JOINT PUBLIC NOTICE

February 2, 2015

United States Army
Corps of Engineers
New Orleans District
Regulatory Branch
Post Office Box 60267
New Orleans, La. 70160-0267

(504) 862-2548/ FAX (504) 862-2574
Jacqueline.R.Farabee@usace.army.mil
Project Manager
Jacqueline Farabee
Permit Application Number
MVN-2009-02402-MR

State of Louisiana
Department of Environmental Quality
Post Office Box 4313
Baton Rouge, La. 70821-4313
Attn: Water Quality Certifications

(225) 219-3225/FAX (225) 325-8250
Elizabeth.johnson@la.gov
Project Manager
Elizabeth Johnson
WQC Application Number
WQC # 150129-01

Interested parties are hereby notified that a permit application has been received by the New Orleans District of the U.S. Army Corps of Engineers pursuant to: [ ] Section 10 of the Rivers and Harbors Act of March 3, 1899 (30 Stat. 1151; 33 USC 403); and/or [X] Section 404 of the Clean Water Act (86 Stat. 816; 33 USC 1344).

Application has also been made to the Louisiana Department of Environmental Quality, for a Water Quality Certification (WQC) in accordance with statutory authority contained in Louisiana Revised Statutes of 1950, Title 30, Chapter 11, Part IV, Section 2074 A(3) and provisions of Section 401 of the Clean Water Act (P.L.95-17).

CANE BAYOU MITIGATION BANK IN ST. TAMMANY PARISH

NAME OF APPLICANT: St. Tammany Parish Government, c/o Biological Surveys, Inc., Attn: Thomas Brown, P.O. Box 94, Covington, LA 70434.

LOCATION OF WORK: The 1110 acre site is located approximately east of Mandeville north of US Hwy. 190, between Bayou Castine to the west and Cane Bayou to the east, in St. Tammany Parish, Louisiana, as shown on enclosed drawings (Latitude: 29.57835555 N, Longitude:–90.502891666 W). The Project is located within the Liberty Bayou-Tchefuncte River Coastal Basin, Hydrologic Unit 08090201.

CHARACTER OF WORK: Replacement of degraded culvert in an existing road and to install three earthen plugs in an existing culvert outfall drainage ditch for the purpose of enhancing and restoring traditional surface hydrology to the site for the construction of a mitigation bank.

The comment period for the Department of the Army Permit and the Louisiana Department of Environmental Quality WQC will close **30 days** from the date of this joint public notice. Written comments, including suggestions for modifications or objections to the proposed work, stating reasons thereof, are being solicited from anyone having interest in this permit and/or this WQC request and must be mailed so as to be received before or by the last day of the comment period. Letters concerning the Corps of Engineers permit application must reference the applicant's name and the Permit Application Number, and be mailed to the Corps of Engineers at the address above, **ATTENTION: REGULATORY BRANCH**. **Similar letters concerning the**

Water Quality Certification must reference the applicant's name and the WQC Application number and be mailed to the Louisiana Department of Environmental Quality at the address above.

The application for this proposed project is on file with the Louisiana Department of Environmental Quality and may be examined during weekdays between 8:00 a.m. and 4:30 p.m. Copies may be obtained upon payment of costs of reproduction.

Corps of Engineers Permit Criteria

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

The U.S. Army Corps of Engineers is soliciting comments from the public, federal, state, and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the U.S. Army Corps of Engineers to determine whether to make, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

The New Orleans District is unaware of properties listed on the National Register of Historic Places near the proposed work. The possibility exists that the proposed work may damage or destroy presently unknown archeological, scientific, prehistorical, historical sites, or data. Issuance of this public notice solicits input from the State Archeologist and State Historic Preservation Officer regarding potential impacts to cultural resources.

Our initial finding is that the proposed work would neither affect any species listed as endangered by the U.S. Departments of Interior or Commerce, nor affect any habitat designated as critical to the survival and recovery of any endangered species.

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The applicant's proposal would result in the destruction or alteration of N/A acre(s) of EFH utilized by various life stages of red drum and penaeid shrimp. Our initial determination is that the proposed action would not have a substantial adverse impact on EFH or federally managed fisheries in the Gulf of Mexico. Our final determination relative to project impacts and the need for mitigation measures is subject to review by and coordination with the National Marine Fisheries Service.

If the proposed work involves deposits of dredged or fill material into navigable waters, the evaluation of the probable impacts will include the application of guidelines established by the Administrator of the Environmental Protection Agency. Also, a certification that the proposed activity will not violate applicable water quality standards will be required from the Department of Environmental Quality, before a permit is issued.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have interest in the matter.

The applicant has certified that the proposed activity described in the application complies with and will be conducted in a manner that is consistent with the Louisiana Coastal Resources Program. The Department of the Army permit will not be issued unless the applicant received approval or a waiver of the Coastal Use Permit by the Department of Natural Resources.

You are requested to communicate the information contained in this notice to any other parties whom you deem likely to have interested in the matter.

Martin S. Mayer
Chief, Regulatory Branch

Enclosure

CANE BAYOU MITIGATION BANK PROSPECTUS

ST. TAMMANY PARISH, LOUISIANA

December 2014

Sponsor: St. Tammany Parish Government
21490 Koop Drive
Mandeville, LA 70471

Agent: Biological Surveys Inc.
P O Box 94
Covington, LA 70433

Consultant: The Nature Conservancy
P O Box 1657
Abita Springs, LA 70420

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1.0 INTRODUCTION

St. Tammany Parish Government proposes to develop the Cane Bayou Mitigation Bank in accordance with the 2008 Final Rule "Compensatory Mitigation for Losses of Aquatic Resources," Department of the Army, Corps of Engineers (33 CFR Parts 325 and 332, Federal Register 2008), and with the guidance provided by the New Orleans District of the Corps of Engineers (CEMVN) on the Corps' Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS; weblink: http:// ribits.usace.army.mil/). The Cane Bayou Mitigation Bank (CBMB) is 1110 acres in size and contains primarily degraded forested wetlands and uplands owned by St. Tammany Parish Government (hereinafter Parish or Sponsor) located in the southern part of the parish in the Northshore region of Lake Pontchartrain. The site is found adjacent to the eastern city limits of Mandeville, Louisiana and 5.5 miles west of Lacombe, Louisiana. It occurs between Cane Bayou (also called Bayou Cane), a Louisiana Natural and Scenic Stream, and Bayou Castine (Figures 1, 2) in the Lake Pontchartrain watershed.

Rehabilitation through physical, chemical and biological repairing of several aquatic functions will provide pine wetland credits for use by the Parish and local government entities for work conducted within St. Tammany Parish for unavoidable, permitted losses of similar wetland habitat types. The Parish and other local government entities anticipate several future projects that may require compensation for wetland loss or impacts; thus, it makes good business sense to establish a mitigation bank for their own use in the watershed. Credits will not be available for non-governmental entities.

1.1 Site Location and Ownership Information

The Cane Bayou Mitigation Bank is located in all or portions of Sections 8,42,43, Township 8 South, Range 12 East in St. Tammany Parish, Louisiana and is found on the United States Geological Survey 7.5 minute quadrangle maps Mandeville, LA and Lacombe, LA (Figure 2). All of the property is owned by the Sponsor, St. Tammany Parish Government, a not for profit government agency. CBMB lies just north of US Highway 190 and occurs in two parcels. The West Parcel borders Bayou Castine and the East Parcel includes a portion of Cane Bayou. Coordinates for the approximate center of the property are 30º 20' 58.19"N and 90º 00' 28.31"W.

The West Parcel is comprised of 151.7 acres of mostly degraded wet pine savanna and upland pine flatwoods that are leased to and are part of the Northlake Nature Center (NNC), a 501c3 non-profit conservation group (weblink: http://northlakenature.com/). The East Parcel is comprised of 958.3 acres of mostly degraded wet pine savanna and mixed pine-hardwood uplands. Formerly owned by the Louisiana Department of Health and Human Resources (now the Department of Health and Hospitals), the East Parcel was referred to historically as the St. Tammany State Game Refuge. It is separated from the West Parcel by Pelican Park, owned by St. Tammany Parish Recreational District 1. North and west of CBMB is private forestland, and to the south are Fontainebleau State Park, and the Northlake Behavioral Health System (formerly known as the Southeast

Louisiana Hospital). This facility was formerly owned by the Louisiana Department of Health and Hospitals and is planned for acquisition by the Parish in 2015.

Public lands adjacent to CBMB comprise a large conservation area herein referred to as the Northshore East Conservation Area (NECA) that will complement and benefit from restoration efforts on the Cane Bayou Mitigation Bank.

Driving directions to the Cane Bayou Mitigation Bank are as follows: From North Causeway Blvd. in Mandeville, LA, exit right on the US 190/Monroe St. exit. At the intersection stay straight and get on East Causeway Approach for 1.3 miles. Turn right on US Hwy 190 and go for 3.7 miles. Turn left on Pelican Drive to reach the center of the property.

1.2 Current Land Condition

CBMB is currently dominated by varying ages of off-site slash and loblolly pine (*Pinus elliottii* and *P. taeda* respectively; Figures 3, 4). "Offsite" is a term referred to as species typically not indigenous to the habitat type. Those pine species, plus a variety of native hardwoods, have encroached in areas formerly dominated by longleaf pine (*P. palustris*). (Note: all plant nomenclature herein follows USDA NRCS Plants Database; weblink: http://plants.usda.gov/). Overstory and understory age, composition and density (heavily or moderately encroached) vary depending on past timber management and ecological events in each area such as major outbreaks of southern pine bark beetle (*Dendroctonus frontalis;* SPBB) and wildfire. A major outbreak of SPBB occurred in the mid 1990's, and the event killed thousands of mature loblolly and longleaf pines in the vicinity. The most recent wildfire on the area is reported to have been in 2001 on portions of CBMB (L. Burch, NNC, personal communication). Relic, old-growth longleaf pine are present on parts of CBMB and the adjacent hospital grounds. The hospital property supports a cluster colony of the endangered red-cockaded woodpecker (RCW; *Picoides borealis*), one of only two colonies remaining in St. Tammany Parish (personal communication, Louisiana Natural Heritage Program, Louisiana Dept. of Wildlife and Fisheries (LDWF).

In general CBMB, most of which supported fire-maintained longleaf pine habitats that burned frequently in the past, has been heavily fire-suppressed for decades. Narrow, linear channels of small stream forest and bayhead strands cut through the eastern portion of CBMB along Cane Bayou and its tributaries. The floodplains have mostly been severed from the bayous, rapidly transitioning into a mostly upland condition along the streams. Relatively open cypress-tupelo swamp mixed with what can be called "scrub-shrub wetlands" occurs along Bayou Castine and its tributaries on the western side of CBMB.

Current cover, by habitat type (heavily to moderately encroached wet pine savanna, cypress-tupelo/scrub-shrub swamp, mixed pine-hardwood and degraded pine flatwood uplands) is illustrated in Figure 3 and provided in Table 1. See Section 3.2 below for additional information on current site conditions. See Appendix 1 for representative photographs and refer to Section 3.2 for additional information on current site conditions.

2.0 PROJECT GOALS AND OBJECTIVES

Goals: The primary goal of the Cane Bayou Mitigation Bank project is to restore the degraded and highly altered timberland comprised nearly exclusively of off-site timber species, to a functioning longleaf pine savanna wetland system similar to what was present on the area in pre-settlement times. In addition, it is possible some areas that are currently "upland" may revert to wetland with restoration and management. Secondary goals include preservation of existing cypress-tupelo/scrub-shrub swamp.

By removing the property to be included in the Cane Bayou Mitigation Bank from industrial-type forest management, restoring natural composition and structure of indigenous habitats, and reintroducing or improving natural processes such as prescribed fire and hydrology, we anticipate enhancement of several aquatic functions on this site. These include sediment reduction in wetlands and streams, prolonged hydro-periods, water quality improvement, wildlife diversity and habitat improvement including that for the endangered Red-cockaded Woodpecker, as well as habitat connectivity and sustainability improvement.

Benefits of the proposed wetland restoration include water quality improvement through water filtration and sediment reduction in wetlands and streams, prolonged hydro-periods and floodwater retention, and increased biological productivity and diversity. Because CBMB includes a significant portion of the Cane Bayou watershed, the proposed work will enhance water quality and quantity within this designated Louisiana Natural and Scenic Stream. Cane Bayou is currently designated as impaired due to total dissolved solids, sulfates and turbidity thus the proposed actions should help with attainment goals. Improved water quality will also benefit the Lake Pontchartrain Estuary which is a priority conservation area identified by The Nature Conservancy, the Lake Pontchartrain Basin Foundation, and many other entities (The Nature Conservancy 2004). The Lake Pontchartrain Conservation Area is considered a conservation priority because 1) it is one of the largest estuaries in the nation and retains a relatively intact interaction between freshwater rivers to the north and the Gulf of Mexico to the southeast, 2) it supports a significant commercial and recreational fisheries resource, including oyster reefs, which provide important habitat for countless marine species, 3) it supports rare sea grass communities, which are critically important for many aquatic species, 4) it provides important habitat for a variety of rare or declining species, such as Gulf sturgeon and Bald Eagle, 5) the forested wetlands are among the largest contiguous blocks of cypress-tupelo in the ecoregion, and 6) although relatively limited in aerial extent, the marshes along the north shore of Lake Pontchartrain are largely in excellent condition.

Restoring plant community composition and structure on CBMB will also promote reestablishment of native animal communities and enhance the suite of native plant and animal species found on the site. Many species indigenous to longleaf pine savanna systems, including an array of amphibians and grassland and open-canopy bird species, are species of conservation concern today (U.S. Fish and Wildlife Service 2008). The

endangered Red-cockaded Woodpecker may be the first to benefit, as an active cluster exists on the adjacent hospital grounds and as well as the nearby Big Branch National Wildlife Refuge (NWR). Restoration of CBMB will provide foraging and potential nesting habitat.

There is no doubt that fire-sustained longleaf pine woodlands and savannas historically dominated CBMB (see discussion under 3.1 below). The presence of relic, old-growth longleaf pine trees and other vegetation associated with a fire-maintained ecosystem, as well as historical maps showing the range of longleaf pine in the area, are a testament to this fact (Daigle et.al. 2006; weblink: http://www.epa.gov/wed/pages/ecoregions/la_eco.htm). High quality, functioning longleaf pine wetland natural communities have become very rare in southeast Louisiana and indeed range-wide as a result of increased development, habitat fragmentation, lack of natural fire regimes and other land management activities (Smith 1991, 2004).

Lastly, as a result of this project, CBMB will expand the area already dedicated to conservation in the immediate area (Northshore East Conservation Area) thereby creating a large block of close-proximity conservation lands approaching approximately 24,000 acres in size (including CBMB) to help minimize habitat fragmentation, maximize smoke sheds and the ability to conduct prescribed burns, foster connections (i.e., corridors) between extant habitat conservation areas, and prepare for a future surrounding land-use of higher density suburban development

Objectives: Specific objectives of the Cane Bayou Mitigation Bank project are to:

- rehabilitate 687.9 acres of degraded and highly altered wet pine savanna and associated wetland communities
- preserve 16.1 acres of cypress-tupelo/scrub-shrub swamp
- restore 147.9 acres of mixed pine-hardwood forest and 36.7 acres of pine flatwood uplands within a 200-foot buffer adjacent to wet savanna areas
- conserve remaining upland habitat to serve as additional non-mitigation buffer

Proposed restoration areas are shown in Figure 11 and a summary of existing conditions and proposed restoration and mitigation types as per the Modified Charleston Method (CEMVN, March 2013 Revision) is shown in Table 1.

