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West of Neutral Mitigation Bank Prospectus

SWG-2020-00178

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West of Neutral Mitigation Bank Prospectus
IP Orange Mill
Orange, Texas

International Paper
Orange, Texas

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Table of Contents

List of Sections

List of Figures

List of Tables

List of Appendices

List of Acronyms

Acronym	Description
AJD	Approved Jurisdictional Determination
APE	Area of potential effect
CELCP	Coastal and Estuarine Land Conservation Program
CFR	Code of Federal Regulations
CWA	Clean Water Act
CSRM	Coastal Storm Risk Management
DBH	Diameter Breast High
DO	Dissolved Oxygen
ECOS	Environmental Conservation Online System (USFWS)
EFH	Essential Fish Habitat (NOAA)
ERDC	Engineer Research and Development Center (USACE)
ESA	Endangered Species Act
FCI	Functional Capacity Index
FCU	Functional Capacity Unit
FEMA	Federal Emergency Management Agency
FIFR-EIS	Final Integrated Feasibility Report and Environmental Impact Statement
FIS	Flood Insurance Study
GLO	Texas General Land Office
HAT	Highest Astronomical Tide
HUC	Hydrologic Unit Code
iHGM	interim Hydrogeomorphic Model
IECS	International Ecological Classification Standards
IP	International Paper
IP Gage	Gage USGS 08030520 Sabine Rv at Intl Paper nr Orange, TX
IPaC	Information for Planning and Conservation system
IRT	Interagency Review Team
LiDAR	Light Detection and Ranging
MBI	Mitigation Banking Instrument
MHT	Mean High Tide
MHW	Mean High Water
MHHW	Mean High High Water
MSL	Mean Sea Level

Acronym	Description
MTZ	Maximum Turbidity Zone
NAVD 88	North American Vertical Datum 1988
NDVI	Normalized Difference Vegetation Index
NGS	National Geodesic Survey
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NRCS	National Resources Conservation Service
NWI	National Wetlands Inventory
NGVD 29	National Geodetic Vertical Datum of 1929
NRHP	National Register of Historic Places
PPT	Parts per Thousand
PRM	Permittee-Responsible Mitigation
PSU	Practical Salinity Unit
RCW	Red cockaded woodpecker
RIBITS	Regulatory In-lieu fee and Bank Information Tracking System
ROW	Right of Way
SOP	Standard Operating Procedure
SWG	USACE Southwestern Division, Galveston District
TCEQ	Texas Commission on Environmental Quality
TNC	The Nature Conservancy
TMDL	Total Maximum Daily Load
TNRIS	Texas Natural Resources Information System
TNW	Traditional Navigable Waters
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
USACE	United States Army Corps of Engineers
USC&GS	US Coast and Geodetic Survey (predecessor agency to NOAA)
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAA	Wetland Assessment Area
WNMB	West of Neutral Mitigation Bank, or Bank
WOTUS	Waters of the U.S.

Mitigation Bank Prospectus Standardized Summary

Galveston District (SWG USACE) has developed a standardized template to aid in their and the IRT review of mitigation banks that contains specific and ordered topic headings. The template is meant to provide a standardized framework for the description of an area for review of basic mitigation bank factors in relation to 33 CFR Part 332. The framework includes basic information such as the type of project, overall goal and objectives, factors considered during site selection, compatibility with adjacent land uses, and the practicability self-sustaining aquatic resources. The template also requests a description of the resource type and needs of the watershed and ecoregion, and finally a tabular presentation of each type and aera of resources. The proposed bank is more complex due to the hydrogeomorphology of the location and would not fit the framework well. However, this summary follows the preferred SWG format, and references the greater detail and additional topics contained the prospectus that would have consideration in relation to 33 CFR Part 332 and the bank's ability to provide compensatory mitigation for functions lost due to DA permits. Many of the complexities are because the bank is located on a tidal segment, has regionally rare climax communities, has indications of threatened and endangered species usage, and due to location contains several other important hydrologically and physiochemically driven ecological aspects. The details in the prospectus are referenced in this summary as they would not strictly follow the general template topic headings.

Proposed Mitigation Bank Name: West of Neutral Mitigation Bank

	Sponsor	Agent	Property
Name	Elton Parker	Robert Burgess	
Company	International Paper Company	RPS Group	International Paper
Address	6400 Poplar Avenue	4801 Southwest Parkway, Parkway 2, Suite 150	1750 IP Way
City, State	Memphis, TN 38197	Austin, TX 78735	Orange, TX 78632
Phone	Phone Number: (409) 746-7401	Phone Number: (512) 347-7588	
	Fax: (409) 746-7540	Cell Number: (512) 576-1764	
Email	Elton.Parker@ipaper.com	Robert.Burgess@rpsgroup.com	

Objectives

The overall goal and objective proposed is the establishment and operation of a mitigation bank named the West of Neutral Mitigation Bank (WNMB). In the wetland areas of the proposed bank there is a nearly complete coverage of rare, ecologically significant, high quality climax community wooded wetlands. Thus, the prospectus outlines a preservation dominated bank. The resources on the bank are mature, extant, and are self-maintaining. Therefore, the basic objective is fairly straightforward; preservation of these hard to replace resources along this reach of the lower Sabine, which will be through establishing the bank and the protection of the area with a conservation easement. This basic action will preserve a 1652 acre plot that fronts approximately 6.65 river miles of the lower Sabine River. The bank plot contains approximately 1,455.70 acres of self-sustaining, high priority wetlands, 179.72 acres imbedded contributing uplands, and 4.82

acres of open water (detailed in Sections 2 and 3 of the Prospectus, and in the SWG AJD in Appendix B). Of these jurisdictional wetlands, there are basically two wetland community types; a cypress tupelo community (636.23 acres), and an Oak Sweetgum community (819.46 acres).

The compatibility with adjacent land uses is exceptional as the addition of this proposed Bank site will connect three other protected management areas to form a continuous wildlife corridor along the lower Sabine River (Figure 1 of the prospectus). It is adjacent to the Blue Elbow Swamp mitigation bank to the south, surrounds the 45.53-acre IP Permittee-Responsible Mitigation (PRM) site, and is adjacent to the Sabine Island Wildlife Management area directly across the Sabine River in Calcasieu Parish, Louisiana. This addition will provide regional ecological connectivity with the preserved resources along the lower Sabine River and with the addition of this property will protect the lower 14.2 miles of the river and be surrounded by approximately 14,593 of protected total acres in Texas and Louisiana. This corridor will protect and provide for communities and species that have an extended ranges or avoid anthropogenically disturbed areas. Many of the sections of the prospectus detail ecological aspects of the bank and the extant resources, but Section 6 of the prospectus is probably the closest section in the prospectus that follows the requested template of a basic summary of broad overall goals and objectives. The additional sections in the prospectus present significant details and specific ecological attributes of the area which are important at this specific bank and better define its ability to replace physical, chemical, and biological services both locally and within the Sabine Lake estuary (Section 2-Ecological Suitability, 3-Onsite Jurisdictional Resources, 4-Estimation of Current Ecological Quality and Functions, 5-Wetland Functional Calculations, and 9 Service Area and the Watershed Approach). These additional sections of the prospectus provide support of attributes specific to this bank to detail how the features on this site have specific ecological values and thus how the bank can meet the objective of providing compensatory mitigation for activities authorized by DA permits. They also help define the limits of where replacement would follow the Watershed Approach (Section 2, Section 4, and importantly Section 9-Service Area and the Watershed Approach). The prospectus sections detail not only the preservation area with the qualities of the onsite resources (Sections 2 and 3), but also details the qualities and relationships of onsite resources to the contributions to ecological functions within the local and Sabine Lake ecosystems (Sections 4, 5, and 9).

The Table format below lists each type onsite resource and has been verified in the SWG USACE AJD issued on February 18, 2022, which is provided in Appendix B of the prospectus. In addition, Appendix D of the Prospectus contains the June 9, 2022 SWG USACE verification of the iHGM estimates. The onsite wetland resources are discussed in Section 3, and wetland quality and functional calculations are discussed in Sections 4 and 5 respectively. The onsite wetlands score very close to the HGM reference condition, and the prospectus discusses the HGM in Sections 4 and 5 in detail. These two sections should be reviewed to better understand the limitations of the HGM output. The HGM model is meant to be a simple model and does not contain number of important ecological functions that are extant on the proposed bank plot. And because they are not represented in the iHGM, ERDC identifies them as modeling flags (as listed in Section 4.2, and additionally Section 4.3 discusses estuarine contributions).

Resource Table

Resource Type	Restored	Enhanced	Created	Preserved
Deciduous Forested Wetland (Ac.)				819.46
Cypress Tupelo Forested Wetland (Ac.)				636.23
Tallow Removal Forested Wetland (Ac.)		0.16		
Open Water (Ac.)				4.82
Succession Pine Plantings to native mixed Bottomland Forested Wetland (Ac.)		52.08		
Succession Pine Plantings to native mixed forest Upland Buffer (Ac.)		179.72		

Project Location, Surveys, and UTM coordinates

International Paper (IP) is the Sponsor and the surface owner of the proposed Bank along the Sabine River. In the prospectus this is shown in several of the figures such as Figure 1-USGS Quad, Figure 12-false IR, and Figure 13 NDVI processed aerial. The approximate center point of the WNMB is located at 30.203187°, -93.717625° (Figure 1). The bank boundaries have been set, but a legal survey of the mitigation boundaries will be needed to finalize legal boundaries of the Bank for the Banking Instrument. Appendix A of the prospectus contains copies of the title abstracts indicating IP has clear title and ownership of the property.

Baseline Conditions

The proposed Bank is located on plots owned by International Paper and is within the freshwater tidal reach of Sabine Lake. The high-quality onsite forested wetlands are composed of two basic climax communities: a cypress-tupelo dominated community and mixed hardwood community dominated by oaks and sweetgum. These wetlands cover a large percentage of the Bank site, and are mature climax community ecological resources that would take decades to replicate or replace. The Bank proposes to preserve approximately 1,455.70 acres of mature forested wetlands and 179.02 acres of upland forested riparian buffer. The upland buffer areas are planted but contain mature loblolly with a native hardwood midstory, as is another 52.08 acres of wetland areas. Galveston District has verified the extent of jurisdictional wetlands on the site and issued an AJD on February 18, 2022, which is provided in Appendix B of the prospectus.

Sections 4 and 5 of the prospectus discuss and detail some the qualities of these onsite wetlands, limitations of the iHGM model, and the official June 9, 2022 verification of the iHGM is contianed in Appendix D of the Prospectus. The overall intent or objective of the HGM method is to provide an estimate relative to a theoretical regional Reference Condition Wetland which gives a relative measure of some of the ecological values of the onsite wetlands based on an ecoregion. While the onsite wetlands nearly score the perfect reference condition, the prospectus discusses the HGM method and limitations in Sections 4 and 5 in detail, and this should be reviewed to

understand the HGM output, the limitations of this method, the ERDC programmatic red flags, and limitations of the iHGM model in estimating functions and values of a resource. There are quite a number of important functions that are not represented in the iHGM (Section 4.2-ERDC modeling flags and Section 4.3-Estuarine Contributions) some of which are:

- This area has a large percentage coverage by cypress tupelo wetlands, which have been identified by the SWG USACE as a rare and difficult-to-replace wetland community
- The bank has habitat that is used by state threatened Texas Pigtoe.
- There have been possible sightings of endangered Red-cockaded woodpeckers on the bank site.
- This area is a tidal system containing a physiochemical gradient that produces the Maximum Turbidity Zone, which is a known nursery area for tidal systems.
- Various agency reports have acknowledged the threats of regional development of these types of high priority resources not only in this area regionally, but the USFWS also had recommended this particular property for acquisition due to dependent species and the habitats along this reach.
- The proposed bank will form a continuous wildlife corridor along the lower 14.2 miles of the river.
- This Bank property is at the head of tide, and this reach of the Sabine River is identified in the Fishery Management Plan as Essential Fish Habitat (EFH, NOAA 2021c). Magnuson–Stevens Fishery Conservation and Management Act defines EFH as those waters and substrates necessary for a species of managed fishery to spawn, breed, feed, or grow to maturity. As the National Marine Fishery Service (NMFS) is the regulatory agency, these logically would be estuarine or marine resources (EFH excludes strictly freshwater species), and as such indicates that NMFS feels that there is an ecological connection between this reach and the Sabine Lake estuary.

As denoted, the project as proposed is preservation dominated because the Bank has a high percentage of coverage by forested wetlands that are mature climax communities that regionally or statewide are imperiled, declining, and identified as in need of additional protection. The communities of the onsite wetlands are dominated by either cypress tupelo community, currently an SWG identified rare and ecologically significant habitat type, or a mature Oak Sweetgum community which the USFWS in their July 21, 2016 comment letter to the Corps NWP program stated were a rare and ecologically significant habitat type. USFWS also recommended this particular property for acquisition due to dependent species and the habitats along this reach. Both wetland communities in the iHGM estimation of function scored near the reference wetland values for all Functional Capacity Indices (FCI values). The bank also includes contributing uplands in irregular imbedded riparian transition areas that provide habitat and refuge to aquatic and terrestrial wildlife. Importantly, the bank's geolocation is also key to some of the services that could be provided to the ecological sustainability of the local and regional the watersheds (Sections 2.2, 2.3, 4.2, 4.3, and Section 9). There are some minor aspects of enhancement through recovery of areas previously used for silviculture proposed in the prospectus, and those areas are mostly upland forested riparian buffer but also do contain 52.08 acres of wetland areas. These areas have been impacted by past use, but presently are covered by mature loblolly with a native hardwood midstory (Section 2.3.5, and Section 4). The sponsor would like to include these upland areas in contributing to the overall mitigation potential of the bank to the region as provided under 40 CFR 230.98(o)(7). There is also proposed the removal of invasive species in two small areas (Section 2.3.6). However, the acreages of all activities other than preservation are necessarily limited as there is no practicable action that could lead to significant ecological lift in the 1455.70 acres of high quality wooded wetlands that presently cover 88.1% of the bank plot and score near the reference functional value on the iHGM.

Establishment and Operation

Section 8 of the Prospectus details Establishment and Operations. SWG's Interim Forested Riverine Hydrogeomorphic Method (iHGM) will be used as the functional assessment/credit accounting mechanism for wetlands within the Bank (USACE Galveston, 2016). The Mitigation Accounting System will be fundamentally based on the units of trade referred to as credits and debits. "Credits" are the calculated ecologic functions of aquatic resources associated with the Bank, and "debits" refer to the unavoidable losses of aquatic resource functions from authorized impacts. An AJD (Appendix B), and a verification of the iHGM values (Appendix D) have been issued by SWG USACE. As the Bank Sponsor, IP will create, maintain, and report a ledger of all credit/debit transactions under the oversight of the USACE. To ensure fair compensatory mitigation, all debit calculations will need to be performed using iHGM scoring at a USACE-approved conversion.

Proposed Service Area(s)

The proposed Bank's geolocation places it very near, along, or even crossing several types of recognized ecological zones, transition zones, water quality gradients, USGS HUCs, and USEPA Ecoregion boundaries. The proposed service area follows the Watershed Approach as is discussed in Section 9 of the prospectus, but the bank is in a tidally influenced area and the Mitigation Guidance Rule under Part §332.3(b)(1) acknowledges that defining contributions of services to a watershed becomes especially problematic in marine and coastal watersheds. The prospectus deals with compensatory and watershed services within Sections 2, 4, and the service area in Section 9. Section 9 of the Prospectus contains the rationale for the service area and runs 22 pages. While this area summarizes compliance with the Watershed Approach, it is strongly recommended that the prospectus Section 9 be reviewed for a complete explanation of the service area.

The Bank makes both local contributions to the Sabine River and regional contributions the Sabine Lake estuary. The appropriate setting of primary and secondary bank service areas in tidal ecosystems following the Watershed Approach is complicated and becomes more involved because the differences in watershed functions served such as hydraulic contributions, wetland functions, and ecosystem services and these values of tidal coastal system being bidirectional and diffuse spatial nature due to migratory lifecycles versus the directional flow of matter and energy in inland unidirectional riverine systems. The application of a service area is even further complicated because of the hydrogeomorphology along this reach creates physiochemical gradients that affects physical and chemical dynamics, and many key estuarine organisms require these types of gradients or habitats to complete portions of their lifecycle.

Under Mitigation Guidance Rule §332.3(b)(1) and supportive of the Watershed Approach, the proposed service areas consider hydrologic connectivity, physiochemistry, ecosystem services, and conservation ecology. Because the Galveston District (SWG USACE) prefers to use HUC Units in their service area establishment, Bank operations credit/debit transactions and all service areas will be expressed in HUC Units. The proposed primary service area consists of the Lower Sabine watershed where the Bank is located, and this follows the SWG preferred HUC8 inland method of setting service areas. Secondary service areas cannot follow the typical HUC8 method because of the geolocation of the Bank and the artificial framework imposed by the HUC Catalog

Unit system in coastal systems. The IRT has also considered these issues associated with setting services areas in the regional coastal aera, and also did not follow the typical HUC8 method in being supportive of the Watershed Approach. Therefore, secondary service areas proposed were planned using hydrologic and ecological classifications to be supportive of the Watershed Approach to serve the purpose of offsetting unavoidable adverse impacts under Mitigation Guidance Rule. Because of the location of the bank near ecological boundaries, the physical, chemical, and biological services provided by the bank will likely cross boundaries to occur in both the South Central Plains and Western Gulf Coastal Plain Level III EPA Ecoregions, but would all be within in the Sabine Estuary which is where the Bank resources would contribute ecosystem services and would maintain the biological, chemical, and physical integrity of this upper estuarine ecosystem. The primary and secondary service areas are detailed below.

The primary service area is the Sabine Lake Watershed, which includes the following (Figure 17, HUC Service Areas):

- Lower Sabine (8-digit HUC 12010005).

There are no Adjacent HUC8 Catalog Units in the same Subregion that would be appropriate service areas under the Mitigation Guidance Rule and be supportive of the Watershed Approach as detailed in Sections 9.1, 9.2, and 9.3. Secondary service areas cannot follow the SWG USACE preferred HUC8 inland procedure because Units cannot be directly adjacent to the primary service area due to the framework of the HUC coding system in coastal systems as is detailed in Section 9.2. Appropriate secondary service areas were instead chosen to be supportive of the Watershed Approach so that they could serve the purpose of offsetting unavoidable adverse impacts under Mitigation Guidance Rule §332.3(b)(1). The secondary service areas which include the following (Prospectus Figure 17, HUC Service Areas):

- Lower Neches (8-digit HUC 12020003). This tidal reach is very similar in ecology and function to the Lower Sabine.

- Pine Island Bayou (8-digit HUC 12020007). A portion of Pine Island Bayou is included within the IRT proposed modified service area. In addition, Pine Island Bayou remains tidal beyond the intersection of Little Pine Bayou 120200070203. This is very much like WQS Segments 501 and 502 (on the Lower Sabine), or 601 and 602 (the Lower Neches).

- Portions of Taylor Bayou (HUC12 120402010100), and Hillebrandt Bayou (HUC12 120402010200), which are sub watersheds of the adjacent HUC8 12040201 Sabine Lake. This service area should be limited to areas that share the similar surrounding vegetive community to 12010005-Lower Sabine, as they would also likely contain similar hydraulic and physicochemical parameters that provide ecosystem services to the Sabine Lake ecosystem. From aerials of those watersheds, it looks like only about 15 to 17% that is wooded and a much smaller area would possibly have similar wooded wetland areas. Thus, with this restraint under the Watershed Approach the ecosystem services impacted due to unavoidable adverse regulated actions could be replaced in these areas by resources of the Bank because of the shared hydrology and ecosystems services.

The proposed geographic primary and secondary service areas were developed with the Watershed Approach considering ecological and hydrological factors for defining service areas for compensatory mitigation. The following is the procedures and rationale for determination of the service area:

- Primary Service Area is the HUC8 containing the bank and local areas directly benefiting from physical, chemical, and biological services provided by the Bank. This primary service area follows the SWG USACE preferred HUC8 procedure.

- Appropriate secondary service areas for compensatory mitigation need to be formulated following the Watershed Approach area to allow replacement of the biological, chemical, and physical functions and provide ecosystem services for the purposes of offsetting unavoidable adverse impacts. However, the USACE HUC8 procedure in this coastal ecosystem would not be supportive of the Watershed Approach.

- The USGS assessment of the Watershed Approach in relation to HUC codes stated that an approach should examine the natural resource conditions and needs and identify programs and other resources to solve those needs. Importantly the USGS recognized there could be significant downstream contributions in many hydrologic units that extend far beyond the unit boundaries even in inland systems (USGS 2007). The methods used for this bank utilized hydrology, physiochemistry, and ecological community structure to set an appropriate service area.

- In consultation with IRT members it was suggested that HUC8 12010004 (Toledo Bend Reservoir) could be considered as part of a secondary service area. However, this area was above a major dam and upon consideration the applicant's agent rejected it as not being viable under the Mitigation Rule as it would not support the Watershed Approach.

- Secondary service areas were limited to areas that have an ecological linkage as part of the Sabine Lake estuary system. Under the Watershed Approach these service areas must have common ecosystem services to allow the resources at the bank to replace the biological, chemical, and physical functions and provide ecosystem services for the purposes of offsetting unavoidable adverse impacts. This approach actually resulted in a reduction of approximately 313800 acres over the IRT suggested application of the rule, but produced secondary services that supported the Watershed Approach under the Mitigation Rule.

- The Bank will provide a substantial water quality benefit and protection to the upper Sabine estuary to help maintain water quality of the region in an area where it is one of the few watersheds in the lower Sabine lacking a TMDL.

- All service areas were translated into the appropriate HUC8 or HUC12 watersheds as they are preferred by USACE for Bank operations and credit/debit transactions.

- Wetlands will provide for flood storage to reducing flooding and pulse flows to the lower Sabine, where the USACE is considering construction of CSRM projects.

- Proposed Service Areas are based on ecological needs within the watershed and are supportive of the Watershed Approach.

- Proposed service area has the potential to have significant growth with limited mitigation banking options servicing the region.

- Due to the lack of bank credits within the watershed, after the Bank is permitted it will allow the avoidance of less desirable PRM projects to offset permitted impacts.

