

**PROSPECTUS  
BAYOU PIERRE MITIGATION BANK:  
PHASE II**

COPIAH COUNTY, MISSISSIPPI

Sponsored by  
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Submitted to:  
U.S. Army Corps of Engineers, Regulatory Branch,  
Mobile District

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**Prospectus  
Bayou Pierre Mitigation Bank: Phase II  
Copiah County, Mississippi**

## **1.0 INTRODUCTION**

The Mississippi Fish and Wildlife Foundation (“Wildlife Mississippi” or the “Sponsor”), submits this prospectus to the U.S. Army Corps of Engineers, Vicksburg District (Vicksburg District), and the Interagency Review Team (IRT) to initiate evaluation of the proposed Bayou Pierre Mitigation Bank Phase II (BPMBII) pursuant to the plan to establish a bottomland hardwood wetland and stream mitigation bank in the upper reaches of the Bayou Pierre watershed Hydrologic Unit Code (HUC) 08060203. The prospectus has been prepared in accordance with the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (Federal Registry/Vol. 73, No. 70/Thursday, April 10, 2008/Rules and Regulations) and with guidance presented by the U.S. Army Corps of Engineers (USACE), Vicksburg District, Prospectus (33 CFR §332.8(d)(2)/40 CFR §230.98(d)(2)). The purpose of this document is to provide a sufficient level of detail to support informed public and IRT decisions regarding the objectives, establishment and operation of the BPMBII proposal.

### **1.1 Bank Sponsor and Owner Wildlife Mississippi**

Wildlife Mississippi is the Sponsor of the BPMBII. The land will be owned in fee simple by Wildlife Mississippi prior to the placement of the conservation easement. Wildlife Mississippi will assume long term ownership and management of the BPMBII. Wildlife Mississippi will remain as the bank Sponsor assisting with establishment and long-term management of the bank.

### **1.2 Site Location**

The BPMBII consists of approximately 1,639 acres in three (3) geographically separate tracts of land that either directly abut Bayou Pierre or are located within the Bayou Pierre floodplain within portions of Copiah County, Mississippi. The BPMBII will include approximately 187.91 acres of preservation, 185.88 acres of bottomland hardwood wetland restoration and approximately 266.33 acres of bottomland hardwood enhancement. As a component of the BPMBII, the project will include in-stream and stream riparian buffer mitigation consisting of approximately 600.76 acres of riparian buffer enhancement and 68.02 acres of riparian buffer restoration. The BPMBII is located within the central portion of Copiah County, Mississippi. The BPMBII is located approximately 6 miles west of Hazlehurst, approximately 11 miles southwest of Crystal Springs, and approximately 5 miles northwest of Wesson, Copiah County, Mississippi (Figure 1). The BPMBII is more specifically located within portions of Sections 10, 15, 23, 26, & 35, Township 10 North, and Range 7 East, Copiah County, Mississippi (Figure 2).

As previously mentioned, the BPMBII will be comprised of approximately 1,639 acres within three (3) geographically separate tracts of land. These tracts are labeled geographically from north to south (Tract 1 and Tract 2).

- 1. Tract 1 – Tract 1 is the northernmost tract within the BPMBII project limits. Tract 1 can be accessed via State Highway 28. Tract 1 consists of approximately**

**556.42 acres and is located within portions of Sections 10, 14, 15, 22, 23, 24, 25, 26, 35 & 36, Township 10 North, Range 7 East, Copiah County, Mississippi. The center Global Positioning System (GPS) coordinates for Tract 1 are Latitude N31.842743 and Longitude W-90.483621. Tract 1 is located within the following 12-digit Hydrologic Unit Codes (HUC): Johnson Creek-Jones Creek 080602030205, Holcomb Creek-Bayou Pierre 080602030207, Thompson Creek-Brushy Creek 080602030203 and King Creek-Bayou Pierre 080602030204. Tract 1 is located within the 10-digit HUC Foster Creek-Bayou Pierre 0806020302 (Appendix A, Figure 4).**

- 2. Tract 2 is the centrally located tract within the BPMBII project limits. Tract 2 can be accessed by Tyson Road to the south. Tract 2 consists of approximately 930.88 acres and is located within portions of Sections 10, 14, 15, 22, 23, 24, 25, 26, 35 & 36, Township 10 North, Range 7 East, Copiah County, Mississippi. The center Global Positioning System (GPS) coordinates for Tract 3 are Latitude N31.804110 and Longitude W-90.470737.**
- 3. Tract 3 – Tract 3 is the southernmost tract within the BPMBII project limits. Tract 2 can be accessed by Cline Road to the south. Tract 3 consists of approximately 152 acres and is located within portions of Sections 11 & 12, Township 9 North, Range 7 East, Copiah County, Mississippi. The center Global Positioning System (GPS) coordinates for Tract 3 are Latitude N31.761794 and Longitude W-90.465308. Tract 2 is located within the following 12-digit HUC King Creek-Bayou Pierre (Appendix A, Figure 4).**

The primary service area for BPMBII is the Bayou Pierre watershed HUC 08060203 found within the South Independent Streams Basin HUC 080602. The secondary service area for the BPMBII is the Lower Big Black HUC 08060202. The Bayou Pierre drainage area covers approximately 1,070 square miles and extends over portions of Hinds, Claiborne, Copiah, Lincoln, and Jefferson County, Mississippi. The BPMBII is located within the central portion of Copiah County, Mississippi and the Bayou Pierre watershed (Figure 4).

Much of the upper reaches of the Bayou Pierre watershed consisted historically of bottomland hardwoods, bald cypress sloughs and scrub/shrub swamp wetlands. However, as with many floodplains much of this area was deforested and converted to agricultural/silviculture uses. This region also represents an important flyway for migratory bird species, such as, waterfowl and neotropical migrants, threatened and endangered species, and important species such as the Louisiana Black Bear.

## **2.0 PROJECT GOALS AND OBJECTIVES**

BPMBII is traversed by reaches of Bayou Pierre, which flows north through portions of the Bank Property before converging with the Mississippi River approximately 40 miles northwest of the Bank Property. Additionally, small segments of Dunking Creek, Wilson Branch, and Brushy Creek transect the BPMBII property and converge with Bayou Pierre within the limits of the Bank Property. The design of the BPMBII will also provide the opportunity to enhance multiple stream channels, in which the natural flow regime has been altered due to culverts, road crossings, and other impediments. The BPMBII will also enhance the riparian buffer zones along Bayou Pierre

and its tributaries. The tributaries are located flowing throughout the BPMBII property. The BPMBII is also abutting the existing bottomland hardwood forests to the north and south allowing the Sponsor to reduce habitat fragmentation by restoring the forestlands within the floodplains of the Bayou Pierre and the Bayou Pierre watershed.

The existing bottomland hardwood forests that adjoin the Bank Property stretch north and south along Bayou Pierre and its tributaries. Properties to the west are predominately occupied by forestland habitat. Properties to the east are predominantly planted pine forests. BPMBII will further promote the restoration of bottomland hardwood forest and riparian buffers along Bayou Pierre and its tributaries within Copiah County, Mississippi particularly within the upper reaches of this basin. The project will further reduce fragmentation of forestland within this region and provide connectivity to both primary drainage features within the upper portion of the Bayou Pierre watershed. The BPMBII project would remove the ongoing silviculture activities within the Bank Property and restore the Bank Property to its historic bottomland hardwood ecosystem within the Bayou Pierre watershed.

As previously described, the goal of the BPMBII is to provide the opportunity to protect 187.91 acres, restore 187.93 acres and enhance 269.17 acres of bottomland hardwood forested wetland habitat. The BPMBII will also provide the rare opportunity to enhance stream channels. More specifically, it is proposed to increase the functions and services of 132,734.16 linear feet of stream channels including enhance and restoration of riparian buffer zones along either bank of the stream channels within the Bank Property. The planned riparian buffer and stream enhancement activities would be conducted in cohesion with the wetland restoration work plan described within the contents of this prospectus document.

**Table 1: Current Habitat Types and Land Uses for BPMBII (Figure 6)**

Habitat Type	Acreage	Linear Feet	Percentage
Emergent Wetlands	4.19		0.26%
Hardwood Scrub Shrub Wetlands	29.69		1.81%
Hardwood Forested Wetlands	688.22		41.98%
Hardwood Forested Uplands	466.69		28.47%
Open Water Sloughs	14.17		0.86%
Pine Plantation Scrub Shrub Wetlands	129.14		7.88%
Pine Plantation Forested Wetlands	83.26		5.08%
Pine Plantation Uplands	81.01		4.94%
Open Field Uplands	1.66		0.10%
Perennial Stream	106.84	70,411.76	6.52%

Intermittent Stream	6.13	20,680.72	0.37%
Ephemeral Stream	5.91	38,170.41	0.36%
Interior Access Roads	16.17		0.99%
Natural Gas Right-of-Way	6.26		0.38%
<b>TOTALS</b>	<b>1,639.34</b>	<b>129,262.89</b>	<b>100.0%</b>

**Table 2: Proposed Mitigation Bank Habitat Types for BPMBII (Figure 14)**

Proposed Mitigation Type	Current Habitat Type	Linear Feet	Acreage	Total Acres
Wetland Restoration	Emergent Wetlands		2.44	185.88
	Pine Plantation Forested Wetlands		28.59	
	Pine Plantation Scrub Shrub Wetlands		148.32	
	BLH Scrub Shrub Wetlands		6.53	
Wetland Enhancement	BLH Forested Wetlands		243.21	266.33
	BLH Scrub Shrub Wetlands		13.44	
	Open Water Sloughs		9.68	
Upland Buffer	Uplands		188.87	188.87
Wetland Preservation	BLH Forested Wetlands		187.91	187.91
Riparian Buffer Restoration	Various Habitat Types		68.02	668.78
Riparian Buffer Enhancement			600.76	
In-Stream Restoration	Ephemeral Stream	12,401.99	1.86	31.13
In-Stream Enhancement	Various Stream Types	73,995.84	29.27	
Non-Mitigation	Bayou Pierre	44,742.79	88.01	110.44
	Natural Gas Easement		6.26	
	Access Roads		16.17	
<b>TOTALS</b>		<b>131,140.62</b>	<b>1,639.34</b>	<b>1,639.34</b>

### 3.0 ECOLOGICAL SUITABILITY OF THE SITE

#### 3.1 Historic Site Conditions

BPMBII is located within Copiah County, Mississippi. Copiah County is located in the southwest part of Mississippi having a total land area of 499,840 acres. The eastern portion of the county is bounded by the Pearl River. The eastern portion of the County is primarily drained via the Pearl River, which flows south into Lake Borgne and eventually discharging into the Gulf of Mexico. The central and northwest portions of the County is primarily drained by Bayou Pierre, which flows north and west before converging with the Mississippi River in Claiborne County, Mississippi approximately 40 miles to the northwest. The southwestern portion of the County is drained by the Homochitto River, which flows south and west before converging with the Mississippi River approximately 55 miles to the southwest. Historically, Copiah County was mainly a farming area with primary crops of cotton and soybeans. The BPMBII lands are currently, and have been historically, used for silviculture purposes.

#### 3.2 Summary of Current Site Conditions

##### 3.2.1 Current Land Uses

The vast majority of the BPMBII property is utilized for silvicultural purposes. Alterations to the historic landscape would include interior roadways, rutting, and drainage improvements in support of the silviculture activities. The current land use for timber production purposes is similar to the adjacent properties.

##### 3.2.2 Current Vegetation

**Forested Wetlands-** The forested wetlands within the BPMBII property exhibit (2) different existing conditions.

**Mature Bottomland Hardwood Forested Wetlands:**

Portions of forested wetland habitats located within Tract 1 have remained largely unaltered from human interventions through time. These areas exhibit a naturally occurring bottomland hardwood forest system commonly observed within riparian ecosystems. The bottomland hardwood forest system that occupies the northern portion in Tract 1 is diverse and contains indigenous species adapted to the alluvial soils and frequent flooding. The linear form of the bottomland hardwood system links adjacent uplands to the riverine systems and provides critical terrestrial corridor habitat. Customary with riparian ecosystems, the complex is very diverse. However, the fullness of this bottomland hardwood system lies within the major forest associates that included swamp tupelo (*Nyssa biflora*), overcup oak (*Quercus lyrata*), swamp chestnut oak (*Quercus michauxii*), water oak (*Quercus nigra*), willow oak (*Quercus phellos*), red maple (*Acer rubrum*), black willow (*Salix nigra*), sweetgum (*Liquidambar styraciflua*), water hickory (*Carya aquatica*), bald cypress (*Taxodium distichum*), American sycamore (*Platanus occidentalis*), American hornbeam (*Carpinus caroliniana*), American holly (*Ilex opaca*), yellow poplar (*Liriodendron tulipifera*) and American beech (*Fagus grandifolia*) to name a few.



Wet Pine Plantation:

Portions of the Property within Tract 2 is under intensive silviculture management of loblolly pine (*Pinus Taeda*). The current wet pine plantation areas within this area were observed to be approximately 8-10-year-old growth. Species such as Chinese privet (*Ligustrum sinense*), Yaupon (*Ilex vomitoria*), groundsel tree (*Baccharis halimifolia*), lamp rush (*Juncus effusus*) and cotton grass bulrush (*Scirpus cyperinus*) were also observed. The overall species composition and density is lacking in these areas. Additionally, the presence of the invasive Chinese privet further degrades this habitat.

Degraded Forested Wetlands:

Portions of the forested wetlands within Tracts 2 and 3 were observed to be degraded and have been subjected to clear-cut timber harvests within the past 5-25 years. It is evidenced that the vegetation within these areas was allowed to naturally restore following the timber harvest activities. As a result, a significant amount of light-seeded, soft mast species have established within these areas. These species include American sycamore (*Platanus occidentalis*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), and water oak (*Quercus nigra*). Additionally, portions of the Property were observed dominated by Chinese privet (*Ligustrum sinense*). The overall species composition and density is lacking in these areas. Additionally, the presence of the invasive Chinese privet further degrades this habitat.

The soil matrix color within the forested wetland habitats ranges from a 5/1 (gray), 5/2 (grayish brown) to a 6/2 (light brownish gray) on the 10YR Munsell Soil Color Chart. There is a soil mottle present at (~10% - 30%) with a soil mottle color of 4/6 (strong brown) on the 10YR chart. Hydrological indicators observed within the forested wetland habitats include saturation, inundation, high water table, sediment & drift deposits, crayfish burrows, waters marks on the base of trees, moss trim lines, drainage patterns, and oxidized rhizospheres along living roots.

Scrub-Shrub Wetland- The scrub-shrub wetlands within the BPMBII property exhibit (2) different existing conditions.

Wet Pine Plantation:

Portions of the Property within Tract 2 is under intensive silviculture management of loblolly pine (*Pinus Taeda*). The current wet pine plantation areas within this area were observed to be approximately 5-year-old growth. Species such as Chinese privet (*Ligustrum sinense*), Yaupon (*Ilex vomitoria*), groundsel tree (*Baccharis halimifolia*), lamp rush (*Juncus effusus*) and cotton grass bulrush (*Scirpus cyperinus*) were also observed. The overall species composition and density is lacking in these areas. Additionally, the presence of the invasive Chinese privet further degrades this habitat.

Beaver Inundation:

Portions of the Property within Tract 2 and Tract 3 are experiencing inundation from beaver activity. The two-primary species observed within the scrub-shrub wetland areas include buttonbush (*Cephalanthus occidentalis*) and black willow

(*Salix nigra*). The landscape of these beaver influenced areas is evidenced by the lack of overstory canopy and desirable species composition.

**Emergent Wetland-** The emergent wetlands within the BPMBII property exhibit (2) different existing conditions.

**Food plots (Wildlife Openings):**

Multiple food plots associated with recreational hunting activities were identified throughout the Property. The predominant vegetation present during the field assessment was annual ryegrass, soft rush (*Juncus effusus*), *Polygonum spp.*, curly dock (*Rumex crispus*), *Cyperus spp.*, ladies eardrop (*Brunnichia cirrhosa*), among others.

**Beaver Inundation:**

Portions of the Property within Tract 2 and Tract 3 are experiencing inundation from beaver activity. The primary species observed within the emergent wetland areas include smartweed (*Polygonum amphibium*), Lizard's tail (*Saururus cernuus*), *Ludwigia spp.*, and *Leptochloa spp.*, The landscape of these beaver influenced areas is evidenced by the lack of overstory canopy and desirable species composition.

The soil matrix color within the emergent wetland habitats ranged from a 5/2 (grayish brown) to a 6/1 (gray) on the 10YR Munsell Soil Color chart. There is a soil mottling present (~10-30%) with a soil mottle color ranging from a 3/4 (dark yellowish brown) to a 4/4, 4/6 (dark yellowish brown) and 5/8 (yellowish brown) on the 10YR chart. Hydrologic indicators observed within these emergent wetland habitats included: inundation in pools, saturation, high water table, crawfish burrows, and oxidized rhizospheres along living roots.

**Forested Uplands-** The remaining portions of the subject property are comprised of a forested upland habitat and pine plantation types. These habitats have been utilized for silviculture purposes in the past. The primary vegetative species within the upland habitats included: Southern magnolia (*Magnolia grandiflora*), American beech (*Fagus grandifolia*), ironwood (*Carpinus carolinana*), loblolly pine (*Pinus taeda*), American holly (*Ilex opaca*), *Andropogon spp.*, Curly dock (*Rumex crispus*), vetch (*Vicia Americana*), among others. The soils within the upland habitat are a 4/4 to 5/4 (yellowish brown) on the 10YR page of the Munsell Soil Color Chart with limited to no soil mottling.

### **3.2.3 Current Hydrology**

The field reconnaissance confirmed the presence of one (1) main drainage feature that transect the limits of the property. Bayou Pierre is a perennial stream, which contains year-round flows and transects the BPMBII property in a generally south to north orientation. Bayou Pierre contains a mean width of approximately 80 feet and is considered the property's primary drainage feature. Bayou Pierre has flows in a northerly direction before converging with the Mississippi River. It should be noted that segments of Brushy Creek, Wilson Branch, and Dunning Creek transect the property. These named perennials are tributaries of Bayou Pierre.

The intermittent streams are unnamed tributaries of Bayou Pierre, previously described. These streams contain seasonal flows and provide the secondary drainage source for storm water runoff for the property. These streams convey storm water flows from the center of the site into Bayou Pierre and the larger perennial streams.

The current hydrology has been altered from the historical hydrologic regime through property alterations associated with timber production and forestry techniques. The primary alterations within the Bank Property include culverts, road crossings, silviculture ditches and rutting. Each of these alterations increase surface water runoff away from the planted pine stands into nearby streams. Additionally, beaver activity located along the southern boundary of the site has impeded normal flow patterns.

The current topography continues to convey storm water runoff through the Bank Property towards Bayou Pierre and its tributaries. During periods of high rainfall and backwater events, flooding events would also extend floodwaters from Bayou Pierre and other perennial streams across large portions of the Bank Property. The degradation and filling of ditches and forestry rutting will restore natural sheet flow across the property and flow through the open water sloughs. This will promote the restoration of the historic hydrologic regime within the Bank Property by reducing flow velocities and restoring the natural overbank flooding patterns. Additionally, removal of in-stream impediments caused by road crossings, culverts, and beaver activity will alleviate backwater congestion; promote exchange of surface and subsurface waters, and the transfer of materials between the stream channels, wetlands, and floodplain networks present within the Bank Property. The current hydrology of the Bank Property is depicted in [Figure 7](#).