TABLE 1. Existing Wetland Conditions and Proposed Restoration Types

Existing Wetland Condition	Proposed Restoration Type	Proposed Mitigation Type	Acres	East Parcel	West Parcel
Heavily encroached wet pine savanna	Wet pine savanna	Rehabilitation 1	269.2	269.2	0
Moderately encroached wet pine savanna	Wet pine savanna	Rehabilitation 1	418.7	321.4	97.3
Cypress-tupelo/scrub-shrub swamp	Cypress-tupelo/scrub-shrub swamp	Preservation	16.1	0	16.1
Mixed pine/hardwood forest / Longleaf pine flatwood uplands	Mixed pine/hardwood forest / Longleaf pine flatwood uplands	Upland Buffer (200')	184.6	161.4	23.2
Mixed-pine/hardwood forest uplands outside buffer	Mixed-pine/hardwood forest	Non-mitigation	190.7	190.7	0
Degraded pine flatwood uplands outside buffer	Longleaf pine flatwood uplands	Non-mitigation	10.3	0.8	9.5
Waters of the U.S.)	Non-mitigation	Non-mitigation	10.1	8	2.1
Non-mitigation Areas	Non-mitigation	Non-mitigation	10.3	6.8	3.5
Total Bank Acres			1110	958.3	151.7
Total Wet Mitigation Acres			704	590.6	113.4
Total Mitigation Acres (wet plus upland buffer)			888.6	752	136.6

Proposed activities to meet the goals and objectives for CBMB are aimed to restore degraded wetlands where most functions have been severely degraded by prior land use management, most notably by a fire-depressed vegetation regime and prevalence of off-site species.

Specifically, the project goals and objectives for CBMB are to rehabilitate and protect in perpetuity the physical, chemical, and biological functions of longleaf pine savanna wetlands and cypress-tupelo/scrub-shrub swamp on CBMB. The overarching goal is to restore open longleaf pine wetland composition and structure important for an extraordinary number of associated plants (many rare and endemic or near endemic to this habitat type) and resident and migratory (e.g., migratory birds) wildlife species dependent on open pineland conditions. The following restoration actions are proposed:

- Restore open longleaf pine wetland composition and structure via harvest of off-site timber and other means.
- Re-establish surface and ground water hydrology by removal or amelioration of artificial features that alter natural drainage patterns (e.g., adding culvert to elevated woods road, plugging ditch) and by reduction of tree and shrub density across the site (reducing evapotranspiration and increasing available water).
- Replant 687.9 acres of historic longleaf pine savanna wetlands and 47 acres of pine flatwood uplands with suitable genetic stock of longleaf pine
- Conduct prescribed burning every 1 to 3 years on 687.9 acres of pine savanna wetlands, 184.6 acres of upland buffer habitat plus remaining upland habitats to rehabilitate and maintain indigenous pine savanna composition and structure
- Expand the area already dedicated to conservation in the immediate area (Northshore East Conservation Area) thereby creating a large block of close-proximity conservation lands approaching approximately 24,000 acres in size (including CBMB) to help minimize habitat fragmentation, maximize smoke sheds and the ability to conduct prescribed burns, foster connections (i.e., corridors) between extant habitat conservation areas, and prepare for a future surrounding land-use of higher density suburban development
- Improve water quality, promote sediment retention, and reduce non-point source pollution and chemical runoff by habitat and natural processes restoration and removing the area from commercial timber management and/or potential residential and commercial development
- Ensure long-term viability of the project by employing targeted restoration strategies, including:
    - Adaptive management as needed as the project progresses and making any mid-course corrections as dictated by restoration results and current research on longleaf pine wetland system restoration practices.
    - Monitoring at a frequency and intensity to determine if the compensatory mitigation project is on track to meet performance standards and whether management plan modifications are needed.
    - Invasive species control across not only CBMB but potentially on adjacent property controlled by Sponsor and other adjacent lands.

Some of these activities will occur only once initially, while others will need to be repeated until desired conditions are met. Prescribed fire will be implemented every one to three years throughout the life of the bank and for long-term management. Sponsor's proposed work will produce wetland "credits" that result from restoration of wetland function, plant community structure and composition, natural processes and hydrology. These credits can be used by government agencies in St. Tammany Parish to help compensate for permitted unavoidable impacts in the area associated with US Army

Corps of Engineers (USACE) permits through Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

3.0 ECOLOGICAL SUITABILITY OF THE SITE

3.1 Historic Ecological Characteristics

3.1.1 Geology, Topography and Elevation

The Cane Bayou Mitigation Bank occurs in the East Gulf Coastal Plain (EGCP) Ecoregion (The Nature Conservancy 2001). The EGCP Ecoregion is a portion of Bailey's larger Outer Coastal Plain Mixed Forest Province (Bailey 1994). Ecoregions are defined as broad regions that possess similar soils, topography, plant and animal species, climate, hydrology and other natural processes. The EGCP ecoregion is physically characterized by subtle topography, a warm to hot, humid, maritime climate, and soils derived from unconsolidated sands, silts and clays, transported to the ecoregion by weathering of the Appalachian Mountains and other northern areas. As part of the Southeast Coastal Plain region, other features shared include a high percentage of land area in wetlands, a dominant role of frequent fire over a great majority of the landscape, a diversity of river and stream systems, diverse estuarine and tidal systems, and significant large-scale disturbance events (tropical storms/hurricanes).

The Cane Bayou Mitigation Bank is found on the Pleistocene-aged Prairie Terrace formation on surfaces that show little dissection (Geologic Map of Louisiana, Louisiana Geological Survey, 1984). In fact, the area in southeast Louisiana where CBMB is found is known as the Gulf Coast Flatwoods Region, named for broad expanses of poorly-drained flats, and extends from southeastern St. Tammany Parish to eastern Livingston Parish (Daigle et. al. 2006). Drainages on CBMB are Holocene-aged alluvial deposits.

There is little topographic relief on CBMB except near drainages, as more clearly shown on 4-foot contour LiDAR imagery (Figure 5). Elevation of the site generally trends from north to south and ranges mostly from 8 to 24 feet, with 4 feet along lower sections of Cane Bayou and Bayou Castine. The East Parcel is typically higher (most areas higher than 15 feet) than the West Parcel (most areas lower than 15 feet).

3.1.2 Historic Habitat Conditions

According to old historical accounts (e.g., Lockett 1874) and early and mid-1800's U.S. Government General Land Office survey records (e.g., Gray 1821) that contain accounts of witness trees and anecdotal observations, the majority of the hills and flats of St. Tammany Parish were dominated by longleaf pine woodlands and savannas (Smith 2004; Daigle et al. 2006), including CBMB. Historically (up until the early 1900's), the majority of CBMB supported wet longleaf savannas, bayhead strands dominated by slash pine and hardwood along some upper drainages, small stream forest and cypress-tupelo swamp mixed with scrub-shrub wetland along lower drainages, and upland longleaf pine

flatwoods and non-wet mixed loblolly pine-hardwood forest (Louisiana Dept. of Wildlife and Fisheries 2004). All of these types, excluding small stream forest and cypress-tupelo swamp/scrub-shrub were fire-dependent communities. Frequent surface fire, burning mainly through the herbaceous litter and pine needles on the ground, was arguably the most significant functional process that created and maintained the composition, structure and character of these habitats.

The original wet longleaf savanna habitat of the region was a very open "forest" (canopy cover averaged less than 50% and more appropriately referred to as "woodland" or "savanna"), with the scattered trees almost exclusively longleaf pine, growing over a dense ground cover of grasses, sedges and forbs (Smith 1996). Low tree density in wet pine longleaf savannas was probably attributable to a number of wetland site and soil characteristics, among them: 1) longleaf regeneration is impeded by standing water, which precludes seedling establishment (perhaps the most important factor), 2) high water tables and heavy subsoils inhibit deep root development, thereby encouraging shallow rooting of longleaf, making it more prone to wind-throw, and 3) wetlands are not the ideal environment for longleaf, and trees growing there are under stress, making them more susceptible to insect or disease attack.

The historic wet pine savannas on CBMB occurred on flat areas in between and topographically higher than the drains. They were dominated by longleaf pine woodlands and savannas, with the flatwoods on slightly higher topographic positions. Narrow bayhead strands occupied narrow drainages and were typified by slash pine and a variety of hardwoods. In some areas, switch cane (*Arundinaria tecta*) comprises the dominant understory, possibly helping give rise to the name of Cane Bayou. Frequent fire from lightning and Native Americans helped maintain wet pine savannas and associated habitats on CBMB. Many places burned to or very near active channels of the small drains, thus confining bayhead strands and non-wet mixed hardwood – loblolly pine forest to relatively narrow zones flanking those drains.

Downstream from bayhead strands, down-cutting, probably caused in part from surrounding land use, such as land clearing for timber management and past stream channelization, has resulted in very narrow riparian floodzones. Lower water tables and sloping topography which facilitates relatively quick water runoff, promoted narrow to relatively broad expanses of upland habitat flanking the Cane Bayou and its tributaries. A mixed hardwood – loblolly pine forest dominated by loblolly and spruce pine (*P. glabra*) with mixed hardwoods characterizes these areas. Historically this habitat type consisted largely of longleaf pine and relatively fire-tolerant hardwoods at least on the middle to upper-most slopes away from the streams. Cypress-tupelo swamp is present along Bayou Castine within CBMB.

3.1.3 Historic Land Use of CBMB and Surrounding Area

Early European settlements in the Parish were initially found along streams and the lakefront. Some sawmills were located in these areas where streams facilitated the floating of logs to mills. Broad-scale land-use in the region initially was primarily free-

range cattle and sheep. Later, development spread throughout as the Northshore region became known as the Ozone Belt that provided clean air and natural springs for health and vacation destinations for New Orleanians and others. Large-scale harvest of virgin timber began late in the 19th Century following invention of the steam engine and development of railroads. However, because of the proximity of CBMB to Lake Pontchartrain and nearby bayous, it is likely this area was logged of most of its merchantable virgin longleaf pine timber prior to the middle 1880's (See Sargent 1884, map page 536). From aerial photographs, CBMB property appears to have been managed primarily for timber production and wildlife habitat in relatively recent times (Figures 6a, 6b).

The property has been in State of Louisiana ownership since approximately 1938 when a large tract was purchased from the Great Southern Lumber Company. After purchased, the property was called the St. Tammany State Game Refuge as shown on the 1971 Lacombe, LA USGS topographic map. Part of this property became Fontainebleau State Park and another portion became St. Tammany Wildlife Refuge operated by LDWF. The remaining portions were eventually owned by the Louisiana Department of Health and Human Resources (now Department of Health and Hospitals) who, through the Louisiana Division of Administration, Office of State Lands, managed the timber commercially on much of the property. Some old-growth longleaf pines are still present on the eastern CBMB tract and on adjacent tracts of the Northlake Behavioral Health System grounds and NNC. Some of these trees outside of and adjacent to the bank boundary support an active cluster site of Red-cockaded Woodpecker.

In 1985, some of the state land mentioned above was leased from the Department of Health and Hospitals to NNC and St. Tammany Recreation District 1 in separate long-term leases. The NNC lease has a stated purpose "for outdoor recreation activities and educational programs…for managing and enhancing the forest and the value of the trees by reforestation and other means…," and includes the West Parcel of the proposed CBMB. NNC is a forested nature preserve used for environmental education, hiking and other nature-related activities. It has walking and biking nature trails, boardwalks and bridges designed for minimal impact to the ecology of the site. No structures or improved trails are present on the portion within CBMB. The state lands leased to St. Tammany Recreation District 1 have been developed into Pelican Park, which is a recreation and meeting area comprised primarily of athletic fields and gyms, a dog park, large meeting facility, and associated infrastructure.

The Sponsor purchased the property that includes CBMB from the State of Louisiana in 2012 subject to NNC and Pelican Park leases which expire in 2035. The Northlake Behavioral Health System (former Southeast Louisiana State Hospital) was developed approximately 60 years ago south of the East Parcel, and plans are for it to be purchased by the Sponsor in 2015. In the 1970's, just north of the central portion of East Parcel, a landfill for St. Tammany Parish and the surrounding area was opened. The facility was operated as an unpermitted open dump and closed in 1994 (GEC 2011). Southeast of the landfill are 2 open fields that are filled-in state hospital former oxidation ponds. The ponds have been replaced by a new wastewater treatment facility just north of the junior

high school. A septic treatment right-of-way still exists leading to Cane Bayou on the southeast boundary of CBMB (GEC 2011; Figures 7 and 10).

Population growth in St. Tammany Parish has risen steadily since the construction of the Causeway across Lake Pontchartrain in 1956. Properties southwest of the West Parcel and southeast of the East Parcel of CBMB are now subdivisions (Cane Bayou Estates/Laurel Oaks, and Bayou Acres/Hidden Pines respectively, among others). The city limits of Mandeville have expanded to the west bank of Bayou Castine, immediately adjacent to the West Parcel. In spite of recent residential/commercial expansion in the area surrounding the proposed CBMB, there is substantial undeveloped timberland to the north and east (Figures 4, 7). Fontainebleau State Park comprises approximately 2,800 acres adjacent to Lake Pontchartrain and shares a common boundary with the East Parcel of the proposed CBMB. Additionally, NNC serves to connect the West Parcel of CBMB with Fontainebleau State Park which is adjacent to NNC on the south. Fontainebleau State Park was purchased in 1938 and opened in 1943 (R. Scott, Interpretive Ranger, pers. commun., 2014), and was followed much later by establishment in 1994 of the Big Branch National Wildlife Refuge (NWR), which is owned and managed by U.S. Fish and Wildlife Service (FWS). Big Branch has expanded to nearly 19,000 acres and now occupies much of the Lake Pontchartrain lakeshore from Cane Bayou (common boundary with Fontainebleau State Park) to Bayou Liberty. Combined, Fontainebleau State Park, Big Branch NWR, St. Tammany Wildlife Refuge, NNS and the proposed CBMB comprise over 24,000 acres of essentially contiguous property under conservation management (Figures 1, 7).

3.1.4 Natural Hydrology

The hydrology of CBMB is largely driven by direct precipitation primarily in the winter and spring and sheet-flow from heavy rain events largely in the summer months. The relatively flat terrain, poorly-drained soils and high water table characteristic of the southern part of St. Tammany Parish, which includes the area comprising the proposed CBMB, historically supported a predominantly wetland landscape. The site is drained by two tidally-influenced perennial streams: Cane Bayou (also called Bayou Cane) on the east, and Bayou Castine on the west (Figure 2). From their headwaters to their terminus with Lake Pontchartrain, Cane Bayou and Bayou Castine are approximately 6 miles long, respectively, and drain a watershed totaling about 18,493 acres (Figure 8). Both bayous meander southerly from CBMB for 2 to 3 miles to Lake Pontchartrain. Their tributaries on CBMB appear ephemeral in the upper reaches and intermittent in the lower reaches.

Water levels on Lake Pontchartrain significantly influence stream height and flow rates on Bayou Castine and Cane Bayou. Periods of high tide and strong southerly winds back up water in those bayous, slow the rate of drainage and lead to backwater flooding. Conversely, low tides, combined with strong northerly winds increases drainage rates and water levels within the Bayou Castine/Cane Bayou watershed. During periods of low rainfall within the watershed, the rates of flow decline significantly and wedges of saltwater can penetrate significantly upstream. However, no data have been found to suggest saltwater intrusion occurs as far north as CBMB and no evidence of stressed

freshwater vegetation has been observed. In the upper reaches of the bayous or their tributaries, beaver locally impact hydrology.

The Bayou Castine-Cane Bayou Watershed is south centrally located in the larger Liberty Bayou-Tchefuncte Watershed (HUC 08090201). The CBMB will service that portion of HUC 08090201 located in St. Tammany Parish and totals 444,372 acres (Figure 8).

3.1.5 Historical Fire Regime

Frequent fire primarily from lightning and secondarily by burning by Native Americans created and maintained longleaf pine savannas and associated habitats in the longleaf pine range of the south (Garren 1943), including the land proposed for CBMB. Fires are estimated to have occurred on the order of once every 1 to 3 years in the upland longleaf pine woodlands and wet longleaf savannas of the area. Many of these fires burned up to or very close to active channels of drains and naturally confined most hardwood trees and shrubs to a relatively narrow zone flanking those drains in a bayhead strand community. The nature of vegetation and the fuels they provide, act to reduce fire frequency. The habitat typically burned all the way to the stream channel but with less intensity, thus, these habitats are typically dominated by slash pine and more fire-sensitive hardwoods rather than longleaf pine.