- The Bank is strategically located within a series of hydrogeomorphic adjacent or connected preservation areas, thereby making the overall benefits to the watershed greater than if the Bank were a stand-alone conservation area or bank plot (e.g. it is adjacent to Blue Elbow Swamp and Sabine Island).

- Proposed service areas are supported by a Watershed Approach analysis and is necessary for the economic viability of the bank. The economic viability is substantiated by the future and historical demand and associated geographic location of impacts.

Several of the above subsections provide a more detailed description of the Watershed Approach and hydrological and ecological classifications relevant to defining the service areas.

General Need and Technical Feasibility

This proposed Bank is a preservation dominated self sustaining area along the Sabine River. It is located within the Golden Triangle of the deepwater ports of Port Arthur, Beaumont, and Orange, which is home to 40 percent of the Nation's petrochemical industry (USACE 2020). The ports and other industries help drive regional economic development and the area has several large projected projects in this area. The USACE RIBITS database does not list nearby banks that have primary or secondary service areas that cover wetland impacts to parts of the proposed Service Aera. Private development and public programs to protect the area would be expected to produce unavoidable impacts to aquatic ecosystems that will require compensatory mitigation. Therefore, any applicant outside these service areas will be required to provide a Permittee-Responsible Mitigation plan for any impacts to jurisdictional resources.

In addition to the general need for mitigation bank credits in this region, there is a specific need identified in planning documents for USACE's proposed Texas Coastal Storm Risk Management and Ecosystem Restoration plan from Sabine Pass to Galveston Bay (2017). As part of this plan, there is a local Orange and Jefferson counties Coastal Storm Risk Management (CSRM) plan. In the Final Integrated Feasibility Report for the CSRM the USACE recommended the construction of 15.6 miles of new levees and 10.7 miles of new floodwall. The FEIS states that this would result in unavoidable direct and indirect environmental impacts to 139.9 acres of forested wetlands (USACE 2017).

Easements and/or encumbrances

International Paper (IP) is the Sponsor and the surface owner of the proposed Bank along the Sabine River. Appendix A contains copies of the title abstracts indicating IP has clear title and ownership of the property. The bank boundaries have been set, but a legal survey of the mitigation boundaries will be needed to finalize legal boundaries of the Bank. This process will involve five (5) IP owned parcels and will require both subdivision and consolidation of tracts to obtain a single abstract that contains the legal boundaries of the bank in one parcel.

The field work on the bank site identified some easements that have a subsurface exploration (one pad), and pipeline ROWs crossing the Bank (3 pipeline easements), there is one unimproved support roadway, and one roadway crossing the Bank leading to structures in West Bluff. All these areas were excluded from any calculations for the Bank since they could not be protected

from future disturbance. These areas excluded from the Bank calculations total 11.52 acres. There are mineral interest owners in the titles of these parcels, and they will be identified along with their access rights addressed in conjunction with further survey work in support of a final banking agreement. This process has begun, and a surveyor has started the cadastral survey process, but this is a complex task that has not yet been legally finalized. However, the property will be documented prior to execution of the conservation servitude and prior to release of credits.

Proposed Ownership Arrangement and Long-term Management Strategy

The prospectus states in Section 7 bank intends to place the entire 1651.72 acre mitigation bank within a perpetual conservation easement held by an accredited land trust. At this time there are two main conservators being considered as possible easement holders: TNC and TPWD. However, this depends on development of the proper metes and bounds to define the Bank which will come out of the formal survey process that is not complete at this time. The funding and establishment of the conservation easement is part of the ongoing plan to define and preserve the Bank resources and assure its viability in perpetuity. This process will need to be completed before the Mitigation Banking Instrument can be completed and operations can start. Section 7 also contains a description of exotic and non-target flora.

Qualifications of Sponsor

The Sponsor, International Paper (IP), is responsible for providing the necessary financial resources, technical and scientific expertise, and financial management and long-term maintenance of the Bank. IP hired Robert Burgess a consultant at RPS to develop and provide support for the Bank. Mr. Burgess is a biologist/scientist on the Water Resources/Environmental team of RPS in Austin, Texas with over 25 years of experience in Texas coastal and inland environmental monitoring, habitat assessments, and environmental impact assessments in wetlands, streams, bays, and estuaries. He also has experience with experimental design, ecological sampling, and functional evaluations, surveying, and as built surveys. Mr. Burgess has been actively involved in mitigation banks while at the Texas Commission on Environmental Quality (TCEQ) under Section 404/401 permits, and he has experience in permitting, and development PRM sites in SWG as well as other USACE districts.

Ecological Suitability of the Site:

In the wetland areas of the proposed bank there is a nearly complete coverage of rare, ecologically significant, high quality climax community wooded wetlands. Discussing the ecological aspects of this specific site is the intent of the prospectus presented below this summary, and are discussed general and at length in Sections 1, 2, 3, 4, 5, and 9. There are the basic aspects of this being an ecological suitable site, such as the coverage with high quality wooded wetlands, as is developed in the AJD and iHGM verification, but in addition there are many other aspects discussed within sections the prospectus that are unique to the bank. Many of these aspects were identified by the U.S. Army Engineer Research and Development Center (ERDC) as flags of excepted aspects in the HGM modeling development, or being identified by other federal or state resource agencies as part of resource management or framework development of the Watershed Approach.

This area has a large percentage coverage by cypress tupelo wetlands, which have been identified by the SWG district as a rare and difficult-to-replace wetland community. There has been documented habitat usage by state threatened species, and there have been possible sightings of endangered Red-cockaded woodpeckers on the bank site. This area is also a tidal system containing a physiochemical gradient that produces the Maximum Turbidity Zone, which is a known nursery area for tidal systems and the reach is identified as EFH under the Magnuson–Stevens Fishery Conservation and Management Act, which indicates it is supportive of managed fishery to spawn, breed, feed, or grow to maturity. With the listing as EFH, the National Marine Fishery Service (NMFS) is indicating that this reach would be supportive of estuarine or marine resources (EFH excludes strictly freshwater species), and as such indicates that NMFS feels that there is an ecological connection between this reach and the Sabine Lake estuary. Various agency reports have acknowledged the threats of regional development of these types of high priority resources. This is not just for the area regionally, but the USFWS also recommended this particular property for acquisition due to dependent species and the habitats along this reach. Finally, the proposed bank also will form a continuous wildlife corridor along the lower 14.2 miles of the river.

Assurance of Water Rights:

A long-term water budget involving surface water for this project was not needed to sustain long-term wetland hydrology. The area is sustainable and self-maintaining with direct precipitation and shallow groundwater connections alone. This is detailed in Section 11 of the prospectus. The hydrologic information summarized in Section 11 was formally presented to the TCEQ Water Rights and Permitting and Availability Section in a January 23, 2023 presentation, and TCEQ responded with a February 22, 2023 letter stating that the West of Neutral Mitigation Bank project does not require a water rights permit (Appendix H). The Bank has been and is anticipated to continue to be self-sustaining in this hydrological and regulatory setting.

Prospectus Attachments:

☑ Copies of title abstracts Appendix A
☑ Approved Jurisdictional Delineation of Waters of the U.S., Including Wetlands Appendix B
☑ Verification of the iHGM of onsite wetlands Appendix D
☑ Historic Properties and Cultural Resources Section 2.5 and Appendix C
☑Threatened or Endangered Species Sections 4.2.2 4.2.3 and Appendix G
☑Figures/Maps

Section 1
Introduction

International (IP or Sponsor) proposes to establish the West of Neutral Mitigation Bank (WNMB or Bank) on approximately 1,652 acres in Orange County, Texas. The proposed Bank is situated along the Sabine River approximately 5.1 miles north of Orange Texas. The eastern portion of the mitigation bank is bound by the Sabine River and is directly across from the Sabine Island Wildlife Management area in Calcasieu Parish, Louisiana. The southern border shares a corridor with Blue Elbow Swamp Mitigation Bank in Orange County, Texas. The WNMB surrounds the 45.53-acre IP Permittee-Responsible Mitigation (PRM) site. The approximate center point of the WNMB is located at 30.203187°, -93.717625° (Figure 1).

Portions of the Bank's proposed service area currently lack access to any mitigation banking credits for wetlands impacts, according to the USACE Regulatory In-lieu fee and Bank Information Tracking System (RIBITS). The WNMB is anticipated to provide wetland compensatory mitigation credits within the Galveston District of the U.S. Army Corps of Engineers (SWG USACE) by preserving approximately 1,455.70 acres of high priority bottomlands in a key location that will significantly contribute to the ecological sustainability of the watershed.

1.1 Property Ownership and Titles

International Paper (IP) is the Sponsor and the surface owner of the proposed Bank along the Sabine River. Appendix A contains copies of the title abstracts indicating IP has clear title and ownership of the property.

The Orange Mill was constructed by Owens-Illinois, Inc. in the mid-1960s and began operating in 1967. Three corporations have owned the IP Orange Mill and its related real property, including the tracts underlying the proposed Bank, since the 1960s; Owens-Illinois, Inc., Temple-Inland, Inc. and currently the International Paper Company. The title abstracts in Appendix A show that that Owens-Illinois purchased the mill property shortly before construction. Temple-Inland purchased the Orange Mill and related real property from Owens-Illinois in 1986. The Temple Inland organization included the subsidiary Temple-Inland Forest Products Corporation, which are noted on the title abstracts. This was an asset sale transaction that required the real property ownership transfer reflected in the title abstract.

In 2011, International Paper Company purchased 100% ownership of Temple-Inland, including the Orange Mill and related real property. Temple-Inland Forest Products Corporation had transferred ownership of these properties to Temple-Inland entity, TIN, Inc., before that transaction, but they were among the assets purchased by International Paper. Because this was a stock sale conveying 100% ownership of Temple-Inland to International Paper, this change in ownership is not yet reflected in the real property title. Temple-Inland and its subsidiaries existed as wholly owned International Paper entities until International Paper dissolved them in 2017, at which their assets became owned directly by International Paper. Accordingly, the Orange Mill and the surrounding real estate parcels are owned by International Paper.

The bank boundaries have been set, but a legal survey of the mitigation boundaries will be needed to finalize legal boundaries of the Bank. This process will involve five (5) IP owned parcels and will require both subdivision and consolidation of tracts to obtain a single abstract that contains the legal boundaries of the bank in one parcel. There are mineral interest owners that will be identified; their access rights will be addressed in conjunction with further survey work in support of a final banking agreement. This process has begun, and a surveyor has started the cadastral survey process, but this is a complex task that has not yet been legally finalized. However, the property will be documented prior to execution of the conservation servitude and prior to release of credits.

1.2 Sponsor Contact Information & Qualifications

The Sponsor is responsible for providing the necessary financial resources, technical and scientific expertise, and financial management and long-term maintenance of the Bank. The contact information for the Sponsor and primary agent are shown below.

	Sponsor	**Agent**	**Property Owner**
Name	Elton Parker	Robert Burgess	
Company	International Paper Company	RPS Group	International Paper
Address	6400 Poplar Avenue	4801 Southwest Parkway, Parkway 2, Suite 150	1750 IP Way
City, State	Memphis, TN 38197	Austin, TX 78735	Orange, TX 78632
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Email	Elton.Parker@ipaper.com	Robert.Burgess@rpsgroup.com	

IP hired Robert Burgess a consultant at RPS to develop and provide support for the Bank. Mr. Burgess is a biologist/scientist on the Water Resources/Environmental team of RPS in Austin, Texas with over 25 years of experience in Texas coastal and inland environmental monitoring, habitat assessment, and environmental impact assessments in wetlands, streams, bays, and estuaries. He also has experience with experimental design, ecological sampling, and functional evaluations, surveying, and as built surveys. Mr. Burgess has been actively involved in mitigation banks while at the Texas Commission on Environmental Quality (TCEQ) under Section 404/401 permits, and he has experience in permitting, and development PRM sites in SWG as well as other USACE districts.

1.3 Site Location General Parameters

To access the Bank from the Interstate Highway (IH) 10 / State Highway 87 interchange in Orange, TX, proceed north on State Highway 87 for approximately 7.4 miles, then turn right/east onto IP Way. Travel east approximately 1.6 miles to the Mill entrance road. Turn right/south and proceed south for 0.4 miles to the front gate of Orange Mill. Once past the front gate of Orange Mill, proceed east of the mill following an east-southeast route on a series of internal Mill roads for approximately 2.2 miles. This will lead to the estimated center of the proposed banking plot, which is approximately 1.7 miles to the southeast of Orange Mill at a heading of approximately 310 degrees. The closest western edge of the proposed bank is approximately 0.5 miles from the Mill.

1.4 Jurisdictional Wetlands under CWA

IP requested an Approved Jurisdictional Determination (AJD) for the Bank Site on March 15, 2019. It was processed by the SWG USACE Compliance Branch and issued on February 18, 2022 (Appendix B). While there were intervening regulatory changes, the AJD was issued based on the regulatory framework that remains in effect as of January 2022, which is the pre-2015 regulatory framework.

Section 2 Ecological Suitability

The proposed Bank is located on plots owned by International Paper and is within the freshwater tidal reach of Sabine Lake. The high-quality onsite forested wetlands are composed of two basic climax communities: a cypress-tupelo dominated community and mixed hardwood community dominated by oaks and sweetgum. The wetlands cover a large percentage of the Bank site, and these climax community ecological resources would take decades to replicate or replace. The Bank proposes to preserve approximately 1,455.70 acres of forested wetlands and 179.02 acres of upland forested riparian buffer. The upland buffer areas are planted in loblolly with a native hardwood midstory, as is another 52.08 acres of wetland areas. Two small areas contain invasive species, which could be removed without unnecessarily endangering surrounding wetland functions, however these areas are of very limited extent totaling less than 0.5 acres. There is minimal impairment by invasive Chinese tallow or other invasive species on the general site (<5%).

The property currently is listed on the appraisal roll for timber use, and the field work for the AJD found that the site has ongoing silvicultural use with observations of plantings loblolly pines. Thus, while the large majority of the Bank are forested wetlands, there are areas of mature planted loblolly pine within the Bank. These stands are approaching maturity and have both timber value and ecological value. However, in addition to the areas with previous row planted silvicultural activity, the entire Bank contains what would be valuable forest products, and there is some historical evidence of activity such as stumps and historical aerials, from which it could be argued are associated with normal silviculture activities. These activities may be covered under relevant exemptions or authorizations and could place these areas at threat of loss or substantial degradation due to unregulated activities. This type of ecosystem, as well as this specific location, has also been identified as a high priority community that historically has undergone substantial losses and is very difficult to replace on relevant timespans. Placing the area under conservation would remove the threat of unregulated use or action in or near the aquatic resources of the site, provide the temporal stability for lift to occur in the planted areas, and prevent potential degradation of aquatic resources.

2.1 General Site Parameters

The regional area of the bank can be described as flat grasslands, croplands, and sections of urban and industrial development (USEPA, 2013). Orange, Texas, the nearest large town, receives an annual average of 62.1 inches of precipitation. The area is humid, and pan

evaporation is also only 62.1 inches a year (NOAA 1982) suggesting that onsite hydrology could likely be maintained from precipitation alone, although the Bank is also very close to the local Mean Sea Level and has shallow groundwater due to this hypsography. The growing season in Orange County is between 250 and 280 days (NRCS, 2006).

IP proposes the WNMB location to be on approximately 1,652 acres along the Sabine River in Orange County, Texas (Figure 1). The proposed Bank is approximately 6.65 river miles in length. The Light Detection and Ranging (LiDAR) datasets indicate the slope of the river along the reach becomes near zero as there is no significant change in river elevation along the Bank at an elevation of about 1.7 feet NAVD88. The onsite USGS gauge also indicates the Bank is within the tidal reach of Sabine Lake indicating that the river elevation is affected by local mean sea level. The Natural Resources Conservation Service (NRCS) maps (2006, 2019) indicate the Bank's soil is predominately Cowmarsh Mucky Clay series, or the Slimelake series in the lower areas. Along higher elevations, such as floodplain terraces along the abandoned river levees, and the river point bars, the soils change to a sandy or silty loam in the Spurger-Caneyhead Complex or Evadale series (Figure 2). While these features are hypsographic highs, the magnitude of change in elevation is small across the site with the average elevation being 7.7 feet NAVD 88.

The tidal floodplain of the Sabine River is the proposed Bank's dominant landform. The effect of the reach hydrogeomorphology, physicochemical parameters, and geochemistry will be summarized in Section 2.2, and there are regional services to Waters of the US (WOTUS) served due to the geographic location of the bank in the Sabine Lake estuarine ecosystem. The forested wetlands surrounding the river occupy a high percentage of the Bank, are high quality, and have been classified in the U.S. Fish and Wildlife Service National Wetlands Inventory (USFWS NWI 2014) (Figure 3). The AJD identified approximately 1,455.70 acres of jurisdictional wetlands. The tree assemblage dominants of climax communities vary in different areas of the Bank and are likely dependent upon hydrology, soil type, and landscape position. The forested wetlands on the site can be classified into two major types based on canopy dominants: cypress-tupelo (631.48 acres), and mixed hardwoods dominated by oaks and sweetgum (824.92 acres). Approximately 179.72 acres are estimated to be upland areas. There is approximately 231.8 acres of planted loblolly pine, which is centered on the upland areas, and the remaining 52.08 acres planted were predicted to meet the three wetland indicators. It is estimated that there are approximately 4.82 acres of open water within the bank site. Finally, there are also 11.47 acres within Right of Way

(ROW) areas; these ROW areas which were excluded from the bank site areal estimate because they cannot be protected from possible future impacts.

A large majority of the Bank are mature native forested wetlands, but there are approximately 231.8 acres of mature planted loblolly pine within the Bank. Approximately 179.02 acres of the planted loblolly occur upland areas that are imbedded within wooded wetlands communities and the remaining 52.08 acres are in areas that met the three wetland indicators. The upland areas are along topographic highs, but they have complex shaped transitions because they are along abandoned channel levees, and even what appears to be relict meanders of the Deweyville formation (BEG 1968). Thus, the shapes of these areas have high edge to area ratios and contribute considerable ecological values to the bank as upland to wetland transition zones can contribute to aquatic physical chemical and biological functions and allow for the completion of the lifecycles some aquatic dependent species. As such these areas provide important ecological functions within a mitigation bank, and compensatory mitigation credit as upland buffer could be considered due to the provided functions.

The Bank also has additional regional ecological values due to the large acreage of this plot and cumulative protected acreage and river reach regionally that this plot will complete. Several Endangered Species Act (ESA) recovery plans with historical ranges encompassing the area, including plans that specifically cite Orange County, indicated the protected species required large contiguous tracts of land with large swaths of old-growth forest to survive (USFWS 1995, 2003, 2010). The proposed Bank is adjacent to both the Blue Elbow Swamp mitigation bank to the south, and the Sabine Island Wildlife Management Area directly across the Sabine in Louisiana. It also surrounds and thus buffers and protects a riverfront 45.53 acre PRM site for permit SWG-2014-00706. The addition of the proposed Bank to the region would create a continuous wildlife corridor along the lower Sabine on the Texas side, and the combination of the three Texas areas with Sabine Island will produce protected area that surrounds the lower 14.2 miles of the lower Sabine River. This would create continuous managed acreage of approximately 6,250 acres on the Texas side, and approximately 14,593 total acres with the Louisiana side included.

2.2 Reach Hydrology and Physiochemical Parameters

Within the Bank, the main hydrology is derived from overbank flooding of the Sabine River and precipitation. The proposed Bank is within the 100-year floodplain, with a preponderance of the site being located in the floodway. The Bank is also located very close to the local mean sea level (Figure 5). Much of the Bank is frequently inundated, remains saturated due to hydrology,

or is close enough to mean sea level to have groundwater to sufficiently support wetland hydrology, soils, and hydrophytic plant communities. The mature riverine forested wetlands that occur within the Bank are contiguous with adjacent bottomland hardwood forests along the Sabine. Limited patches of herbaceous vegetation communities exist very near the river (Riverine emergent), but due to the very limited extent these communities they were not evaluated or included as an ecosystem service within the bank site. The field data sample points indicate that the vegetation across the entire plot meets hydrophytic vegetation criteria. Hydrophytic vegetation was present even in the isolated upland areas, though these areas were classified as non-wetlands due to the lack of the hydrologic and/or the hydric soil indicators. The upland vegetation communities were of native species; however, the species are more facultative (FAC) in nature.

The Bank is within the United States Geological Survey (USGS) watershed of the Hydrologic Unit Code (HUC8) 12010005, the lower Sabine River (Figure 4) and the United States Environmental Protection Agency (USEPA) Level III Ecoregion Western Gulf South Central Plains (35). However, the Bank location falls close to the lower edge of the HUC4 and the HUC8 boundaries, and is within the transitional zone between two ecoregions—it is very near the intersection of the Coastal Plains (34) ecoregion and shares many species with the bottomlands 34c and 34g floodplains and low terraces (Griffith et al 2007). HUC units are typically used as interchangeable with watersheds, but in actuality less than half turn out to be true topographic watersheds (Omernik 2003), and they can be less than ideal for evaluating environmental condition and contribution ecosystem services. Yet these spatial units have classically been used in associating natural characteristics and in many management actions. In the case of the Lower Sabine HUC unit 12010005 has portions that area a part of the Sabine Estuary (called Sabine Lake). The edge or boundary of the HUC is not scientifically well defined as there is a freshwater tidal nature that extends well into this reach. The USGS has assigned the Lower Sabine HUC 12010005 to end at the Sabine Naches canal, which is called the edge of Sabine Lake (HUC8 12040201). This inconsistency is reflected in many of the HUC boundaries of this area being significantly different than other agency classifications such as EPA ecoregions as well as TCEQ Water Quality Standards (WQS) Segments. Due to the cataloging nature of USGS HUC Units, in this area there are three Subregional (HUC4) Units, and three Subbasin (HUC8) Units confluence within 4 miles of each other, but catalog artifact as it is incorrect hydrologically. Essentially the true confluence for all three Subregional HUC4; HUCs 1201 (Sabine), 1202 (Neches), and 1204 (Galveston Bay San Jacinto coastal Subregion) is the Sabine Neches Canal that runs across the top of the Sabine

Estuary. Likewise, the HUC8 12010005 (Lower Sabine), HUC8 12020003 (Lower Neches), and 12040201 (Sabine Lake) also all have that have the same terminus and the same confluence boundaries. Hydraulically, the discharges of both rivers are into the Sabine Neches Canal which is oriented east west across the very top of Sabine Lake and is partially separated from the estuary by a series of shallows that are spoils due to the original dredging the canal. Fresh river discharges either sheet off across these slightly higher friction shallows or are discharged into the Sabine Neches Ship Canal. As such the lower portions of both river segments are tied and share physicochemical and biological similarities, and both have estuarine transition zone extending from the confluence with the estuary to the head of tide, and both contribute similar and important physical, chemical, and biological ecosystem services to the Sabine Estuary (Sabine Lake) ecosystem.