### **3.2.4 Historic Hydrology**

The Bank Property is located within the Bayou Pierre Basin with portions of the storm water flows conveyed through Bayou Pierre and its unnamed tributaries. Bayou Pierre is also a direct tributary of the Mississippi River and the two (2) systems converge approximately 40 miles to the northwest of the Bank Property. The drainage area associated with the Bank Property is collectively approximately 92,670 acres that, as described, flow through the Bank Property prior to the convergence of the Bayou Pierre with Mississippi River.

Sources of hydrology on the Bank include rainfall, sheet flow and overbank flooding of Bayou Pierre and its tributaries. Interior drainage has been compromised somewhat by past timber harvesting practices where perpendicular rutting and silviculture ditches have impeded direction of flow. The historic hydrology of the Bank Property and the adjacent properties are depicted in [Figure 8](#).

### 3.2.5 Mapped Soil Types

**Soils** – As evidenced by the *Soil Survey for Copiah County Mississippi*, published in October 1980 by the USDA - Soil Conservation Service [now Natural Resources Conservation Service (NRCS)], the soils on the subject property primarily consist of Oaklimeter silt loam (Oa) with other soils present such as Gillsburg silt loam (Gb), Guyton silt loam (Gu), Kolin silt loam (Ko), Lorman and Smithdale association (LS) (Figure 9)

The Oaklimeter soil series are moderately well drained soils occurring on floodplains and low terrace bordering streams that drain the Southern Mississippi Valley Silty Uplands. These soils are moderately permeable and formed in silty alluvium. The surface layer is a brown silt loam. The subsoil is a yellowish-brown silt loam. It is underlain by several feet of gray clay mottled with dark yellowish-brown.

The Gillsburg soil series are somewhat poorly drained soils formed in silty alluvial. They occur on broad flood plains. The surface layer is dark grayish-brown silt loam. The subsoil is brown silt loam with pale brown mottles underlain with light brownish gray silt loam mottled with yellowish brown.

The Guyton soil series are level, poorly drained soils formed in silty material. They occur on broad to depressional flats and stream terraces. The surface layer is light brownish gray silt loam with yellowish brown mottling. The subsoil is a mixed light gray, strong brown, and yellowish-brown silt loam.

The Kolin soil series are moderately well drained soils formed in silty material and underlying clayey sediment. They occur on broad terraces and uplands. The surface layer is brown silt loam. The subsoil is a strong brown silt loam.

The Lorman soil series are moderately well drained soils from sloping to moderate sloping to severely sloping with a fragipan. These soils are formed in clayey material. They typically occur on uplands. Typically, the surface layer is a brown fine sandy loam. The subsoil is red clay with gray mottling.

The Smithdale soil series are well drained, strongly sloping soils formed in loamy materials and typically occur on uplands. The surface is a brown sandy loam. The subsoil is a yellowish red sandy clay loam.

### 3.2.6 Property Encumbrances

The BPMBII property is separated into three (3) parcels. Tract 1 is approximately 0.25 miles north of Tract 2. And Tract 2 is approximately 1.25 miles north of Tract 3. A natural gas pipeline and an electrical line ROW traverse the site, these sites are non-mitigation. No other encumbrance was identified with Bank Property.

### **3.2.7 Adjacent Property Development**

BPMBII is connected to and primarily surrounded by natural tributaries and forested wetland areas. When considering a one (1) mile radius around the Bank Property, the current land use type consists of 85% forestland, 2% cultivated cropland, 11% pasture/open field or fallow, 1% rural development and 1% water (Figure 10).

### **3.2.8 Preliminary Jurisdictional Determination**

The BPMBII property was delineated in December 2017 and January 2018 by Headwaters, Inc. A copy of the wetland delineation report was submitted concurrently with this document to the USACE, Vicksburg District on February 2, 2018.

## **3.3 Water Rights and Hydrological Influences**

### **3.3.1 Water Rights**

The State of Mississippi treats water resources under the theory of absolute ownership and rule of capture, provided capture does not result in harm to neighbors.

### **3.3.2 General Watershed Characteristics**

#### **3.2.2.1 Water Sources and Losses**

The sources of water to the project area are currently direct precipitation and surface flow from adjacent land from the south to north. Additionally, overland flooding from Bayou Pierre and its tributaries provides a source of surface water during normal seasonal flooding events. Storm water flows across the site generally via overland flows into drainages interconnected to Bayou Pierre. Bayou Pierre is considered a direct tributary of the Mississippi River, located to the west of the Bank Property.

Copiah County is located within the southwestern part of Mississippi. The Bayou Pierre transects the western portion of the County while the Pearl River forms the east boundary of the County. Other notable streams include Homochitto River, Haley Creek, and Brushy Creek.

The total annual average precipitation is 56+/- inches. Of this, 27 inches, or 48 percent, usually falls in April through September which includes the majority of the growing season.

#### **3.3.2.2 Hydroperiod**

Hydric soils indicate that the site is either currently inundated or saturated in the upper soil profile for at least 14 consecutive days per year. This site is comprised primarily of Oaklimeter soils which, in this area, typically have

a seasonal high water table between the 18 and 30 inches below the surface during the months of December and April.

### **3.4 Water Quality**

Based upon the Mississippi Department of Environmental Quality (MDEQ) 2014 listing for impaired waterbodies (303d), the Bayou Pierre (waterbody ID 602812) in Claiborne County near Carlisle from the confluence with Storm Creek to the 6029 MWS boundary near the confluence with Whiskey Branch is impaired due to pH. As described, Bayou Pierre merges with the Mississippi River approximately 40 miles northwest of the Bank Property.

Consequently, planting of bottomland hardwood tree species for this project will result in overall water quality improvements due to increased filtration and plant uptake. Elimination of current forestry activities will result in the reduction of agricultural pesticides and herbicides, reduction of use of nitrogenous or phosphorous fertilizers, and minimization of sedimentation/siltation as well as TSS and turbidity (i.e., nonpoint source pollution prevention).

#### 4.0 Wildlife Values

Bottomland hardwood forests provide important ecosystem functions, including maintenance of water quality, habitat for fish and wildlife species, regulation of flooding and stream recharge. In addition to the many species present in bottomland hardwood forests, the BPMBII seems properly sited to add to habitat and corridors of and for the Louisiana Black Bear (*Ursus americanus luteolus*) as set forth by the U.S. Fish & Wildlife Services. Once considered Critical Bear Habitat, the forestlands along the Bayou Pierre remain vital to the continued success of the Louisiana Black Bear recovery. The BPMBII is uniquely located within the Bayou Pierre floodplain and within an important bottomland hardwood complex.

The threatened Bayou darter (*Etheostoma rubrum*) is a small 2-inch fish that is found only in Bayou Pierre and its tributaries. The bayou darter is particularly special because it is endemic to southwestern Mississippi, meaning it is found in no other state but Mississippi. The male fish can obtain an attractive turquoise hue to the body with bright red patches on the fins during the breeding season, whereas the females maintain a pale brown and spotted coloration year-round. It was listed as threatened on September 25, 1975 by USFWS. This darter inhabits fast rocky riffles of shallow, meandering creeks and small to medium rivers. Adults most commonly are collected near heads of gravel riffles in water less than 15-30 centimeters deep. Reproductively active females occur mid-April to mid-August at water temperature of 20-30 C, with peak spawning from April to early June during rising water temperatures. Most spawn after their first year and do not usually live beyond 3 years. The BPMBII contains multiple tributaries of Bayou Pierre.

There are no Wildlife Management Areas (WMAs) areas in close proximity to the BPMBII. As a result, restoration and enhancement of this property will undoubtedly serve the purpose of increasing habitat and reducing fragmentation and as an interconnecting corridor habitat for the Louisiana Black Bear and the Bayou Darter. The rehabilitation of the forest will also provide wintering habitat for neotropical migrants.

## 5.0 Bank Establishment

### 5.1 Mitigation Bank Overview

#### 5.1.1 Bottomland Hardwood Wetland Mitigation

##### 5.1.1.1 Wetland Restoration

The Sponsor proposes the restoration of 185.88 acres of bottomland hardwood forested wetlands from pine plantation by eliminating forestry rutting and silviculture ditches, restoring the natural hydrologic regime and planting native bottomland hardwood species. Filling ditches and forestry rutting will restore natural sheet flow across the site through the natural sloughs observed onsite. Water that is currently routed through man-made ditches and forestry rutting will again be allowed to sheet flow across the property, thereby retaining surface water and upper soil saturation as it did historically. This restoration activity will increase water retention on the site and reduce excess water downstream during high water events. The Sponsor further proposes the restoration of the bottomland hardwood habitat through the re-establishment of native bottomland hardwoods. The restoration of the bottomland hardwood ecosystem is critical in this management process to ultimately return the bank property to its historic state.

##### 5.1.1.2. Wetland Enhancement

The Sponsor proposes the enhancement of 266.33 acres of bottomland hardwood forested wetlands located within the Bank Property. The selected wetland enhancement areas currently exist as a bottomland hardwood forested wetlands, emergent wetlands, and scrub-shrub wetlands. These habitats are currently degraded from the past timber management and beaver activity within the property. The overstory vegetation within these areas is dominated heavily by soft mast species including American sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), sweetgum (*Liquidambar styraciflua*), box elder (*Acer negundo*), and sugarberry (*Celtis laevigata*) within minor occurrences of water oak (*Quercus nigra*), willow oak (*Quercus phellos*). The wetlands enhancement areas include an understory component of Trumpet creeper (*Campsis radicans*), Chinese privet (*Ligustrum sinense*), poison ivy (*Toxicodendron radicans*), *Rubus spp.*, Japanese climbing fern (*Lygodium japonicum*), muscadine (*Vitis rotundifolia*), greenbrier (*Smilax rotundifolia*), and yates (*Chasmanthium latifolium*).

To complete the wetland enhancement activities, timber stand improvement (TSI) activities will be conducted to remove a portion of the soft mast dominated overstory. These TSI activities may include selective timber harvest, individual stem injection, and/or forestry mowing. Following the removal of a portion of the overstory component, these areas will be underplanted with primarily hard mast tree seedlings in an effort to achieve



a 50/50 to 60/40 hard mast to soft mast ratio mimicking the natural bottomland hardwood habitat that historically dominated area.

#### **5.1.1.3. Wetland Preservation**

The Sponsor proposes to protect approximately 187.91 acres of bottomland hardwood forested wetlands located within the Bank Property. No management practices are anticipated for the bottomland hardwood preservation areas other than exotic species control. Exotic species will account for no more than 1% coverage at all times. Existing forested wetlands found on the site will be perpetually protected with the application of a conservation easement.

### **5.1.2 Stream Mitigation**

#### **5.1.2.1 Stream (In-Stream)**

The Sponsor proposes to conduct in-stream improvements within the stream channels re-establishing the connectivity to the natural floodplain. It is proposed to improve connectivity of stream channels through the use of structure removal and hydrologic improvements at road crossings. Multiple interior road crossings and culverts were observed creating impairments between the stream channels and the adjacent floodplain. The mitigation work plan will include the removal of impediments to reestablish the stream connectivity with the adjacent floodplains. This process renews the hydrologic and material transfers between the floodplains and stream channels, promotes the creation of riparian and aquatic habitats, and allows movement of aquatic species. The restoration of the channels and the improvements to the existing improved channels will provide a more natural braided stream system through the Bank Property.

#### **5.1.2.2 Stream Riparian Buffer**

##### **5.1.2.2.1 Stream Riparian Buffer Restoration**

Approximately 68.02 acres of stream riparian buffer will be restored by initially restoring the natural floodplain connectivity to the stream channel and re-establishing native bottomland hardwood vegetation within the riparian buffer areas. Native bottomland hardwood species will be planted within the designated buffer on either side of the streams designated in the restoration areas.

##### **5.1.2.2.2 Stream Riparian Buffer Enhancement**

Approximately 600.76 acres of stream riparian buffer will be enhanced by re-establishing native bottomland hardwood vegetation within the riparian buffer areas. Native bottomland

hardwood species will be planted within the designated buffer on either side of the streams designated in the enhancement areas.

## **5.2 Mitigation Work Plan**

### **5.2.1 Hydrologic Work Plan**

#### **5.2.1.1 Bottomland Hardwood Wetland**

The historic silvicultural land uses on the Bank Property have resulted in the development of forestry rutting that has altered the on-site hydrology. The Sponsor proposes to restore and enhance the BPMBI by planting an appropriate species mixture of bottomland hardwood seedlings during the 2019-2020 standard planting season (December-March). Prior to planting, the restoration sites would undergo mechanical site prep by removing the existing pine stand. This would be followed by an aerial application of five quarts of glyphosate product per acre during summer months (July-September) to kill any existing vegetation and prepare the sites for a prescribed burn. The Sponsor proposes to use glyphosate for the Bank prep because of its low toxicity to wildlife and because it does not have any soil activity. Following the herbicide treatment, the site will be roll chopped to help facilitate successful planting of the site. Once roll chopping has been completed, the treated sites will be burned during the time period of September–November.

#### **5.2.1.2 Streams (In-Stream)**

The historic silvicultural land uses on the Bank Property have resulted in disconnection of stream channels and altered the natural stream dynamics. These stream channel alterations were conducted to facilitate storm water runoff away from the silviculture fields and to improve property access. As a result, it is proposed to enhance stream connectivity through the removal of impediments and utilizing mechanized equipment through grading and/or excavation.

#### **5.2.1.3 Stream Riparian Buffer**

The historic silvicultural land uses on the BPMBII Property have resulted in the removal of the natural bottomland hardwood riparian buffer habitats along Bayou Pierre. Full details regarding the vegetative enhancement activities is described in below in Section 5.2.2. [Figure 11](#) depicts the location of the hydrologic work plan designed for the BPMBII.

### **5.2.2 Vegetative Plantings**

#### **5.2.2.1 Bottomland Hardwood Wetland Mitigation**

##### **5.2.2.1.1 Wetland Restoration**

1. It is planned to restore 185.88 acres of bottomland hardwood forested wetlands within the limits of the Bank Property. The restoration work plan for each habitat will be accomplished by preparing the site as needed (ripping, disking, tilling, mowing, etc.) during the fall prior to planting and by planting an appropriate species mixture indicative of bottomland hardwood ecosystems during the non-growing season of 2019-2020 (Table 3). Figures 12 and 13 depict the location of the wetland and stream mitigation work plan designed for the BPMBII.
2. The restoration areas will be planted using a mixture of hard mast and soft mast species during the non-growing season (i.e., December – March). Prior to planting, site preparation will be conducted using mechanical and chemical means, such as, mowing, disking, ripping, shredding and herbicidal application. Invasive and undesirable species control will be conducted throughout the entire project area over the life of the Bank.
3. The Sponsor does not anticipate degrees of soil settlement requiring planting deferment. The site will be prepared in such a manner that soil disturbance will be avoided or minimized to the maximum extent practicable, and site preparation has been planned such that favorable conditions for planting will be established and maintained throughout the preparation activities. Site preparation activities will be documented with digital photographs and provided to the IRT during times in which these activities take place.
4. Planting procedures will adhere to the following specifications:
  - a. One (1) to two (2) year old bare-root seedlings obtained from a registered licensed regional nursery grower and of a regional ecotype species properly stored and handled to ensure viability will be planted at the Bank during the period December 15 through March 15 (planting season). Events, such as, spring flooding may warrant storage of trees with planting in late spring or early summer. If seedlings listed are not available, then substitutions may be made if they are approved by the IRT. The anticipated schedule for planting is the non-growing season of 2019-2020. The Sponsor will plant appropriate species in such a manner to ensure adequate species diversity and to ensure that monotypic tree rows will not be established;
  - b. Seedlings will be planted following a 10' x 10' spacing to achieve an initial stand density of, at minimum, 435 seedlings per acre;
  - c. Species selected for planting will be planted in a random mixture as dictated by terrain and edaphic conditions. The species selected will be site appropriate in terms of habitat design, soil-moisture regime and species diversity. Ten or more species may be represented in the planting assemblage to insure adequate species

diversity. The exact species and quantities for planting will be determined by the availability of such species from commercial nurseries providing localized ecotype seedlings. Seedlings would certainly be mixed upon plantings so that areas are not comprised of a single species. The distribution of stems will create a mosaic of hard and soft mast species that will provide seasonally available forages for a wide range of indigenous wildlife including the Mississippi black bear. The availability of soft mast species is important during the summer and hard mast is critical in the fall and early winter for the buildup of fat reserves in black bears preparing for denning. Single species plantings will generally be avoided.

- d. The Bank will be maintained, on an as-needed basis, by the use of mechanical or chemical control or some combination thereof in order to control exotic species colonization or other plant competition.
- e. Sponsor will use all prudent efforts (physical, chemical, and/or mechanical) to remove and control Chinese tallow tree and any other possible exotic vegetation from the Bank Property. The Bank will be monitored to prevent infestation by noxious/exotic vegetation. Exotic species (e.g., Chinese tallow and Chinese privet) shall not comprise more than 5% cover and noxious species (e.g., honey locust, black willow, and cotton wood) shall not comprise more than 20% of the total stem density. The Bank Property will be monitored for the colonization of exotic and noxious species throughout the life of the Bank.

**Table 3: Plant Species Proposed for the Bank Property:**

<b>Bottomland Hardwood Plantings</b>		
Common Name	Scientific Name	Percent Composition
nuttall oak*	<i>Quercus nuttallii</i>	20%
willow oak	<i>Quercus phellos</i>	15%
water oak	<i>Quercus nigra</i>	10%
bald cypress*	<i>Taxodium distichum</i>	10%
sweet pecan	<i>Carya illinoensis</i>	5%
overcup oak*	<i>Quercus lyrata</i>	5%
green ash	<i>Fraxinus pennsylvanica</i>	5%
Drummond red maple	<i>Acer rubrum var. drummondii</i>	5%
sweetgum	<i>Liquidambar styraciflua</i>	5%
common persimmon	<i>Diospyros virginiana</i>	5%
sugarberry	<i>Celtis laevigata</i>	5%
American elm	<i>Ulmus Americana</i>	5%
mayhaw	<i>Crataegus opaca</i>	2.0%
buttonbush*	<i>Cephalanthus occidentalis</i>	1.0%
water hickory*	<i>Carya aquatica</i>	1.0%
box elder	<i>Acer negundo</i>	1.0%

\*Species to be concentrated within natural low-lying swales and contours.

For a given planting, a minimum of 240 trees/acre will be present following the third full growing season and 150 trees/acre following the 5<sup>th</sup> growing season. Tree species will be planted to achieve an overall composition, on average, of seven (7) to ten (10) target species or greater per acre from the species listed in Table 3 above, with no single species comprising more than 25% of the stocking and hard mast species comprising between 50 to 60% of the total species planted. At Year 10, the overall stand density shall be composed, on average, of seven (7) to ten (10) target tree species/acre or greater at a minimum density of 120 trees/acre, including desirable natural recruits with a target hard to soft mast ratio of 50/50 to 60/40.