3.2 Current Ecological Characteristics

3.2.1 Recent Land Use

Recent land use on CBMB involved continued commercial timber management by the LA Division of Administration, Office of State Lands, until recent acquisition by the Sponsor. Though managed for periodic timber harvest, none of the area was planted into plantations. A large southern pine-bark beetle outbreak occurred in the area in the mid-1990's that killed mature pine timber on much of the surrounding areas and on portions of CBMB. Dead timber was salvage-logged from most of the bug-killed zones shortly after the event (zones evident on Figures 6a and 6b). Prescribed fire was not conducted by the state on CBMB and in-fact, fire was actively suppressed. However, wildfires have undoubtedly occurred in the area over the years, such as the wildfire in 2001 which burned portions of CBMB, killing some timber. St. Tammany Parish Government acquired the state tract including CBMB, NNC and Pelican Park from the Department of Health and Hospitals in 2012 and is planning to acquire the adjacent Northlake Behavioral Health System.

Public lands adjacent to CBMB comprise a large conservation area herein referred to as the Northshore East Conservation Area, totaling over 24,000 acres, that will complement and benefit from restoration efforts at the Cane Bayou Mitigation Bank.

3.2.2 Current Site Conditions

Wetlands

Wetlands to be restored on CBMB consist of degraded wet pine savanna habitat which is presently in two general conditions as follows.

Heavily Encroached Wet Pine Savanna:
Approximately 269.2 acres in the central portion of the East Parcel of CBMB are heavily encroached pine savanna (Figure 3). This area contains a mature commercial pine forest with towering trees 80 to 120 feet tall, and a well-developed mid-canopy of pine and hardwoods such as water oak (*Quercus nigra*), laurel oak (*Q. laurifolia*), live oak (*Q. virginiana*), sweetgum (*Liquidambar styraciflua*), southern magnolia (*Magnolia grandiflora*), and red maple (*Acer rubrum*). Most of the pine is slash and loblolly, but a few relic longleaf pines remain in two areas. A well-developed 10 to 20 foot tall understory is present, dominated by yaupon (*Ilex vomitoria*), big-leaf gallberry (*I. coriacea*), little-leaf gallberry (*I. glabra*), wax myrtle (*Morella cerifera*), American holly (*I. opaca*) and saplings of canopy and mid-canopy tree species. A poorly-developed herbaceous groundcover is present in this area with remnant longleaf pine savanna species such as suppressed yellow pitcher plants (*Sarracenia alata*). Hydrologic restoration is needed in one area of heavily encroached pine savanna along an elevated woods road built in part with spoil from deeply dredged ditches. The sections where hydrologic restoration is planned are shown in Figure 11 and discussed in sections 3.2.3 and 4.1.2.

Moderately Encroached Wet Pine Savanna:
Moderately encroached wet pine savanna occurs in two main areas on CBMB totaling 418.7 acres (Figure 3). One area in the East Parcel contains wet savanna that experienced a hot wild-fire reportedly in 2001 that killed most of the trees leaving a very open pine overstory and some areas completely devoid of a canopy. In this area a mid-story is also mostly lacking, but a dense shrub layer with most shrubs between 6 and 30 feet tall, is present in most of this unit. The mid-story is comprised of loblolly and slash pine, water oak, dahoon holly (*I. cassine*), little-leaf gallberry, wax myrtle (*Morella* spp.), red bay (*Persea borbonia*), swamp black gum (*Nyssa bicolor*), sweetbay magnolia (*M. virginiana*), fetterbush (*Lyonia lucida*), choke cherry (*Aronia arbutifolia*), and saw briar (*Smilax laurifolia*). Extensive areas of poorly to moderately developed groundcover is present and is composed of several species such as old field broomsedge (*Andropogon virginicus*),savanna bushy bluestem (*A. hirsutior*), panic grass (*Dicanthelium* spp.), savanna panic grass (*Panicum scabriusculum*), honeycomb aster (*Balduina uniflora*), yellow-eyed grass (*Xyris* spp.), beak rush (*Rhynchospora* spp), spikerush (*Eleocharis* sp.), clubmoss (*Lycopodiella* sp.), and meadow beauty (*Rhexia alfanus*). Within the wildfire area is a zone that did not have significant mortality in the overstory, but did so in the mid and understory, which has regenerated in an extremely dense stand of pine saplings.

Another area with moderately encroached pine savanna consists of mostly young pine forest in the West Parcel that was logged in the mid-1990's as a result of the severe

SPBB outbreak referenced earlier, and later was reportedly impacted by a hot wildfire on the northern portion in 2001. This wet savanna area has regenerated into a mixture of loblolly pine and hardwood saplings between 30 and 40 feet tall, and a mixture of native and non-native shrubs, such as wax myrtle and Chinese tallow (*Triadica sebifera*) between 10 to 15 foot tall. The area is now very fire suppressed. Portions of the West Parcel were planted with longleaf pine seedlings by NNC volunteers over the last decade but very few of these seedlings survived. This is due in part to lack of prescribed fire that has allowed invasion by off-site woody species, forming a dense understory and suppressed herbaceous vegetation. Other former SPBB spots that are currently classified as moderately encroached pine savanna are present in the central portion of the East Parcel (Figure 3).

Bayhead Strands:
Within the heavily and moderately encroached wet pine savanna areas are linear zones, or strands, of bayhead swamp habitat that occur along poorly defined shallow drainages within wet pine savanna. These areas are slightly lower topographically than the surrounding longleaf pine savanna habitat and are dominated more by sedges and forbs than highly pyrogenic grasses present in longleaf pine savannas. Because these areas are relatively restricted in extent, they are not mapped separately and are considered inclusions in wet pine savanna (Figure 3). They occur in the extreme upper reaches of tributaries to Cane Bayou. Hardwoods present include swamp blackgum, red maple, and laurel oak. Pond cypress (*Taxodium ascendens*) which is typically in similar settings elsewhere in the region, was not noted. In some areas, the predominant understory is nearly pure stands of switch cane.

Cypress-Tupelo/Scrub-Shrub Swamp:
A portion of the western and southeastern boundary of the West CBMB Parcel along Bayou Castine is cypress-tupelo swamp mixed with scrub-shrub wetlands (Figure 3). [As defined by the Environmental Protection Agency, scrub-shrub wetlands are dominated by shrubs less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This type includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions; http://www.epa.gov/mrlc/definitions.html].

Dominant species in the forested swamp areas consists of bald cypress (*Taxodium distichum*), tupelo (*Nyssa aquatic*), swamp blackgum (*N. biflora*), Drummond red maple (*Acer rubrum var. drummondii*), ash (*Fraxinus spp.*), and sweetgum (*Liquidambar styraciflua*). Lining the banks are additional species such as ironwood (*Carpinus caroliniana*), southern magnolia (*Magnolia grandiflora*), and Chinese tallow (*Triadica sebifera*). Shrub and herbaceous species include wax myrtle, sea myrtle (*Baccharis halimifolia*), black willow (*Salix nigra*), Virginia willow (*Itea virginica*), smartweed (*Polygonum sp.),* Gulf swampweed (*Hygrophila lacustris*), savanna panicgrass (*Phanopyrum gymnocarpon*), lizard tail (*Saururus cernuus*), cattails (*Typha* sp.), iris (*Iris* sp.), common rush (*Juncus effusus*), and giant cutgrass (*Zizaniopsis miliacea*). It is thought that beaver activity, known in the area, and past stream channelization (evident on aerial photographs) has impacted these areas in CBMB and contributed to the current

habitats present. Immediately south of CBMB is well-developed cypress-tupelo swamp along Bayou Castine.

Uplands

In addition to wetlands, a total of 395.9 upland acres are present on CBMB (Figure 3). Uplands are in two general categories as follows.

Mixed Pine-Hardwood:
Most (348.9 acres) of the upland area in the East Parcel is relatively mature, mesic (non-wet) mixed pine-hardwood forest. This habitat type occurs on gentle slopes near Cane Bayou and its tributaries and is dominated by loblolly pine, Elliott's blueberry (*Vaccinium elliottii*), yaupon, green briar (*Smilax bonanox*), and bracken fern (*Pteridium aquilinum*), among other species. Historically this habitat type consisted mostly of longleaf pine and relatively fire-tolerant hardwoods at least on the middle and upper slopes away from the streams, with mixed pine-hardwood closer to the steams on lower slope. With fire suppression and other land management activities, the area changed to this current habitat type.

Pine Flatwoods:
Pine flatwood uplands (non-wet) consist of 47 acres on CBMB and are mostly present in the West Parcel of CBMB, with a few acres in the central portion of the East Parcel (Figure 3). The pine flatwood areas contain slash and loblolly pine approximately 50 to 60 foot tall, southern red oak (*Q. falcata*), white oak, black gum (*N. sylvatica*), sweetgum, southern crabapple (*Malus angustifolia*), yaupon, water oak, tree huckleberry (*V. arboreum*), Elliott's blueberry, wax myrtle, Chinese tallow, and winged sumac. The flatwoods are slightly higher topographically than pine savanna and are relatively flat, compared to the sloping mixed pine-hardwood community. Historically this habitat type was dominated by open longleaf pine forest.

Other Waters

Down-cutting by Cane Bayou and its tributaries immediately downstream from the bayhead strands (discussed above) has resulted in very narrow riparian floodzones with relatively deeply incised banks. A small stream forest of loblolly and spruce pine (*P. glabra*) with mixed hardwoods dominate these areas. Current species in the narrow floodplains include swamp blackgum, sweetgum, laurel oak, red maple and dwarf palmetto (*Sabal minor*), western mayhaw (*Crataegus opaca*) and switch cane. Slopes by the small stream forest consist of many of the same species listed above under mixed pine-hardwood forest. At least one beaver dam was found in along a tributary to Cane Bayou creating a small ponded area. Because the small stream forest zones are so narrow and immediately adjacent to the streams, they have been considered as part of "Other Waters" (Figure 3) and have not been included as mitigation restoration areas.

3.2.3 Soils

Soils on the Cane Bayou Mitigation Bank are diverse and are determined in large part by topographic position (Figure 9). A general soils map (USDA 1990) shows level and very

gently sloping poorly–drained to moderately well-drained soils that are loamy throughout. Soils in the lowest areas occur in stream channels or wet depressions. These include Ouachita-Bibb soils that are frequently flooded and that occur along larger drainages, and Myatt fine sandy loam, frequently flooded found on somewhat smaller drains. Ouachita soils are well-drained silt loams on convex ridges, while Bibb soils are hydric, poorly-drained loams and fine sandy loams found in lower positions in flood plains. Myatt fine sandy loam, frequently flooded, is level and poorly-drained. Soils in historic wet pine savannas are found in broad, flat terraces in a landscape with irregular, slight rises and slightly concave areas. Soils here are level and poorly-drained hydric soils, including Guyton silt loam, Myatt fine sandy loam, and Brimstone-Guyton silt loams. Stough fine sandy loam is also found in pine savanna areas. Stough is classified as a non-hydric soil type; however, many areas mapped as Stough in St. Tammany Parish are actually all or in-part hydric soils (J. Bruza, pers. commun., 1996). Much of the non-wetland areas at CBMB are mapped as this soil type; however, with restoration, some of this area may become wetter with time. Other non-wetland areas of CBMB occur in general flatwoods habitat on low ridges, or natural levees of riparian areas. Soils in these areas include Prentis fine sandy loam, 0 – 1% slopes and Latonia fine sandy loam. The former is level, moderately-well-drained with a fragipan, while Latonia soils are sandy and well-drained without a fragipan.

3.2.3 Current Hydrology

Natural hydrology of CBMB as discussed above under 3.1.4 is largely intact, with the exception of some impacts on Cane and Castine bayous and other impacts discussed below. Current hydrology of Cane Bayou north of and within CBMB has undoubtedly been impacted by stream channelization evident on aerial photographs that occurred mostly south of CBMB, extending to the old railroad tram (now the Tammany Trace) south of US Hwy 190. The immediate floodplain area of the bayou on CBMB is very narrow and areas adjacent to the bayou within CBMB are gently sloping and largely non-wet due in part to rapid precipitation runoff. In addition, lack of regular natural or prescribed fire has resulted in thick brush buildup that has greatly increased evapo-transpiration on site, contributing to dryer conditions. Research in pine woodlands in the southeastern U.S. has shown a clear linkage between vegetation density/tree stocking and the amount of surface and ground water available on site (Edwards et al. 2012, McLaughlin et al. 2013). Cane Bayou (also known as Bayou Cane) was designated as a state Natural and Scenic Stream in 1987 due to its variety of habitats and non-channelized and scenic, navigable southern portion.

Current hydrology of Bayou Castine in its upper reaches has also been impacted by steam channelization, including on the proposed CBMB. As evident on aerial photographs, the stream has been channelized from the cypress-tupelo swamp community on the NNC south of CBMB, northward through CBMB to Interstate 12. Of note, Bayou Castine and Cane Bayou would benefit from stream restoration, something St. Tammany Parish Government may consider pursuing in the future should the New Orleans District recognize impacts to streams for its mitigation requirements.

Other existing impacts to hydrology include an elevated woods road built on a berm of soil that impedes sheet flow, particularly on the western end of the road (Figures 11, 12). In addition, a small ditch dug perpendicular to the elevated road impacts sheet flow and may possibly impact hydrology locally. See Section 4.1.2 for more information and for plans to address these impediments to natural hydrology.

3.2.4 Jurisdictional Determination

A jurisdictional determination of the wetlands present at the entire 1442-acre tract purchased from DHH by the Parish, which includes all of the Cane Bayou Mitigation Bank, was made in August 2012 (Appendix 2). When considering only the part that includes CBMB, 687.9 acres of CBMB consist of pine savanna wetlands, 16.1 acres of tupelo swamp, and 10.1 acres of other waters (stream bottoms), and the remainder is upland. These values exclude non-restorable areas such as roads and trails. See Appendix 3 for acreage calculation documentation of non-restorable areas, which total 10.3 acres. These numbers also take into account that a portion of the boundary in the jurisdictional determination has changed. A revised wetland determination has been submitted to CEMVN. As mentioned above, some of the areas on site, particularly those mapped as Stough silt loam may later be determined as wetland when restoration is completed.

3.3 General Need for the Project in this Area

The proposed Cane Bayou Mitigation Bank will directly address several identified needs, which include the following:

1. St. Tammany Parish is one of the fastest growing parishes in Louisiana and in the country (St. Tammany Economic Development Foundation 2014). Much of the growth is in the southern portion of the parish in the wet "flatwoods" region, thus resulting in a relatively high demand for pine savanna mitigation credits. CBMB will provide high-quality mitigation for permitted wetland loss associated with public works projects within the proposed service area.

2. Conservation of green space and special habitats is a goal of the Parish and thus development of a mitigation bank is timely (see Parish plans cited in Item 4 below).

3. St. Tammany Parish Government has developed and approved 5- and 10-year infrastructure plans that will, if permitted, result in the need for many acres of pine wetland credits in the parish within the proposed service area. By providing their own mitigation, it will prevent quickly deleting the available credits in existing mitigation banks for commercial and private use.

4. Numerous watershed and land-use plans have identified the Lake Pontchartrain Basin, which includes the proposed CBMB, as a conservation

priority. Those plans include East Gulf Coastal Plain Ecoregional Plan (The Nature Conservancy 1999), Northern Gulf of Mexico Ecoregional Plan (The Nature Conservancy 2000), Comprehensive Habitat Management Plan for the Lake Pontchartrain Basin (LPBF 2006), Conservation Area Plan for the Lake Pontchartrain Estuary (The Nature Conservancy 2004), Priority Conservation Areas for the Lake Pontchartrain Estuary Zone (Map, The Nature Conservancy and LPBF, 2006), New Directions 2025 Land Use Plan (St. Tammany Parish Gov., 2003b), New Directions 2025 Critical and Sensitive Areas Plan (St. Tammany Parish Gov., 2003a), and St. Tammany Parish Greenprint (St. Tammany Parish Gov., 2007). In addition, the Louisiana Comprehensive Wildlife Conservation Strategy (Wildlife Action Plan), developed by LDWF, identified longleaf pine uplands and wetlands in the EGCP ecoregion as a conservation priority (Lester et al. 2005).