2.2.1 Reach Tidal Propagation, Effect, and Prevalence

While a detailed study of the extent of the tidal reach were not a goal of the Bank data collection, there are several types of available data that can be used to look at the tidal aspects of flow in the Sabine River along the Bank Reach. Location within a tidal reach is important as the physiochemical factors found in these areas can support a wide range of geochemical and ecological functions that have no true equivalents in inland systems. There are several available information sources that can be used to characterize aspects of this reach that ranges from long term elevational data, flow data, tidal data, physicochemical data, and georeferenced map data.

There is a USGS gage located onsite near the mid-point of the proposed Bank (USGS 08030520 Sabine Rv at Intl Paper nr Orange, TX) (IP Gage). The gage is fairly new, being placed and made operational on December 19, 2018. Periodically a tidal signal is seen at the gage, which is not only important in regulatory applications but also supports that this reach may have important functions in the local and regional biogeochemical cycles. The gage has a minimum operational limit of 0.72 meters (m) NAVD 88, and USGS does not report data below this elevation. The tidal signature is seen near but just above this operational limit (Figure 6). The gage data indicates that the tidal reach extends at least to the midpoint of the Bank.

Tidal signals do occur at the IP Gage during low flow conditions near the operational threshold minimum limit as shown in Figure 6. Ecologically it is important to know how prevalent this condition is within this reach. The USGS does not report any data during periods below the operational limit in the published provisional or approved data. However, the reported gage height data points are and date and timestamped and have a standardized interval. Thus, the raw

timestamped data for the gage period of record since the start of data on 12/19/2018 can be downloaded and imported to Excel for analysis of missing data. The gage reports on a standard 15 minute period, and the entire dataset of the gage was 124,190 points documented over 525 days. The analysis of the timeseries indicates that the IP gage dataset had 242 days where all or part of the day is missing (46% of the days), likely meaning the gage was below the minimum operational limit during these time periods. The areas on either side where flows are low, but just above the minimum operational limit, are the periods where there is a tidal signal seen. This suggests that the gage area is subject to the ebb and flow of the tide for a substantial percentage of time, and perhaps the reach could even be predominantly tidal in nature.

Celerity or lag across an estuary as well as tidal asymmetry or distortion can affect geochemical and biological processes in tidal reaches. The local and regional USGS gages and National Oceanic and Atmospheric Administration (NOAA) gages provide temporal datasets that can be used to look at these aspects. For the time period in Figure 6, the data can be used to estimate the damping of the tidal range across the estuary from Texas Point on the Gulf of Mexico to IH10 was an average of 2.21 feet, and 3.23 feet from Texas Point to the gage at IP. The first two tidal cycles tidal wave propagation were reviewed for celerity or lag across the estuary as well as tidal asymmetry or distortion. These features can affect the retention of fluvial suspended loads and the formation of a turbidity maxima. High tides during these cycles were 10:30 hours later at IP than the pass, while low tides were approximately 11:15 hours late which creates distortion or tidal asymmetry. This data indicates that this section of the river is freshwater tidal at least to the IP gage, and the asymmetry can affect residence, discharge, biogeochemical fluxes, and ecological usage of the reach.

In the 2018 Water Quality Standards revision, the TCEQ recognized the tidal characteristics of this reach by moving the segment boundary for Segment 501 Sabine River Tidal from West Bluff at the southern edge of the proposed Bank, upstream to Morgan Bluff, which is approximately 1.4 river miles above the IP Gage and 2.45 miles south of the northern boundary of the proposed Bank (TCEQ 2018). This change was approved by the USEPA in the Standards. Of the approximately 6.65 miles of river along the proposed Bank site, approximately 4.20 miles are within the revised TCEQ State Water Quality Standards Segment 501 Sabine River Tidal (TCEQ 2018). The segment boundary evaluation study was not found but based on the TCEQ monitoring data station at 10395 for this reach, which is 2.15 miles south of the IP Gage, water chemistry of the area supports an average oligohaline condition with a mean reported salinity of 2.91 ppt. However, the reach at times can have much higher salinity with a maximum of 16.95 ppt reported

in the reach (SWQMIS code 00480), indicating that the reach can become mesohaline (TCEQ 2021a). This condition supports salt intrusion by tidal pumping. And the salinity data indicates that the physicochemical characteristics of the area support that the reach may have important biogeochemical functions and be ecologically important to the estuary.

Above the IP Gage to the northern edge of the Bank there is no direct data available on the physicochemical nature of the reach. However, there are remote datasets such as the LiDAR data on river elevations. The LiDAR flights utilized in support of AJD delineation were flown between January 12 and March 22, 2018. The project also included LiDAR flown from June 4 to 6, 2006. The IP USGS gage was installed later on December 12, 2018, but the next upstream gage that was in operation is the Ruliff gage located in Deweyville approximately 7.5 miles north of the IP gage that at the time of the 2006 LiDAR flight was near the median daily flow (USGS 2021). The 2006 LiDAR included water returns and estimated that water levels in the Sabine were approximately 0.519 meters at the upper (inland) edge of the bank, and 0.513 meters at the lower edge. This difference of only 0.006 meters, or 6 mm is well within the Root Mean Square Error (RMSE) of the 2006 LiDAR data. This indicates that during the LiDAR flights at the median flow the point value LiDAR elevation returns did not vary significantly from the downstream to upstream portions of the bank, or the river had no discernable gradient or slope.

Head of tide reaches form characteristic bathymetry such as shoals and bars which also can support the tidal nature of the reach. Pronounced tidal bars typically form up to the head of tide, and in microtidal areas typically form due to the saltation of the suspended sediments and changes in flow velocity as the riverine water elevations in the area approaches the local Mean Sea Level (MSL), as well as tidal asymmetry (Chaumillon et al 2013). Modern NOAA charts (11343 and 11331) of the Sabine River stop near the Port of Orange, and thus detailed bathometric maps were not available for the area (NOAA 2021a). However, the Orange (2012) and Newton (2018) County Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) Flood Profile Sheets have bathometric data reported as average thalweg stream bed depths referenced in NAVD88 at feet above the mouth. The FIS maps have prominent landmarks that allow them to be aligned with the Bank reach. The bottom of the proposed Bank is located at approximately 101,000 feet above the mouth of the Sabine and the top is approximately 139,000 feet above the mouth of the Sabine on Orange FIS Sheets 19P and 20P (Figure 7 and 8). In this reach, the bottom elevations show marked and rapid variations of thalweg depth indicative of shoals and bars and therefore supportive of a tidal reach. Bars and shoals typically form near the head of tide due to large changes in water chemistry in this area driving the

estuarine turbidity maximum, changes in flow due to MSL, and the tidal asymmetry. The important aspect of the FIS thalweg data is that there is a sudden break where depth at the thalweg becomes much more uniform and the bed elevation slowly increases progressing upstream. This slow steady increase in elevation of the river starts at approximately 140,050 feet above the mouth and is shown on the Newton County Sheet 10P (Figure 9), which has overlap with Orange county Sheet 20P. The bars in the bathometry imply that the effects from the average head of tide could actually extend slightly inland of the top of the proposed Bank. Geomorphic features of this portion of the Sabine are of a sinuous, very low gradient, fine grained reach that even contains anastomosing features (Section 2.2.4). While there are variations in thalweg depth, the large rapid changes in the Bank's river reach are typical of a tidal transition zone. Further upstream from the Bank, above the county line, dune ripple channel morphology and a smooth bottom with a slow increase in elevation provide a contrast to these transition features suggesting that there is no longer a significant effect of estuarine flow and chemistry on bar formation and riverine, rather than tidal, processes determine the thalweg depth.

Although a detailed field sampling evaluation of the extent of the tidal reach was not conducted, the extent of the tidal influence was shown up to the onsite USGS IP gage. Above the IP Gage, the tidal reach is supported by multiple lines of data. The USGS data confirm that the site has tidal influence at the IP Gage with the tidal regime occurring a substantial percentage of the time. The TCEQ designated the tidal segment boundary to a location above the center point of the Bank's river length. Finally, the difference in surface water elevation in the LiDAR data document a slope of essentially zero along the Bank's river reach, and the bathometry (bar structures) support the conclusion that the entire river reach along the Bank is freshwater tidal.

2.2.2 Geomorphic Setting; MSL and Groundwater

The Bank is very close to sea level and understanding the geolocation of the parcel, the hypsography, and local MSL is important to understanding the potential ecological processes occurring on the parcel as well as ecological contributions through connectivity with the estuary, supporting regional ecological resources and sustainability. Even basic Hydrogeomorphic Model (HGM) classification of the wetlands in the Bank is multiphase and complex. The wetlands could be classified either as riverine because they have processes strongly linked to regular flooding of the nearby Sabine River, or they could be first classified as a tidal and groundwater influenced system because the plot is very close to sea level. Either basic classification would have to include both subclassifications to account for water sources, transports, and hydrodynamics. The

river system along this reach becomes very low to zero gradient, having a meandering form with frequent local anabranches up to areas of actual anastomose flow and sediments of the Bank parcel are fine grained and dominated by clays and slits. The Bank parcel is very flat and has an average elevation of only 7.7 feet NAVD88.

Sabine Lake estuarine area is microtidal, and the hypsography of the Bank has very little relief. These conditions make careful data transformations necessary to maintain the accuracy and precision of vertical datums of the geospatial data to enable evaluation of the Bank site geomorphic setting. The georeferenced datasets used were the National Geodetic Survey (NGS) geodetic datums: NGVD 29 datum (the sea level datum of 1929) which is still used in many USGS resources, such as quadrangle maps and stream gage elevations, and the North American Vertical Datum 1988 (NAVD 88) used in data such as the LiDAR dataset used in this study. These datums were developed so that survey elevations remain accurate on a continental scale. However, the disadvantage in using these geodetic datums is that physical and ecological processes in tidal ecosystems are tied to local sea levels, not geodetic elevations. Local mean sea level as well as high and low tides must be calculated. NGS and NOAA calculates tidal harmonics at many major passes, and they are referred to as chart datums for nautical charts. Transformations at these locations are also given to other geodetic datums NGVD29 and NAVD88.

There are sizable variations in measured local MSL across the Gulf of Mexico. Therefore, local MSL has to be calculated from local gage data because there are complex harmonic components and hydrodynamic components that interact to give a local mean and range. Estimation of local MSL, Mean High Water (MHW), and Mean High High Water (MHHW) are complex harmonic calculations due to intrabasin effects that occur both within the Gulf of Mexico and even across the subbasin like the Sabine Lake estuary. The tidal components are cyclic in nature and thus a tidal prediction relies on using a harmonic analysis, but to accomplish this NOAA NOS uses stations with 19 years of data to calculate these components since the lunar node procession cycle is 18.6 years. The closest NOAA National Water Level Observation Station with observations across the current National Tidal Datum Epoch, is AV0456 at Sabine Pass (NOAA 2021b). Using the tidal gage data over the epoch, the local MSL at the pass was calculated to be 0.436 meters NAVD88. Along with an estimate of MSL, there are estimates of MHHW of 0.644 meters NAVD88, and the Highest Astronomical Tide (HAT) of 0.972 meters NAVD 88.

Level data is available from the new USGS IP Gage that is on the Bank. The data has a short temporal range from December 19, 2018 to present on 15-minute intervals and gage height is in NAVD 88 (USGS 2021). Gage height is reported in meters NAVD 88. It is important to again note that the IP Gage also has a stated minimum operational limit of 0.72 meters, which would be only 0.28 meters (approximately 11 inches) above the estimate of MSL at NOAA AV0456 at Sabine Pass. The MHW at Sabine Pass is 0.195 meters above MSL (0.638m NAVD 88), and the MHHW is 0.229 meters above MSL (0.75m NAVD 88), which means that the stated minimum measured gage height elevations at the USGS gage are only a few centimeters above the local MHW at the pass (8.2 cm) and MHHW is over the minimum limit (3.0 cm). However, these estimations of MHW and MHHW ignore the effects of tidal propagation through the estuary.

As the tidal signal propagates from Sabine Pass, tidal propagation within the Sabine estuary becomes affected by intrabasin dynamics of the estuary. The propagation of the Kelvin wave within the basin is complex, it is simultaneously deformed and damped by friction, and thus the basin morphology determines the effect on tidal range. These basin factors were estimated in a study of the Chenier Plain coastal ecosystem (USFWS 1979), and a long-term water surface slope was calculated across Sabine lake from the Sabine Pass to Sydnes Island on the north side of Sabine Lake (a local observed mean level), which is near the mouth of the Sabine River. The study estimated the effect of tide propagation through the Sabine Lake estuary produced a positive slope across the estuary at approximately 0.64 cm/km, which would result in the addition of approximately 0.113 meters to the MSL seen at the pass or produces a local average MSL of 0.549 meters NAVD 88 at the north end of Sabine Lake. Eleven centimeters, or only about 4 inches, is relatively unimportant as a navigation issue on NOAA charts. However, this increase in average water elevation may be ecologically important to the bank site with large areas with a hypsography below 1 meter NAVD88.

The estimated average MSL elevation at the north end of Sabine Lake results in the minimum operational gage height at the IP Gage being only 0.18 meters (~7 inches) above the estimated local MSL. The deformation of the wave was estimated by the USFWS study to be producing a local high in propagation across the estuary (an antinode), and this antinode produced a long term increased MSL when measured at Sydnes Island. But an estimated location of the actual antinode was not given in the study and a tidal range was not given. The effect of this on local tidal range at the Bank is still not clear due to intrabasin effects modulation of tidal amplitudes and specific tidal frequencies. The tidal range at AV0456 for the current tidal epoch was 0.42 meters (1.37 feet). However, in the tidal cycle observed at the IP Gage (Figure 6), the range was damped

to 0.13 meters (0.44 feet). Although a minimum tidal datum epoch would be 18.6 years, the data from this shorter period is still informative.

LiDAR was used in the field study to form elevation models and contours that estimate that the average Bank elevation is only 2.35 m NAVD 88. The FEMA 2006 LiDAR data has accuracy limits, and they have been estimated as a Standard Error from the dataset benchmark heights, and as estimated by 2 Standard Deviations (2SD) to be 47.72 cm. The 76 plots of the field study were taken by survey grade Trimble R8 and R10 VRS GNSS systems, with a stated vertical survey capability of only 1.5 cm, and the benchmark precision estimates were estimated near this value although the precision of each field observation point field dataset was not estimated and were likely larger due to position errors due to field conditions. The field data of the Bank had an average observation plot elevation of only 2.32 m and a median of 2.24 m NAVD 88. But the minimum elevation in the field study was an observation plot that was estimated to be only 0.69 m, and there were 10 observation plots that were estimated to be less than 1.0 meter NAVD 88. Considering the NOAA AV0456 gage estimate of MSL and the USGS study in the Sabine Lake estuary (1979) that modifies that estimate of MSL to an average level of the upper Sabine Lake, suggest a likely local MSL elevation at the Bank that would place many areas of the Bank very close to local MSL, affecting the chemical physical and biological contributions of the Bank to the regional ecosystems.

The estimated elevation of the local MSL, the range of tides, and the within-basin effects indicate that this reach appears to be within the freshwater tidal reach. The transformation of the local MSL elevations to the NAVD 88 geodetic datum facilitates consideration that sea level has effects on physical chemical and biological functions on the Bank site. The geomorphic location of this Bank results in the dominant hydrodynamics of the area being mostly unidirectional and horizontal (riverine hydrodynamics) at higher flows. But the tidal aspects of flow in the region cause the Bank to appear to have lacustrine or more properly the characteristics of freshwater tidal ecosystem for substantial amounts of time.

The wetlands on the site of course obtain their hydrology to some extent from all three main hydrology sources: surface water, groundwater, and precipitation. The dominant source driving the community structure is elevation with respect to the Sabine River. However, plentiful rainfall, the humid environment, and the elevation of the Bank in relation to local MSL would likely influence the vertical hydrodynamics of the local shallow groundwater, which also supplies hydrology to the wetlands in the area. For example, an observation plot having a one-meter

NAVD 88 elevation, would only be approximately 0.46 meter (~16 inches) over the estimated local MSL at the top of Sabine Lake. The undamped HAT estimate at the top of the estuary could be just over one meter, and this elevation would flood the observation site. This would mean that many soils across the Bank likely always have water in the top 18 inches due to local MSL alone, and this depth is within NRCS guidance for some field indicators of hydric soils. The actual depth to groundwater would likely be further reduced due to capillary rise in the soils of the Bank, and because groundwater in these types of areas under natural conditions commonly has an elevated freshwater lens. Thus, if wetland water table monitoring wells were installed consistent with the Technical Standard for Water-Table Monitoring (USACE 2005), these areas would be expected to show shallow groundwater simply due the elevation of the Bank with respect to local MSL. Higher astronomical tides also could inundate parts of the bank periodically. The NOAA inundation analysis tool (NOAA 2021d) supports this, but the closest station for that tool was at the Rainbow Bridge. However, data for 2021 to 2017, indicates this range of inundation occurs approximately 11 times a year at that location.

The geomorphic setting and hypsography of the Bank suggests that it is located very near MSL, and that parts of the bank are within the oligohaline tidal reach of the Sabine River. This location would affect physicochemical parameters and connectivity with surrounding ecosystems biological ecosystem services to the Sabine Lake ecosystem in ways not seen in inland systems, and should affect the range where contributions of the Bank could be effective in compensating for adverse environmental impacts, and thus the effective service area.

2.2.3 Shallow Groundwater Capillary Fringe

Capillary effects in silts and clays found in the proposed Bank would place the pore saturated zone even closer to the surface because of the shallow groundwater due to MSL as well as the effect of pore pressure capillarity in an unconfined tidal aquifer (Wang et al. 2019). Soil saturation is part of the wetland definition and a diagnostic hydrology characteristic given to identify jurisdictional wetlands (USACE, 1987). The Sponsor took 76 soil samples on the proposed Bank and observed saturation or the shallow water table in many of the samples. The tidal propagation (Section 2.2.1) and geomorphic setting (Section 2.2.2) supports the conclusion that the area is freshwater tidal, and that due to hypsography, there is the potential for influence of physiochemical or biological parameters through connectivity with surrounding ecosystems. Capillary fringe, while primarily used for evaluation of jurisdiction, also provides an indicator of whether this connectivity exists.

The major soil types within the Bank are the silty clay Cowmarsh (Pedon S12TX1991028) in the lower elevations, and the silty sand Spurger series on higher terraces (Pedon S12TX1991028). The pedon data for the Spurger soil indicated that 55% was sand, but 30.3% of this was very fine sand, and there was 37% silt. Silty sand mixtures in laboratory studies on capillary fringe rise indicate that the rise is strongly related to particle size with the rise in fine sand mixtures being in the range of 1.5 feet and silt mixtures having capillary fringes in excess of 2 feet (Fetter 1988). Clay soils in laboratory studies had much higher fringes which would include Cowmarsh series where the pedon data indicate approximately 45% clay (NRCS 2012).

There are a number of studies on the extent of capillary fringe and the effect of tidal action on unconfined aquifers in the literature, a simple model was chosen that produced estimates identified as being considered conservative (Fetter, 1988). The capillary fringe effect would extend the saturated groundwater level above the estimated local MSL of the nearby surface water (Section 2.2.1 and 2.2.2). A georeferenced map can be made by using the FEMA Digital Elevation Model (DEM) and overlaying the estimated extension of the saturated zone due to the capillary fringe effect. This map identifies where surface elevations are within the elevations where the effects of capillary fringe likely result in a permanent shallow groundwater that would contribute significantly to the hydrology of the area (Figure 10). It was not unusual to observe a shallow water table or saturation in the soils of the observation plots of the field study which are also plotted on Figure 10. There were 50 observations of saturation and 36 observations of water in the hole, indicating a shallow water table. The average depth, when found, was about 4 inches. The shallow water table was observed not only in plots near the Sabine River drainage, but also across the entire Bank, including observations plots well over a mile from the Sabine. The plots that did not show a shallow water table were strongly related to elevation, especially in sandy areas. However, there was also a subset of plots that were low elevation and did not show free water. Those plots contained soils that were tight clays or fine silty clays and thus, the transmissivity would be very low in these types of soils and would not produce perceivable water for a considerable amount of time. This subset of observation plots that did not produce water even included many that were very close both horizontally and vertically to the Sabine River; due to low transmissivity of these types of soils, it is likely that if the soil sample pits were revisited after several hours, they too would have contained signs of a shallow water table. This map suggests that local MSL elevation producing a permanent shallow groundwater table in soils that are conducive to significant capillary fringe effect would contribute and technically satisfy hydrology in many of the wetlands of the bank by being a pervasive factor in maintaining

saturation, that the field data indicates is widespread across the Bank Site. This maintenance of saturation due to MSL and the added capillary fringe would also influence the chemical, physical, and biological contributions by the Bank to the surrounding ecosystems.

2.2.4 Anastomose Flow

On either side of Grubs Island along Transect 1 there are many irregular small stable low islands separated by many narrow sloughs with flow channels approaching a mile in length (Figure 11). Most of the islands are less than 50 square meters and the islands and surrounding areas are dominated by cypress tupelo communities. This type of flow channel is termed anastomose with flows typically present in many subchannels across most river flow stages up to bank full flow. The flows occur in stable established flowlines around small stable but irregular low islands. The observation of this type of flow can be informative to the type of flow across an alluvial plain, as well as the communication of the Bank with surrounding ecosystems due to the hydraulic and geomorphic processes. The estimated area of anastomose flow on the site was approximately 108.41 acres based on remote data. The image flight occurred when the nearby USGS gage at Ruliff (08030500) was running below the daily median indicating that anastomose flow occurs in this area under lower than median flow conditions.