#### **5.2.2.1.2 Wetland Enhancement**

As previously discussed, it is proposed to enhance approximately 266.33 acres of bottomland hardwood wetlands within the Bank Property. Portions of the BPMBII property have been subjected to intensive silvicultural management activities over the years. These practices have resulted in a degraded bottomland hardwood habitat that is heavily dominated by soft mast species. The current vegetative composition of these areas is discussed above in Section 5.1.1.2. It is proposed to conduct Timber Stand Improvement (TSI) activities within these areas to reduce the amount of soft mast species. TSI activities may consist of selective timber harvest, individual stem injection, and/or forestry mowing.

Following the removal of a portion of the overstory component, these areas will be underplanted with primarily hard mast tree seedlings in an effort to achieve a 50/50 to 60/40 hard mast to soft mast ratio mimicking the natural bottomland hardwood habitat that historically dominated area. Tree seedlings species will consist of hard mast species included within Table 3 above.

### **5.2.2.2 Riparian Buffer**

#### **5.2.2.2.1 Riparian Buffer Restoration**

The proposed mitigation plan for the BPMBII includes the restoration of approximately 68.02 acres of riparian buffer along the primary and secondary drainages within the Bank Property. Vegetative restoration activities within these areas will include activities similar to those described for the Bottomland Hardwood Wetland Restoration areas described in Section 5.2.2.1.1. above.

#### **5.2.2.2.2 Riparian Buffer Enhancement**

The Sponsor is proposing to enhance approximately 600.76 acres of riparian buffers along the primary and secondary drainages within the BPMBII property. Enhancement activities conducted within these areas would include similar activities to those described for the Bottomland Hardwood Enhancement areas described in Section 5.2.2.1.2 above.

### **5.2.3 Noxious/Exotic Species Control**

Exotic and nuisance species (Chinese tallow tree, and Chinese privet) species shall not comprise more than 5% cover and noxious species (e.g., honey locust, black willow, cotton wood, thistle, and baccharis) shall not comprise more than 20% of the total stem density. Exotic and/or noxious species will be removed using various techniques which may include pre-and post-emergent herbicide applications, direct application by spray and/or injection, mowing and any other successful technique during initial planting. The percent cover of invasive plants will be monitored during short-term and long-term success monitoring and appropriate action taken, if needed. (Please reference 5.2.2. Vegetative Plantings.)

### **5.2.4 Monitoring**

Monitoring shall commence immediately following plantings such that a baseline is established for the BPMBII. Monitoring will then occur following the growing seasons in years 1, 3, 5, 8 and 10 so that any corrective measures by the Sponsor may be undertaken. Monitoring reports will be submitted to the Chair of the IRT no later than December 15<sup>th</sup> following monitoring activities. Monitoring efforts will

be conducted to verify the success of the restoration activities and will include vegetative surveys, wildlife observations, hydrologic observations, and overall property assessments.

### **5.3 Proposed Service Area**

#### **5.3.1 Primary Service Area**

The BPMBII will be established to provide mitigation to compensate for impacts to Waters of the United States, including wetlands and streams, within the Vicksburg District. The BPMBII is located within the U.S.G.S. 8-Digit HUC 08060203 and is included within a portion of Copiah County within that part of the cataloging unit occurring in Mississippi. The service area encompasses all, or portions of, the counties Webster, Choctaw, Montgomery, Carroll, Attala, Holmes, Leake, Madison, Yazoo, Hinds, Warren, Claiborne, Copiah, Jefferson, Lincoln, Adams, Amite and Wilkinson in Mississippi. (Figure 15).

Decisions authorizing use of credits from the BPMBII for impacts outside of the designated service area and for out-of-kind impacts will be made on a case-by-case basis by the USACE Vicksburg District.

### **5.4 General Bank and Need and Technical Feasibility**

BPMBII is proposed to provide compensatory mitigation for Vicksburg District approved projects within the Hydrologic Unit Code (HUC) 08060203 (Bayou Pierre). Projects located outside the HUC 08060203 would be evaluated on a case by case basis by the District.

In addition to providing mitigation for activities associated with continued population growth within the community, the proposed service area has a history of oil and gas exploration and production, federal water control projects and considerable linear activities, including transportation, power transmission and pipelines.

## **5.5 Future Ownership and Long-Term Management Strategy**

### **5.5.1 Sponsor/Operations Manager/Long-Term Management**

Wildlife Mississippi  
POC: Mr. Steven Gruchy  
P.O. Box 187  
Amory, MS 38821

### **5.5.2 Landowner/Long-Term Ownership**

Wildlife Mississippi  
P.O. Box 187  
Amory, MS 38821

### **5.5.3 Agent**

Headwaters, Inc.  
P.O. Box 2836  
Ridgeland, MS 39158  
[www.headwaters-inc.com](http://www.headwaters-inc.com)  
POC: Mr. Josh Brown

### **5.5.4 Perpetual Site Protection Mechanism**

To ensure long-term protection of the Bank Property, the Sponsor will be responsible for maintaining and protecting lands contained within the BPMBII in perpetuity, unless the lands are transferred to a state or federal resource agency, non-profit conservation organization, or this responsibility is contractually conveyed to another person, all of which will be subject to approval by the Vicksburg District. A conservation easement will be prepared to include a non-profit or state agency as the Grantor and Holder. This conservation easement specifically prohibits activities that would reduce the quality of the restored wetlands. The conservation easement also specifies permissible activities such as hunting, fishing and recreational use given the activity causes no negative effect on the functions and values of the restored wetlands. Forest management within the conservation easement would be allowed, given that this activity is performed to maintain or improve the overall ecological function of the Bank. Impacts that adversely affect the function and value of the Bank, which are caused by permissible activities, will required permitting and subsequent mitigation.

### **5.5.5 Sponsor Qualifications**

Bayou Pierre Mitigation Bank Phase II, managed by Mr. Steven Gruchy, will be the primary operator for the Bank Property, management and office operations. Mr. Steven Gruchy will be supported by Mr. Walt Dinkelacker and Headwaters, Inc. who have considerable experience in mitigation banking in Vicksburg, New Orleans and the Mobile Districts.



## **6.0 Conclusion**

In summary, the BPMBII has the potential to restore, enhance, and protect approximately 1,308.90 acres of bottomland hardwood habitat through a combination of approximately 68.02 acres of riparian buffer restoration, 600.76 acres of riparian buffer enhancement, 185.88 acres of bottomland hardwood wetland restoration, 266.33 acres of bottomland hardwood wetland enhancement, and 187.91 acres of bottomland hardwood wetland preservation following the completion of the planned wetland and stream mitigation work plan described within the contents of this Prospectus. The planned Bank Property would be protected and maintained by a Conservation Easement in perpetuity. More detailed information regarding financial assurances, monitoring provisions, and credit release schedules will be provided in the subsequent draft MBI and will reflect current standards within the Vicksburg District.

## 7.0 References

Code of Federal Regulations, Title 33, Parts 325 and 332 and Title 40, Part 230, as published on pages 19594-19704 in the Federal Register dated 10 April 2008.

United States Department of Agriculture – Natural Resources Conservation Service, Web Soil Survey, Copiah County, Mississippi.

<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

United States Department of Agriculture – Soil Survey of Copiah County, Mississippi, issued October 1980.

Mississippi Department of Environmental Quality, Mississippi Water Quality Inventory: Integrated Report (305(b)/303(d)).

<http://www.deq.Mississippi.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/WaterQualityInventorySection305b/2012IntegratedReport.aspx>

<http://www.deq.Mississippi.gov/portal/Portals/0/planning/305b/2012/12%20IR1%20Appendix%20A%20Text%20and%20Maps%20FINAL%201-25-13.pdf>

National Wetland Plant List, Version 3.2. U.S. Army Corps of Engineers, 2016.

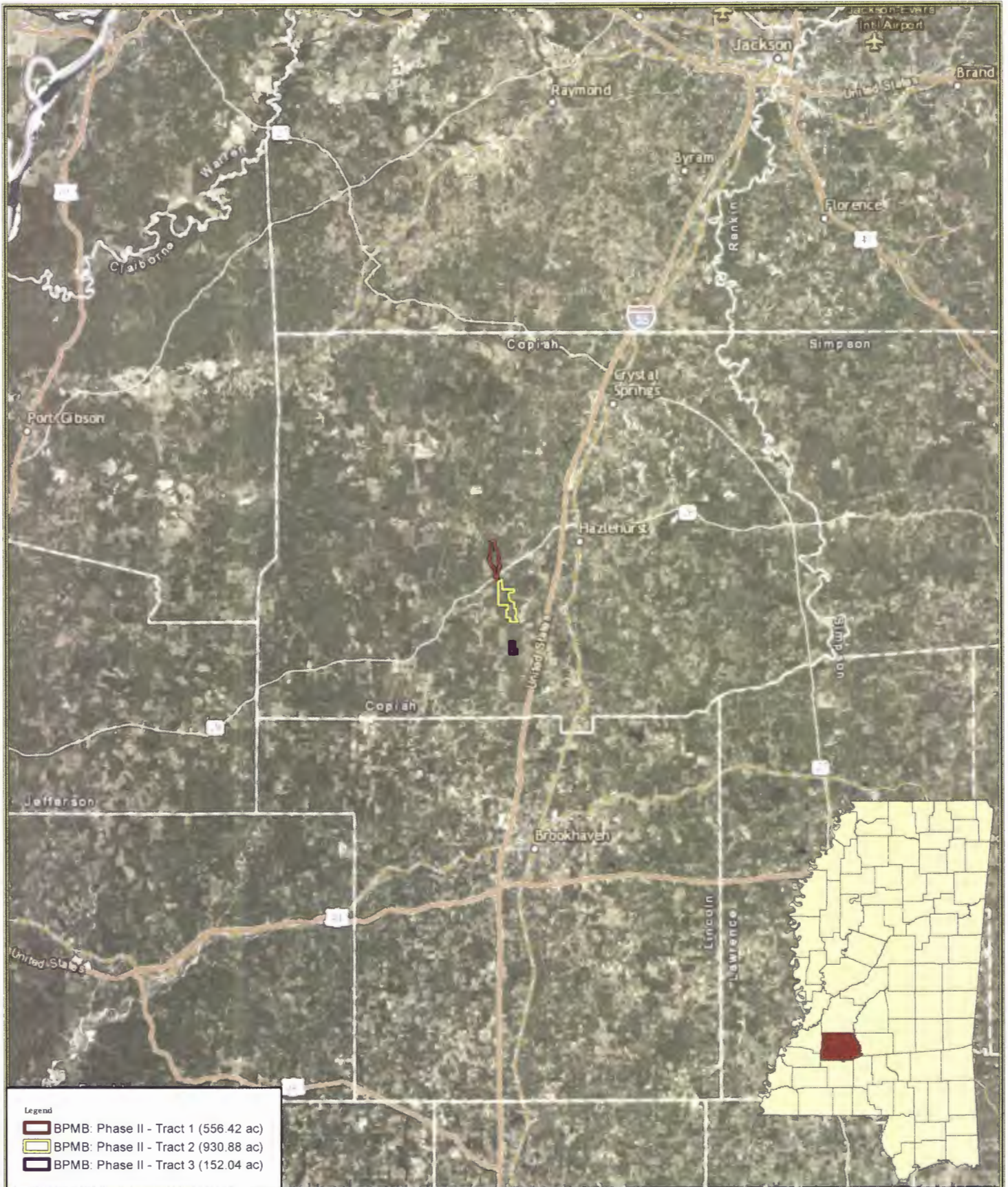
[http://wetland\\_plants.usace.army.mil/](http://wetland_plants.usace.army.mil/)

The Natural Communities of Mississippi. Mississippi Department of Wildlife and Fisheries Mississippi Natural Heritage Program 2009.

[http://www.wlf.Mississippi.gov/sites/default/files/pdf/page\\_wildlife/6776are%20Natural%20Communities/LA\\_NAT\\_COM.pdf](http://www.wlf.Mississippi.gov/sites/default/files/pdf/page_wildlife/6776are%20Natural%20Communities/LA_NAT_COM.pdf)

<http://law.justia.com/codes/mississippi/2015/title-51/chapter-3/article-1/section-51-3-7/>

## Figures



Legend

- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



Date Created: 8/2/2018

Created by: JDL

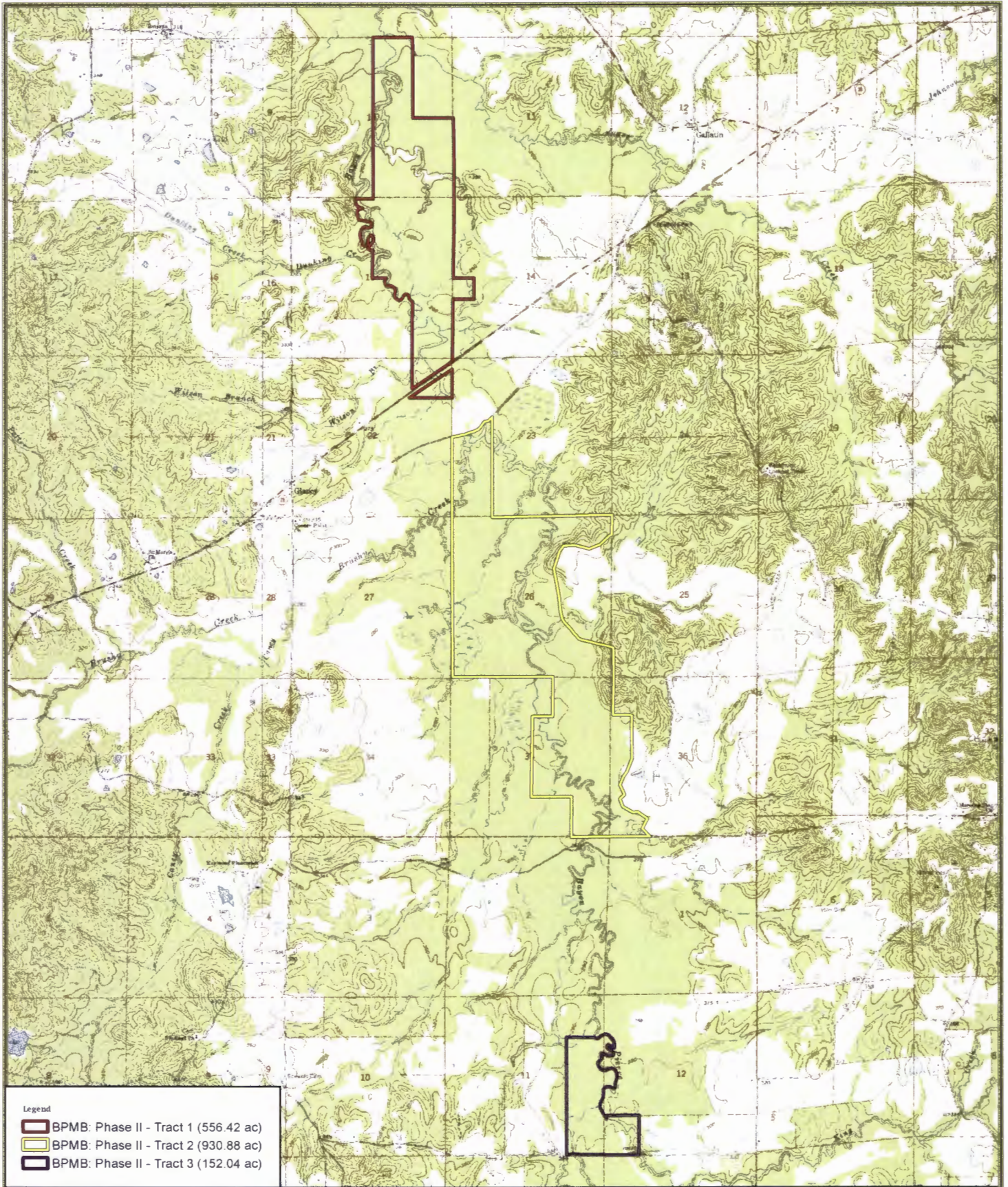
### Bayou Pierre Mitigation Bank Phase II

Copiah County, Mississippi  
**Figure 1 - Vicinity Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

ESRI World Imagery Basemap



Legend

- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



Date Created: 8/2/2018

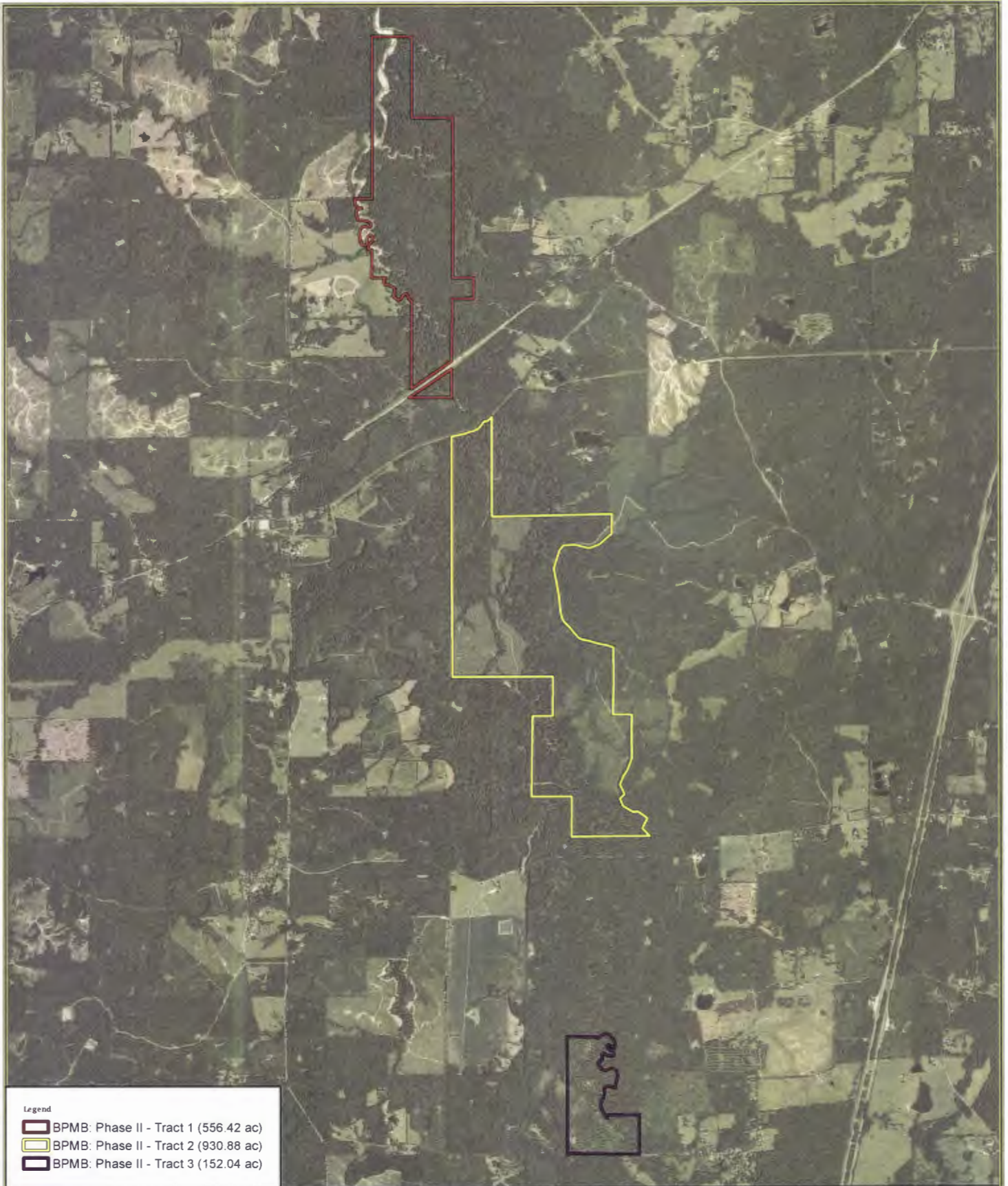
Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copeiah County, Mississippi  
**Figure 2 - Site Location Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USGS Hazlehurst (MS) Quad Basemap