5. Restoration of CBMB could provide foraging and nesting habitat for the endangered RCW. Active RCW cavity trees are present on the adjacent Northlake Behavioral Health System. This cluster site has been known since the 1980's and has been maintained by artificial means, such as mowing to keep encroaching brush away around colony trees. A growing population of RCWs is also present on nearby Big Branch National Wildlife Refuge (NWR). There are some old longleaf pines on CBMB that could provide potential cavity trees. Once midstory and understory are reduced, residual pine may provide suitable nesting and foraging habitat for birds dispersing from occupied habitat on the hospital and refuge.

6. CBMB will provide benefits to Cane Bayou, a state-designated Natural and Scenic Stream,

7. Restoration and management of pine savanna will benefit numerous rare wetland plant species tracked by the Louisiana Natural Heritage Program. Restoration of CBMB could also provide additional habitat for state and federally-rare species of plants and animals that require upland and wetland pine savanna and several species of grassland birds, which are of conservation concern.

8. The Cane Bayou Mitigation Bank is adjacent to existing conservation and open-space areas that total over 24,000 acres in public ownership. These include the Northlake Nature Center, Pelican Park, Fontainebleau State Park, and Big Branch NWR (portions west of I-10), herein called the Northshore East Conservation Area (NECA). By growing this conservation area, long-term viability and conservation of wetland benefits of both CBMB and the NECA will increase. The proposed CBMB will greatly contribute to biodiversity and wetland habitat conservation of this region and reduce land fragmentation, hydrologic degradation and the challenges and complexity of prescribed burning.

3.4 Technical Feasibility

The technical feasibility of CBMB is achievable with careful design and planning as included herein. Over the past century, the property has been significantly altered from its original, natural state. The original longleaf forest that once dominated the site was cleared for commercial pine plantations and fire has mostly been excluded. The work of the Nature Conservancy and others has shown that restoration of lands in this condition is possible. Required management activities will consist of targeted hydrologic improvements, timber and brush management, invasive species control, and implementation of an aggressive prescribed fire program, all management activities that have been conducted at the adjacent NNC, Fontainebleau State Park and/or nearby Big Branch NWR, and thus are compatible with the area.

The most challenging aspect of the proposed restoration and management may be maintaining the ability to use prescribed fire in an increasingly urbanized landscape and the increasingly difficult challenge of smoke management. Several steps are planned by the Parish to mitigate problems with smoke management. For example, the Parish is considering employing a public information program that will alert new development in the area that occasional smoke should be expected. The Parish will consult with The Nature Conservancy, FWS, Office of State Parks and others to develop a safe and effective prescribed fire program for CBMB.

Because there are known active RCW cluster sites within a mile of CBMB, any proposed restoration and management of the bank property will require consultation with federal and state agencies responsible for RCW recovery. Forest restoration will follow LDWF and FWS regulations near RCW cavity trees. A meeting has been held with LDWF and their recommendations, including that of the RCW Recovery Plan (USFWS 2003; specifically Appendix 5- Private Lands Guidelines) and provided guidance will be incorporated into the proposed CBMB restoration plan (USFWS 2003).

The Sponsor will provide financial assurances to provide for long-term fire management of the site.

4.0 ESTABLISHMENT OF THE MITIGATION BANK

4.1 Site Restoration Plan

4.1.1 Restoration Objectives

The following is a general description of the desired future conditions that will guide the restoration objectives at the Cane Bayou Mitigation Bank. With the exception of a mature longleaf pine overstory, it is estimated it will require a minimum of 5 years for the entire area that originally supported pine savanna to begin to attain the conditions described.

- Restore and sustain the physical, chemical, and biological functions of wetlands and adjacent wetland buffer in perpetuity.

- Wet longleaf pine savanna will be restored to its original extent. Mixed pine-hardwood in uplands along Cane Bayou will receive regular fire and contain many characteristics of open longleaf pine forest, whether or not they are restored to upland longleaf pine habitat.

- Very open, scenic longleaf pine savannas will dominate the site, with only a few hardwood trees mixed in. The area will appear as an open, park-like plain of thick grasses and wildflowers with a relatively open forest canopy. Longleaf pine will be found as scattered individuals, moderately stocked groups, and in relatively dense groupings such that stand density will be variable across the tract to mimic original character of longleaf pine savannas. Likewise, slash pine, where it occurs naturally in lower topographic positions, will vary from scattered individuals to more closely-spaced patches

- Uneven-aged longleaf stands containing multiple age classes of trees, with a variety of age classes present on a typical acre. Different-aged and sized regenerating "cohorts" (patches) of young longleaf pine will be common and scattered about.

- Shrub cover minimal and very patchy throughout the flats.

- Thick, diverse and continuous swath of native savanna herbs, characteristically dominated by many kinds of grasses and sedges and a variety of intermixed native forbs will be ubiquitous throughout the historic savanna flats.

- Minimal invasive, exotic (non-native) species present; and few native weedy species present.

- Hydrologic regime appropriate to sustain pine savanna wetlands and all associated native species.

4.1.2 Initial and Long-term Restoration Management (Mitigation Work Plan)

Because much of the area that historically supported wet longleaf savannas (and longleaf uplands) on CBMB has deviated significantly from its original condition mainly due to past commercial timber management and lack of appropriate fire, restoration management will, by necessity, initially include a variety of aggressive management practices, including very frequent prescribed burning, mechanical and chemical control of invasive native and non-native species, and judicious timbering of off-site species. The use of these practices is necessary to "push" the area toward the structure and

composition outlined in the Restoration Objectives (section 4.1.1 above). All practices must be implemented in a careful and ecologically compatible fashion that promotes the overall ecological integrity of the area.

The following is an overview of the principal management activities that will be needed for restoration and maintenance of the wet longleaf pine savannas, and other wetland habitats on the area. Following the overview are specific restoration/management steps per Management Unit.

Prescribed Fire

Prescribed fire will arguably be the most important regular management tool used on the tract. Burning is a natural ecological process essential for longleaf regeneration, preclusion of unwanted hardwood, shrub and other pine establishment, rehabilitation/perpetuation of rich herbaceous ground-cover communities, and several other benefits. Application of frequent fire is necessary to help restore the native distribution of longleaf pine habitats into areas that have been overtaken by hardwoods and other pines. Further, properly timed fires stimulate native herbaceous plants to grow vigorously, flower and produce seeds, stimulate longleaf pine to grow out of the "grass-stage", and control brown spot needle-blight on young longleaf.

Application of prescribed fire will follow a fire plan designed to restore the wetland areas and upland buffers to natural conditions, and then maintain these conditions in perpetuity. On-going periodic monitoring of site conditions will guide modification of the prescribed fire schedule, if needed, to accomplish priority objectives.

The Sponsor will reestablish the natural frequency and seasonality of fire through an aggressive, strictly regulated ecological burning program. Historically, most fires occurred during the growing season, which in Louisiana is generally considered to be late March to late October, with the majority of fires concentrated in April, May and June (early thunderstorm season). Early to mid-growing season burns will be favored over late growing season or dormant season burns; however, burning will take place throughout most of the year. Burn frequency will eventually average every 2 – 3 years in each burn unit, although in the initial restoration phase we may need to burn more frequently, on the order of every 1 to 2 years, to reduce the midstory and understory hardwood and shrub component and promote the native ground cover.

Natural or existing man-made fire breaks will be used whenever possible to reduce unnatural disturbances to the site and allow burning in larger blocks to mimic natural fire behavior (e.g., burning into ecotonal areas near streams). Large blocks of upland areas near Cane Bayou may not receive fires as intense as the adjacent wetlands, but will be burned concurrently with those wetlands to prevent establishment of unnecessary fire breaks as discussed above.

Time Line: Application of frequent prescribed fire will be an initial and long-term management practice in longleaf pine flatwoods and savannas. Initially, fires may be applied at a frequency greater than the estimated historical frequency to help in the

control of undesirable woody cover and restoration of the native ground cover. Where commercial removal of off-site timber is needed, timing of application of fire will be determined by a number of factors, including timber marketability (whether better burned or unburned) and estimated results of fires burning under different conditions (e.g., before cut or after). All pine savanna restoration areas should be burned at least once by year 3.

Once restored, wet pine savannas will be burned long-term at the estimated historical fire frequency (approximately every 2 – 3 years).

Hydrology Remediation

As discussed in Section 3.2.3, some artificial features and conditions are significant and their remediation will result in improved wetland functions and services, discussed as follows.

Elevated Woods Road: An elevated woods road is present in the west portion of the East Parcel of CBMB. The road, which measures 4,500 feet long and 20 feet wide, is elevated an average of 1 foot, but is nearly 2 foot in places (Figure 11). It was built from spoil from ditches dug on both sides of the road with the ditches deepest on the eastern end. Because the elevated woods road is essential for access and management needs, particularly for prescribed fire, there are no plans to remove this road. An 18-inch-wide culvert is present on the eastern end of the road and it appears to minimize the impediments to flow caused by the road. However, on the western end of the road there is a non-functional culvert where a natural ephemeral channel exists, draining from northeast to southwest. The Sponsor plans to rehabilitate this drainage by installing a new 18 inch culvert in this location. Figure 11 shows the location of the existing and proposed culvert, with specific details in plans shown in Appendix 4a.

Ditch: An approximately 700 foot long and 4 foot wide ditch runs perpendicular to the elevated woods road discussed above. There is shallow spoil evident along the ditch, which itself is very shallow, averaging 1 foot deep, running parallel to an existing swale. The ditch was dug apparently to speed drainage of a portion of the wet savanna area away from the elevated road to a lower wet savanna area. Drainage here flows from the northeast to southwest. As shown in Appendix 4b, the Sponsor proposes to plug the ditch with 3 earthen plugs on the eastern portion which is more incised. The plugs will span the width of the ditch with height to the natural grade of the surrounding topography. This activity will slow down water flow and cause it to fan out more readily into the adjacent savanna. The material for the plugs will be obtained off-site and brought in for this purpose.

Further assessments of unnatural influences on hydrology at the site will be made during the restoration process. If alterations to hydrology are significant, steps will be taken to restore natural hydrologic conditions to the area.

Time Line: This is an early restoration activity that will be completed prior to initial credit release for the management unit.

Mechanical and/or Chemical Control of Non-merchantable Slash and Loblolly Pine Hardwoods and Brush

In many areas, fire will work alone to control/kill most young undesirable brush and trees. However, there are areas where brush is too mature to be killed by fire or where fire will not penetrate due to lack of adequate fuel conditions, and mechanical and/or chemical methods will be needed initially to control undesirable woody species. Mechanical treatment (e.g., strategic bull-dozing, brush mowing, mechanical chopping, hand felling) will be the first step in such areas, and an evaluation will be made soon after treatment to determine whether native grasses are colonizing the area with sufficient density to carry fires. If brush is not sufficiently reduced after the initial chemical and mechanical treatments and at least one prescribed burn, a follow-up herbicide application or additional mechanical treatment may be necessary. If insufficient desirable grasses develop after subsequent herbicide/mowing treatments, plantings of desirable grasses may need to be performed (see "Native Ground Cover Plantings" following).

Time Line: Evaluation of areas that need mowing/herbicides for control of undesirable woody species will be made in year one. Undesirable brush and trees should be controlled across entire tract within first 3 years.

Commercial Logging of Pine and Hardwood

Prior to development of a timber management plan, a thorough search for the endangered Red-cockaded Woodpecker and relic longleaf pine will be conducted following methodology under the RCW recovery plan (USFWS 2003). To facilitate restoration of pine wetlands, commercial logging of undesirable pine (slash & loblolly pine where longleaf pine occurred) and hardwoods will be needed in wetland portions and upland buffers of CBMB, primarily in the Eastern Parcel. Not all pines will be removed, to allow for foraging habitat for RCW and desired needle-drape to provide extra fuel for prescribed fires. Extensive blocks of mixed pine-hardwood forest in pine flatwoods and mesic slopes along Cane Bayou may or may not be logged and restored to longleaf pine by the Sponsor since those areas are non-wet, and are relatively mature and scenic. Should any timbering occur in the uplands, those areas will be reforested with longleaf pine as appropriate. The upland areas will not be excluded from regular fire and will be burned along with the pine wetlands.

All logging will be governed by comprehensive timber deed developed by the Sponsor that provides extensive direction and guidance to the logging contractor on how the timbering will be conducted to be as ecologically sensitive as possible. In addition, all logging events will be carefully monitored by the Sponsor on a daily basis to ensure all requirements are being followed. After initial logging events for restoration purposes, commercial logging will cease on the property, including salvage logging, unless deemed essential for habitat restoration and only following a timber management plan approved by the IRT.

Time Line: This assessment will be made within the first year and all commercial timber operations will be completed by year 2.

Chemical Control of Invasive, Non-Native Plants

The primary invasive plant species noted on site thus far that will need treatment include cogon grass (*Imperata brasliensis/cylindrica*), Chinese tallow tree (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*), and Cherokee rose (*Rosa laevigata*). Tallow tree and privet in pine savanna areas will be principally controlled by frequent fire. However, there may be some problem areas or scattered individuals that will need herbicide treatment. Much of this will be addressed during chemical and mechanical brush control operations where undesirable native and non-native species will be targeted. Following this activity, the Sponsor will apply at least two prescribed burns and then thoroughly survey the site to assess tallow and privet control. If needed, appropriate herbicides will be applied to problem areas. Tallow and privet along or near the drains may need direct chemical treatment since fire will probably not be frequent or intense enough to control them in those areas. Cogon grass is a highly invasive grass that occurs in patches primarily along existing roads and trails, particularly near the closed landfill where it is prevalent. The Sponsor will not only control cogon grass on the mitigation area, but will implement control on all its ownership in the area to prevent recurring infestation on CBMB.

Personnel will remain constantly vigilant for the appearance of other invasive non-native species. If any other problematic invasive species are detected, an appropriate treatment program will be devised and implemented.

Time Line: Chemical treatment of all known patches of cogon grass, tallow, privet and Cherokee rose along Cane Bayou, Bayou Castine and their tributaries will be performed the first year. Follow-up treatments to occur periodically as these and other species are detected.

Longleaf Pine Plantings

Longleaf pine will need to be planted in former longleaf pine zones. If practicable, longleaf will be planted in a "patchy" pattern, or in "random rows" rather than in regular rows. Plantings will be done in areas lacking or inadequately stocked with longleaf pine and that have sufficient herbaceous ground cover to carry frequent fires. Planting density will vary widely due to patch planting specifications, but will average approximately 200 - 300 trees per acre. The goal is to achieve 10% - 80% longleaf canopy cover. In areas that do not have sufficient grassy groundcover, longleaf will be planted in regular rows to allow for a future spot treatment chemical release if needed.

Time Line: Initial longleaf planting to occur within the first 2 years and will follow creation of suitable planting conditions by burning, and control of undesirable native woody species.

Native Ground Cover Plantings
Strategies for restoring native savanna ground cover in the southeast U.S. are relatively new and much is unknown about the best methods (e.g., planting times, planting rates, seed bed conditions, etc.). In addition, local ecotype seeds of needed species are very limited in availability.

Ground cover plantings may be needed in a limited number of places where native grasses fail to sufficiently recolonize areas (such as in treated cogon patches) to effectively carry fire. Initially, at least a few desirable warm season grasses, such as broom-sedges and little blue stems (*Andropogon* spp., *Schizachrium* spp. respectively), may be needed to establish a robust fire-carrying ground cover. If local ecotype seed materials do not become commercially available in the next few years, seeds may need to be collected from nearby source areas for these plantings. This has been successfully performed by The Nature Conservancy elsewhere in St. Tammany Parish, and the Parish will consult with The Nature Conservancy for guidance in any native ground cover planting needs.

Time Line: If establishment of desirable local native graminoids is considered insufficient to carry fire, warm-season native grasses will be planted. Plantings will follow removal of undesirable trees and brush and completion of at least two prescribed burns; by year 5, if needed.

4.1.3 Other Management

Road Maintenance
Occasional road maintenance will be needed to allow for access for management and to prevent erosion into area drainages. Maintenance may involve a variety of techniques, such as grading, dozing, reshaping, adding fill, placement of water bars, and adding gravel or other permeable material to stabilize the road surface.

Property Survey & Boundary Maintenance
The property boundary needs to be surveyed marked appropriately. The boundary will need periodic remarking to be maintained.