This type of multi-channel morphology normally forms under relatively low-energetic conditions near a local base level, such as would be produced by MSL. But this type of channel system is typically found where gradients are near zero. This does not strictly occur at or below MSL, in tidal rivers as the river inflow modulates tidal amplitudes and frequencies that can cause gradient changes above the point of tidal extinction (Sassi and Hoitink 2013). It is important to note that this type of anabranching geomorphology was also seen in the Lower Neches River (HUC8 12020003) starting around and continuing below the town of Evadale (Phillips 2014). This type of geomorphology is not commonly seen in inland systems, but was found in both the Sabine and Neches basins just above the Sabine Lake estuary. The similar biogeomorphology supports that the Bank's resources are likely similar to the Neches area and could contribute to the physical, chemical, and biological integrity of the of the Sabine Lake ecosystem, and should be considered in the range where the Bank could effectively compensate for adverse environmental impacts.

2.3 Compensatory sustainability and Watershed services

In this section as set out in the Mitigation Guidance Rule (33 CFR 332.3) for site selection, sustainability, and mitigation strategies are considered. These factors are typically addressed in

Mitigation Guidance Rule and are based on the method of the Watershed Approach (§332.3(c)). The goal of the Watershed Approach is defined §332.3(c)(1) to maintain and improve the quality and quantity of aquatic resources within a watershed. This section is one of several related sections dealing with sections of the Mitigation Guidance Rule. Sections 4.3, 6, 7, and 9 also discuss the application of the Mitigation Guidance Rule to the proposed bank as based on general factors, geolocation, geochemistry, and ecology. This section deals with general recommendations of site selection, sustainability, and mitigation strategies as set out in the Mitigation Guidance Rule (33 CFR 332.3) but is in consideration of the Watershed Approach (§332.3(c)). The concentration or focus of this section is for compensatory mitigation under §332.3(b)(1) as it typically is applied in inland compensatory plans with contributions of onsite wetlands under the Watershed Approach. Section 4.3 of this prospectus will focus on summarizing the concepts of estuarine contributions or the implications under §332.2 and §332.3. Finally, in Section 9.1 the rationale of the application of the Watershed Approach to set appropriate service areas will be discussed considering the geolocation of the bank, estuarine contributions, and regional contributions of the site.

2.3.1 Long Term Hydrology

The existing forested wetlands are supported by current overbank flow of the Sabine River, direct rainfall, and the hypsography of the bank site being near MSL. The rainfall in the area is plentiful, and precipitation equals the pan evaporation in this area (NOAA 2022, 1982). Literature values of the relationship of pan evaporation to evapotranspiration of a mature floodplain forest (K_c) are usually much less than 1.0, resulting in the hydrology of the onsite wetlands being able to be supported from precipitation alone. Additionally, as discussed in Section 2 the elevation of the Bank in relation to local MSL would influence the vertical hydrodynamics of the local shallow groundwater (sections 2.2.2 and 2.2.3), and shallow groundwater would also contribute to the hydrology of the wetlands in the area. The Bank is also in a FEMA designated floodway or 100-year floodplain area. The Wetland Assessment Areas (WAAs) of the Bank are adjacent to and share a boundary with the Corps identified Traditional Navigable Waters (TNW) boundary. Since the WAAs share a boundary with an identified TNW, they necessarily will maintain connectivity as stated under V_{dur} of the Galveston iHGM metrics. Thus, the wetlands have several sources of identified hydrology.

The long-term stability of certain high flow events—both instream flows and freshwater inflows to bays and estuaries—is also now legislated and regulated under the State of Texas environmental

flows program (see Texas Senate Bill 2, 2001; Senate Bill 3, 2007). Under the environmental flows program, the Texas Legislature created a basin-by-basin process for developing recommendations to meet the instream flow needs of rivers and the freshwater inflow needs of estuaries. The statute also required TCEQ to adopt, as rules, a version of these recommendations. These became the environmental flow standards that, by rule, are adequate to support a sound ecological system, to the maximum extent reasonable, considering other public interests and other relevant factors. TCEQ applies these environmental flow standards as part of the water rights permitting process. The TCEQ adopted standards for the Neches and Sabine River Basins (effective May 15, 2011) that established a framework for limiting new diversions during low streamflow conditions, promoting flow variability, and evaluating the impact of new water rights permits on freshwater inflows to the bay, in order to support the sound ecological system of the basin and bay systems and to maintain the productivity, extent, and persistence of key aquatic habitats in and along the affected water bodies.

The Bank has been and is anticipated to continue to be self-sustaining in this hydrological and regulatory setting. The natural rainfall, shallow groundwater due to the proximity of MSL, and overflow onto or through the flood plain sets the hydrology for the Bank. The Bank will not divert water from a watercourse or store water in any constructed surface features. As such, long-term hydrology maintenance will not depend on the diversion of state water from a watercourse. This information was formally presented to the TCEQ Water Rights and Permitting and Availability Section in a January 23, 2023 meeting and presentation, and TCEQ responded with a February 22, 2023 letter stating that the West of Neutral Mitigation Bank project does not require a Water Rights Permit.

2.3.2 Temporal Lag in Replacement of Resource Type.

Temporal losses of functions are important to consider in mitigation site selection. This proposed Bank currently contains a large percentage of extant climax community wooded wetlands and the wildlife and ecosystem support functions of these types of forested wetlands would take many decades to develop and to serve effectively in the maintenance of watershed aquatic resource functions. This Bank also has water quality functions that involve flood retention along a major drainage, and the Corps is now considering a Coastal Storm Risk Management Project that may impact this function regionally. Biogeochemical transformations that can take many years to develop because they depend upon the chemical and biological characteristics of the wetland soils are currently extant on the site as well. Because of the long temporal lag in generating these

ecosystem services, this site is important in serving and maintaining the water quality and ecosystem dynamics of the watershed. The long lag in replacement of wildlife and ecosystem services and the anticipated changes in land use and hydrology supports preservation of this valuable resource area.

2.3.3 Resource Preservation Priority

Regulated and unregulated activities present a threat to these types of forested aquatic resource communities both regionally and nationally (LASAF 2015). During the 20th century, a significant amount of bottomland forest (a type of floodplain forest) was lost across the United States. Approximately 63% of the original bottomland hardwood community in Texas had been lost by the 1980's, and it continued to rapidly decline (TPWD 1988). The types of wetlands on the site, have been identified by SWG USACE as high priority and are listed as ecologically unique and sensitive areas with regional conditions restricting permitting (USACE 2021). SWG has also removed these types of wetlands from the nationwide permitting to help preserve the rapidly disappearing wetland habitat in this area.

The USFWS also identified this local region, this community type, and even this proposed bank site in their preservation programs. The Region 2 Emergency Wetland Resources Act Report and Texas Bottomland Hardwoods Report identified regulated and unregulated threats to this region including medium to high regional development, and threats to habitat, waterfowl, and endangered species and ecosystem services (USFWS 1985, 1991). The Texas Bottomland Hardwoods Report specifically names this proposed Bank site as part of their regional protection concept plan and denotes that this area has very high quality bottomlands (USFWS 1991). Under the Emergency Wetland Resources Act, the Service sought to encourage not only preservation of this area, but also acquisition within this reach due to species that were dependent on wetland habitats. The Service evaluated and ranked proposed acquisition areas on a national priority scale by the Service's Land Acquisition Priority System. The Report rated wetlands in this region as the top priority (Priority 1), citing a threat due to pipelines, commercial development, roads, and canals. The USFWS indicated that the wetlands had very high functions in flood storage, water quality, fisheries, and isolated ponds valuable to migratory waterfowl. This reach is part of the Great Texas Coastal Birding Trail as part of the Big Thicket Loop (TPWD 2023).

As part of Senate Bill 1 (1997), the regional planning group has identified this reach of the Sabine River as an Ecologically Significant Stream Segment from the confluence with Sabine Lake in Orange County upstream to the Toledo Bend Dam (the Sabine within TCEQ classified

stream segments 0501 and 502). The regional planning group identified extensive freshwater wetland habitat in this segment, which that displays significant overall habitat value considering the quantity and quality (TPWD 2005). This reach was also identified as a Texas Natural Rivers System nominee for outstandingly remarkable fish and wildlife values, and a system nominee for exceptional aesthetic values (NPS 1995). On the Texas side of the river, the reach contains a riparian conservation area (the Tony Houseman State Park/Wildlife Management Area), which shares a corridor and is adjacent to the proposed Bank. The bank is also across the Sabine River from the Sabine Island Wildlife Management area. Preservation of this plot would protect a wildlife corridor along the lower 14.2 miles of the lower Sabine River. On the Texas side this would create a continuous plot managed acreage of approximately 6,250 acres, and with Louisiana, the protected acreage in this region would be approximately 14,593 acres. This size could serve protected species requiring large contiguous tracts of land with large swaths of old-growth forest.

Use and development in this region has the potential to cause impacts to jurisdictional water through both regulated and unregulated activities. Due to the local hydrogeography, services provided by these onsite resources are valuable in both the local and regional context. This Bank is along a transition zone between riverine and estuarine ecosystems, and thus is a potentially valuable nursery habitat for both ecosystems. This Bank has the potential to benefit both local and regional watersheds through direct contributions to water quality and flood storage and both local and regional plant and animal communities, including large territory rare species. The Bank can favorably impact the biogeochemistry of the estuary, sediment contributions, estuarine lifecycles, and otherwise benefit the Sabine River and Sabine Estuary (Sabine Lake) ecosystems.

2.3.4 Difficult to replace Resources and Practicable Ecological Lift

The compensatory mitigation for losses of aquatic resources under 33 CFR Part 332 indicates that preservation plans should provide compensatory mitigation with enhancement if practicable. However, the analysis detailed in the documentation submitted to Compliance Branch, the AJD, and the verification of the iHGM (Appendix D) indicated that the wetlands currently score high values – very near to ideal reference values. The AJD and iHGM for the adjacent PRM site also supports this conclusion (Appendix E). The area is a natural and mature wooded wetland with a persistent climax community with little invasion of non-native species. Thus, the term “practicable,” as used in this context becomes relevant. Under 40 CFR §230.3, “practicable”

means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. This definition requires consideration of whether any significant increase in ecosystem service of the wetlands could be obtained feasibly, if at all. The iHGM scores suggest that in the wooded wetlands little ecological lift could be achieved through enhancement, and the entire plot is wooded so creation is not practicable. However, invasive species control and changes in land management are commonly undertaken and identified as enhancement activities. These activities will be implemented to the extent that they are practicable, as discussed in the following sections. Due to the extant high functioning wetlands themselves, unintended or secondary damage or loss of functions from potential enhancement activities should be carefully weighed against possible enhancement gains in ecosystem services. The disturbance in implementing an enhancement activity very well may exceed the intended goal of what little ecological lift could be achieved. There are accordingly only two instances of where enhancement could be considered. First, there are two small, isolated areas where disturbance from removal of invasive species as an enhancement activity could serve the overall project purpose and thus be practicable given the risk. Next, the planted loblolly forest has a hardwood mid-story that will slowly replace the loblolly and increases in diversity and mast sources will enhance ecological functions by improving the forested riparian buffer.

Due to the extant high quality and rare and valuable resources on the Bank, the proposed Bank is necessarily primarily based on preservation. Preservation is defined in 33 CFR Part 332 as the removal of a threat to, or preventing the decline of, aquatic resources. Preservation includes activities commonly associated with the protection of valuable aquatic resources through the implementation of appropriate legal and physical mechanisms. The wetlands resources in this Bank are rare, declining, and difficult-to-replace, and thus are a high priority for preservation. The USFWS Region 2 Emergency Wetland Resources Act Report and Texas Bottomland Hardwoods Report identify regulated and unregulated threats to this region and the specific area, which included a medium to high regional development (USFWS 1985, 1991). The pines, as well other forest products in the surrounding hardwoods and cypress areas, are valuable resources; both of which could contribute billions of dollars to the economy (Williston et al. 1980, LASAF 2015). Many of the pine stands are at the stage of maturity where stands usually reach their economic maturity.

From a regulatory stance, it is possible that the resources could be affected by regulated or unregulated activities, including actions qualifying under Section 404(f)(1). After verification of

the iHGM by SWG Compliance Branch, SWG Policy Branch also requested that a theoretical model run of the iHGM be done to explore a possible Section 404(f)(1) situation. This type of unregulated action would affect the integrity of all three characteristic processes of the wooded wetland ecosystem that are estimated by the Functional Condition Indices (FCI) under HGM modeling. Further, portions of the land could be put to future use in a variety of ways, including mineral production absent a dedicated surface use, such as the Bank, that must be reasonably accommodated. The threat to these valuable mature wooded wetlands and the riparian buffer from regulated or unregulated activities is particularly notable because these resources would take many decades to create or restore. The resources to be preserved provide important physical, chemical, and biological functions for the watershed and the region that simply cannot be replaced or are not practicable to create on a reasonable timescale.

2.3.5 Preservation and Enhancement of Upland and Silvicultural Areas

The compensatory mitigation guidance under 33 CFR §332.3(c)(2)(i) allows the inclusion of the protection and maintenance of terrestrial resources, such as non-wetland riparian areas and uplands, when those resources contribute to or improve the overall ecological functioning of aquatic resources in the watershed. The onsite silvicultural areas are approaching maturity, and the succession of these stands will produce a stand of native dominants and minimize the temporal losses as defined in § 332.2. The onsite upland areas provide not only a natural buffer to wetland areas, but more importantly provide an adjacent upland habitat required by many species to complete their lifecycles. Thus, these uplands are ecologically valuable to the surrounding wetland areas in providing habitat and enhancing connectivity with adjacent aquatic resource landscape elements. The sponsor would like to include these upland areas in contributing to the overall mitigation potential of the bank to the region as provided under 40 CFR 230.98(o)(7).

There are approximately 231.8 acres of planted and mature loblolly pine as identified by aerial photography within the Bank (approximately 14% of the total Bank area). Loblolly is an important silviculture tree, but it is also a native species of the area that is on the National Wetland Plant List as a native facultative tree. Loblolly in these mature stands are mast producing softwoods for many species of wildlife in addition to nesting habitat. The etymology of the word loblolly is old English for a thick gruel, and the southern colloquial use of this word was to describe the soft wet soils where the pine could be found. The planted areas were predominately non-jurisdictional upland areas, which is estimated to be 179.72 upland acres. But there was an estimated 52.08

acres of planted loblolly that by elevation would meet the three criteria of jurisdictional wetlands (approximately 3.2% of the Bank). There is also a small proportion of non-jurisdictional upland areas that are native and have not been planted and have a native mixed pine hardwood forest. The upland silviculture areas currently have a canopy of loblolly trees, and a midstory of a native hardwood mix along with secondary pine growth which the sponsor would like to include these acres as well as the native upland wooded areas under 40 CFR 230.98(o)(7) as credits provided by riparian areas, buffers, and uplands.

Most of the bank is within the base flood elevations, and because the upland areas are also bottomlands close to a major drainage, they do not occur in zonal landforms, but instead occur along the sandy topographic highs of abandoned channel levees and other relic features. These highs are imbedded within the surrounding landscape that are the slightly lower silty soiled wooded wetlands. This results in complex shaped transitional areas that have high edge to area ratios, and this high ratio also contributes to the areas being able to provide the physical chemical and biological functions to the bank. These upland areas also allow the completion of the lifecycles some aquatic dependent species. Therefore, these resources are potentially ecologically important uplands positioned to contribute to or improve the overall ecological functioning of aquatic resources both in the bank as well as the watershed (§332.3(c)(2)(i)).

The planted areas are also undergoing community succession. The plantings on the Bank are mature loblolly pine, which is a native species of the area. These are fast growing trees that are of a short to moderate lifespan, and shorter lived compared to native hardwoods. In this way the plantings have functioned somewhat like a grown cover crop. Like classical cover crops used in agriculture, these plantings have provided multiple services such as controlling erosion, suppressing invasive species, as well as providing habitat and food for biological communities. While the pine stands that were planted are distinct from the surrounding native communities of mixed hardwoods found in this riparian zone, they have matured and recovered significant ecological function since planting. They are far beyond the age that is termed the pulpwood age, and the stands are either at or near their peak in timber value as a silvicultural crop, which also means that these stands are approaching maturity and have developed in ecological values as well. In addition, the stands look to have been row thinned several decades ago. This release providing by the thinning trees not only reduced competition between pines for light, soil moisture, and nutrients, but the subsequent mixed stand management has allowed a mix of hardwood species native to the area to grow up and form a midstory under the canopy of the silvicultural plantings. Thus, the plantings are now of an age where they alone have ecological value, and

the stands due to management practices are increasing in overall stand diversity and true ecological lift can begin to occur within these areas as well.

There are three typical methods employed in compensatory mitigation under 33 CFR Part 332, but as detailed above the sole opportunity for compensatory mitigation due to the onsite resources indicates that preservation is the only practicable alternative for a large proportion of the bank. The other two methods used in mitigation are creation and enhancement activities. In typical creation projects, areas that were historically not wetlands are cleared, elevations adjusted, soils amended, and then they are planted in a desired community structure. This process is expensive to implement, and has substantial temporal loss for wooded wetlands as it takes many years to develop the functions of a mature ecosystem, and this type of project has the lowest chances of success (National Research Council 1992). In the typical enhancement or restoration project, the area is a wetland that is currently in a degraded state. The restoration may involve a physical modification to restore the topographic or hydrologic characteristics that historically supported the wetland ecosystem. Or the manipulation may just be biological such as the removal of undesirable species, but in the case of wooded wetlands it may also involve stand management. In restoration, the gross manipulation done to the ecosystem are typically not as severe as creation projects and this likely contributes to success rates being higher. However, the intent or object of both creation and enhancement ecological projects is to try and create or return to an ecosystem that functions to as close of an approximation of a regional reference conditions as possible. For compensatory mitigation it is also recognized that simply completing the physical or biological manipulations, even under the best-case conditions, will not directly result in the restoration of ecological functions as soon as they are completed, but there is a temporal element (NRC 1992). This temporal aspect is also recognized in the mitigation rule (§ 332).

In compensatory mitigation a key aspect of mitigation banking is to minimize the temporal loss of resource functions and define services (§ 332.3 (b)(2)). As such all modern banking instruments recognize the temporal element in creation and restoration projects, and to evaluate this temporal change most of these instruments require monitoring over time not only for uncertainty, but also to quantify temporal changes in functions for release of credits, thus recognizing that time itself is a needed part of the manipulation to effect recovery of function. This is not at all a new idea in ecology, community ecology, or regulatory promulgation and implement of administrative rules. In fact, is the explicit underpinning of classical successional ecology (Clements 1916) and it is this succession that is being proposed for the silvicultural areas. Loblolly is only moderately tolerant of shade and is considered an early successional type species (LASAF 2015). The

clearing and planting of the silviculture areas was a severe manipulation, and the field data now support that mixed stand management along with time have resulted in a diverse young ecosystem is developing and that suggest that succession is occurring. Time is also a key factor in the ecological disturbance hypotheses explaining alpha diversity (Eggeling 1947, Grime 1973), and even the special case alternatives to the disturbance hypothesis that suggests that there may be a historical disturbance intensity and frequency for each community. These theories base the climax community structure and diversity on disturbance and time (Hall 2012). With wooded ecosystems this recovery of function after large disturbances is slow and may take many decades, which is the very reason that the onsite wooded wetlands have value being preserved because they are difficult to replace in a reasonable timeframe.

Because of the maturity and distribution of the silvicultural planted resources, these areas today directly provide functions within the mitigation bank because they contribute to or improve the overall ecological functioning of aquatic resources in the watershed, and they contribute to the chemical, physical, and biological integrity of the nation's waters. As such they could be considered as contributing to the total compensatory mitigation credits that the bank can provide. However, this only considers the current functional attributes of these areas. In addition to the extant functions, the historical physical manipulation of mixed stand management has allowed for an effective understory release of native hardwoods. This understory release has developed into an ongoing succession and makes it likely that these areas will continue to develop towards a mixed pine hardwood native climax community. The mixed pine hardwood community is a regional reference condition occurring both riparian uplands as well as wetland areas. Because of the higher diversity of the mixed community, it will provide a broader set of ecosystem services than the pine dominated forest. Thus, it is likely that these areas will increase in overall ecological function over time. This is the same effect seen in creation and restoration projects where the biological communities develop over time. In this case a restoration action, the mixed stand management, had been initiated prior to bank formation, but has not reached completion due to the long development time of the resource.

To effect a restoration of functions in these areas, there is no need to correct a physical modification to restore the topographic and hydrologic characteristics, and there is not a need for biological modifications such as removal of undesirable species. Therefore, to effect a restoration of functions to these areas, it is the natural disturbance regime that must be reestablished, and thus the manipulation is to allow natural stability over time. This is a temporal manipulation that eliminates the current disturbance frequency which is the harvest cycle rate, and reestablishes

the natural disturbance regime of floods and natural tree falls. With continued protection, which in in this case would be manipulation of the temporal stability in these areas, it is likely that the ecological lift will continue to occur until the functional aspects of the area will mirror a native mixed pine hardwood forest, which is a native community to the area in both upland and higher wetland areas. It is proposed that rather than using another physical manipulation such as thinning or removal of loblolly pines, that these areas to be allowed to continue to naturally progress through succession to the climax community condition. The tree diversity of the midstory of these areas is high and comparable to the surrounding native areas, and at this time looks to be a successful successional event that could be endangered by mechanical removal of the canopy. Thus, the primary compensatory plan for this site is preservation of existing high quality onsite forested wetlands and enhancement of the surrounding potentially ecologically important forested riparian buffer through allowing community succession to a mixed pine hardwood forest. It is proposed that these areas be brought under a protective covenant that will restrict usages, such as harvest, and that time be allowed for these areas to naturally progress to a mixed pine hardwood forest, which is native to these areas. The planted loblolly pine areas, regardless of if the area meets the wetland criteria, currently have lower species diversity in the canopy than the native areas.