Legend

- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



Date Created: 8/2/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

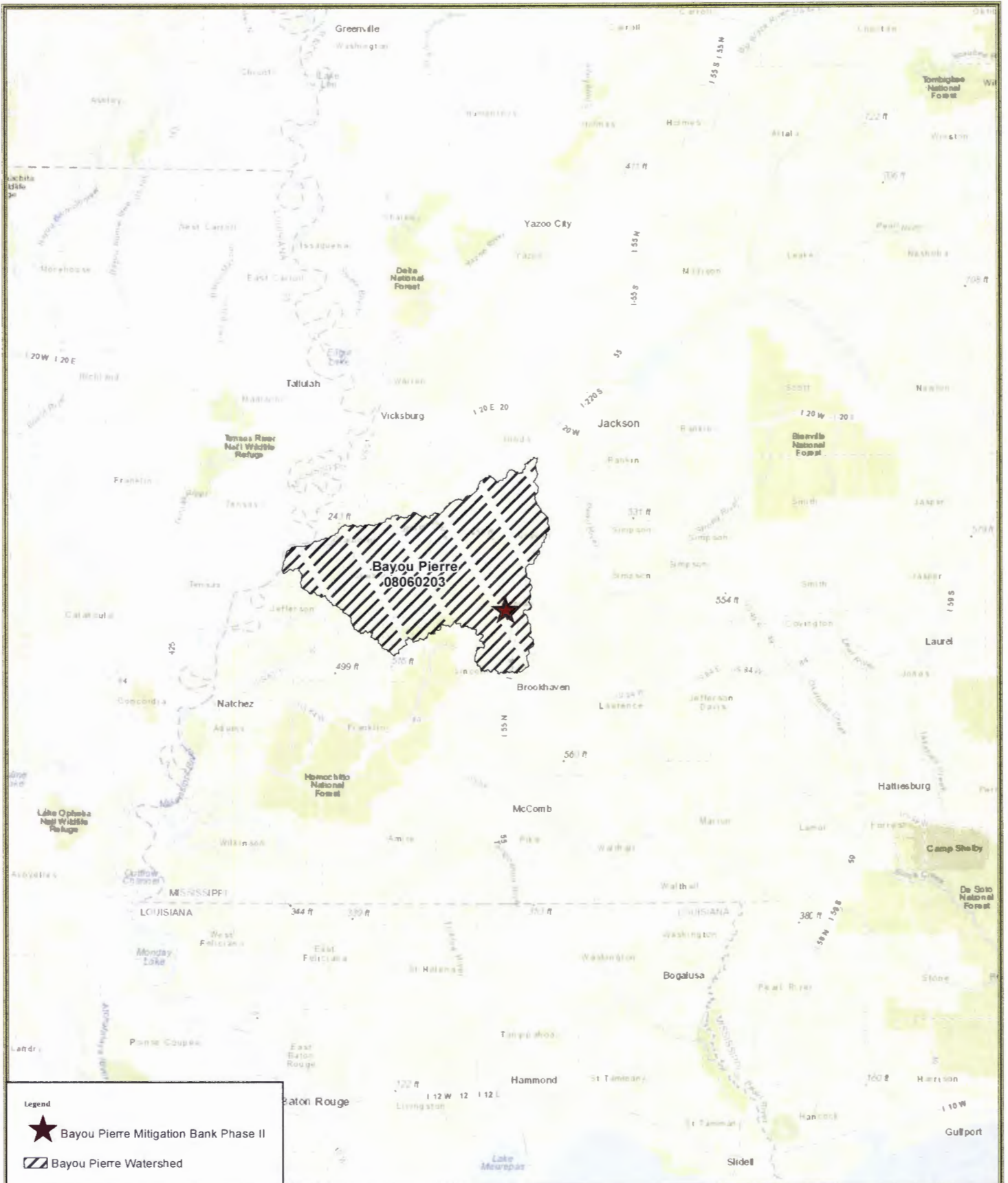
Copiah County, Mississippi

**Figure 2 - Site Location Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

- Bayou Pierre Mitigation Bank Phase II
- Bayou Pierre Watershed



Date Created: 1/30/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 4 - Watershed Location Map**

1:1,500,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

ESRI Topographic Basemap



Legend

- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



Date Created: 8/2/2018

Created by: JDL

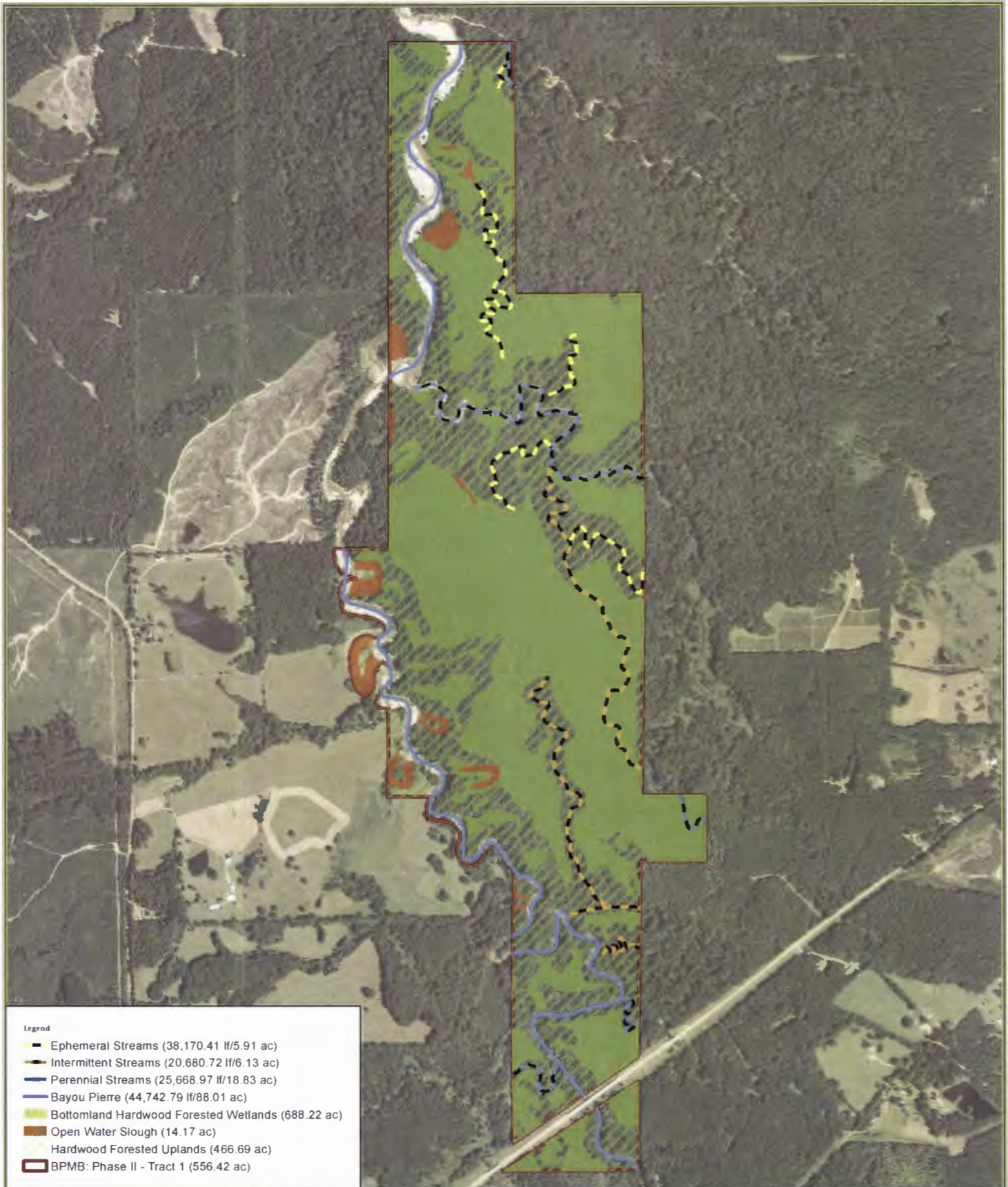
**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 5 - Historical Imagery Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

1952 Aerial Photography





**Legend**

-  Ephemeral Streams (38,170.41 lf/5.91 ac)
-  Intermittent Streams (20,680.72 lf/6.13 ac)
-  Perennial Streams (25,668.97 lf/18.83 ac)
-  Bayou Pierre (44,742.79 lf/88.01 ac)
-  Bottomland Hardwood Forested Wetlands (688.22 ac)
-  Open Water Slough (14.17 ac)
-  Hardwood Forested Uplands (466.69 ac)
-  BPMB: Phase II - Tract 1 (556.42 ac)



Date Created: 7/24/2018

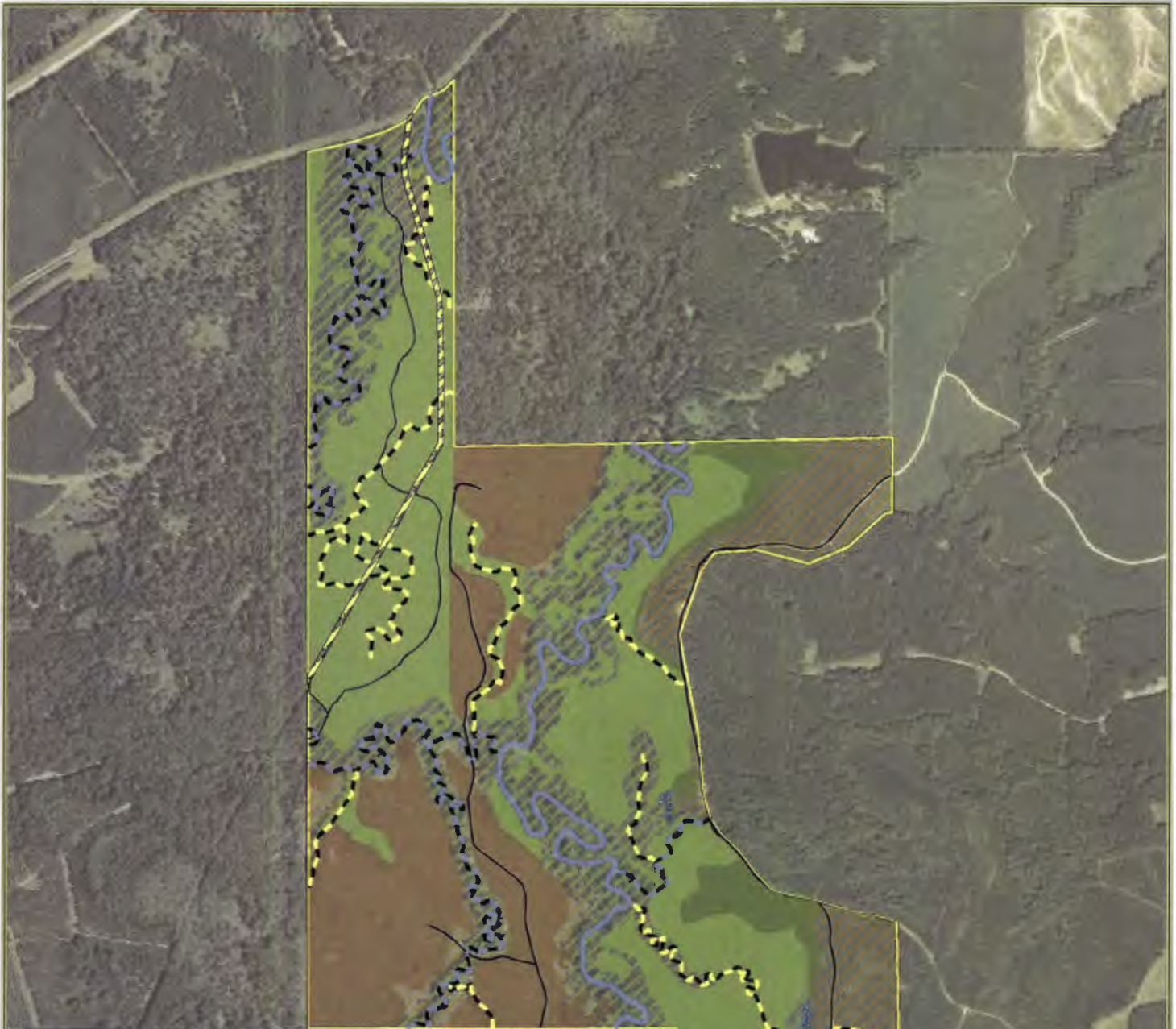
Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 6A - Current Habitat Map 1**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

- Interior Access Roads (40,077.85 lf/16.17 ac)
- ▨ Natural Gas Right-of-Way (6.26 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Perennial Streams (25,668.97 lf/18.83 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Emergent Wetlands (4.19 ac)
- Bottomland Hardwood Forested Wetlands (688.22 ac)
- Pine Plantation Forested Wetlands (83.26 ac)
- Bottomland Hardwood Scrub Shrub Wetlands (29.69 ac)
- Pine Plantation Scrub Shrub Wetlands (129.14 ac)
- Hardwood Forested Uplands (466.69 ac)
- Pine Plantation Uplands (81.01 ac)
- Open Field Uplands (1.66 ac)
- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)



**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 6B - Current Habitat Map 2**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet













USDA NAIP 2016 Imagery Basemap

Date Created: 7/24/2018

Created by: JDL



**Legend**

-  Interior Access Roads (40,077.85 lf/16.17 ac)
-  Ephemeral Streams (38,170.41 lf/5.91 ac)
-  Intermittent Streams (20,680.72 lf/6.13 ac)
-  Bayou Pierre (44,742.79 lf/88.01 ac)
-  Emergent Wetlands (4.19 ac)
-  Bottomland Hardwood Forested Wetlands (688.22 ac)
-  Pine Plantation Forested Wetlands (83.26 ac)
-  Bottomland Hardwood Scrub Shrub Wetlands (29.69 ac)
-  Hardwood Forested Uplands (466.69 ac)
-  Pine Plantation Uplands (81.01 ac)
-  Open Field Uplands (1.66 ac)
-  BPMB: Phase II - Tract 2 (930.88 ac)



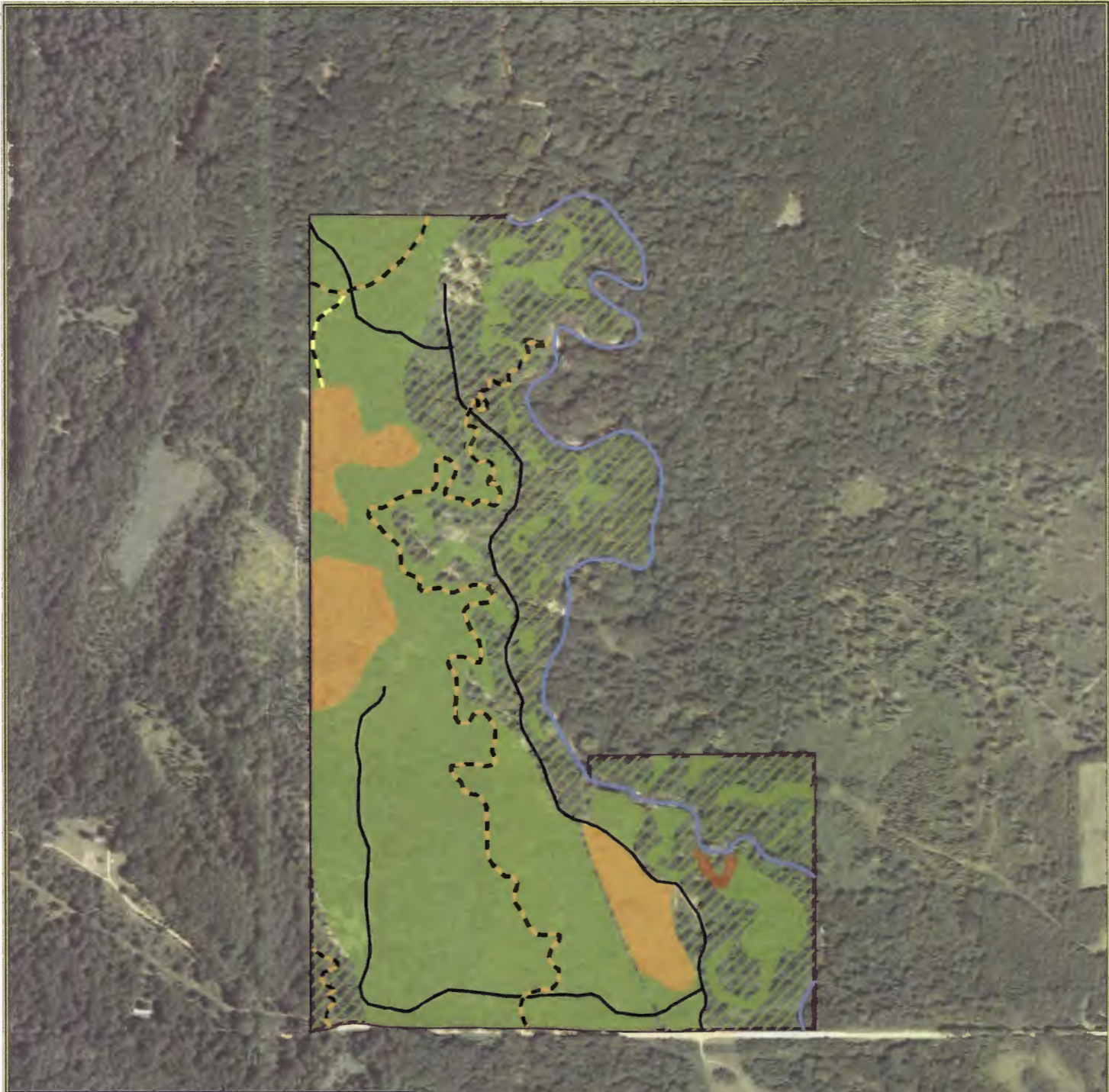
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**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 6C - Current Habitat Map 3**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



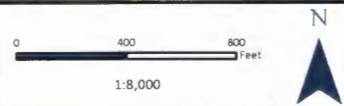
**Legend**

- Interior Access Roads (40,077.85 lf/16.17 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Intermittent Streams (20,680.72 lf/6.13 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Bottomland Hardwood Forested Wetlands (688.22 ac)
- Bottomland Hardwood Scrub Shrub Wetlands (29.69 ac)
- Open Water Slough (14.17 ac)
- Hardwood Forested Uplands (466.69 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