Recreation and Interpretive Signs
As mentioned above, the West Parcel has an existing nature trail (the North Loop trail) that is part of Northlake Nature Center. This trail is open for foot and bicycle traffic only. Occasional maintenance will be needed such as grading and adding gravel or other permeable material. The North Loop trail provides a good fire break and access for interior ignition and can be shut down on short notice for prescribed burns. Also, as mentioned above, future nature trails may be desired on the East Parcel as well, particularly in the larger blocks of upland habitat. Planned trails will occur along existing roads or trails in wetlands or along Cane Bayou in uplands. All new trails and development methodology will receive approval by the IRT prior to installation. No recreation activity will be allowed to negatively impact management of CBMB. The Sponsor may add educational interpretive signs in the future, similar to what The Nature

Conservancy has done on its Abita Creek Flatwoods and Lake Ramsay Savanna mitigation banks, to inform the public about the ecology of the Cane Bayou Mitigation Bank and provide information on its management

4.1.4 Monitoring

Sponsor will perform initial, interim and long-term monitoring, employing methods and on a schedule set by the MBI, to determine the effectiveness of implemented restoration actions, progress toward set restoration objectives, and whether or not adaptive management measures need to be implemented, such as control of previously undetected or newly arriving invasive species, replanting of longleaf pine, additional hydrologic remediation actions, or other restorative activities.

4.2 Current Site Risks/Encumbrances

The following are site risks or encumbrances known to potentially affect CBMB with comments on how to address these issues, if needed.

1. As mentioned above, there is risk of smoke management issues from burning in a growing suburban environment; however, the Parish plans to mitigate this threat with carefully designed, smaller fire units that can be burned in a relatively short period of time, and with fire prescriptions (management plans) that are conservative as far as the conditions under which a burn can be conducted. The Parish is considering the appropriateness of special regulations as well as developing a public information program to notify businesses and residents that occasional smoke may be experienced on currently undeveloped property to the north of CBMB.

2. The Parish plans to construct a road with a 200-foot right-of-way within the next 5 years that will extend from US Hwy 190 to Parish Road 1088, commonly called the Mandeville Bypass. This extension will be on the east boundary of Pelican Park and on the west boundary of the East Parcel of CBMB (Figures 7, 11); however, the final route has not been determined. As currently planned, it follows a paved access road and later a small dirt road already on-site. As this area is already open and developed by the Pelican Park Recreation Area, hydrologic impacts should be minimal and the Parish is prepared to close the road if needed to accommodate control burns. This acreage in not included in the proposed bank boundary.

3. The closed St. Tammany Parish Landfill is located north of the center portion of the property. This facility was closed in 1994 in compliance with LDEQ regulations. A recent Phase I environmental assessment stated "because the landfill continues to be actively monitored, and groundwater constituents do not exceed applicable standards …with continued

monitoring, the landfill should not pose a risk to the project area" (GEC 2011).

4. The West Parcel of CBMB is leased from the Parish by the Northlake Nature Center (NNC), a 501c3 non-profit conservation group. The lease was a 50-year lease when initiated, with approximately 21 years remaining in the lease. See comments above under section 4.1.3 for planned management in this area. As discussed above, there are benefits to fire management by maintaining the existing trails in this area and they can readily be closed when management such as prescribed fire dictates.

5. There is a right-of-way for a major electric transmission line owned by CLECO on the western edge of the East Parcel (Figures 10, 11). This transmission line connects to an electrical transfer station adjacent to the landfill near CBMB. No negative impacts are anticipated by the presence of this transmission line or transfer station. The transfer station is not included in the bank boundary.

6. A right-of-way for a sewer discharge pipeline from the Behavioral Health Center traverses the extreme southeastern tip of the East Parcel of CBMB and discharges into Cane Bayou (Figure 10). This right-of-way forms part of the southeastern boundary of the proposed bank.

7. Co-located natural gas pipelines form a right-of-way corridor on the eastern boundary of the West Parcel of CBMB. The older pipelines are owned by TriStates NGL Pipeline LLC. and Gulf South Pipeline Company (GEC 2011). This R-O-W was recently widened to approximately 60 feet to accommodate a new pipeline owned by Parkway Pipeline. The pipeline rights-of-way provide a good fire break between CBMB and Pelican Park, and ecological restoration using native seed was required by the NNC (Larry Burch, pers. commun. 2013).

8. Elevation of CBMB ranges mostly from 8 to 24 feet, with 4 feet along lower sections of Cane Bayou and Bayou Castine (Figures 2, 5). Should sea level rise occur at high levels predicted, it could possibly allow for some saline water movement up the stream channels, but this should have minimal effect in the pine wetlands during this century.

9. No other significant site risks are evident, save for the potential for development to the north of the site. The Parish has received no plans for such potential development. No anticipated hydrologic impacts are expected over which the Parish has no control.

4.3 Long-Term Sustainability of the Site

There are no issues anticipated with long-term sustainability of the site. Proposed management of CBMB is compatible with adjacent conservation and recreation areas. Ownership and long-term management by St. Tammany Parish will help ensure long-

term stability and favorable management oversight. A third-party conservation servitude holder will independently monitor the site for future generations. The hydrology of pine wetlands is primarily rainfall driven, thus there are no structural management requirements following restoration. The Sponsor will provide financial assurances as allowed in the 2008 Rule to insure that long-term stewardship needs will be met (US Army Corps of Engineers 2008).

5.0 PROPOSED SERVICE AREA

To provide compensation for impacts to pine flatwood wetlands by government agencies in St. Tammany Parish, the Bank Sponsor proposes the Liberty Bayou – Tchefuncte watershed as defined by the USGS Hydrologic Cataloging Unit 08090201 (Figure 8). No secondary service area is proposed, as it would include areas outside St. Tammany Parish or outside of the CEMVN.

6.0 OPERATION OF THE MITIGATION BANK

The Cane Bayou Mitigation Bank will be owned and operated by St. Tammany Parish Government with an approved third party conservation organization, such as The Nature Conservancy, holding a conservation servitude on the site. The Parish will seek technical assistance by the agents listed below during the restoration and management process.

6.1 Project Representatives

Sponsor:	St. Tammany Parish Government 21490 Koop Drive Mandeville, LA 70471 Contact: David Brunet dpbrunet@stpgov.org; 985-898-2552;
Agent:	Biological Solutions Thomas K. Brown, President P. O. Box 94 Covington, LA 70433 Tbrown52@bellsouth.net 985-893-1321 (Office); 985-373-4540 (mobile)
Consultant:	The Nature Conservancy P O Box 1657 Abita Springs, LA 70420 Contact: Nelwyn McInnis nmcinnis@tnc.org 985-809-1414 (office); 985-320-9284 (mobile)

6.2 Qualifications of the Sponsor

St. Tammany Parish Government's budget is one of the largest of the Louisiana parishes and will provide adequate oversight to this project as required. Audits on fiduciary responsibilities carried out by the parish have been favorable as indicated by the Government Finance Officers Association's Certificate of Achievement for Excellence in Financial Reporting in 2011 for their Comprehensive Annual Financial Report for the 9th straight year, and several bond ratings of "AA" or higher. The Parish has a history of progressive action toward highlighting the importance of greenspace and land-use planning. In 1992 the Parish developed the Tammany Trace, a rails-to-trails project across the parish totaling over 30 miles. In 2000, the Parish began a 25-year land use plan, called New Directions 2025, which resulted in conservation recommendations, as well as a developed parish-wide land-use map incorporating desired conservation areas. This was followed in 2007 by another conservation planning effort called "Green Print" in which the Trust for Public Lands developed a conservation tool for the Parish to identify important areas for conservation, such as wetlands, among other uses, which included parts of CBMB. Comprehensive rezoning in the parish in 2010 utilized these products. St. Tammany Parish purchased Camp Salmen, a former boy-scout camp property, in 2004, for the purpose of habitat restoration and development of a nature park. The Parish's Department of Engineering, Environmental Program is involved with coastal as well as inland restoration projects, including CWPPRA projects, Christmas tree marsh restoration and Christmas tree fish habitat projects. In addition to their own staff, the Parish will be consulting and contracting with knowledgeable entities, such as the agent and consultant above, to oversee and conduct the restoration work at CBMB.

6.3 Proposed Long-Term Ownership and Management Representatives

Proposed long-term ownership of CBMB will be the Sponsor, St. Tammany Parish Government. The Sponsor also plans at this time to be the long-term manager. The Parish plans to contract out needed monitoring and management work, such as prescribed fire, with qualified entities such as The Nature Conservancy and Biological Surveys.

6.4 Site Protection

Sponsor, or its heirs and assigns shall be responsible for maintaining and protecting the lands contained within CBMB in perpetuity. Protection will be facilitated via a conservation servitude held by a qualified, non-profit conservation organization, such as The Nature Conservancy, that will monitor the site annually in accordance with the terms of the conservation servitude. The area in the servitude will match that contained within CBMB. The version of the conservation servitude proposed for execution and recording in the real estate records of the Mortgage and Conveyance Office of St. Tammany Parish shall be provided to CEMVN for review and approval prior to filing. After filing, a copy of the recorded conservation servitude, clearly showing the book, page and date of filing, will be provided to CEMVN. Any change to the conservation servitude must be subject to a 60-day advance notification and approval by CEMVN.

6.5 Long-Term Strategy

Long-term management will consist of prescribed burning, invasive species control, and erosion control as needed. Some forest management may be needed in the event of a tropical or wind storm, or insect outbreak such as SPBB, damage from wildfire, or other unforeseen factors. In such an event, the Sponsor will submit a forest management plan to the IRT for approval prior to initiation of any work. The forest management plan will be consistent with the goals and intent of the Cane Bayou MBI and conservation servitude. Additional recreation may be desired in the future in addition to that discussed in this Prospectus or included in the MBI. All recreation allowed will receive approval by the IRT prior to initiation. Should any direct or indirect negative impacts occur from recreation activities, that activity will be discontinued.

The Sponsor will continue to promote biodiversity on site and to maintain habitat suitable for the endangered Red-cockaded Woodpecker, including allowing trees to become old-growth, maintaining recommended forest densities and structure, and allowing monitoring for this and other rare species. A long-term management plan will be included in the MBI that will detail long-term management needs, costs, and funding mechanisms. The Sponsor commits as much as in its power to maintain appropriate zoning and regulations to allow continued management of the Cane Bayou Mitigation Bank for future generations.

Stream restoration activities along Cane Bayou or Bayou Castine may be conducted by the Parish should the CEMVN recognize and allow for stream mitigation, or should other funding be found. Any stream restoration or maintenance activities will be approved by the IRT prior to initiation.

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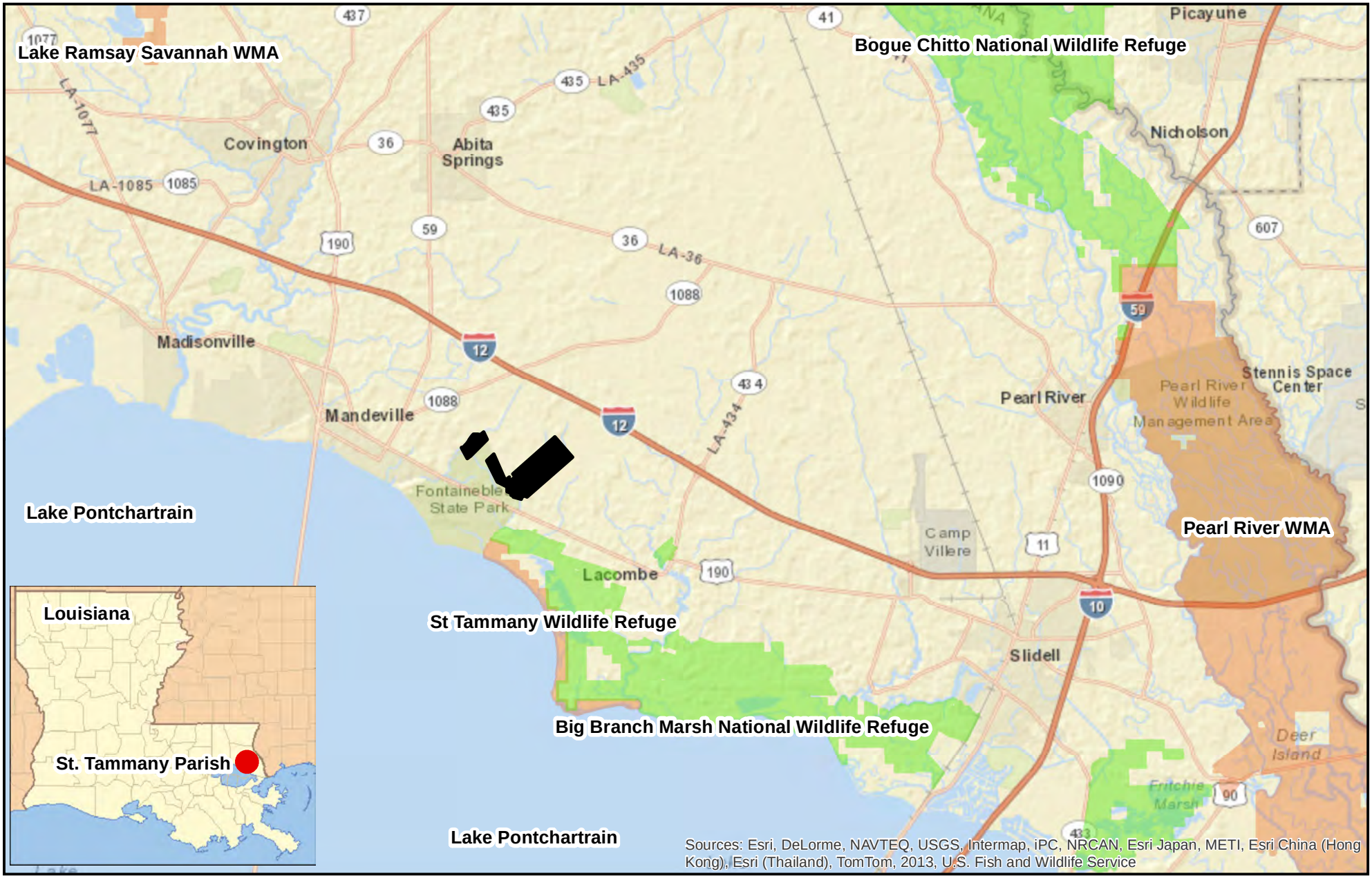
FIGURES AND APPENDICES