The planted loblolly pines were planted at least 20 to 25 years ago and have gone through the low ecological value monoculture exclusion phase, and now they support pine dominated overstory with mixed stand midstories and understories. The loblolly stands are now at the stage that they are producing abundant cones to provide an important food source and habitat for birds and small mammals. And due to the age and stand management, they are also developing a more complex vertical structure due to the diverse understory that is developing. The mature pines are of the Diameter Breast High (DBH) size class that could be utilized by many species. This includes by the endangered Red cockaded woodpecker (RCW), which tentatively has been seen on the site near some of these planted areas. For the RCW requirements, the trees have reached forage class in most areas, but there are areas with larger trees that could be considered cavity sized trees on the site. These planted areas also do not look to have been maintained as a silvicultural monoculture but instead have undergone a mixed stand management. The row thinning seems to have maintained low enough overstory density through the stand development that now they have the potential to naturalize into a secondary-growth forest as they contain sapling to tree sized bottomland hardwood species. Due to the stand management style these areas are poised to naturally progress towards a mixed pine hardwood forest. The understory is

now being dominated by water oak, sweetgum, red maple, magnolia, cherrybark oak, american holly, and yaupon, in addition to secondary growth of young loblolly. The understory is more developed in areas as they intergrade into the lower wetland areas probably due to higher seedling failure in these areas.

The functional values of the planted stands are developing, and while the planted areas have lower diversity and ecosystem services than the natural areas at this time, the estimation of functions as reflected in their iHGM Functional Capacity Indexes (FCI) values presented below, was considerable. The FCI values of upland areas were not included in the bank as this would not be appropriate, but they were reported including the ones that were later determined not to be jurisdictional. However, the FCI values support that pine plantings are a valuable habitat now, and through natural progression through ecological succession this value will increase (Cowles 1899, Clements 1916). The loblolly dominated upland areas also provide an ecologically needed upland habitat that required by many species to complete their lifecycles. In the absence of fire (which would be unanticipated at a proposed Bank mostly within the floodway), the loblolly pine stands will be replaced at climax with a mixed pine hardwood forest that is seen regionally. This mixed pine hardwood forest is a native climax community that is a reference community, and thus at climax will score very close to the iHGM maxima. While the pines were planted as a crop, the loblolly pines have also been a valuable species in healing and stabilizing the ecosystem, and they have been effectively suppressing non-native invasive species that could have occurred after the last harvest. Management techniques, a manipulation, have allowed these areas to have maintained low enough canopy density that they allowed hardwoods to grow up in their understory, and now the area is becoming a mixed stand. As time goes on, the mature pines will senesce, fall naturally, and thin themselves. The understory hardwoods and secondary pines that have developed will provide cover to also help to continue to suppress the invasives. Thinning the loblolly pines would create a risk of releasing tallow before the hardwoods obtain a superior crown height to help suppress them. In addition, thinning loblolly can promote root rot in the trees left (Stambaug 1989).

The approximately 231.8 acres within the bank are of planted pine are mature at this time and have an understory mix of native hardwoods due to past manipulation techniques. It is proposed that these areas be allowed to continue to undergo ecological succession to a pine hardwood forest, which is a climax type in this type of ecosystem. Comments on the preliminary plan were received with the concern that succession alone is not an active manipulation, but row thinning is an active management technique. And not really to agree with the concern as succession was

one of the earliest ecological processes studied (Clements, 1916) that is also inherently used in guiding all creation and restoration mitigation areas to a preferred mature ecosystem community in all mitigation areas. Mitigation Rule supports this in § 332.2 which recognizes that the enhancement of degraded resources is an important consideration of compensatory mitigation, and even recognizes that mitigation can be initiated prior to or concurrent with permitted impacts to avoid temporal loss considerations in mitigation projects. The goal of the resource management on the bank site remains the same and is to produce mature or climax communities, as it is with any mitigation area. Thus, the question is not the use of forest management in stand development, but how is how to properly apply this theory to the stand in question to produce the greatest probability having a climax community of high functional value with the result of these processes being termed enhancement as there is expected over time for an increase in ecosystem services to occur, commonly termed ecological lift. Enhancement through ecological succession towards a climax community as a mixed pine hardwood forest would occur as early successional dominants die, and this dominant in this case would be the native but planted Loblolly Pine. And thus, the question is if we are going to kill them in another active management cycle or would it be better to allow senescence to occur. The senescence is beginning to occur naturally in lower areas without mechanical or chemical intervention, and thus is likely the safest and quickest way to achieve the enhancement goal of restoring community mix of native species for these areas. Under the guidance in §332.3(c)(2)(i) these resources contribute to or improve the overall ecological functioning of aquatic resources in the watershed, and the Sponsor would like to include them as part of an overall management plan.

The bank sponsor would like to like to include the non-jurisdictional upland acres planted in loblolly as well as the native upland wooded areas under 40 CFR 230.98(o)(7) as credits provided by riparian areas, buffers, and uplands. The upland silviculture areas currently have a canopy of loblolly trees, and a midstory of a native hardwood mix along with secondary pine growth which will over time become the native climax mixed pine hardwood forest. The bank sponsor would also like to include the 52.08 acres of planted loblolly that by elevation would meet the three criteria of jurisdictional wetlands (approximately 3.2% of the Bank). These areas will also slightly increase in functional value over time and could technically be termed a wetland enhancement. However, in data collection for the HGM field variables some of these areas were sampled in an attempt to find the elevational limit of jurisdictional wetlands in the Bank, and these areas score very close to the rest of the bank in terms of the iHGM. They are also included in the HGM FCU calculations. Thus, they are currently scoring so close in function to the idealized regional

reference wetlands that they should be considered for the most part credits provided by preservation under 40 CFR 230.98(o)(6) as is the majority of the bank acres.

2.3.6 Invasive Species and Practicable Ecological Lift

Though the Bank site is along a major drainage, the area is heavily wooded and there are very few areas where there has been damage. There are no real clearings at this time, and invasion of non-native Chinese tallow (*Triadica sebifera*) is extremely limited and occurs only at the few limited areas that damage has occurred.

Field data was collected for the 76 processed observation plots so that they could be mapped. This collection's main intent was for evaluation of the wetland determination datasheets, as well as to guide later calculations in the iHGM where values such as the floodway or floodplain are part of the calculations. The field data included geolocation for verification with locations on the NWI map, the NRCS soils map, FEMA flood plain data, extraction of the LiDAR elevations of the locations, and if the plot met the three indicators for jurisdiction (Table 1). It also allowed the estimation of invasive species across the site.

The entire proposed Bank supports a hydrophytic community structure of very large, long lived species. The Bank's forested wetlands are dominated by oaks in the sandier areas and the cypress tupelo component in the slightly lower elevations and higher silt and clay soils. While there are some invasive species present, such as Chinese tallow, the disturbance looks to have been minor both in percentage as well as plots despite the area being in the floodway of a major drainage. The overall average percentage of tallow was low; trees (2.9%) and tallow saplings (3.5%) across the observation plots (Table 1). The Wetlands Delineation Manual (USACE 1987) stresses sampling areas at distinct features, and a tallow dominated area is very different than native communities. The field sampling design under the Wetlands Delineation Manual (USACE 1987) introduces a confirmation bias or selection bias due to this non-random sampling and would inflate the estimates of central tendency of tallow coverage.

However, the distribution of areas with tallow coverage in general can be discerned from field observations, which were along random transects. Areas within the proposed Bank that show higher percentages of invasive species such as Chinese tallow, or even shade intolerant species natives, are most likely to be in areas that may have seen disturbance to would allow the growth and development of these species (Meadows and Stanturf 1997). Consistent with these expectations, Chinese tallow appears to be slightly more prevalent along the current river high

bank where disturbance due to floods would be presumed to be higher or more frequent. There also are a few small plots that have obviously been either naturally or anthropogenically disturbed, and these local areas were observed to have higher Tallow coverage. But these areas are very small in overall areal extent within the proposed Bank. There is a localized area that looks to have been anthropogenically disturbed (plot T2_6) that was subsequently invaded by tallow, but surprisingly this area also looks to have been too wet for tallow (FAC), and tupelo (OBL) is now invading and out competing the Tallow. Plot T9_7, which is on the shoreline of a large cypress swamp, is within a small extent of shoreline dominated by Tallow. It should be noted that this area, when found, was actively targeted for sampling under the Wetlands Delineation Manual, even though it occupies very little of the shoreline. Historical aerial photos seem to show a change in cover in that nearby area around 2012, suggesting that the damage may have been due to Hurricane Isaac, which crossed near this area.

Overall tallow presence is very low, and at this time mechanical or chemical removal could potentially cause more unintended or secondary damage to occur through the disturbance of the enhancement activities than would be potentially gained in the little ecological lift that could be achieved through removal. Thus, a Bank-wide removal has not been proposed. In addition, there has been no historical removal of tallow, and yet tallow Coverage is low, indicating that there is a very high likelihood that the current performance metrics of the wetlands will continue to be naturally maintained and there is a low risk of loss of function at the Bank. There are two areas discussed above where there was damage; an approximately 0.11 acre area at T9_7 that looked to be the result of hurricane damage, and an area 0.05 acre area near site T2_6 that looks to have been affected by a pad placement. At T2_6 site the damage allowed tallow to invade, but the site looks too wet to support the tallow and tupelo is naturally taking over the area. However, the Sponsor could selectively apply herbicide using a brush axe method or a basil spray method in these two areas and monitor for two years for any significant increase in tallow coverage. If the initial control treatment is warranted and completed, the areas would be checked for sprouting, or germinating stems to be spot treated again until control meets SWG District suggested coverage percentiles. Because these areas are very limited in scope there may be little practical benefit. General removal of invasive species is not proposed on a broad basis because it has the potential for secondary impacts and would not produce significant ecological lift in the overall Bank.

2.3.7 Preservation dominated Compensatory Mitigation

The Bank's preservation-based plans reflect the ecosystem service value of these forested wetland resources and surrounding buffer, as recognized by multiple agencies, and the priority to protect these areas from modification or destruction (see Section 2.3.3) and 33 CFR 332.3(h)). The Bank provides important physical, chemical, or biological functions both to the local watershed and to regional ecological resources and sustainability (see Sections 2.2.1, 2.2.2, and Section 4). The onsite wetlands are rare and difficult to replace declining resources that could be considered under threat of destruction or adverse modifications through both regulated and unregulated activities (Section 2.3.4). Replacement of these types of resources would take many decades with substantial temporal loss of functions.

The bank is dominated by high quality wooded wetlands that score very close to the regional ideal wooded wetlands of the Galveston iHGM metrics. However, the Sponsor has looked at the practicability of enhancement of areas within the bank. The disturbance of general removal of low levels of invasive species as an enhancement activity very well may exceed any goal of ecological lift that could be achieved in most of the 1455.70 wetland acres. (Section 2.3.6). There are an estimated 52.24 acres in jurisdictional areas have been disturbed by silviculture (Sections 2.3.5 and 2.3.6) and could be enhanced. In theory this could be by clearing the areas and replanting them with native seedlings, thinning them, and maintaining them into canopy dominance. This would be an active management technique but would involve loss of the current functions for decades and result in significant disturbance and potential invasion of non-native species. These areas currently have a native mixed hardwood understory of trees, and succession of the native community is thought to be the safest and most practicable enhancement activity. The removal of invasive species is proposed in two small disturbed areas to remove Chinese tallow (Section 2.3.6). The Sponsor has also identified the practicable enhancement of the 179.72 acres of upland buffers, and it is proposed that this would be best served through succession towards a climax mixed pine hardwood forest as method poses the lowest risk to achieve an enhancement goal of restoring this community to a mix of native species within these buffer areas. Thus, the proposed plan for the 1,652 acre Bank is preservation dominated as there are 1455.70 acres of high quality wetlands that currently exist, and enhancement of ecosystem services to any real extent would not be practicable and cannot be a dominant activity.

2.4 Phase 1 Environmental Site Assessment

There are no known hinderances to establishing a wetland mitigation bank on the property and no potential environmental risks have been observed. A formal Phase 1 Environmental Site Assessment under ASTM E1527-13, or under ASTM E2247-16 as a primarily undeveloped plot of land, has not been conducted. However, other preliminary on-site reviews that have been done and have not indicated any concerns.

The regional area historically is forested. The first commercial development in the local area was the Orange Mill. The mill groundbreaking started at the mill in January 1966 (Owens-Illinois Administrative Records Accessed 2019.12.07), and the site is now owned by International Paper Company. Based on remote data reviewed from before and after the mill, as well as the ecological surveys, the proposed Bank site was not put to industrial or commercial use. There has been historical silviculture use in the area. The paper mill type is a kraft mill that produces linerboard for boxes and packaging. As such it does not produce products that need to be bleached to a high brightness and thus does not have processes that could produce the related types of concerns related to bleaching. The wetlands are also not part of a discharge route, nor are they treatment wetlands.

The USGS maps of the area indicated during the period from 1932 to 1960 that there were roads created presumably for silviculture as well as permanent structures that look to have been fish camps, which could have involved regulated activities today but was unregulated at the time. IP, as well as other private owners and leasees, also currently use the regional area for silviculture. Section 404(f) of the Clean Water Act (CWA) exempts from permit requirements certain discharges associated with normal silviculture activities in waters of the U.S.

Historical aerials of the Bank's area were downloaded from the Texas Natural Resources Information System (TNRIS), and reviewed, including the 1943, 1957, 1964, and 1985 USGS aerial photography (TNRIS Accessed 2019 2020), as well as the modern available orthoimages. The raw digital photographs from several sets were manually orthorectified in ArcGIS utilizing ground control features that could be located as static over the decades to use as background maps. The historical USGS quadrangle maps show that the area did contain limited of small structures or dwellings along the river mainly between the 1930's and the 1960's and declining thereafter with no structures shown by the USGS today. Some of these areas were visited during the ecological fieldwork but no trace of any structures was found.

There has been limited subsurface exploration (one pad), and pipeline ROWs crossing the Bank (3 pipeline easements), there is one unimproved support roadway, and one roadway crossing the Bank leading to structures in West Bluff. All these areas were excluded from any calculations for the Bank since they could not be protected from future disturbance. These areas excluded from the Bank calculations total 11.52 acres. No environmental concerns on the Bank site have been identified in any of these areas or the reviews done thus far.

A Phase I Environmental Site Assessment has not yet been conducted and does not appear necessary given the consistency of field observations with desktop review of past use and limited potential for any environmental issues affecting the bank.

2.5 Cultural Resources and Historical Infrastructure

A desktop and literature cultural resource assessment were conducted that included a review of the Texas Historical Commission (THC)'s Texas Archeological Sites Atlas (Atlas) online database and the National Register of Historic Places (NRHP) database to identify previously recorded cultural resource sites, historic structures, properties, designated historic districts, and State Antiquities. In addition to a records and literature search, soil data, USGS historical and 7.5-minute topographic quadrangles, historical navigation maps, aerial photographs, and contemporary geologic and physiographic features were also examined. However, this review did not reveal recorded archeological or historical sites within the project area or obvious signs of one in the aerials. In addition, the bank being proposed is a predominantly preservation area, and no earthwork or disturbance is planned to occur on this site as part of the plan. Appendix C summarizes the literature and records review, including these historical maps and plots.

Section 3
Onsite Jurisdictional Resource Area

Field work was conducted in support of the AJD in August 2018 and October 2019, guided by and used in conjunction with well-established remote sensing tools and data. A summary from the 76 observation plots is presented in Table 1. At all 76 plots the vegetation indicator met the criteria for wetlands. This was true even in pine plantings because loblolly pine is a facultative (FAC) plant. Indicators of hydrophytic vegetation, hydrology, and hydric soils were met at 70 of the 76 established plots by the procedures set out in Appendix D in the Corps of Engineers Wetland Delineation Manual (1987) and the Hydric Soil Indicators in the Regional Supplement for the Atlantic and Gulf Coastal Plain Region (2010). The observations made in the 76 observation plot areas field verified the strong correlation of the indicators of hydrology and hydric soils (Table 1). Similarly, for the adjacent PRM site, elevation was the dominant variable linked to the determination of jurisdictional wetland boundaries, based on the field documentation submitted to Compliance Branch (PRM AJD Appendix E).

While the observation plots were set up specifically in support the Clean Water Act Section 404 jurisdictional determination, numerous additional observations were made at each observation plot for the iHGM, to verify the NWI, define and establish trends, verify interpretation, and aid in mapping. The vegetation indicators from the individual plots and other observations were used to build a vegetation list for the site presented in Appendix F, and the iHGM field variables will be discussed in the estimates of wetland functions in later sections.

The AJD indicated the following: 1,455.70 acres of wetlands composed of two major types of forested cover: cypress-tupelo (636.23 acres), and hardwoods dominated by oaks and sweetgum (819.46 acres). There are approximately 179.72 acres that are estimated to be upland areas, and approximately 231.8 acres are planted pine. There are estimated to be approximately 4.82 acres of open water (in 5 small open water areas, considered deep water habitat) within the Bank. There is also 11.47 acres that are within ROWs, which were excluded from Bank estimates because they cannot be protected from possible future impacts.

Section 4 Methodology for the Estimation of Current Ecological Quality and Functions

The accounting in this proposed Bank will utilize the Galveston iHGM metrics to estimate and quantify functions and values of aquatic resources (USACE 2016). To ensure ecosystem services of impacted wetlands are adequately compensated by Bank credits, the USACE suggests that the same procedures for delineation and assessment of functions for the impacted resources and the mitigation bank providing credits for compensatory mitigation. The HGM approach to functional assessment of wetlands are simple models that limit the domain by limiting classification to a specific regional subclass, and then functional models for the physical, chemical, and biological characteristics of the wetlands are scaled to an idealized reference wetland condition. This produces a model output that is expressed on an ordinal scale relative to that specific reference. For wetlands like those found on the bank site, the USACE Galveston District suggested the use of their forested riverine iHGM to estimate current values and functions of delineated riverine forested wetlands which references the developed Kentucky Riverine HGM (USACE 1999). The iHGM Riverine Wooded Wetland model run on the onsite wetlands was verified by SWG Evaluation Branch on June 9, 2022 (Appendix D). HGM models as they generally apply and as applied to the bank site for different ecological base conditions were also developed in a report and submitted to SWG policy.

The intent of the iHGM methodology in compensatory mitigation is to allow the conversion of areal aspects of compensatory mitigation and impacted sites to be expressed as functional units so that it would be possible to compare this numeric value to adequately mitigate for impacts. However, several aspects of the proposed Bank are not well captured in the iHGM models, and these Bank-specific aspects would increase the ecological value of the mitigation site and are addressed qualitatively in this prospectus.

4.1 Estimation of Resource Values and Functions

HGM methods have been developed to estimate identified features in terms of values and functions using multimeric formulas. The intent of the HGM metrics is define functional resource values to make the impacts and the mitigation of values and functions within a class of aquatic resources fungible, much like any like coin has a set fungible value. This function-based accounting system takes advantage of fungible qualitative measures that functional metrics estimate so that comparisons can take place among wetlands. These metrics have been used extensively in banking instruments at both the bank sites and impact sites across the nation.

Because these models are relatively simple, they also become inherently limited to the systems to which they can be applied. The HGM methodology explicitly sets ways to achieve an appropriate level of model resolution and sensitivity the first is to limit the model to specific wetland subcategories, and usually even further limit the application to wetlands within a specific subregion. With these restrictions however, considerations for site specific issues in application of an HGM method become an issue that must be addressed as a source of error, such as WAA considerations or other flagged variances. These will be discussed below for the site.

Under the HGM method, field variables are developed by looking at disturbance gradients from idealized regional reference wetland to increasingly impacted wetlands in a training dataset, in other words they are conceptual relational reference models. In the HGM method, all field variables in the reference wetland are set to a high value of 1.0 (the maximum score of a reference), and other wetlands in the training dataset score lower down to a minimum score, which in the case of the SWG USACE Riverine iHGM was 0.10 for a wooded wetland that has minimal function in that attribute. Because of the way these models are developed, the output is on an ordinal scale, and not an interval scale. However, the idea is that impacted wooded wetlands will rank lower than the reference.

The SWG iHGM method is a subset of the general HGM method and it is tailored to evaluate impacts and compensatory mitigation within the SWG USACE district by wetland subclass. The SWG USACE has published iHGM guidance for four different wetland subclasses. Of these four subclasses, the SWG forested riverine iHGM best matched the onsite and regional factors of the proposed Bank. The riverine iHGM uses three sub-indices to determine the functional capacity values for: biota, physical, and chemical functional aspects of the wetlands. The Functional Capacity Index (FCI) value of each sub-index is calculated by incorporating field data from 15 field attributes which are incorporated into specific multimeric equations to calculate the FCI value of the wetland assessment area. FCI values are intended to be applied to a single defined WAA. The FCI values are then converted to Functional Capacity Units (FCU) by multiplying the areal extent or acreage of the WAA as an identified jurisdictional resource.

HGM methodology is meant to assess wetland ecosystem services, not adjacent upland areas which would be outside the intent of the original HGM metrics and methods. However, the field effort was also to actively search for wetland jurisdictional boundaries and areas that did not meet the three indicators to be a jurisdictional water so that these upland points could better define the edges of the wetland upland boundary. All 76 observation plots had wetland indicators and iHGM

field attribute measures taken in the field and are reported in the tables to provide a comprehensive picture of the Bank. However, six of the observation points were found not to meet all three indicators in the delineation (they are upland areas), two stations were mapped to be outside the AJD review area, and three stations that met the indicators but were above the 3.5 meter maxima set by the AJD. All areas determined to be non-jurisdictional by the AJD, or outside the AJD review area, were excluded from all iHGM calculations of FCI values and FCU units but are presented as collected field data in greyed out columns to prevent confusion (Table 2). Thus, estimations of resource functional capacity by the iHGM utilized the 65 jurisdictional observation plots within the AJD review area (Table 1, 2). The values of each field HGM variables in Table 2 are presented by observation plot. Values from the field data in Table 2 are used to calculate the three FCI Index scores in the iHGM.