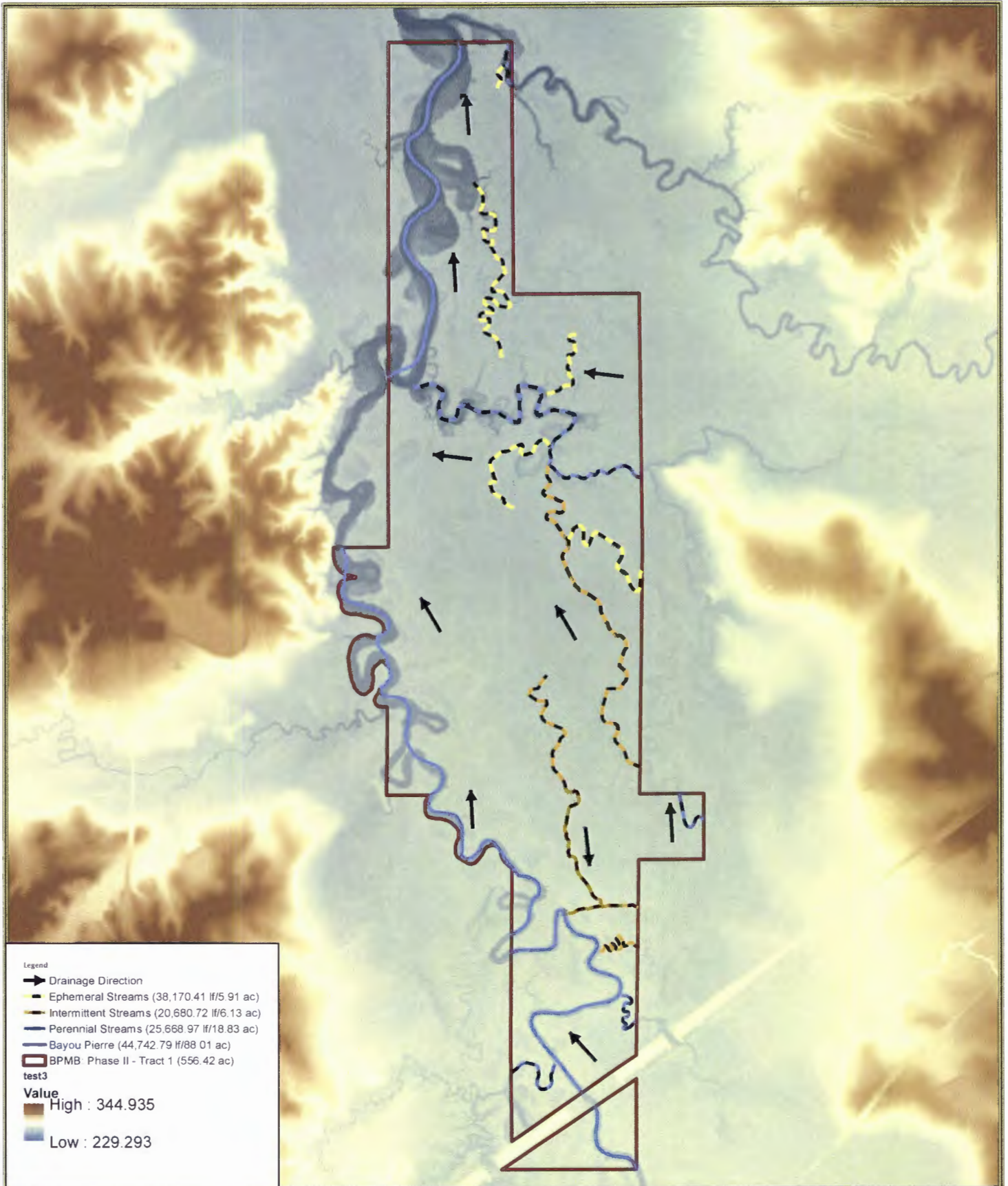
Date Created: 7/24/2018      Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 6D - Current Habitat Map 4**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend

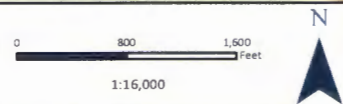
-  Drainage Direction
-  Ephemeral Streams (38,170.41 lf/5.91 ac)
-  Intermittent Streams (20,680.72 lf/6.13 ac)
-  Perennial Streams (25,668.97 lf/18.83 ac)
-  Bayou Pierre (44,742.79 lf/88.01 ac)
-  BPMB - Phase II - Tract 1 (556.42 ac)
- test3
- Value
-  High : 344.935
-  Low : 229.293



Date Created: 7/24/2018

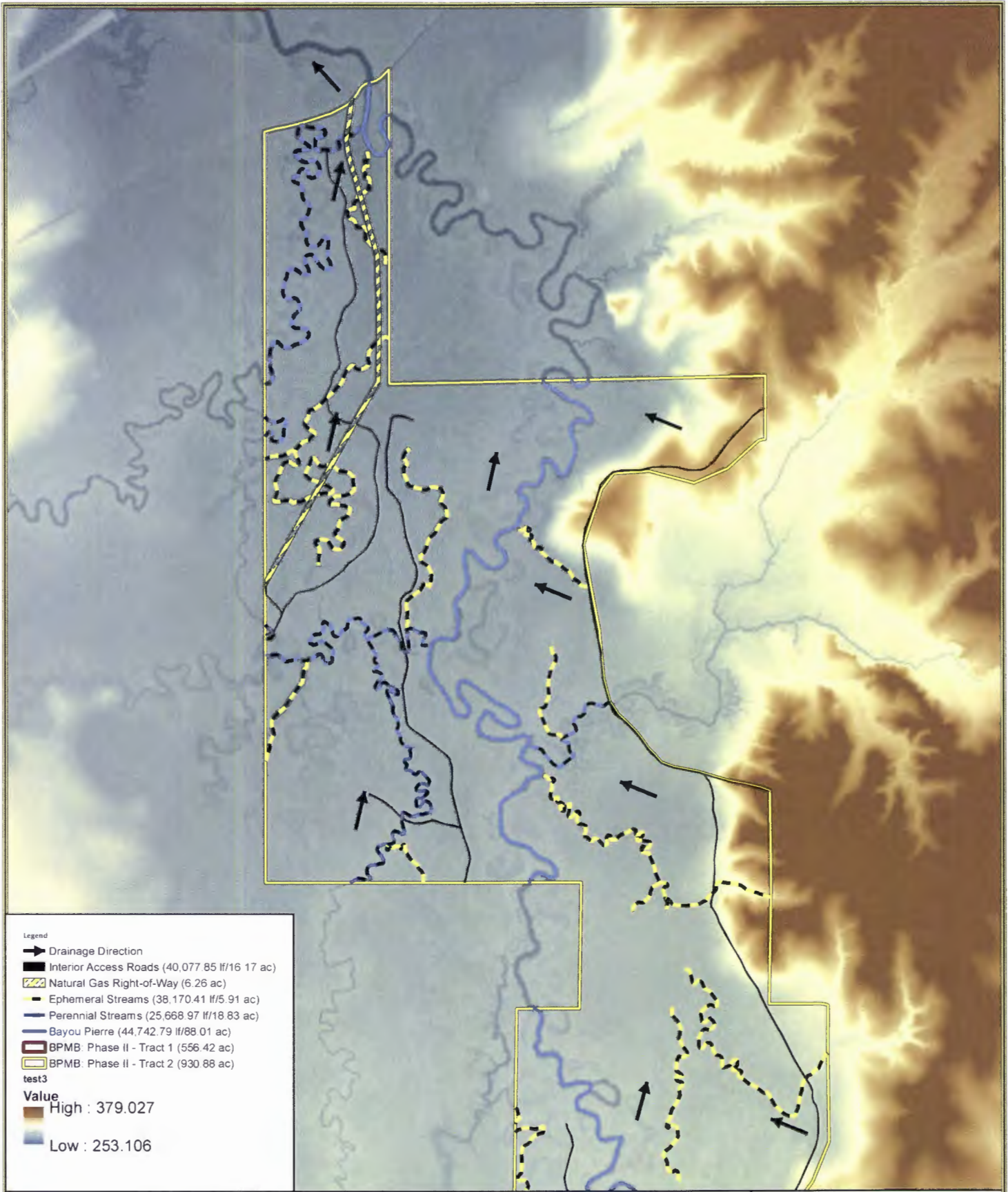
Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 7A - Current Hydrology Map 1**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

LIDAR



**Legend**

- ➔ Drainage Direction
- ▬ Interior Access Roads (40,077.85 lf/16.17 ac)
- ▬ Natural Gas Right-of-Way (6.26 ac)
- ▬ Ephemeral Streams (38,170.41 lf/5.91 ac)
- ▬ Perennial Streams (25,668.97 lf/18.83 ac)
- ▬ Bayou Pierre (44,742.79 lf/88.01 ac)
- ▭ BPMB - Phase II - Tract 1 (556.42 ac)
- ▭ BPMB - Phase II - Tract 2 (930.88 ac)

test3

**Value**

- High : 379.027
- Low : 253.106

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**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 7B - Current Hydrology Map 2**

N

0 800 1,600  
Feet

1:16,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

LIDAR

Date Created: 7/24/2018      Created by: JDL

S:\PROJECT FILES\Wildlife\MS\Bayou Pierre Phase II\Mapping\BPMBP2\_CurrentHydrology.mxd

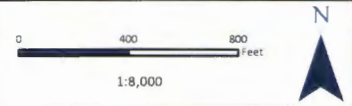


Legend

- ➔ Drainage Direction
- ▬ Interior Access Roads (40,077.85 lf/16.17 ac)
- - - Ephemeral Streams (38,170.41 lf/5.91 ac)
- - - Intermittent Streams (20,680.72 lf/6.13 ac)
- ▬ Bayou Pierre (44,742.79 lf/88.01 ac)
- ▭ BPMB: Phase II - Tract 2 (930.88 ac)
- test3
- Value**
- High : 347.08
- Low : 263.921



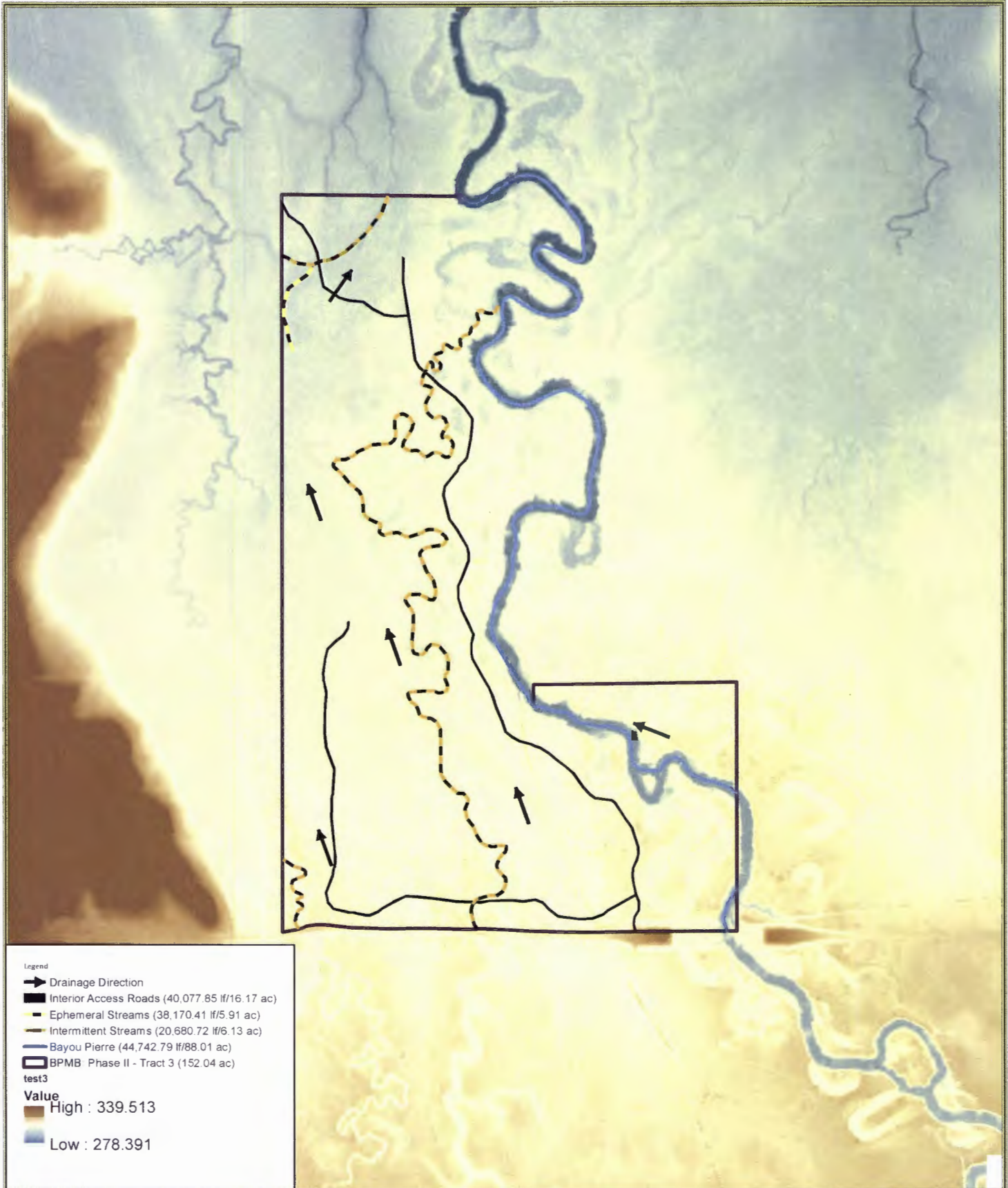
**Bayou Pierre Mitigation Bank  
Phase II**  
 Copiah County, Mississippi  
**Figure 7C - Current Hydrology Map 3**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

LIDAR

Date Created: 7/24/2018      Created by: JDL

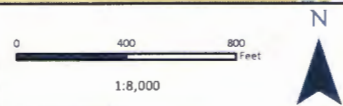


Legend

- ➔ Drainage Direction
  - ▬ Interior Access Roads (40,077.85 lf/16.17 ac)
  - - - Ephemeral Streams (38,170.41 lf/5.91 ac)
  - - - Intermittent Streams (20,680.72 lf/6.13 ac)
  - ▬ Bayou Pierre (44,742.79 lf/88.01 ac)
  - ▭ BPMB Phase II - Tract 3 (152.04 ac)
- test3
- Value**
- High : 339.513
  - Low : 278.391



**Bayou Pierre Mitigation Bank  
Phase II**  
Copeiah County, Mississippi  
**Figure 7D - Current Hydrology Map 4**

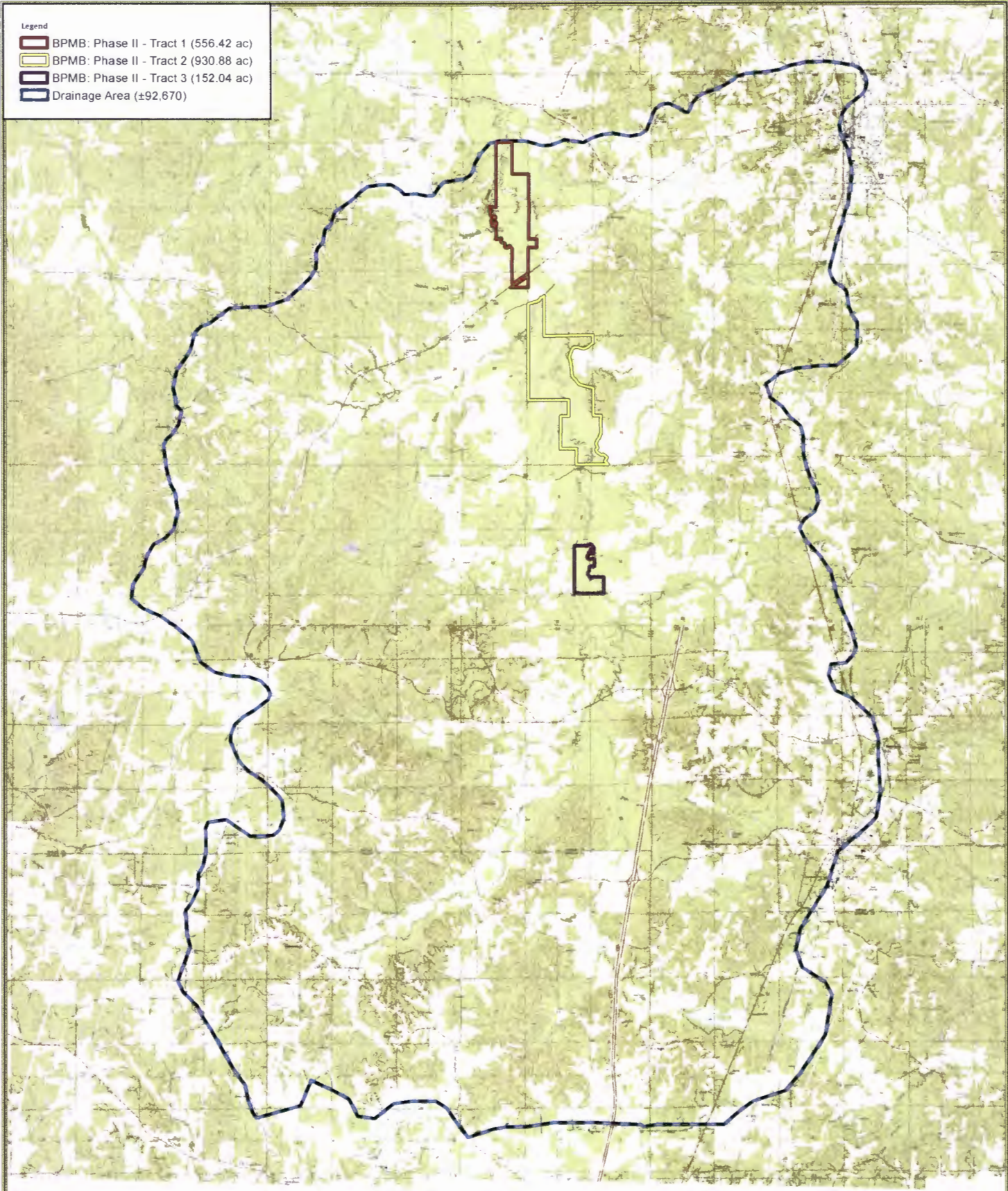


NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

Date Created: 7/24/2018 Created by: JDL

LIDAR

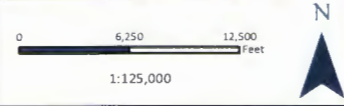




- Legend**
- BPMB: Phase II - Tract 1 (556.42 ac)
  - BPMB: Phase II - Tract 2 (930.88 ac)
  - BPMB: Phase II - Tract 3 (152.04 ac)
  - Drainage Area (±92,670)