CBMB



Legend

- Cane Bayou Mitigation Bank
- National Wildlife Refuges (<3M)
- LDWF WMA Refuge

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Vicinity Map
Figure 1

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

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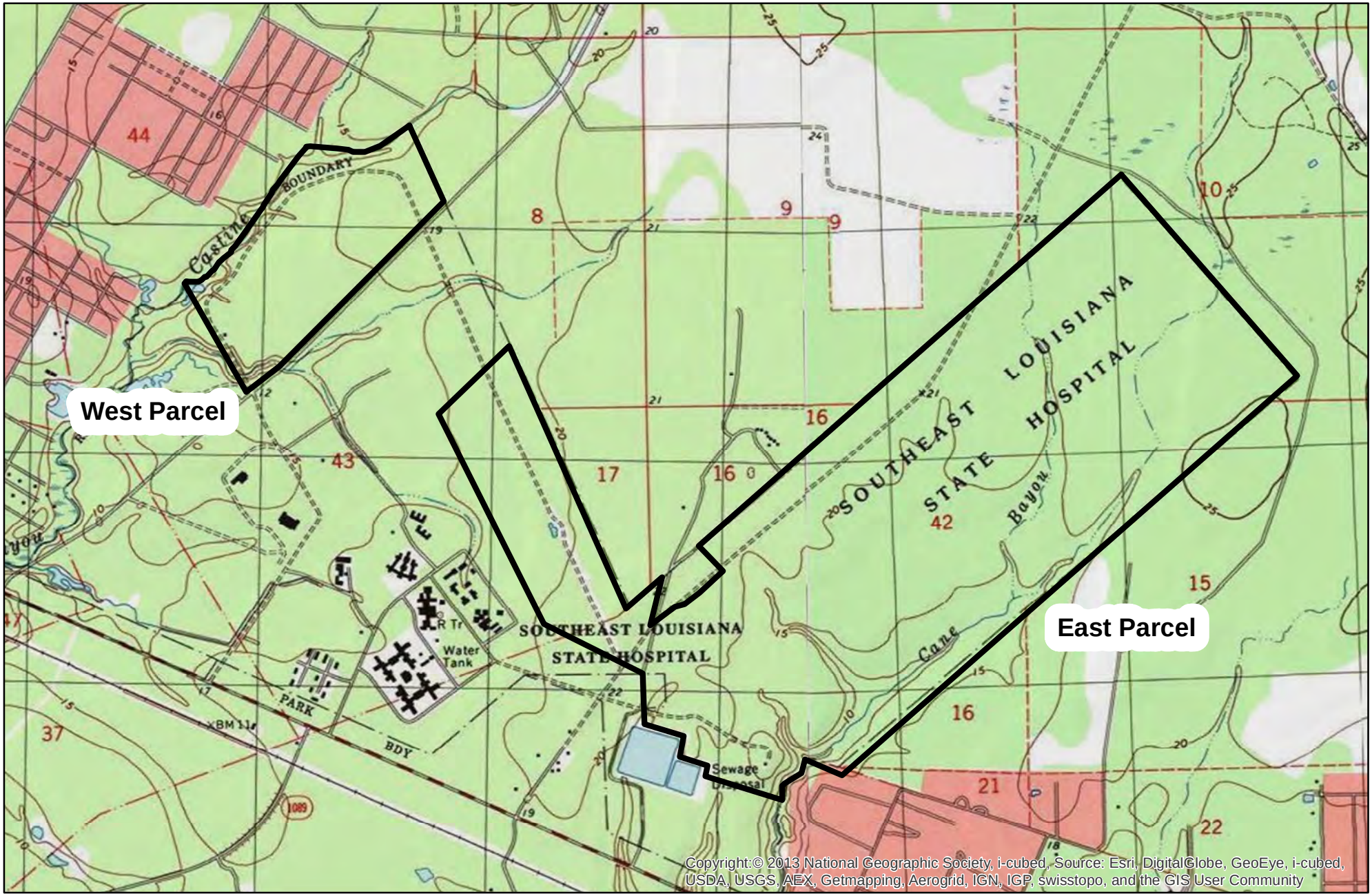

Legend

Cane Bayou Mitigation Bank

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Mandeville and Lacombe, LA Quadrangles
USGS Topographic Map
Figure 2

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

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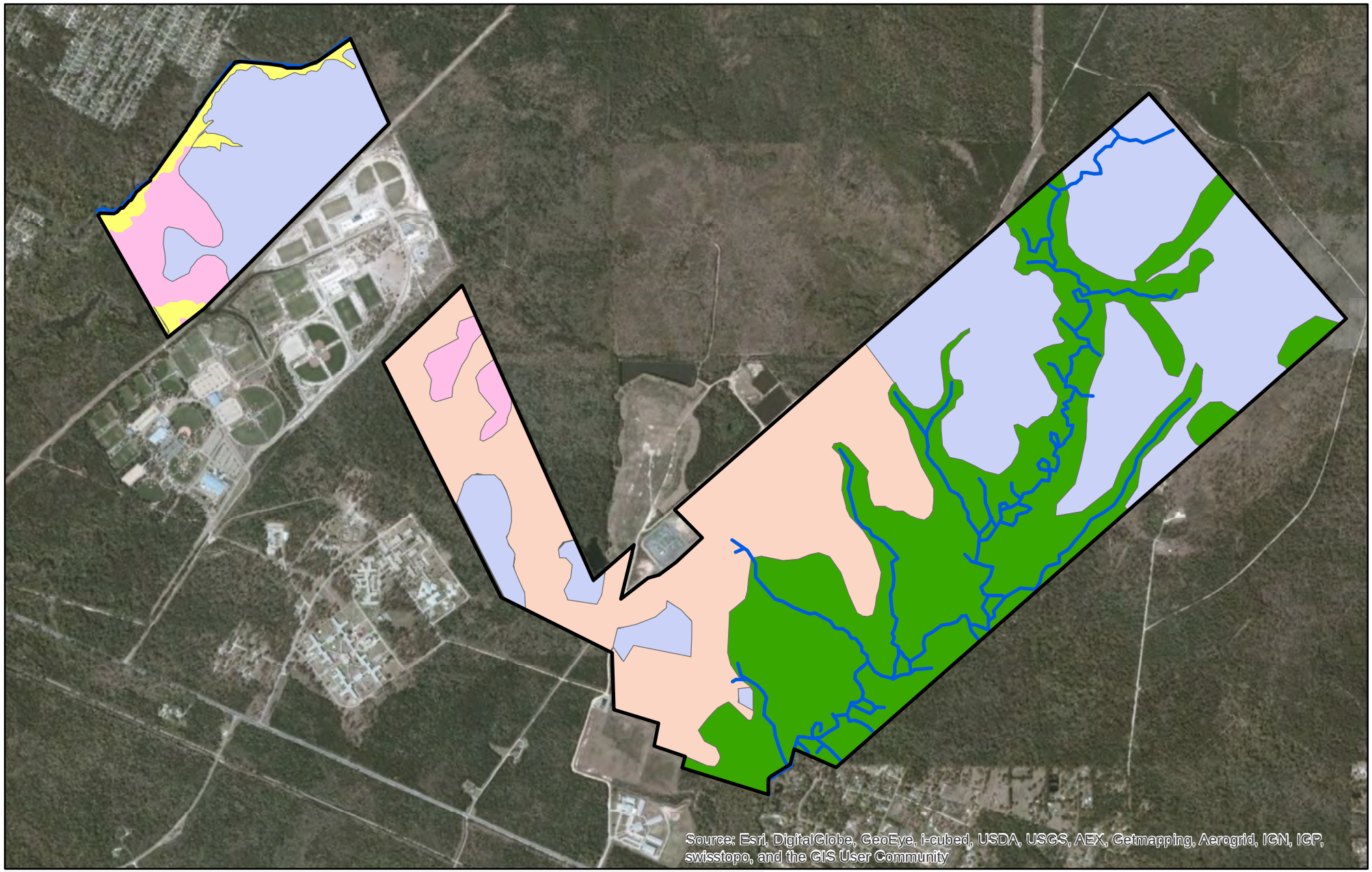

Legend

- Cane Bayou Mitigation Bank ±1110 ac
- Moderately Encroached Pine Savanna ±418.7 ac
- Heavily Encroached Pine Savanna ±269.2 ac
- Cypress-Tupelo/Scrub-Shrub Swamp ±16.1 ac
- Degraded Pine Flatwood Upland ±47 ac
- Fire-suppressed Mixed Pine-Hardwood Upland ±348.9 ac
- Other Waters ±10.1 ac

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Current Habitat Conditions on the Cane Bayou Mitigation Bank
Figure 3

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

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Legend

Cane Bayou Mitigation Bank

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

2013 Aerial Photo
Figure 4

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

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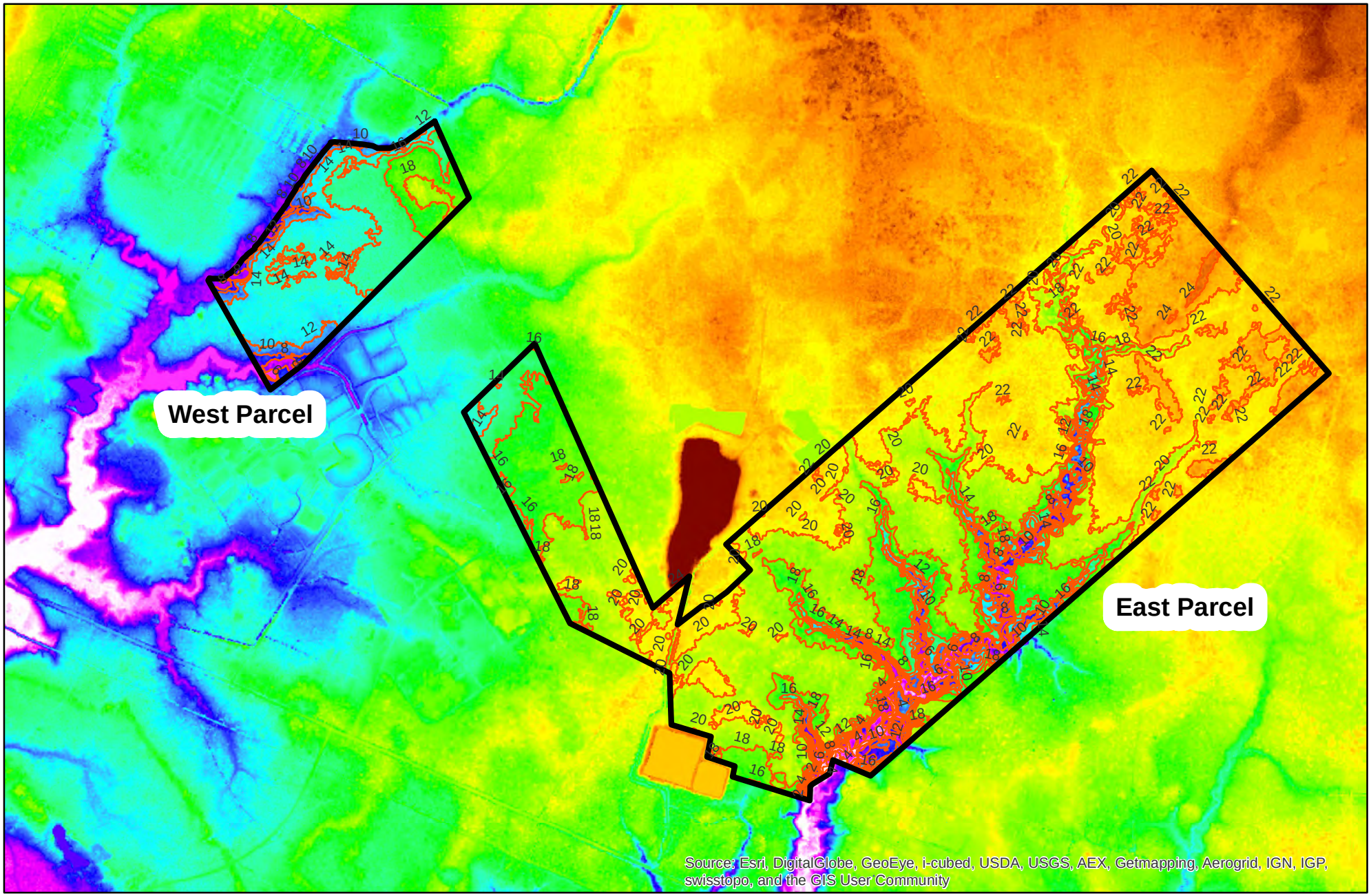

Legend

- Cane Bayou Mitigation Bank
- Contours (2-ft)

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Mandeville and Lacombe, LA Quadrangles
LIDAR Map
Figure 5

Biological Surveys, Inc.
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Covington, LA 70434
Date: April 22nd, 2014

N

0 1,300 2,600 3,900 Feet

Legend

Cane Bayou Mitigation Bank

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Historical Aerial 1998
Figure 6a

Biological Surveys, Inc.
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Covington, LA 70434
Date: April 22nd, 2014

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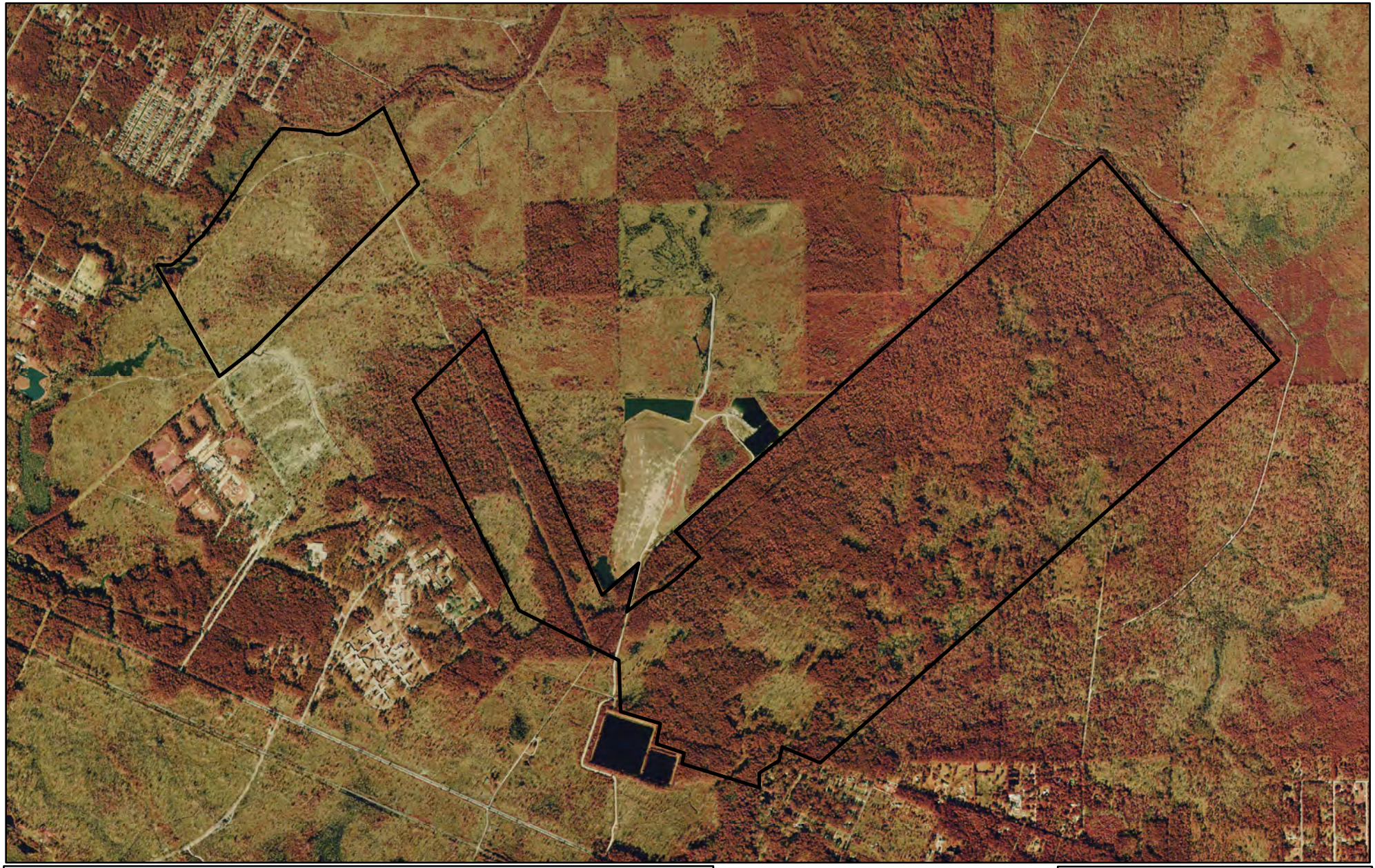

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Cane Bayou Mitigation Bank

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Historical Aerial 2004
Figure 6b

Biological Surveys, Inc.
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Covington, LA 70434
Date: April 22nd, 2014