4.2 HGM Model Red Flag Limitations

Consistent with the US Army Engineer Research and Development Center (ERDC) guidelines for the development of HGM Guidebooks (USACE 2013), and the Kentucky Riverine HGM (USACE 1999) model limitations suggested that resources be screened to identify conditions or resources that require special consideration or attention in addition to their HGM identified functions to capture the appropriate functions, and ecosystem services of a wetland, or the surrounding landscape that were not represented in the HGM models. While the iHGM is not a verified model and does not have an associated Guidebook, these are general guidelines developed by ERDC and were referred to in all the developed Guidebooks as Red Flags. Red Flags could be used in the HGM process as a proactive attempt to guard against some of the limitations of the models and better characterize resource values and functions of specific wetlands on a specific site. Red Flags may be explicit such as ones based on national criteria or programmatic purview, based on regional or local criteria, take into account past or present site usage, or be due to special features or functions of the onsite wetlands in the environment such as considering if the ecosystem services may be modified by onsite or regional processes around the project area. With this Bank, there are several Red Flags that, at least qualitatively, should be considered to identify unique features or natural resources in or around the project area that require special or increased consideration as they are not represented in the SWG Forested Riverine iHGM field variables.

The SWG Forested Riverine iHGM model uses three multimeric Functional Capacity Indices: Temporary Storage and Detention, Maintain Plant and Animal Community, and the Removal and Sequestrian of Elements and Compounds. These equations use the rank order values from 15

field attributes which are estimated in the field with the intent to broadly catch many of the physical and ecological functions of this class of wetland. However, there are several ecological aspects of the proposed mitigation area are not well captured in the iHGM models. The Red Flag process is an attempt to screen for these features that may need special recognition specific to the proposed site.

4.2.1 Programmatic Red Flags by the ERDC Guidelines

In the ERDC guidelines for the development of HGM guidebooks (USACE 2013) part of the list of potential red flag features were based on national criteria or programs or special ecological ecosystem services (ERDC Table 19 pg 126). The recognition or protection may occur due to a federal, state, regional, or local criteria. Several ERDC listed programmatic Red Flags apply to this property.

- This reach along the Sabine, as well as this actual Bank site, was identified by the U.S. Fish and Wildlife Service in their Texas Bottomland Preservation (1985) and Emergency Wetlands Resources Act (1991) reports as warranting priority attention for protection and acquisition for important, scarce, and vulnerable wetlands. The adjoining Blue Elbow Swamp was given a Priority 1 (very valuable) in their efforts for fee title acquisition or conservation easement as an important, scarce, or vulnerable wetlands in the Nation.
- This segment of the Sabine River was listed on the National Rivers Inventory of river segments potentially eligible for protection under the Wild and Scenic Rivers Act for outstandingly remarkable Scenic, Recreation, and Wildlife values. The National Parks Service also cited federally listed endangered species occurring in the area, and recommended inclusion in the proposed Texas Natural Rivers System in 1982 (TPWD 2005).
- As part of Senate Bill 1 (1997), the regional planning group under Texas Water Development Board (TWDB) designation criteria (31 TAC 357.43 & TAC 358.2) has identified this reach of the Sabine River as an Ecologically Significant Stream Segment in their adopted regional water plan from the confluence with Sabine Lake in Orange County upstream to the Toledo Bend Dam (TCEQ classified stream segments 0501 and 502).
- The Bank forms a large continuous wildlife corridor between large areas that are special management areas. This site and other contiguous protected sites form a corridor along the Sabine that extends approximately 14.2 miles along the lower Sabine. The iHGM

references the Kentucky Riverine HGM (USACE 1999) as the basis of the functional indices, and the verified Kentucky Guidebook has additional landscape field variables Vtract and Vcore. Because these variables were not included as part of the iHGM, this would also technically become a non-represented programmatic Red Flag per the ERDC publication (USACE 2013).

- While mainstem segments 0501 and 0502 are not listed in the 2020 Texas Integrated 303d report (TCEQ 2021b), several tributary segments that flow to Sabine mainstem segments 0501 and 0502 are listed as not meeting assigned water quality standards, and given category 5c for depressed dissolved oxygen in water (501B, 502A, 502B, 502E, and 513). There are also twenty-three Total maximum daily loads (TMDLs) developed for Orange County involving segments 0508, 0508B, 0508C, 0511, 0511A, 0511B, 0511C, 0511E, which flow into 0501, and the TMDLs in general include addressing depressed Dissolved Oxygen (DO). The large number of segments exceeding Water Quality Standards indicates that this region can be sensitive to non compliance for low DO, and thus should be receive special consideration under the programmatic Red Flag procedure. While the proposed Bank's stream segments are not listed, the many regional listings indicate that the combined sources in this type of geomorphology can exceed the assimilative capacity, have done so in the impaired bayous, and that there are a large number of segments where this is occurring. It was noted in the developed TMDLs that the exceedances occurred more often in rural areas, at high temperatures, and low flows. Importantly, nonpoint source contributions in these assessment units were estimated to be greater than point sources. The TMDL modeling effort included a pristine condition scenario where all developed land classes were replaced with a mixed forested condition and loadings. The pristine modeled condition provided a lower percentage of days that did not meet the DO criterion (TCEQ 2020). Water quality functions of wetlands and riparian corridors have well recognized functions and ecosystem services in water quality management. With the documented exceedances occurring in the rural areas of the subwatersheds, along with the information from the modeling efforts, it appears that these subwatersheds likely have lower assimilative capacity due to previous agricultural operations. The TMDL implementation plan suggests Water Quality Management Plans that encourage practices including avoidance of damage to the vegetation of the riparian corridors and promoting sustainable forestry practices (TCEQ 2015). The proposed Bank will preserve the wetlands and riparian corridor along 6.65 miles of the Sabine River, and

thus will support local and regional water quality by minimizing and moderating loadings that could lead to depressed oxygen levels.

- This Bank property is at the head of tide, and this reach of the Sabine River is identified in the Fishery Management Plan as Essential Fish Habitat (EFH, NOAA 2021c). The statute defines EFH as those waters and substrates necessary for a species of managed fishery to spawn, breed, feed, or grow to maturity. NOAA's regulations further define EFH by specifying that "necessary" means "the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem."
- This Bank property is at the head of tide, and part of the property is identified as an area protected by the Texas Coastal Zone Management Plan (TCMP). Coastal management program is listed specifically by ERDC as a programmatic Red Flag. The Office of Ocean and Coastal Resource Management in NOAA, has a program under the TCMP to give matching grants to state agencies for acquisition and conservation easements; in Texas this grant program is led by the Texas General Land Office (GLO). The funding is through the federal Coastal and Estuarine Land Conservation Program (CELCP). For state agencies to qualify for the 1:1 federal match grant in this program, the monies for acquisition and conservation easements use specific guidelines for funding. The GLO program (TCELCP) have identified in Texas that the priorities are tidal waters of rivers and streams, vegetated corridors that lie adjacent to coastal streams and rivers, coastal swamps and bottomland hardwoods, and habitats for rare, threatened, or endangered species. However, unlike the federal program the priority habitat of this program looks to include both federal Endangered Species Act (ESA) species as well as state threatened and endangered species. Not only would this property meet these guidelines, it would also meet the named TCELCP preferred Project Areas for the program. The Blue Elbow Swamp, this Bank site, and this local habitat type are recognized under several federal and state CNRAs, planning documents, and are shown as an important habitat, including as a priority protection area (polygons PPA0008, and PPA009) for TPWD and GLO. As such, TCELCP could place priority on this property due to the connectivity, buffer potentials, state and possibly federal rare threatened or endangered species, and that the onsite resources are rare and have suffered historic losses.
- This area has a large percentage coverage by cypress tupelo wetlands, which have been identified by the SWG USACE as a rare and difficult-to-replace wetland community, and as such have been excluded from RGP and NWS permitting pathways.

In Texas palustrine forested wetlands have decreased by nearly 11%, or over 96,000 acres, in the timeframe between 1955 and 1992 (Moulton et al. 1997).

- Nearly the entire site is located within the FEMA floodplain, floodway, or flood prone area, which is listed by ERDC as a programmatic Red Flag. The Bank's wetlands remained jurisdictional even under the narrower construction of waters of the United States adopted in the 2020 Navigable Waters Protection Rule because they are hydrologically connected in a typical year to the Sabine River (a TNW).
- The Bank site is also in an area listed within the North American Waterfowl Management Plan as on the boundary between the Central and Mississippi flyways, and this is specifically listed as a programmatic Red Flag (USACE 2013). The specific location of the Bank site is near the terminus of the north American flyways and is therefore the area cited as being one of the most important waterfowl areas in North America, providing both wintering and migration habitat for significant numbers of migratory populations that use both flyways. As such, it is also part of the Gulf Coast Joint Venture Region (Wilson and Esslinger 2002). There are only 4.82 acres of open water on the proposed bank site (0.4% of the total area) and the majority of the interior is heavily wooded such that Anatidae species that would be that may be covered by the Management Plan would likely be limited. However, the east side of the bank is the Sabine River, which in this reach has a high connectivity avulsional nature. And on the west side of the Bank, there is an abutting shallow reservoir that is named on the USGS quad Teal Island, and the Bank would contribute to habitat quality of these adjacent resources. The observed game species on the site were primarily wood ducks. As for onsite non-game migratory shorebird and waterfowl, two flocks of white ibis, cormorants, anhingas, herons, kingfishers, and an unidentified sole curlew have also been observed on site. There are also several other species observed that would be protected under the Migratory Bird Treaty Act, such as but not limited to the neotropical migrants, owls, and the several species of woodpeckers that have been observed on site.

4.2.2 Regional Wildlife Contributions

The Bank will form a large continuous wildlife corridor between large plot areas that are special management areas. Focusing on inland contributions, the iHGM references the Kentucky Riverine HGM in the estimation of these values and functions (USACE 1999). The Kentucky Riverine HGM guidebook has additional landscape field variables such as Vtract and Vcore, which the proposed tract would score highly on. And furthermore, the guidebook states that the

size of the tract is perhaps the most important determinant of forest species richness with larger tracts supporting more species. The theory of Island Biogeography supports these variables as important as species increase with area (MacArthur and Wilson 1967). The iHGM does not use these field variables, and thus does not consider contributions of tract size. For many projects, this may not be a major variable, but the proposed plot is approximately 6.65 river miles in length and 1651.72 acres, occurring near or across the head of tide. Thus at this scale, these landscape variables can become significant contributors to ecological functions and are not represented in the iHGM. There are other contributions that this site makes due to its location within the Sabine Lake estuary, which will be discussed in Section 4.3 on estuarine contributions.

This Bank site adds to many regional areas that are also protected; it surrounds a riverfront 45 acre IP PRM site for SWG-2014-00706; it is adjacent to the Blue Elbow Swamp mitigation bank to the south; and the 8,695 acre Sabine Island Wildlife Management area is directly across the Sabine River in Louisiana. Together, these protected areas would create a continuous wildlife corridor along the lower Sabine on the Texas side from the mouth of the Sabine nearly to Newton County. The combination of the three Texas areas would produce a protected corridor on the Texas side that is approximately 14.2 miles of the lower Sabine with a continuous managed acreage of approximately 6,300 acres. The large plots connected by corridors would actually increase the ecosystem service value of the surrounding plots as well as the mitigation bank area Functional Capacity Index (FCI) metric for Maintenance of Plant and Animal Communities for species that have an extended range or avoid anthropogenically disturbed areas, such as some birds and the Black Bear. There have been sightings of Black Bear in Calcasieu Parish, which is across the Sabine from the proposed bank (Davidson et al 2015). The effects of such a large contiguous area will have regional effects on chemical, physical, and biological integrity that extend well beyond the hydrologic unit or the nearby ecosystem boundary.

4.2.3 Threatened and Endangered Species

The USFWS Information for Planning and Conservation (IPaC) system was used to look for species that were listed in the area and protected under the ESA. The proposed bank is located entirely on the Texas side of the state line, but the IPaC system included the Louisiana office, likely due to the mapping polygon touching Louisiana.

A 2019 list and an updated 2021 list from both the Texas Coastal, and the Louisiana Ecological Services Field Offices were received and indicated no critical habitat designations (USFWS 2019,

2021). Federal species were included on the lists from both the Texas Coastal and Louisiana Ecological Field Offices. The ESA species named include the West Indian manatee (*Trichechus manatus*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus*), and the red-cockaded woodpecker (*Picoides borealis*) (RCW) (Appendix G). Importantly, in the original 2019 list, the Louisiana Ecological Services Field Office listed the RCW but the Texas Ecological Services Field Office did not. In the 2021 list both field offices now list the RCW. However, the proposed bank is a preservation dominated bank and no effects to an ESA protected species are anticipated as a result. Information and literature reviewed regarding the life histories and habitat requirements of the listed species on the lists were consulted and included state and federal agency reports, management documents, peer-reviewed scientific literature, online data, USFWS, and Texas Parks and Wildlife Department (TPWD) data. This evaluation was also based on the on-site direct observations made of the Bank site and the larger action area conducted by RPS staff.

The potential for the RCW had been recognized at a very early stage of consideration of the site and as part of the preliminary experimental design and data collection for the Bank. Conversations were started with the Interagency Review Team and representatives with the USFWS Texas Coastal Ecological Services Office because the Sponsor identified that there may be habit conducive to RCW on the Bank property. The site borders the meandering Sabine River and contains sandy ridges and islands along natural levees of the meander scars. These areas were known from preliminary field data to contain mature pines of the size classes needed by the RCW. These pine areas are surrounded by old forested areas, including large open areas of cypress dominated communities, which are listed as a secondary resource for the RCW (USFWS 2003). Pileated Woodpecker (*Dryocopus pileatus*), and red-bellied woodpeckers (*Melanerpes carolinus*) were observed in the pines along the wetlands. These preliminary conversations resulted in the USFWS suggesting an informal preliminary survey of portions of the property. After a short informal consultation, a survey of the northern most transect was undertaken on October 24, 2019.

During site verification visits on 10/24/2019 and 9/11/2020 a single small black and white woodpecker was spotted that was possibly an RCW. During the 2019 survey near the northern edge of Grubs Island, a single individual was observed for several minutes as well as a tree containing what looked to be an incomplete cavity in that large live pine (30.223894, -93.724129) at about 30’ up. The pine was oozing some sap from a small excavation that was about 1 to 1 ½

inches in diameter. On the 2020 field visit, an individual that was possibly an RCW was observed near the Sabine River on Transect 1, which crosses near Grubs Island.

The woodpecker seen on either site visits was not seen up close and could not be positively identified as an RCW. But the 2019 observation was for several minutes, and it could fit 3 species that are in the area that are like what was observed: the Downy, the Hairy, and the Red Cockaded woodpeckers. The following observations were made and support that it was possible that it was the RCW:

1. It was not thought to be a Downy because that species has a very white belly and a large white patch along the back, which was not observed. The male of this species also has a patch of red on the head, which was also not observed.

2. It was not thought to be a Hairy because this species too has a very white belly. This species also has very little checking on the wings, and the male has a patch of red on the head. The individual observed had strong ladders on the wings, and no red patch was observed.

The Bank has natural mature pines in excess of 100 feet, and 231.8 acres of pine dominated silviculture stands with tree sizes near or exceeding 10 inches in diameter. Foraging and cavity habitat for RCW consists of pine stands with trees from approximately 10 inches DBH and larger, with them preferring mature trees. They also forage in pole stands, consisting of pines 4 to 10 inches in diameter. The pines on the site appear to be only loblolly, but in Texas, RCW cavities have been found in longleaf, loblolly, shortleaf, and slash pines. Most of the silvicultural stands on the Bank site were loblolly pine trees that look to have been planted several decades ago. Trees in these stands are exceeding or approaching 10” DBH. The potential for RCW habitat was presented to the SWG USACE IRT in February 2019 and the two sightings were reported to the Texas USFWS office staff as well as the SWG Compliance Biologist.

LiDAR data analysis indicates that there are a number of large trees ringing the Grubs Island area that could provide the RCW’s foraging and cavity habitat. This area was surrounded by an open cypress dominated area, that could serve as secondary habitat. The LiDAR also indicates that there are also a number of large trees in the general area above T2 where the original crossing to Grubs Island was attempted, and where large mature pines were observed. Using a height height-diameter model for loblolly pines a rough estimate of diameter can be had from this data, which indicates all loblolly above approximately 60 feet have a DBH of 10” or more (Coble and Lee 2011. However, the southern part of the island has a large number of trees that are over

100'. The recovery plan states that preferred cavity heights can range from 6.1 to 15.2 m (20 to 50 ft), which these trees could support. At these heights, under typical field conditions, and with the equipment used, it would be likely that these small birds and cavities could have been missed.

As part of mapping the extent of the PRM area for SWG-2014-00706A, which is surrounded by the proposed Bank, a couple dozen individuals of the Texas pigtoe (Fusconaia askewi) were found, both alive as well as fresh dead. A shell was keyed to the Texas pigtoe (Fusconaia askewi) and confirmed by Texas Parks and Wildlife biologists. The Texas pigtoe is a regional endemic limited to a relatively small area in Texas and Louisiana and is listed in Texas as a state threatened species.

4.3 Estuarine Contributions

While the hydrology of the Bank benefits from high rainfall and low evaporation and a high groundwater table, the elevation of the Bank Site relative to local MSL also results in overbank water from the Sabine River. In addition to water table elevation, the Bank experiences periodic inundation contributing to ecological connectivity to the Sabine Lake estuary. The inundation can be due to both predictable astronomical tides and meteorological events or higher flow events. In addition to hydrologic influences related to the Sabine, the wetlands are also important because they are a physicochemical water quality zone that is exploited in estuarine trophic coupling and typically is an important nursery habitat of the estuary. The wetlands' influences have the potential to not only affect the geochemistry but also biotic contributions of keystone species in ways that are not commonly seen in inland systems. These differences from inland systems in the chemical and biological interactions of the Bank with the surrounding ecosystems should not only be considered as a Red Flag under the HGM as it is in this section, but also should be considered in setting the range where the Bank can effectively compensate for environmental impacts as a service area as outlined under § 332.3(b)(1).

4.3.1 Connectivity

The Bank is very near predicted MSL as described in Section 2.2.2 and overall, the plot has little relief. The connection from tidal inundation can be significant to the hydrologic and ecological connections between the Bank and the regional ecological resources as well as support sustainability. The elevation of HAT, without even considering the USGS estimate of an increase of local MSL across the estuary, could result in flooding by astronomical tides at 8 of the observation plots, or 11% of the observation plots. Using the USGS estimates of local MSL

at Sydnes Island at the edge of 12010005 upstream to the site and ignoring further harmonic changes, would give an estimated HAT slightly over 1 meter, which at the Bank Site could flood 10 of the 76 observation plots, or 13% of the plots (Figure 10). Thus, it appears that the wetlands could maintain at least intermittent connections due to astronomical tides alone. Due to local MSL reducing the slope of the river to zero along this reach, high flow elevations would only be dissipated by friction and would also maintain connections. This very flat topography and geolocation also places the wetlands potentially into the zone of migration due to climate change and coastal resilience. The local dataset on local astronomical tides does not provide the full tidal epoch as needed to define the average and range. However, the available local dataset suggests that there is a tidal component in the range to be ecologically important for the Bank site.

The definition of HAT is strictly the highest astronomical tide that occurs within a tidal epoch. This does not take into account river flows, or other weather driven high water events in the actual water level seen at the site. While the HAT would likely inundate considerable acreage within the Bank site, limitations of the available data leave uncertainty about the magnitude and frequency of very high astronomical tides and future tidal migration. But if the assumption of the increase of MSL across the estuary from the USGS study is used, and one standard deviation of precision of the LiDAR data is used to define a supportable contour periodicity, then for year 2021 the predicted astronomical very high tides that would be between the NAVD 88 one meter and half meter contours shown on Figure 10, would occur between 12 and 26 times out of all these very high tides. This does not account for connectivity due to higher flow events or metrological factors. The NOAA inundation analysis tool (NOAA 2021d) was also used for estimation of inundation of past events, but the closest station for that tool was at the Rainbow Bridge. Data for 2021 to 2017, indicates this range of inundation occurs approximately 11 times a year at that location, and at the more isolated Gum Cove, with almost no active watershed on the Intracoastal Waterway, the tool suggests inundation approximately 8 times a year. The tool producing a frequency close to the range estimated from the LiDAR would support an inundation frequency in this range.

4.3.2 Physicochemical Parameters

The physicochemical parameters of the reach along the Bank indicate that this is a transition zone between the riverine and estuarine ecosystems. This type of transition zone is not truly represented in inland waters. The closest representation in limnology is the lotic-lentic gradient

produced when a stream or river discharges into a lake or reservoir. However, the discharge and surrounding water are both fresh, and the biogeochemistry seen in estuaries due to the change in ionic speciation is not produced. In addition, due to this chemistry a maximum turbidity zone (MTZ) is produced and is extensively utilized by estuarine food webs. The physiochemical parameters of the reach of the Sabine are available through the USGS and TCEQ sampling of the area. The Sabine in this reach based on the onsite USGS gage 08030530 can be shown as tidal (detailed 2.2 and in the functional assessment submitted to Compliance Branch). Based on TCEQ monitoring data station 10395, also located within the Bank reach about a mile to the south of the USGS gage, water chemistry of the area supports an average oligohaline condition with a mean reported salinity of 2.91 ppt, but also has maximum of 16.95 ppt when reported (SWQMIS code 00480), indicating at times this can be a mesohaline reach (TCEQ 2021a). However, Code 00480 is not reported at salinities below 2.0 parts per thousand (ppt, TCEQ 2012) and results in a truncated dataset that has bias towards the low flow periods.

TCEQ salinity data was evaluated but looks to be truncated to low flow periods where salinity would be above 2.0 practical salinity unit (psu). The specific conductivity data is a larger dataset and does not have an introduced bias due to a reporting cut off. Regression conversions of specific conductivity do experience a slight loss of accuracy due to a violation of the law of constant proportions (UNESCO 1981). However, based on established principles (Millero 1984), the magnitude of this error is usually small and it is appropriate to use specific conductance data (SWQMIS code 94) and convert to psu as this value is always reported in the data, making it non-truncated dataset that includes higher flow events, which will give a better estimate of the average reach conditions. Based on best available information, the SWQMIS code 00094 gives an estimate somewhere near a calculated mean of 1.08 psu, which would be more appropriate to use to characterize an average in this case rather than the 2.91 ppt of the truncated salinity dataset reported (SWQMIS code 00480). This places the reach at higher flows near the edge of a riverine type ecosystem, but at lower flow times this shifts and it is better described as a head of estuary ecosystem that typically is slightly brackish; and had a maximum salinity of 16.9 ppt being recorded in the dataset, which is about half the strength of oceanic water (approximately 35 psu). This range of water chemistry is important for trapping and organic matter transference.