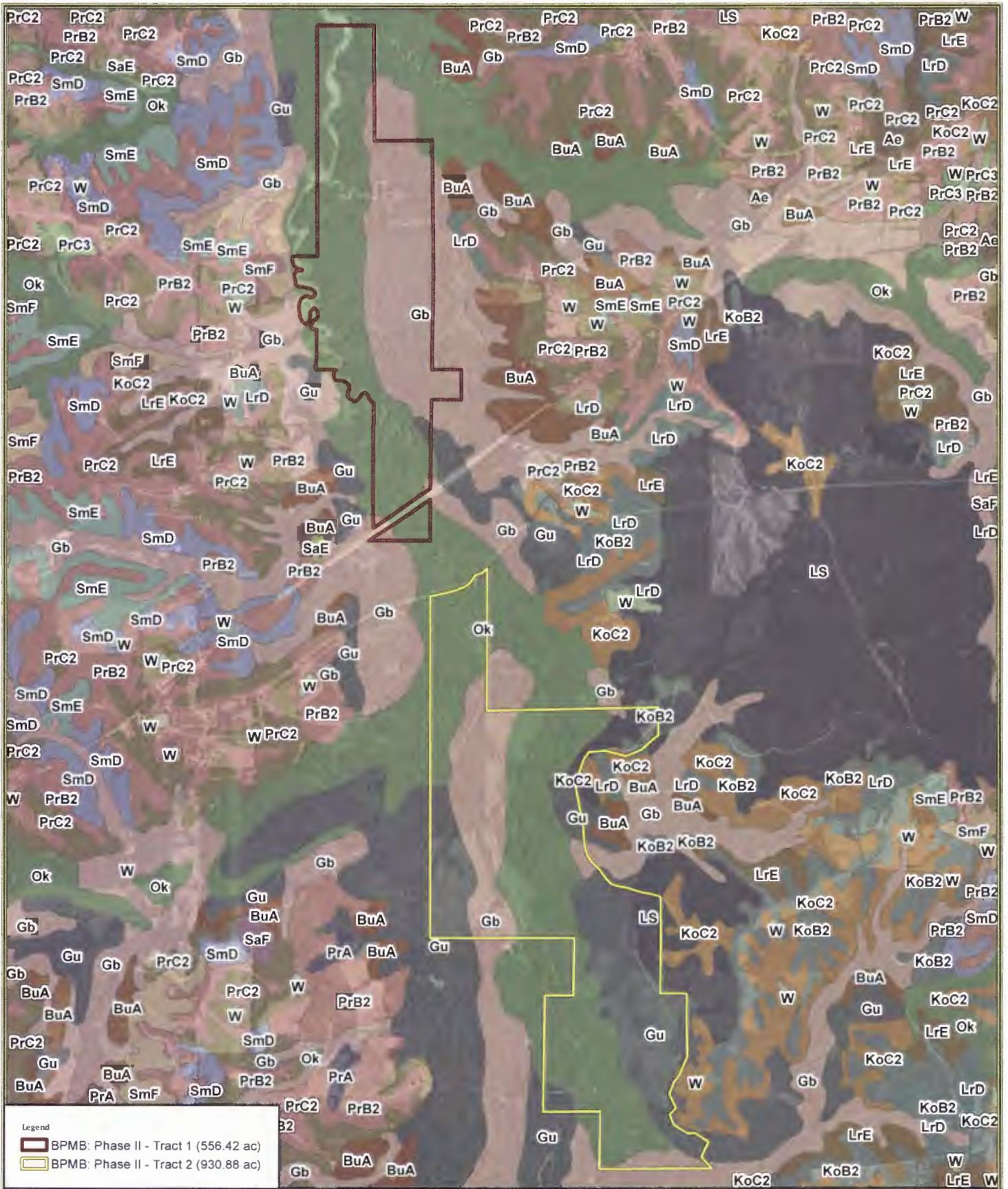
**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 8 - Historical Hydrology Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USGS Hazlehurst (MS) Quad Basemap

Date Created: 8/2/2018      Created by: JDL



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Date Created: 8/2/2018      Created by: JDL

**Bayou Pierre Mitigation Bank  
 Phase II**  
 Copiah County, Mississippi  
**Figure 9A - NRCS Soils Map**


0      1,750      3,500  
 Feet

1:35,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend  
 BPMB: Phase II - Tract 3 (152.04 ac)




Date Created: 8/2/2018 Created by: JDL

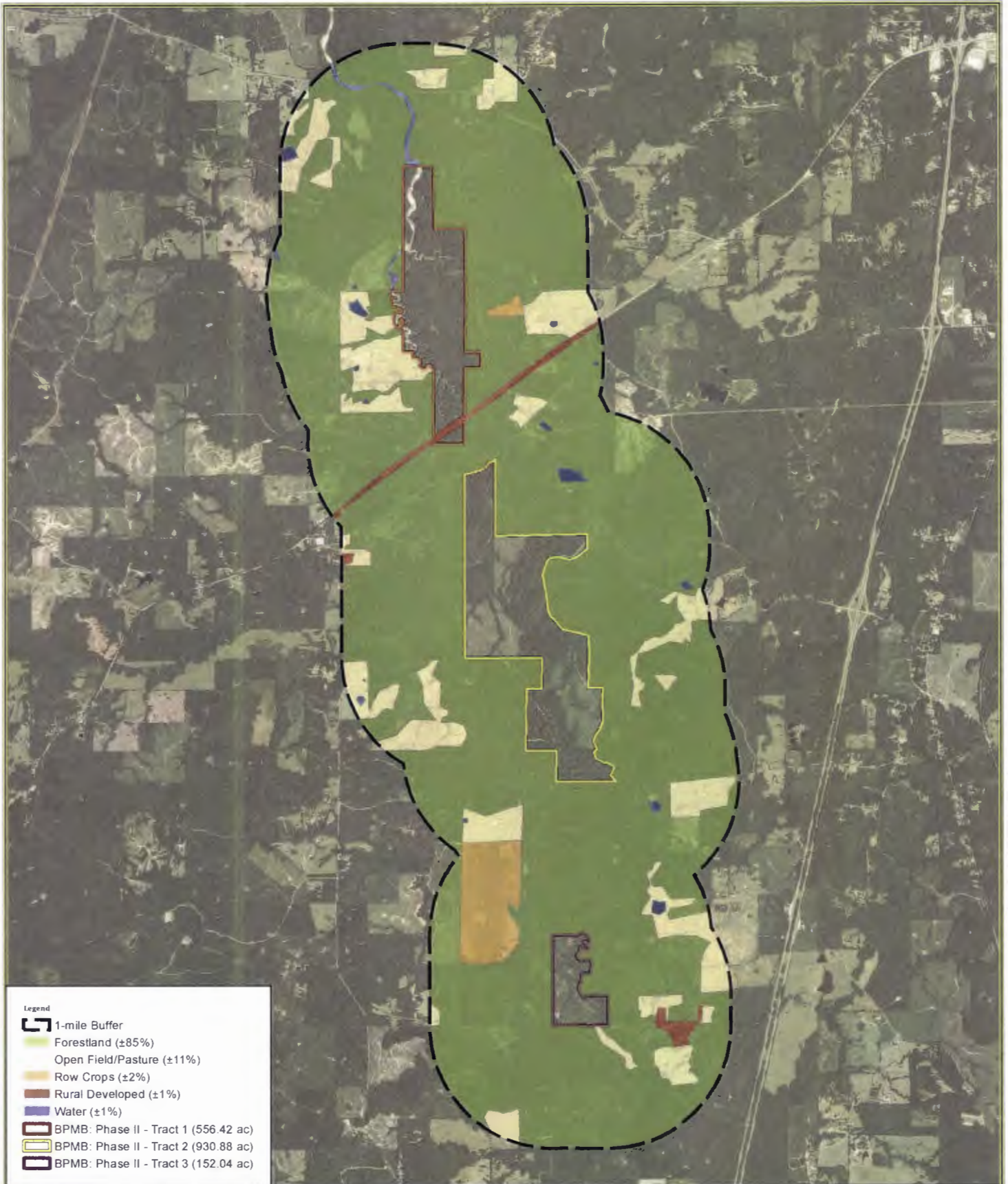
**Bayou Pierre Mitigation Bank  
 Phase II**  
 Copiah County, Mississippi  
**Figure 9B - NRCS Soils Map**

0 500 1,000 Feet  
 1:10,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap





Date Created: 8/2/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

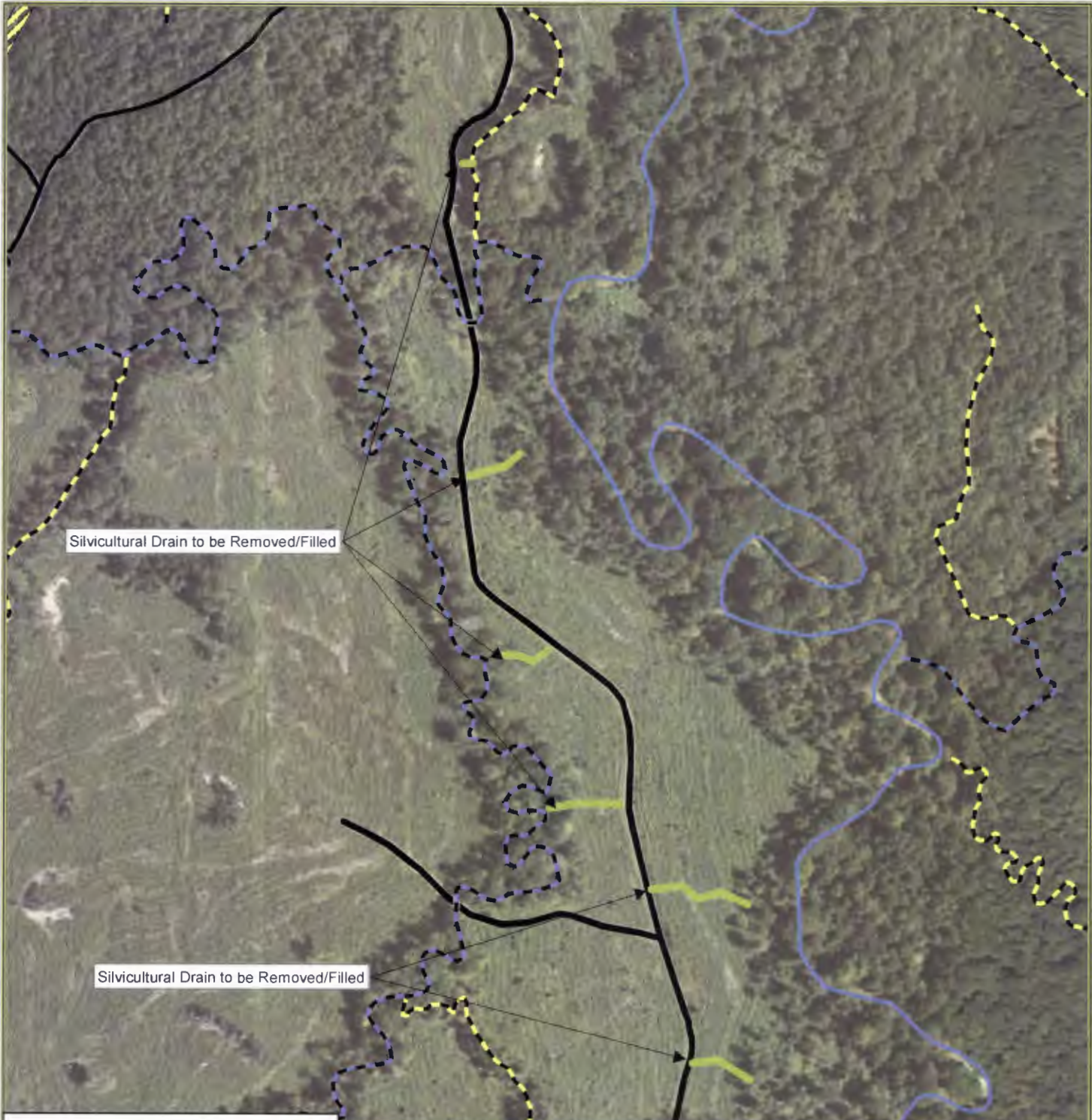
Copiah County, Mississippi

**Figure 10 - Surrounding Land Use Map**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Silvicultural Drain to be Removed/Filled

Silvicultural Drain to be Removed/Filled

Legend	
	Silvicultural Drain to be Removed/Filled (6)
	Interior Access Roads (40,077.85 lf/16.17 ac)
	Natural Gas Right-of-Way (6.26 ac)
	Ephemeral Streams (38,170.41 lf/5.91 ac)
	Perennial Streams (25,668.97 lf/18.83 ac)
	Bayou Pierre (44,742.79 lf/88.01 ac)
	BPMB: Phase II - Tract 2 (930.88 ac)

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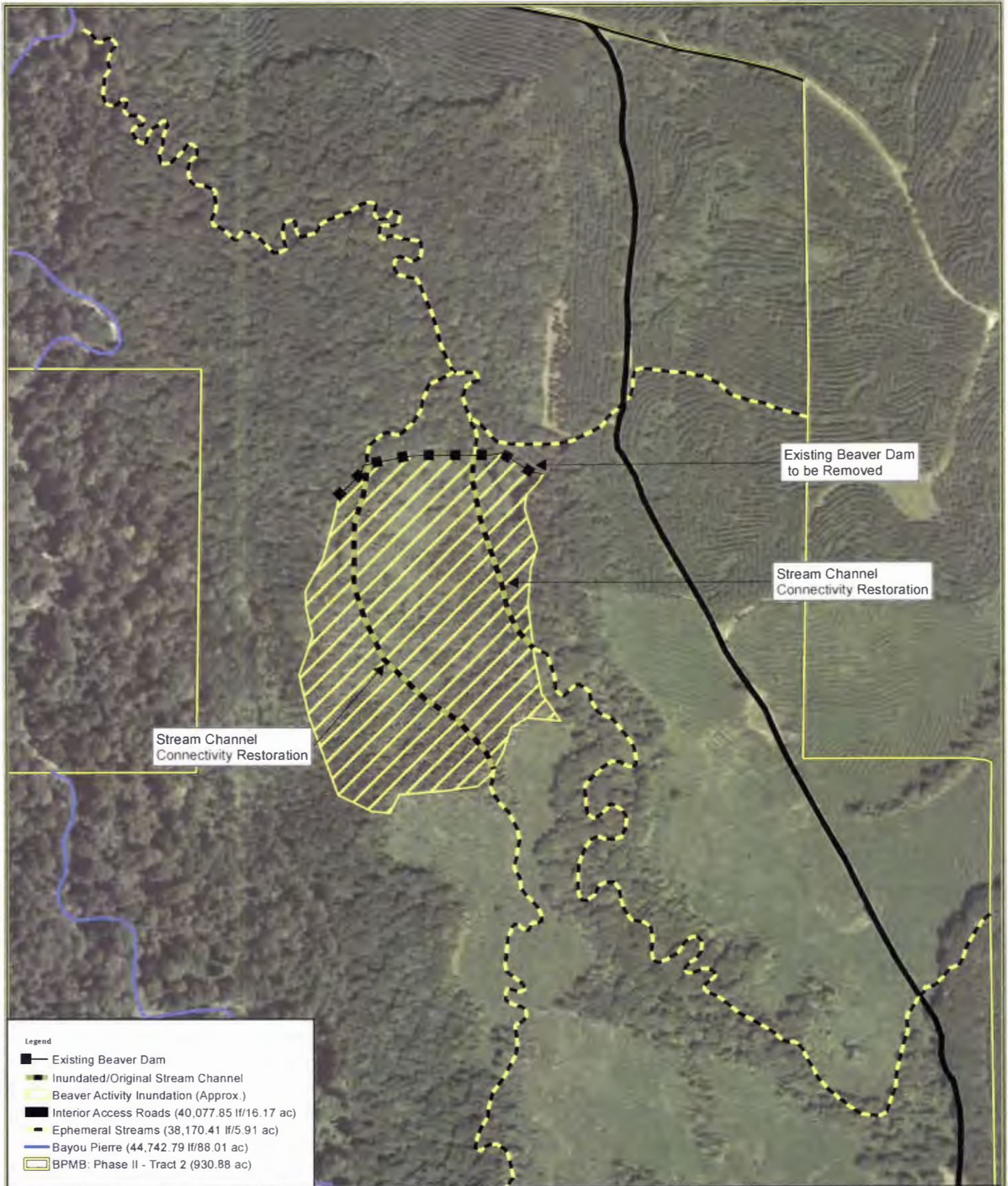
**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 11A - Hydrologic Work Plan Map 1**

0 250 500 Feet  
1:5,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

- Existing Beaver Dam
- Inundated/Original Stream Channel
- - - Beaver Activity Inundation (Approx.)
- Interior Access Roads (40,077.85 lf/16.17 ac)
- - - Ephemeral Streams (38,170.41 lf/5.91 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)

Date Created: 7/24/2018  
 Created by: JDL

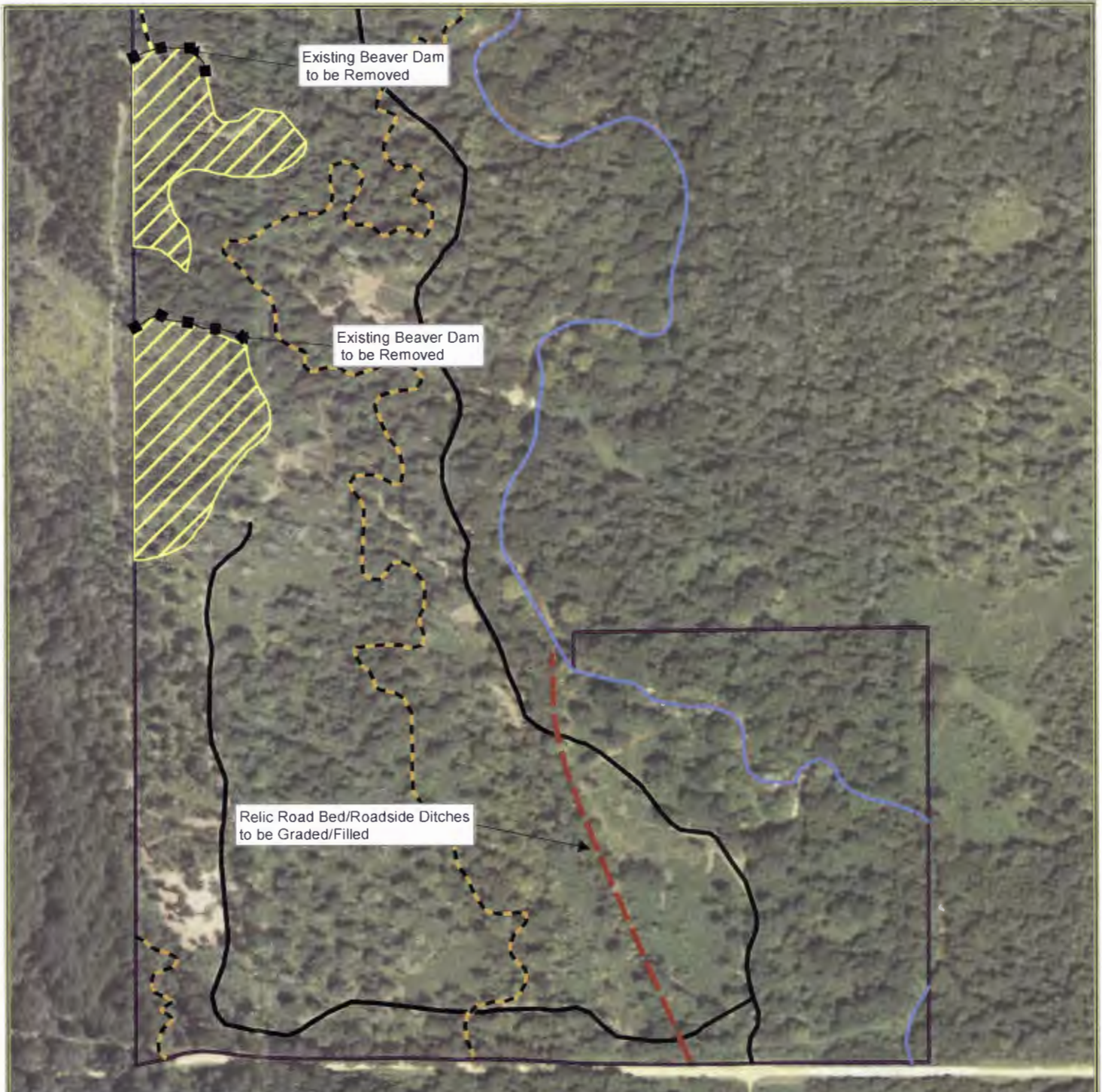
**Bayou Pierre Mitigation Bank  
 Phase II**  
 Copeiah County, Mississippi  
**Figure 11B - Hydrologic Work Plan Map 2**