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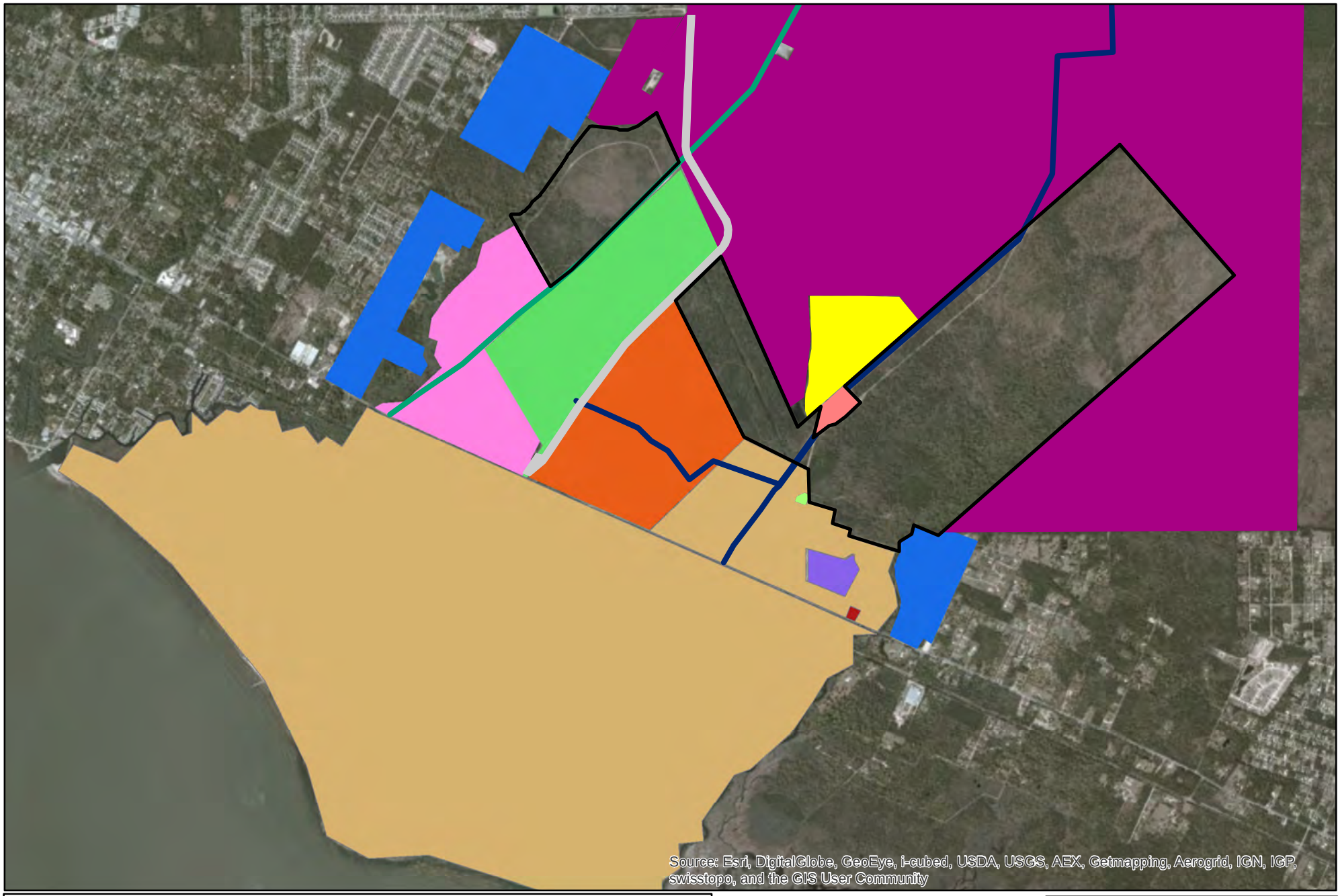

Legend

- Cane Bayou Mitigation Bank
- Sewer Treatment Plant
- Electric Transfer Station
- Proposed Roadway
- Powerline
- Abandoned Landfill Complex
- Gas Pipeline
- Private TimberLand
- Residential
- Northlake Nature Center
- Nothlake Behavioral Health System
- Public Lands
- High School
- Fire Station
- Pelican Park

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Surrounding Land Use
Figure 7

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

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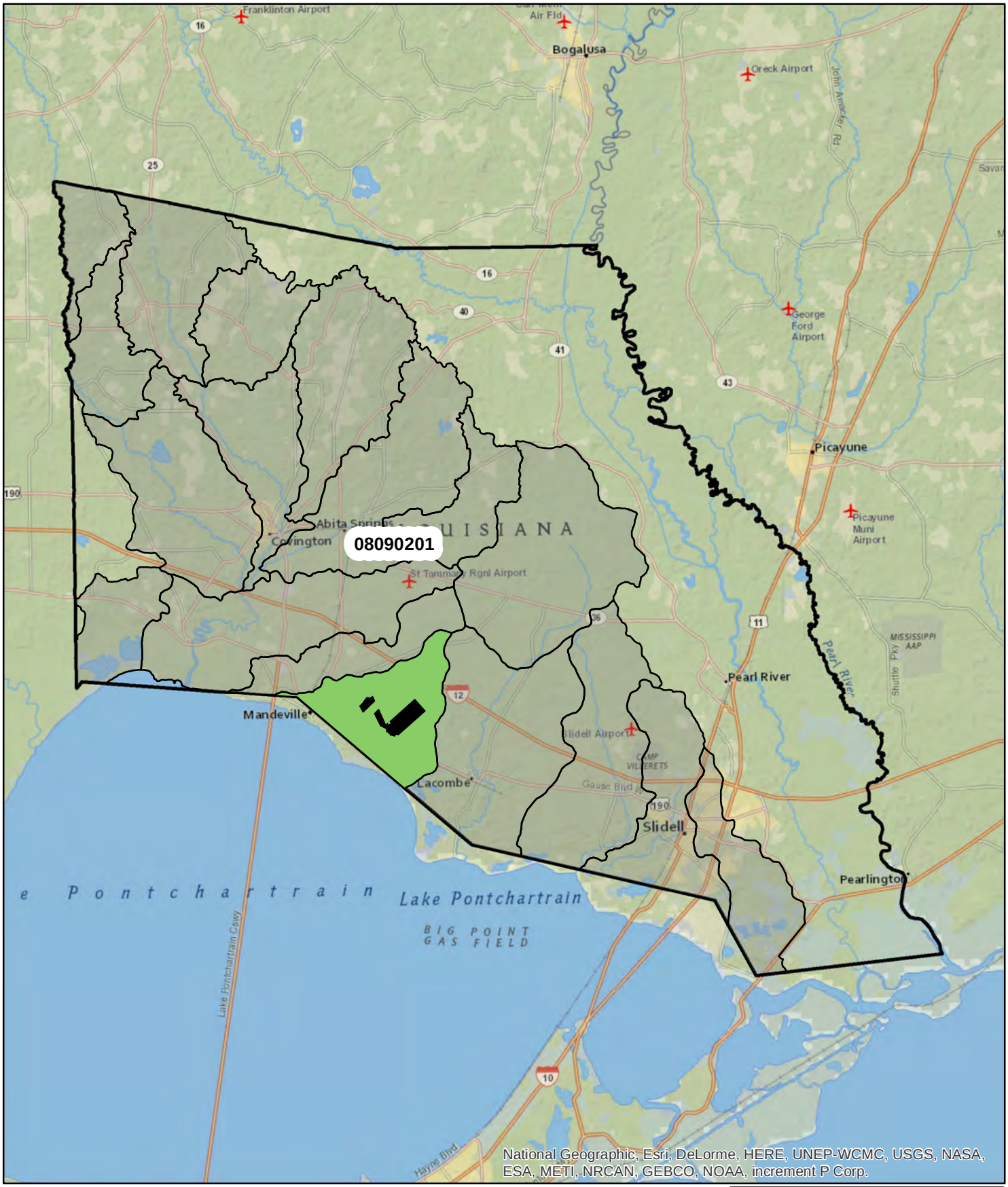

Legend

- Cane Bayou Mitigation Bank
- Primary HUC-08090201
- St. Tammany Parish
- Watershed Boundary
- Bayou Castine-Cane Bayou Watershed

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Bayou Castine-Cane Bayou Watershed and Proposed Service Area (HUC 08090201)
Figure 8

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

0 4 8 Miles

Legend

- Cane Bayou Mitigation Bank
- W- Water
- Aa-Abita silt loam, 0 to 2 percent slopes
- Bg-Brimstone-Guyton silt loams
- Dp-Dumps
- Gt-Guyton silt loam
- Lt-Latonia fine sandy loam
- Mt-Myatt fine sandy loam
- My-Myatt fine sandy loam, frequently flooded
- OB-Ouachita and Bibb soils, frequently flooded
- Pr-Prentiss fine sandy loam, 0 to 1 percent slopes
- St-Stough fine sandy loam

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Soils Map
Figure 9

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

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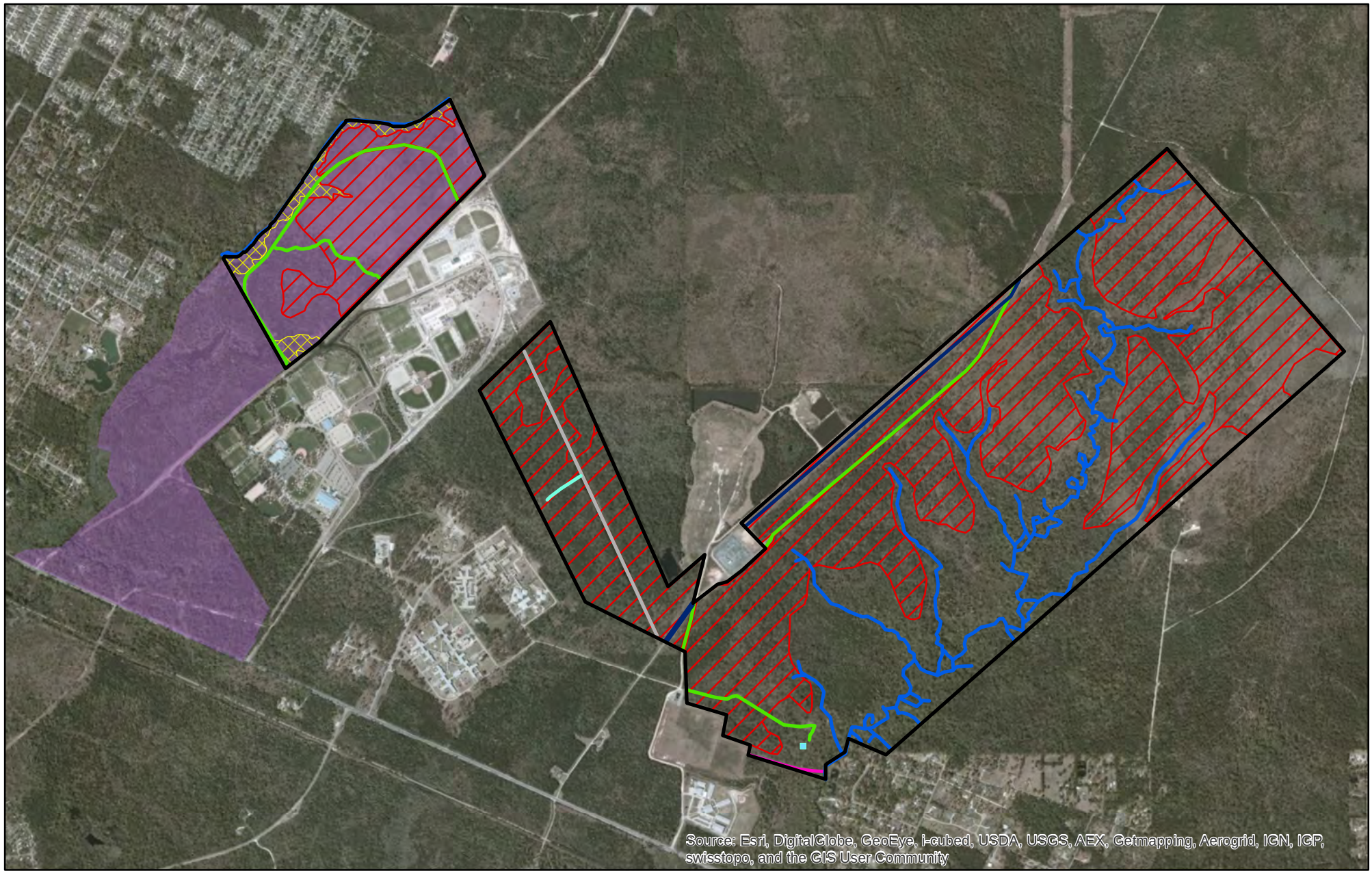


Legend

- Cane Bayou Mitigation Bank
- Wetlands (Pine Savanna)
- Cypress-Tupelo_Scrub-Shrub Swamp
- Part of Northlake Nature Center
- Ditch
- Other Waters
- Sewer ROW
- Powerline within Bank
- Old PumpHouse
- Roads/Main Trails
- Elevated Woods Road

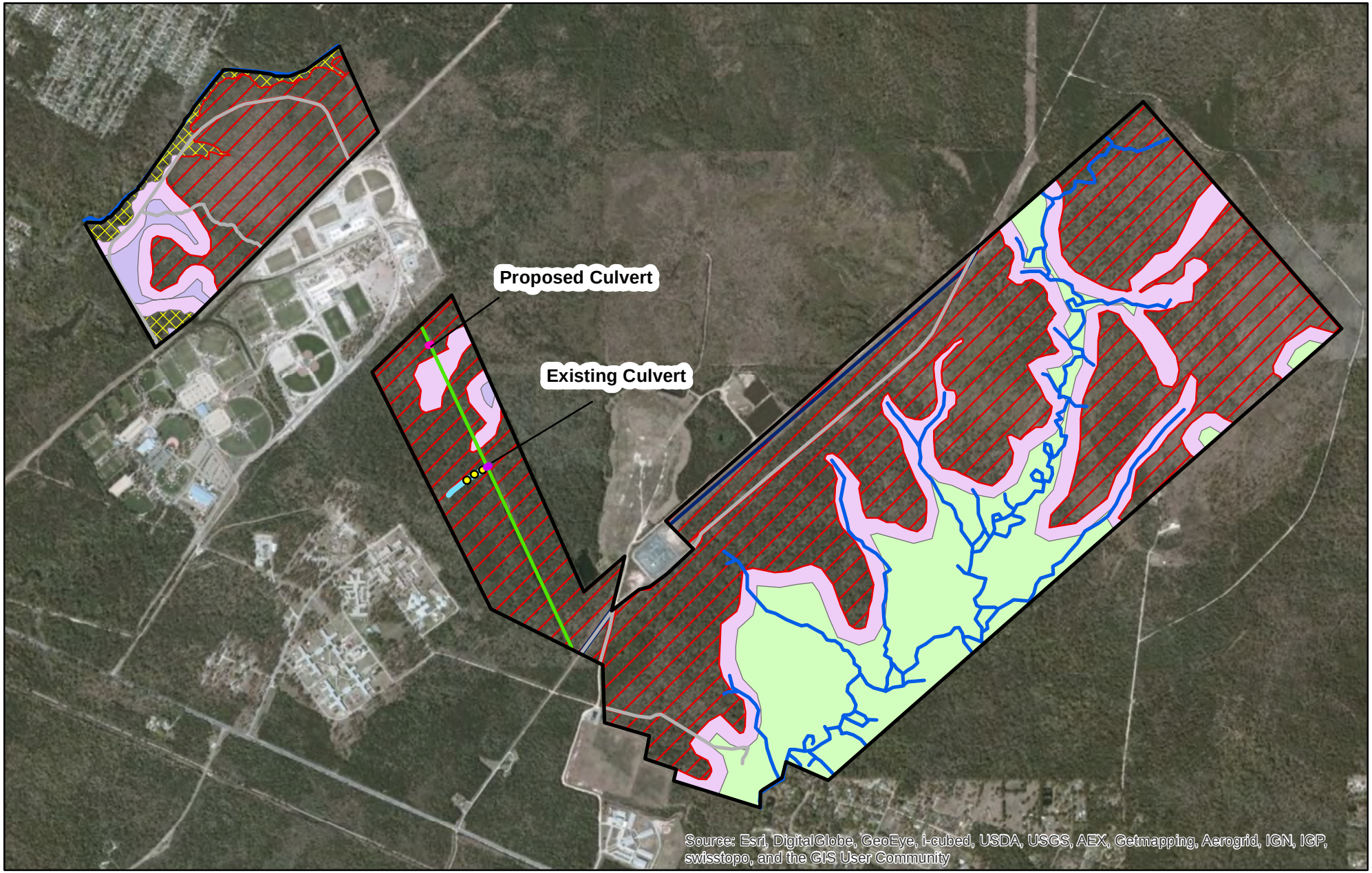
Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Current Conditions on the Cane Bayou Mitigation Bank
Figure 10