4.3.3 Maximum Turbidity Zone

The SWQM water quality data discussed in Section 4.3.2 indicates the reach is in a transition zone. Transition zones with characteristics like this reach are recognized as important spawning and juvenile nursery habitat for many estuarine dependent species (Day et al. 1987). One of the reasons that these transition zones are important is that they contain the estuarine turbidity maximum (ETM) or maximum turbidity zone (MTZ). MTZs support increases in secondary production not only because of the allochthonous loading, but also that the change in ionic speciation causes flocculation and the hydrodynamics then traps organic matter. Biologically the MTZ also hydrodynamically concentrates prey items for secondary producers. These loadings and trapping affect local autotrophic and heterotrophic processes, and this trapping is exploited in estuarine trophic coupling typically as a nursery habitat.

Multiple lines of data indicate the MTZ is likely frequently within the Bank's reach of the Sabine River. In microtidal estuaries, MTZs usually occur due to salt induced flocculation, hydrodynamics introduced due to tidal asymmetry (outlined in section 2.2), and forced estuarine pycnoclinic or density circulation. The organic carbon nitrogen and phosphorus brought down by the river flow to this zone, or allochthonous sources, is then trapped here due to chemistry and hydrodynamics of the MTZ. The MTZ typically occurs between 0 and 8 ppt (Day et al, 1987). A flocculation study of riverine material indicated that salt flocculation can start between 1 and 2 ppt and flocculate 73% of the organic carbon by 6 ppt (Asmala et al. 2014). Conditions supportive of flocculation in this reach would be supported by the TCEQ data in about 47% of the samples. Further, the TCEQ field data indicates Secchi depth (SWQMIS code 00078) averaged only 0.43 meter (m) and had a maximum of 0.83 m (TCEQ 2021a). The MTZ results in both the flocculation of inorganic and organic components, which limits penetration of light. But the component of degradable organic detritus is reflected in the relatively high Kjeldahl values and in the dissolved oxygen dynamics of the reach which had a wide range. The range had an average of 6.8 mg/L due to photosynthesis, 77% average saturation, as the routine monitoring spot data values are likely all daytime sampling values, but had a minimum of 0.1 mg/L likely due to the high allochthonous organic loading.

4.3.4 Connectivity of the Lower Sabine River and Sabine Lake

The lower Sabine River and the surrounding ecosystems of the bank contribute to the major estuary Sabine Lake, and the Sabine River below Toledo Bend. The extensive and diverse bottomland areas maintain periodic hydrologic connectivity to the lower Sabine River sub-basin

either by flow or astronomical tides alone as detailed in Section 4.3.1. The local physicochemical environment produces an essential or highly favorable habitat for many organisms in the estuary are presented in Sections 4.3.2 and 4.3.3. However, the onsite wetland resource is not the only resource that is dependent on connectivity. Oxbow lakes, the riparian corridor, and other floodplain habitats are important components of the ecosystem supported by the lower Sabine River by providing habitat to many freshwater dependent aquatic species in various parts of their lifecycle in addition to the estuarine contributions. A study of oxbow lakes in the Brazos River concluded that oxbow lakes increased overall fish diversity in that system (Winemiller et al. 2000). Water quality of the mainstem systems are also affected by connectivity with the floodplain wetlands. In addition, the Texas Senate Bill 3 instream flow protections—particularly protections for high volume "pulse" flows—applicable to new water rights within the Sabine and Neches Rivers are to promote productivity, extent, and persistence and thus connectivity for key aquatic habitats and species while the freshwater inflow rules provide support for a sound ecological environment of estuarine system.

Historically, the Sabine River had very high ichthyological species richness containing more than 85 species of fish, some of which are estuarine or marine. A more recent collection effort consisted of only 64 species in a 15,000 individual collection conducted on the mainstem and major tributaries (Bonner and Runyan 2007). The historical ichthyological collections contained several species that migrate: diadromous, catadromous (American eel), and anadromous (striped bass) species, but represent a time before Toledo Bend Reservoir. The anadromous species were not represented in the 2007 collection, but there are species that are floodplain dependent still represented. The available habitat as well as streamflow variability and magnitude are all considered important aspects of river ecology for native or adapted fish species. After excluding extirpated fishes in the modern collection, the Sabine drainages had 17 historically abundant fishes that became rare in the modern collection (Bonner and Runyan 2007). In support of instream flows in the Sabine several species were also nominated as needing microhabitats in their lifecycles involving natural floodplain features including blue sucker, paddlefish, scaly sand darter, dusky darter, pallid shiner, shoal chub, Sabine shiner, and spotted bass (TIFP and SRA, 2010). These floodplain features will be preserved in the proposed Bank. Mussels are also represented across this reach, including the state threatened Texas pigtoe (Fusconaia askewi) a regional endemic limited to the two Sabine Lake river systems (Neches and Sabine).

There are important estuarine biogeochemical transformations that occur in the transition zones of the upper estuary, and estuarine and marine species show migrations in their lifecycles to the heads of estuaries to use this material and the nutrients brought down by the river, termed allochthonous material. One example keystone species is the important Gulf Menhaden (*Brevoortia patronus*) that uses the shallows of the upper tidal areas as nursery areas (Vanderkooy and Smith 2015). Menhaden are a small filter feeding fish utilizing both phytoplankton and zooplankton that are one of the most abundant estuarine fish of the estuaries of the region and they are one of the largest gulf fisheries. Importantly, this small oily fish is a critical keystone species that supports many of the commercial fisheries of the estuaries and nearshore areas (Day et al, 1987). Adult menhaden spawn offshore, and then larval menhaden perform a tidal migration to the oligohaline zone at the top of estuaries. Menhaden utilize phytoplankton throughout their life, but the larva utilize a large proportion of detritus in the riverine portion of the estuary for initial growth, including detritus of terrestrial origin (Olsen et al 2014). Menhaden are important in the estuarine food web in that it consumes and redistributes significant amounts of energy being consumed by mackerels, seatrout, gars, drum, dolphins, and piscivorous birds (VanderKooy and Smith 2015). Consistent with this example, the Fishery Management Plan identifies this reach of the Sabine River as Essential Fish Habitat necessary for managed estuarine fisheries to spawn, breed, feed, or grow to maturity (NOAA 2021c). This type of lifecycle, and the targeted use of upper estuarine resources provided by this reach, is not limited to menhaden but shared with many keystone species. Tidal migration of marine spawned larvae to oligohaline areas is an observed phenomenon in many keystone species such as mysids, penaeid shrimp, crabs, and mullet, as well as commercial fisheries (other than shrimp and crab) such as southern flounder, croaker, and other fish species. The low salinity oligohaline portions are also valuable areas to many freshwater species such as channel catfish, blue catfish, and shads that move down to take advantage of the reach (Gosselink 1984). Thus, the low salinity oligohaline portions are valuable areas to many species as there are eggs, larvae, and young of freshwater spawners, semi-anadromous species, anadromous species, and estuarine and freshwater invertebrate and larvae. But this may not be readily obvious because the organisms are small and require specialized equipment to sample, and skilled taxonomists to identify (Day et al, 1987).

Because of the chemical changes such as flocculation of allochthonous carbon occurring in the upper estuary, these upper areas of estuaries also can exhibit excursions of typical water quality measures for both freshwater and estuarine systems. Typically they can exhibit low dissolved

oxygen, high turbidity, as well as increased bacterial loading. Tributaries of main stem TCEQ segments 0501 and 0502 in the Counties of Orange, Jasper, and Newton are currently listed on the 303d list and TMDL's are proposed or have been developed and are being implemented (TCEQ 2021b). Many of the impairments are due to, or include, depressed dissolved oxygen and high bacteria counts. The listed tributaries are mostly rural watersheds lacking point source inputs, and these impaired segments likely have higher amounts of agriculture than along the mainstem of the Sabine River. Part of the TMDL effort names protecting riparian areas through local development of Water Quality Management Plans programs. In the nearby Atchaflaya basin of Louisiana, large wooded cypress tupelo swamps have also been shown to be effective in reducing in-stream organic nitrogen (TKN) loading by up to 27% (Xu 2006). The proposed Bank will protect the riparian zone of the Sabine and will result in the exclusion of any development of the riparian zone along approximately 14.6 miles of the lower Sabine, protecting long term water quality.

Transition areas such the reach along the proposed Bank reach can have significant regional contributions. The Bank makes the typical more localized wetland habitat functions and contributions the lower Sabine River below Toledo Bend as is seen in inland waterways. However, it also makes significant biogeochemical contributions to the Sabine Lake estuary The Bank site is important to regional water quality, flooding, biogeochemical cycling, the nekton community, the benthic community, commercial fisheries in both the estuarine and coastal food webs in addition to services provided to the lower riverine Sabine. As such this area likely has a significant effect not only locally but on regional and coastal ecosystem diversity and productivity as well.

4.4 WAA Classification in HGM Model Applications

The Bank is a large contiguous forested wetland, and nearly all is within the floodway or 100 year floodplain of the Sabine River. The Galveston District iHGM cites the Kentucky Riverine HGM Guidebook (USACE 1999) and this guidebook as well as the ERDC set of guidelines for the HGM indicate that a WAA should be a wetland area that belongs to a single regional wetland subclass and is relatively homogeneous with respect to the site-specific criteria used to assess wetland functions (USACE 2013). Based on this criterion the Bank is a single wetland unit that is of a single regional wetland subclass. The guidebook does give examples of three situations that necessitates defining and assessing multiple WAAs within a project area: including when spatial heterogeneity exists with respect hydrology, vegetation type, maturity, or disturbance. However,

this is driven by when the heterogeneity translates to significant differences in the HGM field variable evaluations. This implies that the differences should be significant and produce distinctly different values in the HGM field variables, and not be relatively minor differences that are within the range of variability that typically occurs within a regional subclass. Discussions with SWG USACE have centered around spatial heterogeneity of community dominants of the wetland communities in the onsite wetlands.

One of the first assessment decisions in the HGM framework is definition of the onsite WAAs. This is part of the strength of the HGM procedures as it allows for comparisons between an impacted site and a mitigatory site, but to do this requires a highly restricted WAA type. The restriction is because the HGM method is based on creating a conceptual model of a preferred reference standard, and this subjective pristine condition is compared to other like wetlands. The method is also designed to be a quickly and easily applied field method. This aspect results in the models being fairly simple and are restricted to using coarsely categorized and field observable variables. Because of these characteristics of these models, they also become inherently limited to the systems to which they can be applied. At the onset of the field data collection there was a range of opinions for WAA identification were proposed as it was unknown how the HGM variables would respond to differences that were on the site. Because of the concerns due to the inherent limitations of the HGM framework, SWG USACE Compliance Branch directed RPS to define WAA categories on the bank site.

Upon completion of the field data collection there was the request by Compliance to again look into the possibility that there was more than one WAA, as Compliance felt that multiple WAAs could affect quantities of functions estimated by the iHGM and a more advanced model may better define the functions and the quantities on the bank site than a simple single WAA model. Therefore, several postprocessing methods were provided to SWG Compliance to support the AJD and the iHGM in looking at a variety of WAA separations where the field samples were grouped and analyzed as potentially being multiple WAAs. All analyses and field variable estimates would basically be a repeated measures experimental design.

4.4.1 Wetlands Represented as a Single Onsite WAA

The Bank has a basic signature that is widespread of a single solid wetland area. There are small areas excluded as uplands, but these uplands do not separate the bisect or subdivide the wetland area into parts and thus fail to meet the criterion of widely separated wetland areas in the HGM method guidance. However, the onsite wetlands do exhibit natural variation in function due to

factors such as small changes in elevation or changes in soils. These environmental factors force changes in the canopy dominants (Figures 13,14,15). This change did not seem to constitute a contrasting heterogenetic types as cited within the HGM methodology such as having different hydrology (all are basically riverine), changes in vegetation type (all are bottomland forested wetlands), or soils (all are mineral soils). Also, the overall disturbance does not vary markedly within the bank. The field results under the HGM framework look to be supportive of a single 1,455.70 acre WAA in the proposed Bank.

4.4.2 Separation of Onsite WAAs by Canopy Dominants

To address the potential concern for differences in the value of assigned functions under the HGM indices in a single average WAA versus canopy dominant WAAs model, an evaluation was made to differentiate for two WAAs to allow a sensitivity analysis in HGM model selection. The wetland community structure varied with cypress/tupelo dominated communities in the semi permanently to the seasonally flooded areas (PFO1/2F and PFO1/2C) and in areas that have higher silt and clays in the soils; while the oak/sweetgum dominated communities occupied the slightly higher seasonally flooded to the temporarily flooded elevational areas (PFO1C and PFO1A) and in areas that had more fine sand in the soils. These two communities have mature stands and are adjacent.

The classification method was an interactive supervised method using the maximum likelihood classification based on image classification and overlay of LiDAR. This initial raw classification is post processed using statistical techniques to remove noise and spurious small features to give a simplified classification that can be used to draw preliminary polygon boundaries (Figure 15). Then, the LiDAR wetland elevation boundaries were used to limit the upland boundaries of these preliminary polygons. These polygon boundaries were verified using other remote or map data produce a polygon layer (Figure 16). Based on the verification using field and remote data, the polygons produced did appear to separate the cypress tupelo from the oak sweetgum wetlands. With the separation of onsite community dominants, the data for iHGM model assessment was available.

4.4.3 HGM WAA Area Estimates

The single WAA encompasses all the 1,455.70 acres of wetlands as delineated in the AJD. The two WAA approach based on community dominants is also based on AJD verification that separates the Cypress Tupelo dominated wetlands out as an individual WAA estimated to be

636.23 acres (43.71%), and thus 819.46 acres (56.29%) were deciduous dominated wetlands with oak or sweetgum dominated communities.

With the area of each resource type estimated, alternative FCI models by WAA can be built from the field data and mathematically estimates of the total functional value can be made. The model runs also would provide sensitivity analysis in HGM model selection for comparison and selection.

Section 5 Wetland Functional Calculations

The use of the iHGM allows the conversion of area and quality aspects of the onsite wetlands to be expressed as functional units. The purpose of the method is to provide a rapid assessment of the current functions of a given aquatic resource that is more objective than the simple use of type and area. This Bank site was considered HGM model runs as a single WAA, or as two contiguous WAA areas. The 70 wetland observation plots along 9 transect lines within proposed Bank used for the AJD were also used for iHGM field variable collections. Six of the observation points in the report were determined to be non-jurisdictional by the AJD or outside the AJD review area and therefore those six were excluded from all functional calculations.

Wetland functions across the Bank were evaluated for consistency using one or two WAA models and comparing median and mean estimates of central tendency of the field variables in the functional estimates. These model runs produced relatively minor differences in modeling the single versus the two WAA approach, and minor differences in the central tendency statistic used. The Sponsor proposes to use the two WAA model as suggested in the AJD issued by SWG USACE and base the FCI calculations on the median, which is more appropriate than the mean given the number of samples for each of the two WAAs.

WAA 1,455.70 Acre	Functional Capacity Units
Temporary Storage & Detention of Storage Water	1455.69
Maintain Plant & Animal Community	1353.74
Removal & Sequestration of Elements & Compounds	1406.34

5.1 HGM Field Variable Central Tendencies

The Kentucky guidebook suggests that a mean of the field variables of a WAA be used to calculate the FCI of that type of resource. The FCI models are multivariate regression models. With either the assumption of one or two WAA homologous areas within the Bank, the HGM methodology applies the premise that each collection of HGM field attributes at an observation point was a random repeated sample of the population that was within that WAA. As the iHGM uses the field attributes in an additive fashion in each FCI model, the parametric arithmetic mean would be an appropriate central tendency of the population. The complement nonparametric statistic, the

median, could be used or provide a sensitivity analysis for the same reasons. The mean has the assumption that the distribution of the field variables is normal, and the median does not.

If the iHGM is calculated on the entire Bank site as a single WAA, then 70 observation plots are used in the estimates of field attribute central tendency. When sufficiently large number of random samples are taken from the population, then the distribution of the sample values will be approximately normally distributed because of the Central Limit Theorem and a sample mean can be supported (Liapounov, 1900). A general rule of thumb is that 30 to 40 random samples are needed. Thus, with the single WAA model the parametric and nonparametric estimates will likely be similar in value, and both would be appropriate for the field variable central tendency. Most observation plots produce HGM FCI calculations that have very low range and variance across observation plots (Table 3), implying good uniformity of the HGM field attributes across the Bank. This uniformity also suggests a single WAA design may adequately describe the onsite wetlands in the HGM model as the variance produced between models should also be small. The uniformity is also supported by comparing the single and two WAA model runs.

Evaluating two WAAs (Section 4.4), the 70 samples are split between the WAA's and the number of samples from the Cypress Tupelo dominated WAA will be calculated on only 23 samples, which raises a concern in using the parametric arithmetic mean on a small dataset. Therefore, to allow comparison on the single and two WAA models, both the arithmetic mean and the median of each field variable for the observation plots were utilized to calculate FCI metrics and this was carried through to the functional unit calculations and are presented by assessment model following the iHGM methodology. This demonstrates the range of variability of the HGM model by comparing the runs made with either an arithmetic mean or median in the model runs.

The four model runs allow the assessment of a one or two WAA model, as well as provide support on the stability of the models when using a central tendency to calculate FCI estimates.

5.2 HGM Functional Capacity Index Calculation Tests

The iHGM field variables were collected at all the observation sites in the field study of the Bank. Both the median and mean of the iHGM field variable scores are presented and can be used for the 70 sample single WAA model (Table 2). After grouping by WAA the same data can also be used for the two WAA design. The central tendencies of these field attributes by WAA will be used to estimate the wetland functional capacities using the iHGM indices.

While the FCI calculations for the iHGM are presented as a central value applicable broadly to a single WAA site in the guidebooks, the 15 field attributes can actually be used to calculate the FCI scores for individual observation plots within a WAA and can be used to evaluate the variance of the three functions across the bank to look for subpopulations and outliers (Table 3). It is important to note that with the HGM method the FCI models produce a 1.00 for a Reference Condition Wetland in that FCI, which the HGM defines as the least-altered wetlands in the least-altered landscapes with the assumption that these wetlands sustain the highest level of functioning that are inherent to the wetland subclass (USACE 2013). Many of the observation plots produce FCI scores that are very close to reference conditions for the three FCI metrics. The rationale for running this test was validation of observation point inclusion as if a central tendency for the field variables is to be used in the FCI estimation, then large outliers in these scores or possible additional populations could affect this estimate or outliers that could skew the FCI calculations. This procedure was followed by a quick visual and stem and leaf exploratory of the results (Tukey 1977), which did not point to many outliers or seem to indicate subpopulations within the data that may affect the central tendency calculations. The next test of the field attribute scores is to look at the individual field attribute scores central tendencies using the mean and median (Table 2). The output data was slightly negatively skewed, but averages and medians were numerically close, and the 95% confidence intervals around the means were numerically small. The 95% confidence interval around the mean was numerically small suggesting that either the parametric or nonparametric central tendency would produce a good estimates of the true field attribute parameters

Utilizing the SWG iHGM for the FCI models, the Riverine Wetlands in Western Kentucky Guidebook and the USACE manual as the field guide, Table 2 documents the Field Variable values to be used in the FCI models. FCI by observation plot were also developed for the three indices: Temporary Storage & Detention of Storage Water, Maintain Plant and Animal Communities, Removal & Sequestration of Elements & Compounds (1999) to look for outliers or subpopulations (Table 3). This data also did not point to many outliers or seem to indicate subpopulations within the by observation plot data that may affect the central tendency calculations to be used in calculating FCUs under the single or two community models.

5.3 Calculation of FCI values for the WAA Models

The guidebook sited in the iHGM that has been adopted by the Galveston USACE indicates that average, or the arithmetic mean, of a variable input into the regression model. This experimental

design indicates that the investigator is taking a number of repeated measures of a population. Ignoring the issues of sampling bias introduced by the 1987 manual methods, the repeated measures are needed to lessen the possible effects of random variability and measurement error. For the single or two WAA models the statistics of central tendency were calculated for all the iHGM field attributes in that WAA, and these values were used to calculate the functional capacity units (FCU) using the three FCI assessment equations. The models tested were the one and two WAA models, as well as using the mean and median values of the field attributes as inputs to the FCI equations. of the proposed bank area (Table 4). The FCI values calculating using the mean and median were numerically close, although due to the negative skew in the data the median was numerically slightly larger. However, the difference between the two estimates did not seem to be greatly inflated for the Cypress Tupelo community that only had 23 samples suggesting that the slight skewness of the raw data would not have a marked affect in the estimate by the arithmetic mean. The similarity of the scores using the median and mean are a test of the robustness of the central tendency calculations and suggests that skew and outliers do affect the mean as a central tendency estimate, but this effect is not large.

5.4 Calculation of FCU Values

Estimates of FCU quantities for all three WAA are simply the FCI calculations as shown in Table 4 multiplied by the areal extent of the jurisdictional resource in US survey acres of each WAA in the HGM model to get the resultant FCU value for the site (Tables 5, 6).

The single homologous WAA model estimates there to be 1,455.70 acres of jurisdictional wetlands within the proposed Bank (Sections 3, 4.5.1). The second model separates the two individual WAAs by canopy dominants as detailed in Sections 4.5.2. The FCU values were calculated using both the median and mean derived FCI values. The FCU for each WAA were presented, and then the FCU values were summed by FCI index type for a composite FCU of the Bank site (Tables 5 and 6). The differences seen in the one WAA model with a mean or median are carried through to again produce a mean estimate that is slightly lower than the median estimate.

There were approximately 179.72 acres within the Bank site that exceeded the 3.5 meter contour and based on the field determination plot data and were deemed non-jurisdictional in the AJD. There are also 4.82 acres of open water ponds, of which 0.72 acres were jurisdictional. IP and its agent RPS are aware that adjacent upland areas and open water can be credited in the banking process as having functions as wetland buffers and adjacent habitat for feeding or resting, or to

complete a particular phase of a life cycle. It should also be noted that there are also several areas that were shown with the field data to be wetlands that exceeded the 3.5 meter elevation contour, and in some of these appeared to be areas where otherwise site wide minor factors played substantive local roles in increasing hydrology such as the depressional nature of a meander scar, local basin morphology, or a contributing groundwater source since the general site location is very near to MSL.