N

1:5,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend

- Existing Beaver Dam
- Relic Road Bed/Roadside Ditches
- Beaver Activity Inundation (Approx.)
- Interior Access Roads (40,077.85 lf/16.17 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Intermittent Streams (20,680.72 lf/6.13 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



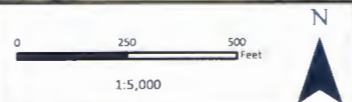
Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

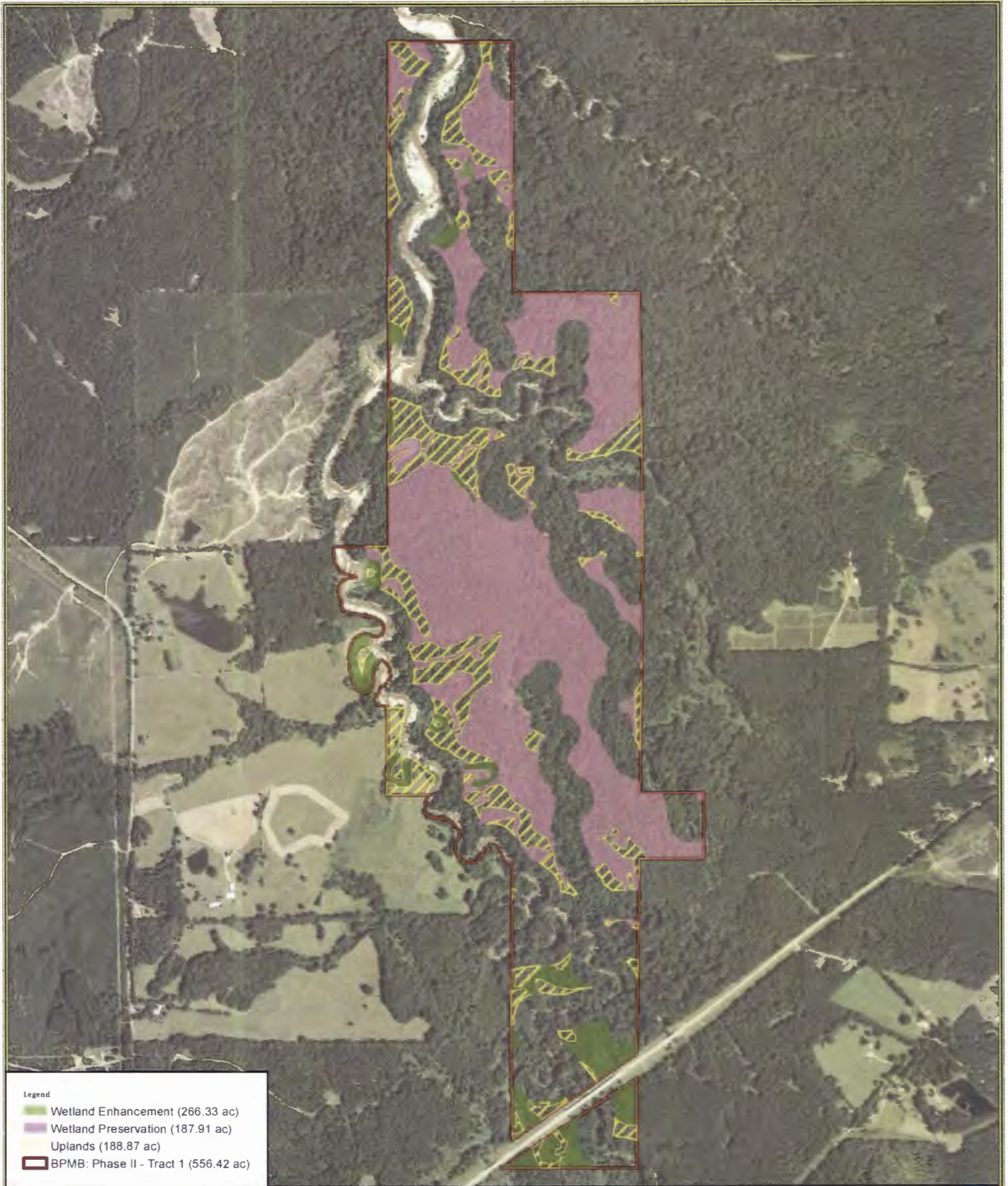
Copiah County, Mississippi

**Figure 11C - Hydrologic Work Plan Map 3**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend

- Wetland Enhancement (266.33 ac)
- Wetland Preservation (187.91 ac)
- Uplands (188.87 ac)
- BPMB: Phase II - Tract 1 (556.42 ac)



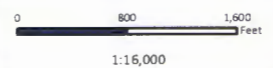
Date Created: 7/24/2018

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**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

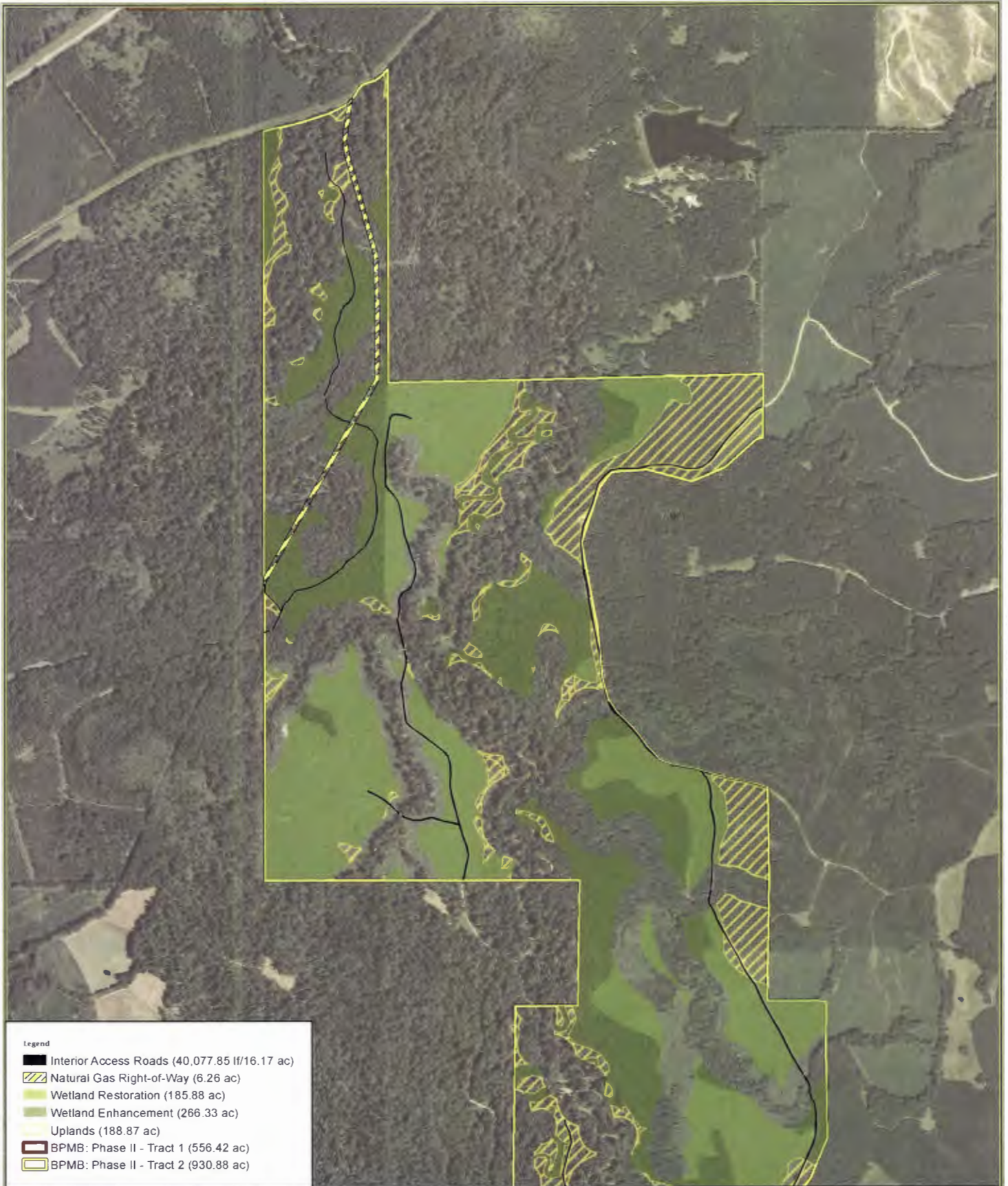
**Figure 12A - Wetland Mitigation Plan Map 1**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap





Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 12B - Wetland Mitigation Plan Map 2**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

- Interior Access Roads (40,077.85 lf/16.17 ac)
- Wetland Restoration (185.88 ac)
- Wetland Enhancement (266.33 ac)
- Uplands (188.87 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)



Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 12C - Wetland Mitigation Plan Map 3**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend

- Interior Access Roads (40,077.85 lf/16.17 ac)
- Wetland Enhancement (266.33 ac)
- Uplands (188.87 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 12D - Wetland Mitigation Plan Map 4**

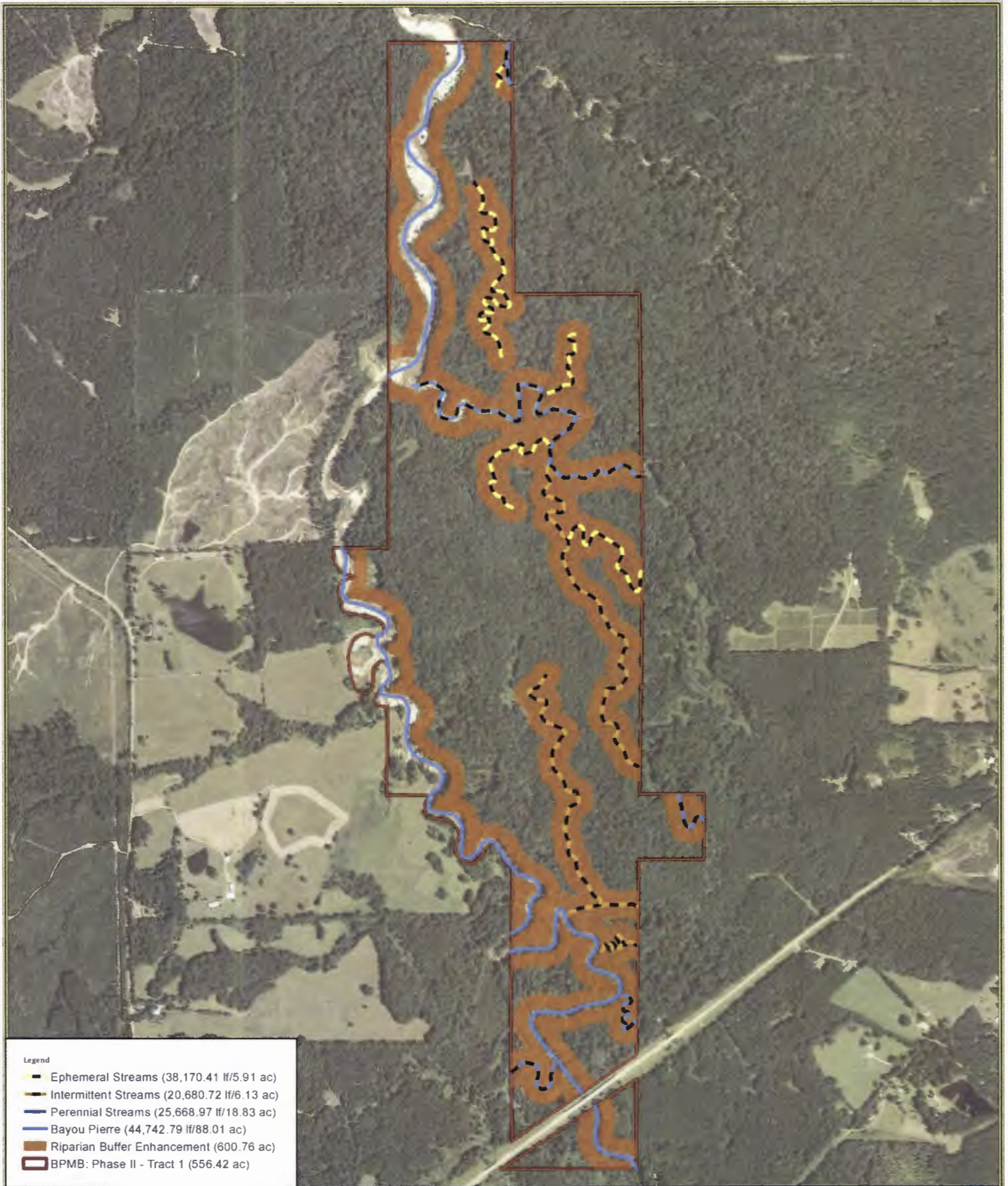
Date Created: 7/24/2018

Created by: JDL



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



Legend	
	Ephemeral Streams (38,170.41 lf/5.91 ac)
	Intermittent Streams (20,680.72 lf/6.13 ac)
	Perennial Streams (25,668.97 lf/18.83 ac)
	Bayou Pierre (44,742.79 lf/88.01 ac)
	Riparian Buffer Enhancement (600.76 ac)
	BPMB: Phase II - Tract 1 (556.42 ac)

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Date Created: 7/24/2018      Created by: JDL

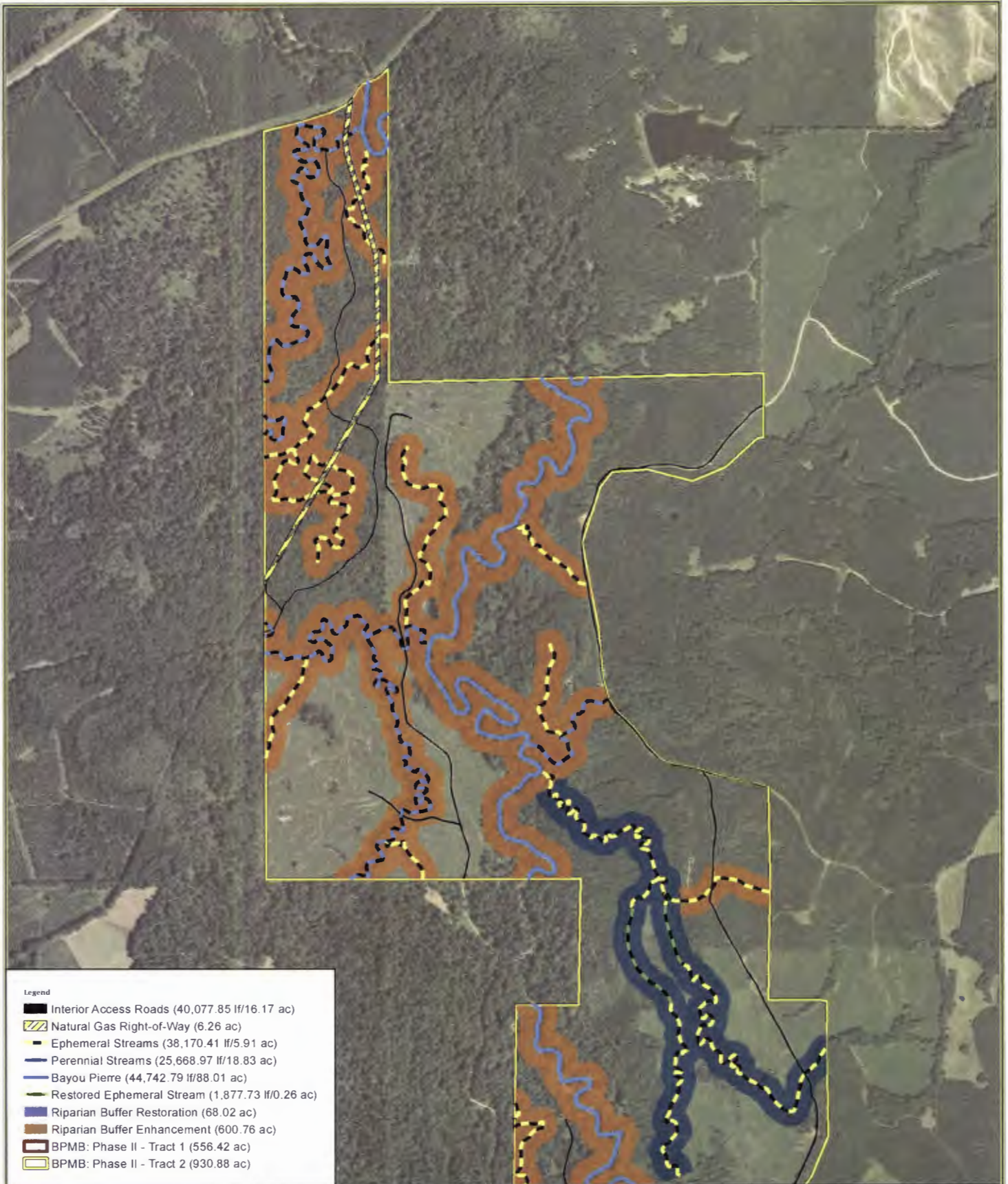
**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 13A - Stream Mitigation Plan Map 1**

N

1:16,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

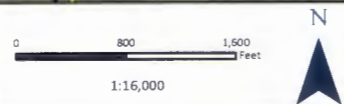
- Interior Access Roads (40,077.85 lf/16.17 ac)
- ▨ Natural Gas Right-of-Way (6.26 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Perennial Streams (25,668.97 lf/18.83 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Restored Ephemeral Stream (1,877.73 lf/0.26 ac)
- Riparian Buffer Restoration (68.02 ac)
- Riparian Buffer Enhancement (600.76 ac)
- BPMB: Phase II - Tract 1 (556.42 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)