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

0 0.2 0.4 0.6 Miles



Legend

- Cane Bayou Mitigation Bank ±1110 ac
- Existing Culvert
- Proposed 3 ft Earthen Plugs
- Ditch
- Planned Culvert
- Roads/Main Trails
- Elevated Woods Road
- Other Waters
- Powerline within Bank
- Upland Buffer
- Pine Flatwood Upland
- Wet Pine Savanna
- Cypress-Tupelo/Scrub-Shrub Swamp
- Mixed Pine-Hardwood Upland

Cane Bayou Mitigation Bank
St. Tammany Parish
Louisiana

Restoration Plan
Figure 11

Biological Surveys, Inc.
P.O. Box 94
Covington, LA 70434
Date: April 22nd, 2014

N

0 0.15 0.3 0.45 Miles

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Cypress-tupelo Swamp along Bayou Castine in West Parcel October 2014

Scrub-shrub Swamp on Bayou Castine in West Parcel October 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Moderately Encroached Wet Pine Savanna in West Parcel looking west from new pipeline October 2014

Pine Flatwood upland in West Parcel looking southwest from new pipeline October 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Heavily Encroached Wet Pine Savanna in East Parcel May 2014

Mixed Pine-Hardwood Upland in East Parcel May 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Moderately encroached Wet Pine Savanna in East Parcel – wildfire area with little overstory May 2014

Moderately encroached Wet Pine Savanna in East Parcel – wildfire area with no midstory May 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Switchcane along upper reaches of Cane Bayou tributary in East Parcel March 2014

Relic old-growth longleaf pine in East Parcel May 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Large powerline on northwest boundary of East Parcel May 2014

Typical ATV trail through wet pine savanna May 2014

APPENDIX 1. CANE BAYOU MITIGATION BANK – REPRESENTATIVE PHOTOGRAPHS

Closed landfill north of East Parcel March 2014

APPENDIX 2. JURISDICTIONAL WETLAND DETERMINATION

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

REPLY TO
ATTENTION OF

AUG 10 2012

Operations Division
Surveillance and Enforcement Section

Mr. Thomas K. Brown
Biological Surveys, Inc.
P. O. Box 94
Mandeville, Louisiana 70471

Dear Mr. Brown:

Reference is made to your request, on behalf of St. Tammany Parish Government, for a U.S. Army Corps of Engineers' (Corps) jurisdictional determination on property located in Sections 37, 42, 43, and 46, Township 8 South, Range 12 East, St. Tammany Parish, Louisiana (enclosed map). Specifically, this property is identified as two sites on and north of US 190 and west of Cane Bayou.

Field inspections of the property were conducted on multiple dates throughout 2012. Based on the results of these investigations, we have determined that part of the property is wetland and may be subject to Corps' jurisdiction. The approximate limits of the wetland are designated in red on the map. A Department of the Army (DA) permit under Section 404 of the Clean Water Act will be required prior to the deposition or redistribution of dredged or fill material into wetlands that are waters of the United States. Additionally, a DA permit will be required if you propose to deposit dredged or fill material into other waters subject to Corps' jurisdiction. Other waters that may be subject to Corps' jurisdiction are indicated in blue on the map. Furthermore, Cane Bayou that may be subject to Corps' jurisdiction under Section 10 of the Rivers and Harbors Act (RHA). A DA permit will be required prior to any work in waters subject to Corps' jurisdiction under Section 10 of the RHA.

You and your client are advised that this preliminary jurisdictional determination is valid for a period of 5 years from the date of this letter unless new information warrants revision prior to the expiration date or the District Commander has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

Please be advised that this property is in the Louisiana Coastal Zone. For additional information regarding coastal use permit requirements, contact Ms. Christine Charrier, Coastal Management Division, Louisiana Department of Natural Resources at (225) 342-7953.

Should there be any questions concerning these matters, please contact Mr. Brian Oberlies at (504) 862-2275 and reference our Account No. 2011-02895-SY. If you have specific questions regarding the permit process or permit applications, please contact our Eastern Evaluation Section at (504) 862-2766. The New Orleans District Regulatory Branch is

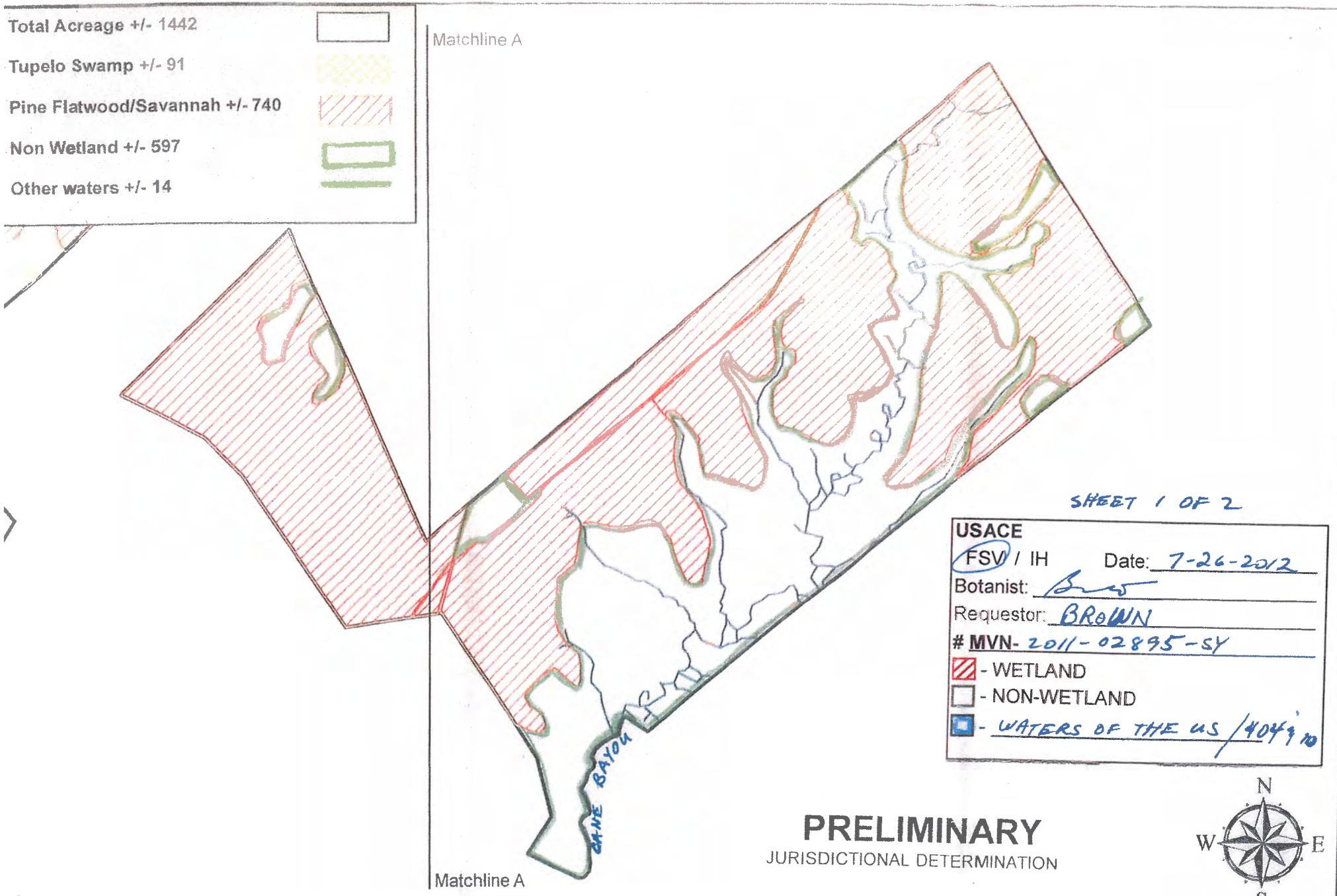
committed to providing quality and timely service to our customers. The New Orleans District Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please complete the survey on our web site at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

for Pete J. Serio
Chief, Regulatory Branch

Enclosures

+/- 1442 Acres on Hwy 190, Mandeville, Louisiana - St. Tammany Parish Government



Biological Surveys, Inc., P.O. Box 94, Covington, LA 70433
Date: 28th October. 2011

0 875 1,750 3,500 Feet

*This is not a boundary surveys and should not be utilized as one.

+/- 1442 Acres on Hwy 190, Mandeville, Louisiana - St. Tammany Parish Government

Total Acreage +/- 1442	
Tupelo Swamp +/- 91	
Pine Flatwood/Savannah +/- 740	
Non Wetland +/- 597	
Other waters +/- 14	

SHEET 2 OF 2

USACE
FSV IH Date: 7-26-2012
Botanist:
Requestor: BROWN
MVN-2011-02895-SY
- WETLAND
- NON-WETLAND
- WATERS OF THE US 404

PRELIMINARY
JURISDICTIONAL DETERMINATION

N
W E
S

Biological Surveys, Inc., P.O. Box 94, Covington, LA 70433
Date: 28th October, 2011

0 700 1,400 2,800 Feet

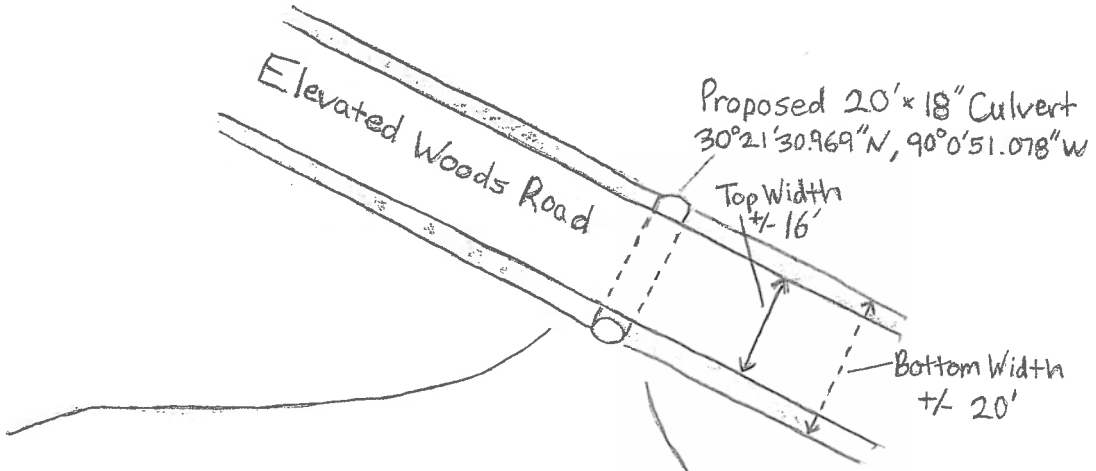
*This is not a boundary surveys and should not be utilized as one.

APPENDIX 3. Non-mitigation Area Calculations

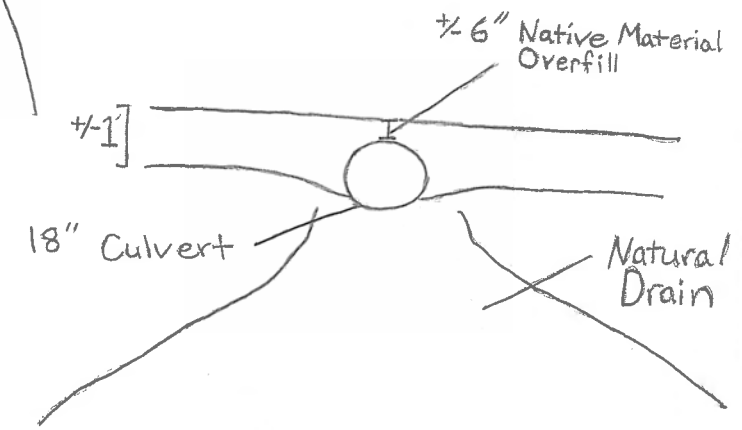
Non-wetland Features	Area (sq ft)	Distance (ft)	Avg. Width (ft)
Gravel Road - East Parcel	207,500	8300	25
Improved Nature Center Trail - West Parcel	153,000	7650	20
Elevated Woods Road - East Parcel	90,000	4500	20
Total Sq. Ft.	**450,500**		
Total Acres	**10.34205693**		

Appendix 4a

Cane Bayou Mitigation Bank
Hydrologic Remediation
St. Tammany Parish, LA



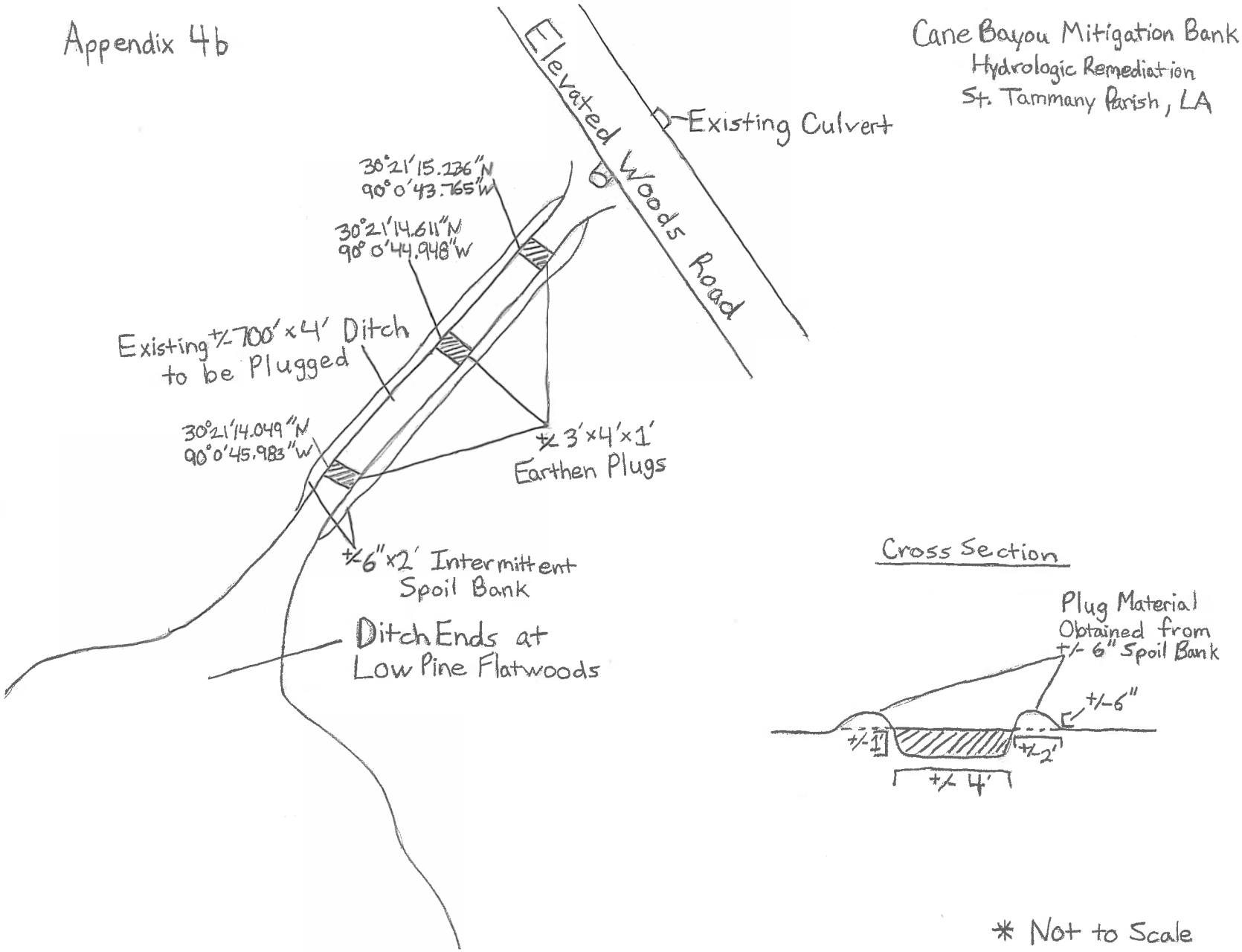
Cross Section



*Not to Scale

Appendix 4b

Cane Bayou Mitigation Bank
Hydrologic Remediation
St. Tammany Parish, LA



Cross Section

* Not to Scale