of a proposed pipeline. The site consists of buried lithic debitage and prehistoric ceramics up to 60 centimeters below the ground surface. According to the site form, it was recommended that the site be avoided during pipeline construction, or that a testing program be developed to determine the eligibility of the site for listing on the National Register of Historic Places.

Locations of recorded sites in or near the subject study area are being provided separately via e-mail in a digital mapping format with the understanding that RS&H agrees to restrict access and distribution of all archeological site locations in accordance with federal and state laws. Archeological site location information is protected by the National Historic Preservation Act of 1966 (as amended), Title III

January 10, 2013
Page 2

§304 and by the Texas Antiquities Code §191.004, and is not intended for public distribution.

POWER is grateful for the opportunity to assist you and RS&H with this important project. If you have any questions about the results of this cultural resource records review, please contact me at your convenience

Sincerely,

A handwritten signature in black ink, appearing to read "Eugene R. Foster, Jr.", written in a cursive style.

Eugene R. Foster, Jr.
Sr. Project Manager

Sent Via Email
PER-02