Date Created: 7/24/2018

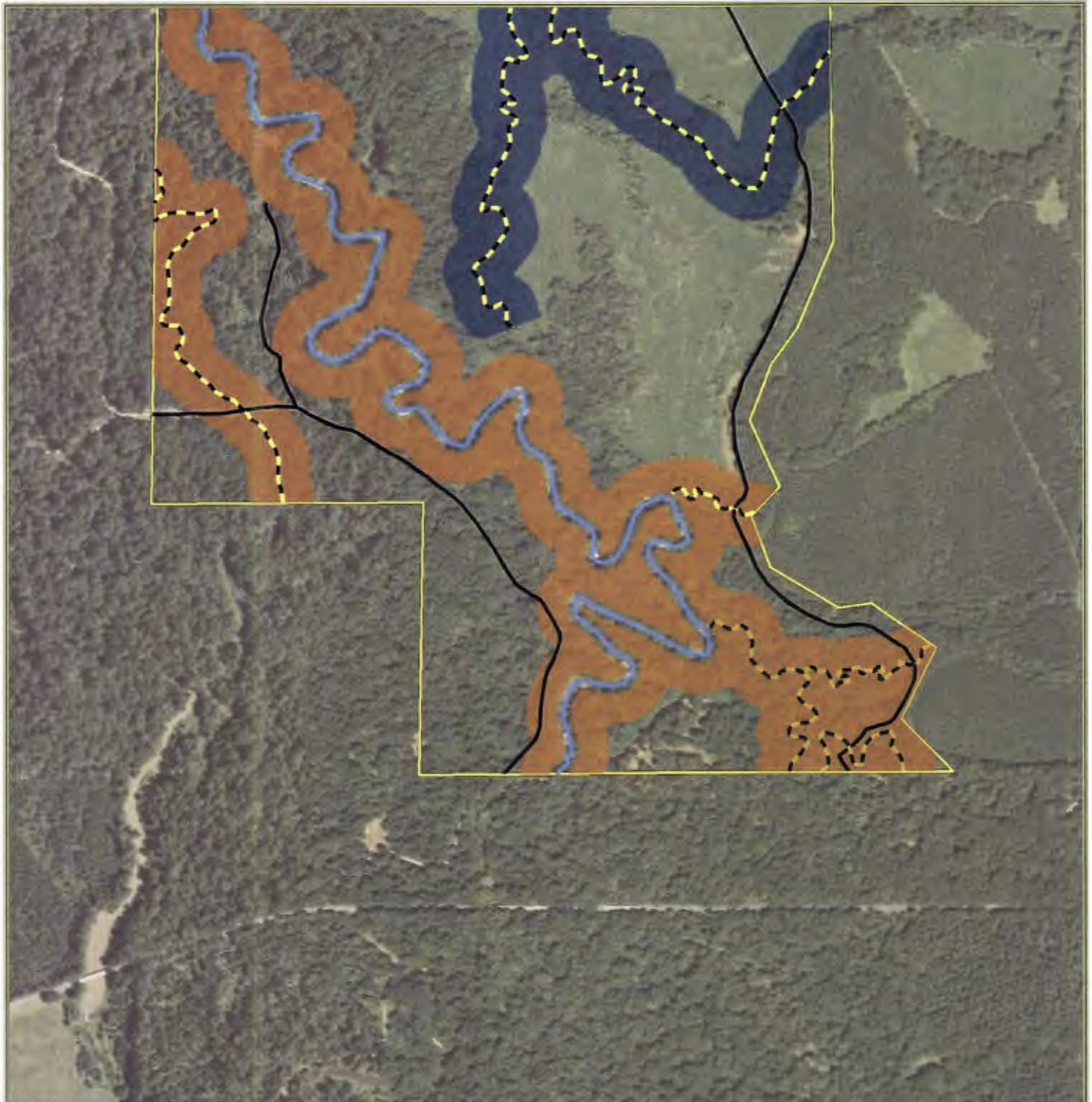
Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 13B - Stream Mitigation Plan Map 2**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

- Interior Access Roads (40,077.85 lf/16.17 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Intermittent Streams (20,680.72 lf/6.13 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Riparian Buffer Restoration (68.02 ac)
- Riparian Buffer Enhancement (600.76 ac)
- BPMB: Phase II - Tract 2 (930.88 ac)



Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 13C - Stream Mitigation Plan Map 3**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

	Interior Access Roads (40,077.85 lf/16.17 ac)
	Ephemeral Streams (38,170.41 lf/5.91 ac)
	Intermittent Streams (20,680.72 lf/6.13 ac)
	Bayou Pierre (44,742.79 lf/88.01 ac)
	Riparian Buffer Enhancement (600.76 ac)
	BOMB: Phase II - Tract 3 (152.04 ac)

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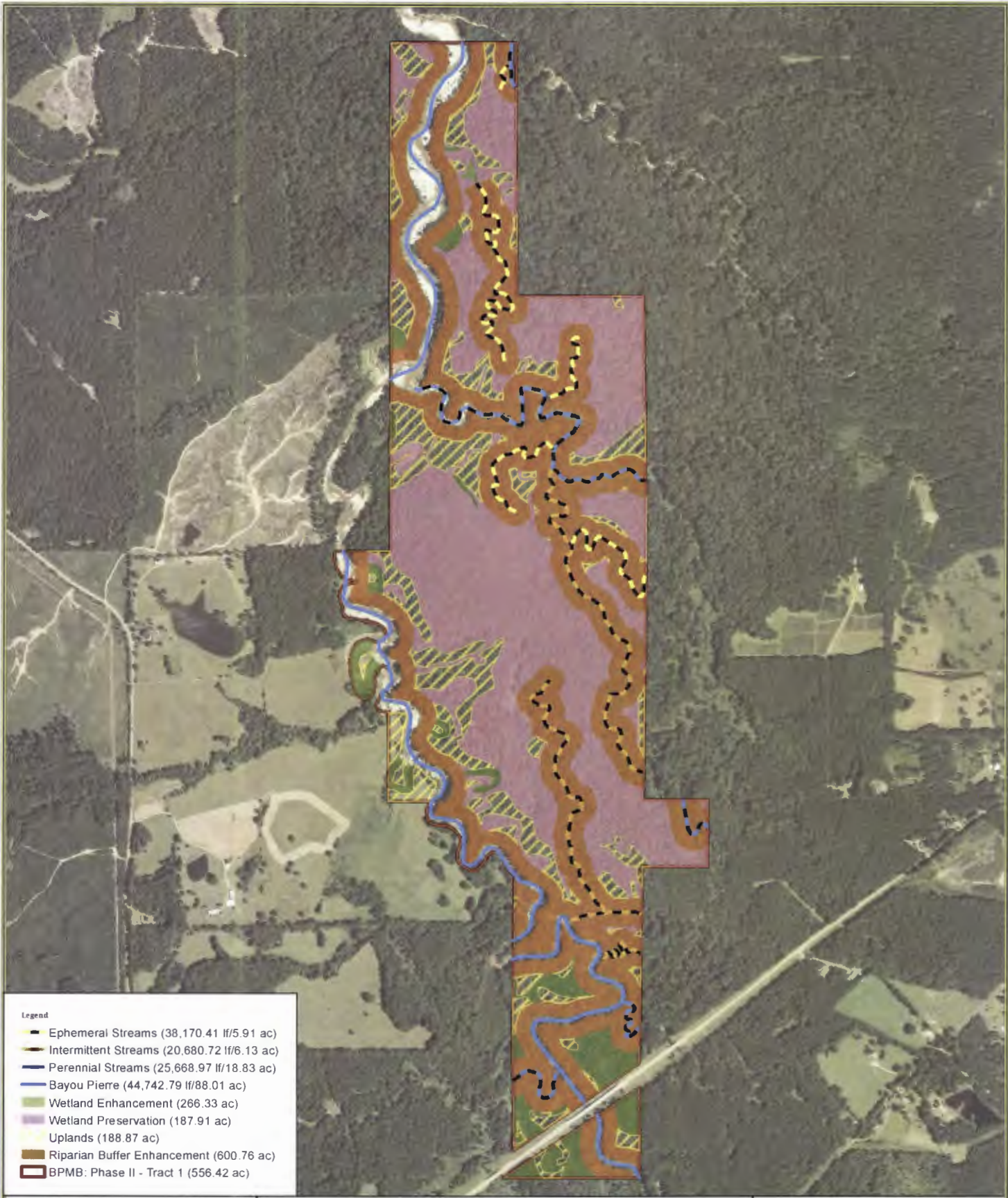
**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 13D - Stream Mitigation Plan Map 4**

 1:8,000 NAD 1983 StatePlane Mississippi West FIPS 2302 Feet	
USDA NAIP 2016 Imagery Basemap	

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**Legend**

- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Intermittent Streams (20,680.72 lf/6.13 ac)
- Perennial Streams (25,668.97 lf/18.83 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Wetland Enhancement (266.33 ac)
- Wetland Preservation (187.91 ac)
- Uplands (188.87 ac)
- Riparian Buffer Enhancement (600.76 ac)
- BPMB: Phase II - Tract 1 (556.42 ac)



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**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 14A - Overall Mitigation Plan Map 1**

0      800      1,600  
Feet

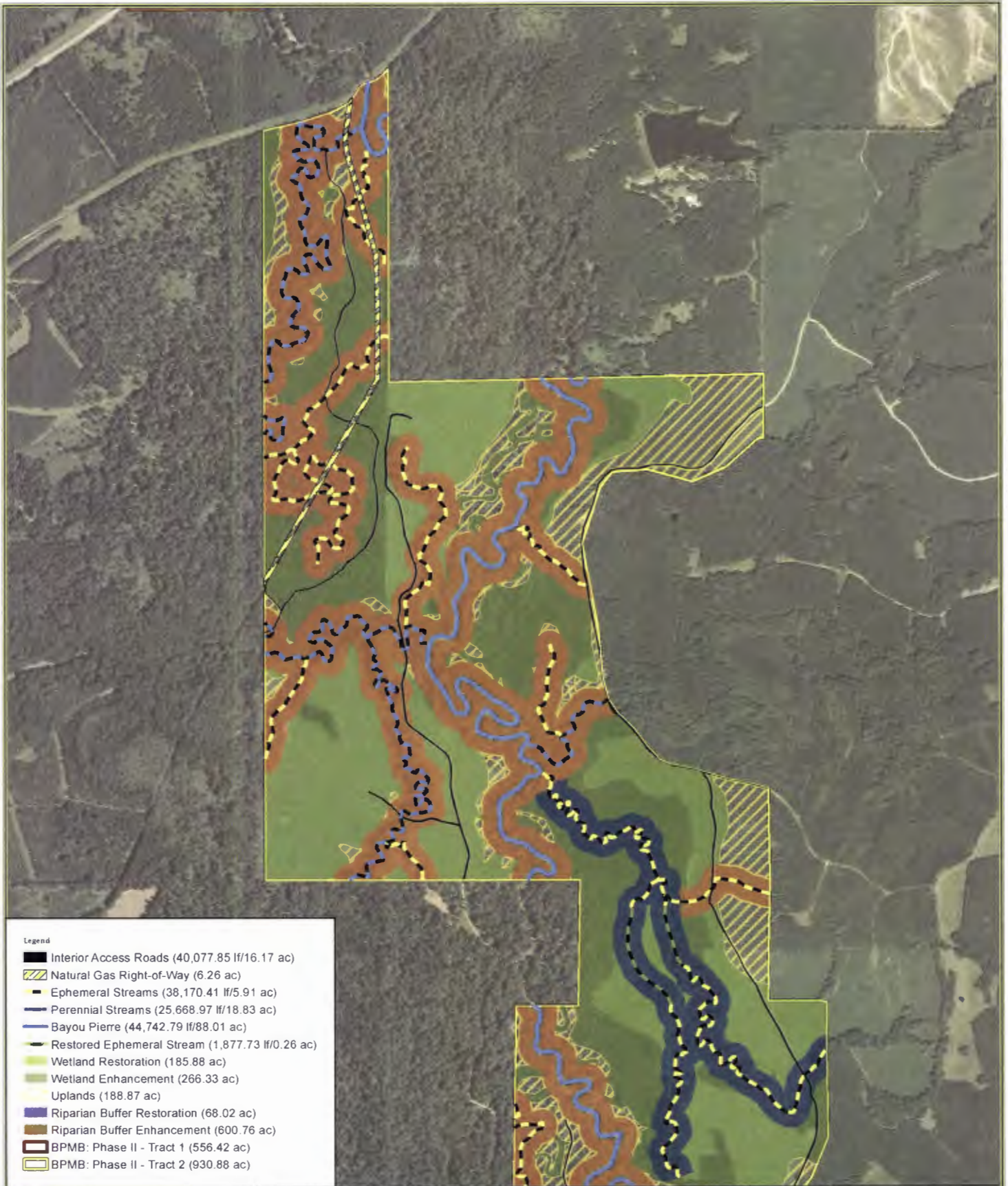
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

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap





Legend

-  Interior Access Roads (40,077.85 lf/16.17 ac)
-  Natural Gas Right-of-Way (6.26 ac)
-  Ephemeral Streams (38,170.41 lf/5.91 ac)
-  Perennial Streams (25,668.97 lf/18.83 ac)
-  Bayou Pierre (44,742.79 lf/88.01 ac)
-  Restored Ephemeral Stream (1,877.73 lf/0.26 ac)
-  Wetland Restoration (185.88 ac)
-  Wetland Enhancement (266.33 ac)
-  Uplands (188.87 ac)
-  Riparian Buffer Restoration (68.02 ac)
-  Riparian Buffer Enhancement (600.76 ac)
-  BPMB: Phase II - Tract 1 (556.42 ac)
-  BPMB: Phase II - Tract 2 (930.88 ac)



Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

Copiah County, Mississippi

**Figure 14B - Overall Mitigation Plan Map 2**



NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

	Interior Access Roads (40,077.85 lf/16.17 ac)
	Ephemeral Streams (38,170.41 lf/5.91 ac)
	Intermittent Streams (20,680.72 lf/6.13 ac)
	Bayou Pierre (44,742.79 lf/88.01 ac)
	Wetland Restoration (185.88 ac)
	Wetland Enhancement (266.33 ac)
	Uplands (188.87 ac)
	Riparian Buffer Restoration (68.02 ac)
	Riparian Buffer Enhancement (600.76 ac)
	BPMB: Phase II - Tract 2 (930.88 ac)



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**Bayou Pierre Mitigation Bank  
Phase II**  
Copiah County, Mississippi  
**Figure 14C - Overall Mitigation Plan Map 3**

0 400 800  
Feet  
1:8,000

N

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap

Date Created: 7/24/2018

Created by: JDL



Legend

- Interior Access Roads (40,077.85 lf/16.17 ac)
- Ephemeral Streams (38,170.41 lf/5.91 ac)
- Intermittent Streams (20,680.72 lf/6.13 ac)
- Bayou Pierre (44,742.79 lf/88.01 ac)
- Wetland Enhancement (266.33 ac)
- Uplands (188.87 ac)
- Riparian Buffer Enhancement (600.76 ac)
- BPMB: Phase II - Tract 3 (152.04 ac)



Date Created: 7/24/2018

Created by: JDL

**Bayou Pierre Mitigation Bank  
Phase II**

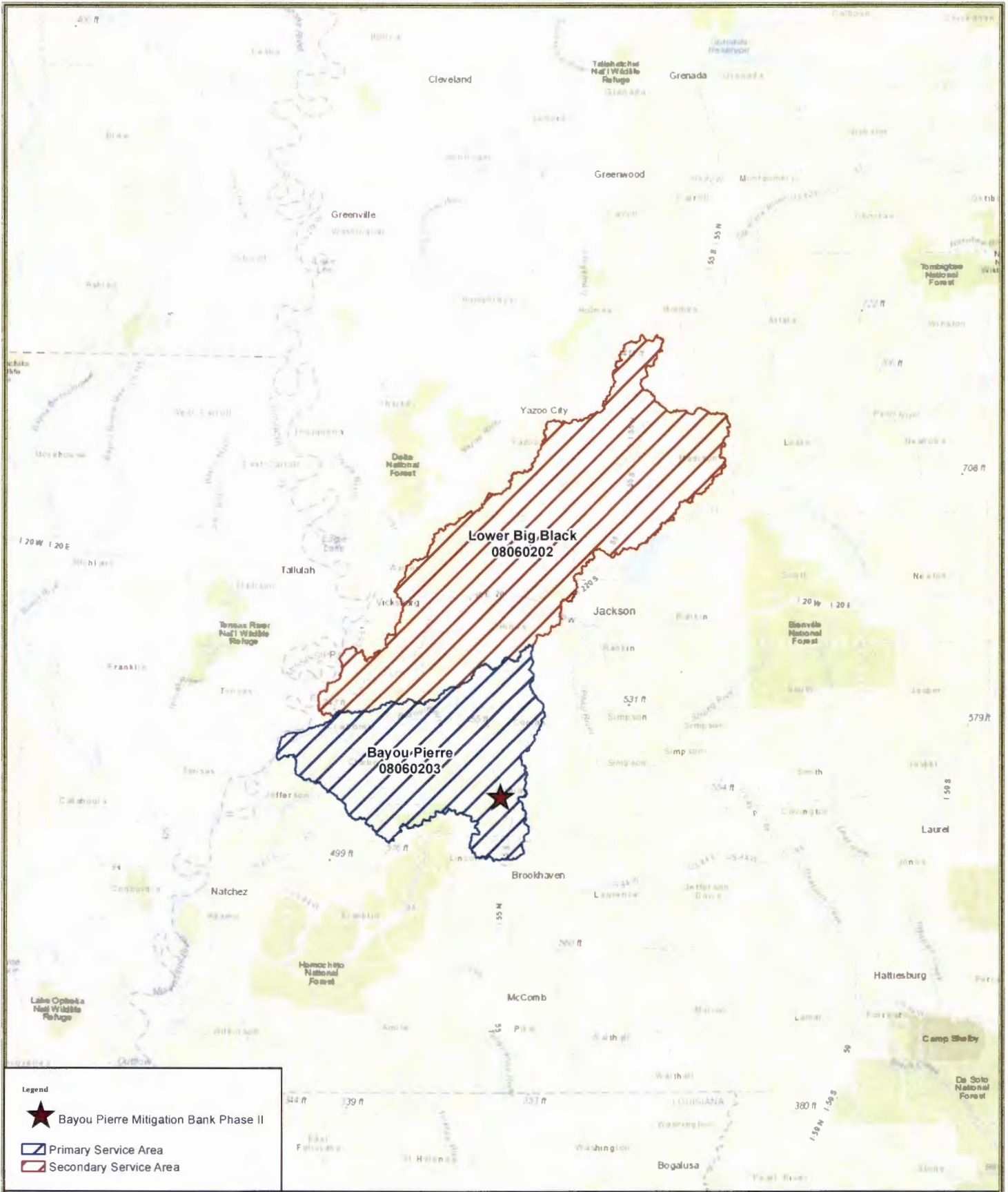
Copiah County, Mississippi

**Figure 14D - Overall Mitigation Plan Map 4**






NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

USDA NAIP 2016 Imagery Basemap



**Legend**

-  Bayou Pierre Mitigation Bank Phase II
-  Primary Service Area
-  Secondary Service Area



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**Bayou Pierre Mitigation Bank  
Phase II**  
Copeiah County, Mississippi  
**Figure 15 - Service Area Map**

0      75,000      150,000  
Feet

1:1,500,000

NAD 1983 StatePlane Mississippi West FIPS 2302 Feet

ESRI Topographic Basemap