5.5 Performance of stratified random field sampling design

Although not used in the final analysis, a new experimental design was presented by RPS to the IRT and SWG Compliance Branch. The intent of the experimental design was to gain unbiased estimates of function from limited preliminary field data. This experimental design was preliminarily presented to the IRT on February 21, 2019, in the preapplication meeting and presented in the report to Compliance Branch in support of the AJD after the field collection had been completed. The stratified random experimental design utilized the collection of preliminary baseline field data from only 10 randomly placed sample plots based on NWI location data to obtain estimators of the onsite populations. The stratified random design was used in a one WAA design. The comparison of estimator results obtained with this 10 plot subsample, which was only approximately 14 percent of the traditional field effort, resulted in the stratified random dataset closely predicting the mean and median values of the one WAA iHGM FCI values of the much larger 70 plot study that followed the 1987 Corps Wetlands Delineation Manual design. This sample design also brought the mean and median values into closer alignment, and closer to the middle of the range between the median and mean scores as well suggesting that it reduced the skew in the data. It should be noted that stratified random designs help control the confirmation bias or selection bias that was potentially introduced by the 1987 manual field sampling protocol.

Section 6
Goals and Objectives

The Bank is intended to preserve approximately 1,455.70 acres of high priority bottomland wooded wetlands and surrounding contributing wooded uplands in a key location that will significantly contribute to the sustainability of water quality and ecological resources of the local watershed as well as the Sabine Lake estuary. (See Figures 1-5, 10-14). Discrete acreage will also be enhanced by invasive species removal or successional growth into native mixed forest, where practicable. The Bank would immediately preserve a dynamically stable climax forest ecosystem that is resistant and resilient to disturbance events, provides important physical, chemical, and biological functions for the local and regional watershed, which cannot be replaced due to geolocation and preserve ecological aspects that are not practicable to create on a reasonable timescale if lost.

The importance of preserving such ecologically valuable areas, including this specific site, has been recognized in conservation literature and by multiple agencies. The USEPA and the USACE have promoted Watershed Protection Approach (WPA) which had the intent that undamaged habitat and fully functioning aquatic communities large enough to maintain viable populations of biologically diverse communities could be considered critical areas. Because these areas can be viewed as sources of biodiversity, they may provide the best hope for repopulation or maintenance of balanced terrestrial and aquatic communities. The protection of remaining critical areas or refuges should have a high priority in watershed projects, including the use of conservation easements (USEPA 1995).

The wetlands on the bank are a mature, self-sustaining aquatic resource. The hydrology of this reach of the Sabine River is stable due to operational control of on channel reservoirs; flow variability and minimum stream flows within the river as well as freshwater inflows to the bay are also supported by the Texas environmental flow program applicable to this basin (see Texas Senate Bill 2, 2001; 2007). The hydrological conditions, climatic conditions, soil characteristics, and other physical and chemical characteristics support a mature wooded wetland containing a climax community of considerable ecological service value maintaining aquatic habitat diversity, water quality, habitat connectivity, and other landscape scale functions. The area was chosen for mitigation to preserve the landscape scale functions and values that are important to the physical, chemical, and ecological functions and values of the local and regional Sabine Lake watershed, which compensatory mitigation is meant to safeguard.

This Bank will preserve and protect water quality in the Lower Sabine system, provide flood storage, and moderate pulse flows, and provide ecological services to both the local area and regional the Sabine Lake estuary. These upper estuarine reaches stabilize and moderate the volumes of flows, transport of sediments, and allochthonous materials in the watershed. The inundation of the Bank from both higher flows and astronomical tides contributes to connectivity to the estuarine ecosystem. In addition to substantial direct precipitation and overbank floodwater, water table elevations are high because of the elevation of the Bank site relative to local MSL. The Bank Site is thus expected to continue to experience frequent inundation from astronomical tides, meteorological events, and higher flow events and contribute to this functionality. This reach of the Sabine River is also a physicochemical transition zone that is exploited in estuarine trophic coupling, typically as a nursery habitat. These aspects of the Bank have the potential to not only have local effects, but affect the geochemistry and also biotic contributions of keystone species in ways that are not commonly seen in inland systems. The Bank's forested wetlands and riparian buffer provide high quality habitat and refuge to aquatic and terrestrial wildlife, including threatened and possibly endangered species. Further, the Bank will establish meaningful ecological connectivity with the surrounding protected, large tracts included in the adjacent Blue Elbow Swamp mitigation bank and an adjacent PRM site, as well as with the Sabine Island Wildlife Management area directly across the Sabine River.

The USFWS identified both the local region and the area including the site of this Bank in their Region 2 Emergency Wetland Resources Act Report and Texas Bottomland Hardwoods Report. These reports identify the degree of regulated and unregulated threats to this region and the specific area, which included a medium to high regional development posing threats to rare high-quality habitat and waterfowl and endangered species (USFWS 1985, 1991). The Texas Bottomland Hardwoods Report also specifically names this Bank site as part of their regional protection concept plan and denotes that this area has very high-quality bottomlands (USFWS 1991). Under the Emergency Wetland Resources Act, the Service sought to encourage not only preservation, but even acquisition within this area due to species that were dependent on wetland habitats. In the report, the Service evaluated and ranked the proposed acquisition areas on a national priority scale by the Service's Land Acquisition Priority System, and these wetlands in this region were rated as Priority 1, citing a threat due to pipelines, commercial development, roads, and canals. The wetlands had very high functions in flood storage, water quality, fisheries, and isolated ponds valuable to migratory waterfowl. The area across the Sabine River and the county bordering the north side of the Bank Site are listed in the Environmental Conservation

Online System (ECOS) database as counties or parishes in which the RCW is known to or is believed to occur (USFWS, 2019). Preliminary work also suggests that the RCW may inhabit parts of the site.

The proposed Bank would act as a wildlife corridor in conjunction with other preserved areas. The site sits across the Sabine River from the State of Louisiana's 8,695 acre Sabine Island Wildlife Management Area and shares a corridor with the TPWD Blue Elbow Swamp 4,560 acre mitigation bank area. The large plots adjacent to this area would increase the ecosystem service value of this mitigation area for species that have an extended range or avoid anthropogenically disturbed areas such as some birds and the black bear. Additionally, during the delineation efforts in the adjacent PRM area mussel beds along the Sabine River were observed and a couple dozen individuals were found, both alive and freshly dead. Two matching valves from a recently dead specimen were keyed to the Texas pigtoe (*Fusconaia askewi*). This identification was confirmed by Texas Parks and Wildlife biologists. The Texas pigtoe is a regional endemic limited to a relatively small area in Texas and Louisiana and is listed as a threatened species in Texas and as a rare species in Louisiana. Both the RCW and Texas pigtoe are sensitive to changes in habitats, and preservation of Bank resource may affect regional population dynamics.

Preservation is appropriate for high priority, unique, rare, or difficult-to-replace aquatic resources that contribute to the ecological sustainability of the watershed—the Bank presents exactly this case. The values and functions of the wetlands, as shown by iHGM scores, are a mature and natural very high-quality wooded wetland that is very close to reference conditions. These high-quality bottomland resources are rare and hard to replace. Little ecological lift could be achieved through enhancement, and the damage that could occur through the disturbance of enhancement activities may actually exceed lift. The ecosystem services provided by these wetlands serve the local and regional area and may contribute to habitat for federal and state threatened and endangered species. Preservation fosters greater certainty to offset permitted impacts to WOTUS, given that time lags and failure rates are high in creating these types of wetlands as PRM. The Bank also provides physical, chemical, and biological functions to the surrounding regional landscape and provides ecological services to the Sabine Lake estuary. As discussed in Section 4.3 this area also maintains connectivity with Sabine Lake, and the reach is likely part of a transition zone that is typically used as a nursery habitat for several keystone species. The Bank's preservation would ensure the longevity and functioning of the forested wetland and riparian buffer system, supporting the ecological sustainability of the watershed, through long-term conservation measures.

Section 7 Compensatory Need

7.1 General Need

This proposed Bank is located within the Golden Triangle of the deepwater ports of Port Arthur, Beaumont, and Orange, which is home to 40 percent of the Nation's petrochemical industry (USACE 2020). The ports and other industries help drive regional economic development; in 2006 the direct GDP impact of the Sabine-Neches port was estimated to be 247 million (CTR 2008). The projections of growth along this portion of the Texas Gulf coast are strong, as local ports handle over 4 million tons of grain, steel, forest product, and liquid bulk products (Port of Orange 2021). The port facilities are not only direct economic drivers, but also have a local and regional indirect economic impact in many sectors of development across the region, such as shipyard activities, docks, and transportation.

In addition to the port and petrochemical industries, there are other industries in the area including steel mills, paper mills, as well as other timber products industries (Allen Plummer et al. 2016). The economy developed also supports higher average annual wages for this area; up to 15% higher than other east Texas employment regions further inland.

Population estimates using the 2010 U.S. Census information indicated that Orange County was expected to grow at an approximate average 2% rate over 2010 to 2019. A census block level projection done with 2020 data for a TMDL study indicated that the county was expected to grow 12.7 percent to 2070 (TCEQ 2020). However, an estimate growth for the East Texas Water Planning Area projected growth to continue increasing at an average rate of approximately 6% per decade until 2070 (Allen Plummer et al 2016).

This area has regional future demands that would be supported by availability of a mitigation bank. The USACE RIBITS database does not list nearby banks that have primary or secondary service areas that cover wetland impacts to parts of this area. Therefore, any applicant outside these service areas will be required to provide a Permittee-Responsible Mitigation plan for any impacts to jurisdictional resources.

Private development and public programs to protect the area would be expected to produce unavoidable impacts to aquatic ecosystems that will require compensatory mitigation. This region has very low grade terrain, is near sea level, and has climatic propensity for extreme precipitation events both from tropical cyclones and synoptic scale fronts (Bomar 1995). Bank credits are the

preferred vehicle for compensatory mitigation and any efforts to use PRM are unlikely to provide the scale and scope of benefits that are generated by this Bank's preservation of high-priority bottomlands.

7.2 Specific Need - USACE Local CSRM Plan

In addition to the general need for mitigation bank credits in this region, there is a specific need identified in planning documents for USACE's proposed Texas Coastal Storm Risk Management and Ecosystem Restoration plan from Sabine Pass to Galveston Bay (2017). As part of this plan, there is a local Orange and Jefferson county Coastal Storm Risk Management (CSRM) plan. The Final Integrated Feasibility Report and Environmental Impact Statement (FIFR-EIS) for the CSRM plan found that there was a federal interest for implementing a local project after considering recent events, the population and infrastructure of the region, and the national significance of the economic and environmental resources within the region. The no-action alternative indicated that there would be damages to critical infrastructure. The Orange-Jefferson CSRM recommended the construction of 15.6 miles of new levees and 10.7 miles of new floodwall. This would result in unavoidable direct and indirect environmental impacts to 139.9 acres of forested wetlands, and yet the FIFR-EIS found net benefits (USACE 2017). The FIFR-EIS and 2020 pre-construction, engineering, and design of the local plan suggested that 559.5 acres of wooded wetlands would need to be preserved (which indicates that the Corps is proposing just under a 4:1 ratio in preservation).

In the 2017 FIFR-EIS, the USACE states that mitigation banks would be an acceptable compensatory solution, but none were known at that time. This proposed Bank is within the CSRM project area and would likely have similar resources. As such, the proposed Bank has the potential provide compensatory mitigation for the federal CSRM project.

Both the USACE and the FIFR-EIS state that there is no feasible and prudent alternative to the taking of approximately 47.5 acres of the nearby Texas Parks and Wildlife Department (TPWD) lands in the Tony Houseman (Blue Elbow Swamp) and the Lower Neches River WMAs for construction of a portion of the Orange-Jefferson CSRM Plan (USACE 2017). The areas that will be affected by the local CSRM have similar ecosystem dominants and ecosystem dynamics to the proposed Bank. The proposed Bank has the potential to directly and indirectly affect the same local and regional biogeochemistry and biological resources as the CSRM project, including habitat for estuarine dependent organisms. The CSRM project's estimated WOTUS impacts are

preliminary as the USACE is now at the of preconstruction engineering and design stage and exact alignments, and thus WOTUS impacts, may change.

In addition to placement of levees, the CSRM project also modifies Cow and Adams Bayou by including closure gate structures. While least impact configurations were established through coordination and meetings with the USEPA, NMFS, USFWS, TXDOT, TWDB, and TPWD, these bayous will also be somewhat affected in their ability to provide physiochemical and ecosystem functions to the estuary due to the artificial constriction of the inlet, the proposed installation of flap gates, vertical lift gages, and gated culverts. A USACE-contracted independent external peer review of the FIFR-EIS roughly supports this stance and suggests the CSRM project has the potential to have unexpected impacts and may have underestimated impacts to diverse functions of coastal habitats, in part due to the complexities of the ecological and biological resources (Battelle Memorial Institute 2019).

Beyond the quantitative application of the iHGM, the ecological aspects of the Bank Site qualitatively align with the ecosystem services anticipated to be impacted by the CSRM project. These additional ecological considerations are discussed in several sections of this report, but in summary here: The CSRM project impacts and the Bank are both located in the transition zone of the Sabine River. Impacts to this zone will likely have effects at a regional scale due to the contributions as a nursery zone of the estuary. This Bank has landscape-scale and watershed scale ecosystem services due to juxtaposition with other conservation lands which contribute to aquatic and terrestrial connectivity and corridors. This Bank and this region were recognized in USFWS regional conservation planning efforts as rare and threatened and identified as warranting priority attention for Federal or State acquisition efforts. The proposed Bank, being in the transition estuarine zone, has the potential to directly and indirectly affect both local and regional biogeochemistry and regional biological resources, compensating for relative nearby impacts of the CSRM project. The independent review of the Corps' FIFR-EIS detailed the CSRM local project impacts, including those proximate to the Bank. As discussed above, there is potential for species protected under the ESA to be present on site, and the area is identified as EFH. Finally, there has been identification of state-listed threatened species in the reach.

7.3 Compensation

The purpose of the Bank is to provide the necessary resources to allow for compensation of authorized/unavoidable impacts to aquatic resources and to meet the need for wetland mitigation

credits within the geographic service areas of the Bank as approved by the USACE in coordination with the Interagency Review Team (IRT).

Credits generated by the Bank will:

a. Reduce the workload burden that strains the agencies' limited resources for review and compliance monitoring for non-bank mitigation credits.
b. Reduce uncertainties when gauging the ecological benefit and success over PRM mitigation for mature long lived wetland communities.
c. Decrease the time necessary to permit projects with aquatic resource impacts.
d. Provide large tract preservation of a sensitive transition area containing rare, threatened, and possibly endangered species.
e. Provide preservation of forested upland buffer habitat to provide additional protection for wetlands within the Bank.
f. Allow for the naturalized enhancement of wetlands impacted by silviculture operations.
g. Assure the removal of the limited invasive species infestations on the site, where practicable and appropriate.
h. Provide preservation of forested buffer habitat to the main stem Sabine to provide additional long-term protection water quality.
i. Preserve shallow water nursery for estuarine dependent migratory species of the Sabine estuary.

These goals will be achieved by accomplishing the following objectives as summarized in the Table below:

- Place the entire 1651.72 acre mitigation bank within a perpetual conservation easement held by an accredited land trust. At this time there are two main conservators being considered as possible easement holders: TNC and TPWD.
- Removal of Tallow to the suggested 5% coverage from two areas: T9_7, and T2_6. To minimize risk of damage to native vegetation, a basil frill cut and injection method may be considered over traditional soak or basal methods.
- Natural succession over time to restore 231.8 acres of planted loblolly pine. Most of this area is contributing uplands (179.72 Acres). These areas currently have an understory consisting of an assemblage of the native mixed pine hardwood community common to the area.

Resource Type	Restored	Enhanced	Created	Preserved
Deciduous Forested Wetland (Ac.)				819.46
Cypress Tupelo Forested Wetland (Ac.)				636.23
Tallow Removal Forested Wetland (Ac.)		0.16		
Open Water (Ac.)				4.82
Succession Pine Plantings to native mixed Bottomland Forested Wetland (Ac.)		52.08		
Succession Pine Plantings to native mixed forest Upland Buffer (Ac.)		179.72		

Section 8
Establishment and Operations

SWG's Interim Forested Riverine Hydrogeomorphic Method (iHGM) will be used as the functional assessment/credit accounting mechanism for wetlands within the Bank (USACE Galveston, 2016). The Mitigation Accounting System will be fundamentally based on the units of trade referred to as credits and debits. "Credits" are the calculated ecologic functions of aquatic resources associated with the Bank, and "debits" refer to the unavoidable losses of aquatic resource functions from authorized impacts. As the Bank Sponsor, IP will create, maintain, and report a ledger of all credit/debit transactions under the oversight of the USACE. To ensure fair compensatory mitigation, all debit calculations will need to be performed using iHGM scoring at a USACE-approved conversion.

The Sponsor shall be responsible for management of the compensatory mitigation credit accounting system that documents all credit transactions. All credit and debit transactions will be recorded in a ledger database and submitted to the appropriate agencies (i.e. the USACE/IRT) upon sale/receipt. The ledger will include:

- Permit applicant name, address, telephone number, and permit number
- 8-digit HUC and county locations
- Brief description of the project impacts
- Number of credits provided
- Remaining balance of Bank credits
- Date of Transaction

Permittees will use either the Galveston SOP, Section 4 (Impact Assessment), or other methodology approved by the USACE to determine the amount of credits to be purchased to compensate for unavoidable impacts to WOTUS (USACE SWG, 2013). In general, transactions will be debited at a 1:1 ratio within the primary service area and a 1.5:1 ratio within the secondary service area. However, all credit requirements for permittees are established by the USACE on a project-specific basis. The Bank and the Sponsor will provide credits for purchase, but it is the responsibility of the permittee to coordinate with the USACE and any other appropriate authorities to determine the number and kind of credits required for their project. The Sponsor shall provide the USACE with a copy of the completed credit transaction within 30 days. The Sponsor shall provide an annual statement of the ledger to the USACE by January 31st of each year until all credits have been withdrawn and/or the Bank is closed.

A credit release schedule will be developed after coordination with the USACE and IRT. While the majority of total credits would be expected to be released upon signing of the conservation easement and execution of the Mitigation Banking Instrument (MBI), as these activities have an immediate effect, any remainder of the credit releases will be dependent on milestones and the achievement of the overall success criteria associated with enhancement.

Section 9
Service Area and the Watershed Approach

The Sponsor is requesting the designation of the Bank as a high-quality preservation dominated mitigation area to provide compensatory wetland mitigation credits to appropriate parts of the Sabine Lake estuarine ecosystem. The proposed Bank's geolocation places it very near, along, or even crossing several types of recognized ecological zones, transition zones, water quality gradients, USGS HUCs, and USEPA Ecoregion boundaries. The Bank is located within the Lower Sabine River USGS Catalog Unit (HUC8) 12010005. This HUC8 is located within the Sabine Basin (HUC 1201). This HUC8 crosses the EPA Ecoregions borders Floodplains and Flatwoods of the South Central Plains (35) and the Northern Humid Gulf Coast Prairies and Coastal Marshes of the Western Gulf Coastal Plains (34). This places this project within the transitional zone between the two ecoregions (Gould et al. 1960, USEPA 2013). The bank is also located across Texas Water Quality Segments Sabine River Tidal (0501) and Sabine River Above Tidal (0502).

As discussed in detail Section 2.2, the Bank is located along the freshwater tidal zone in the Sabine River, and as discussed in detail in Section 4.3 the Bank makes both local contributions to the Sabine River and regional contributions the Sabine Lake estuary. The appropriate setting of primary and secondary bank service areas in tidal ecosystems following the Watershed Approach is complicated and becomes more involved because the differences in watershed functions served such as hydraulic contributions, wetland functions, and ecosystem services and these values of tidal coastal system being bidirectional and diffuse spatial nature due to migratory lifecycles versus the directional flow of matter and energy in inland unidirectional riverine systems. The application of a service area is even further complicated because of the hydrogeomorphology along this reach creates physiochemical gradients that affects physical and chemical dynamics, and many key estuarine organisms require these types of gradients or habitats to complete portions of their lifecycle. It is not uncommon for the fish and invertebrates in estuaries to have diadromous lifecycles, transitioning between fresh and seawater, and thus extending across hydrologic unit boundaries, ecosystem lines, and the large biogeochemical gradients provide for the transfer of energy and nutrients to contribute or the support regional estuarine food webs dynamics. The Mitigation Guidance Rule under Part §332.3(b)(1) acknowledges that defining contributions of services to a watershed becomes especially problematic in marine and coastal watersheds. The SWG IRT also has acknowledged there is an issue in setting an appropriate service area considering topics such as the relationship of

functional values, ecosystem services, and regional contributions in tidal systems. The IRT workgroup in an apparent effort to address these topics under §332.3(b)(1) preliminarily proposed a series of service area zones for tidal areas around Sabine Lake. The geolocation of the bank is within this IRT proposed service area zone except for the inland 0.85 river miles of the Bank (16%) fall just inland of this tidal service area zone. This area has a multi-channel morphology near a local base level, implying that this area is very close to MSL and supports that this area is likely near the head of tide.

9.1 The Watershed Approach

The Corps must use a watershed approach in compensatory mitigation to the extent appropriate and practicable §332.3(c)(1). The Watershed Approach was originally developed by the USEPA Office of Water and promoted an ecosystem based framework (EPA 1995). The EPA then developed the theory in a Watershed Plan Handbook to develop the framework and approach, and it acknowledges to be effective the methods to achieve the Watershed Approach are not, and should not be, rigidly defined or focus exclusively on specific functions (EPA 2008). Instead, it suggests in formulating a plan under the Watershed Approach framework that a great deal of latitude be given to cover several classes of ecologically linked factors and the appropriate spatial extent should depend on the intent of the individual project or program to be successful. Watershed plans, or plans based on this theoretical framework, have been successful in protecting and restoring the chemical, physical, and biological integrity of the Nation's waters as described in CWA section 101(a). The scale of projects that can be accommodated by the Watershed Approach are not limited and can be from very local resources like fairy shrimp in ephemeral pools to very large geographical scales for wide ranging species such as anadromous fish. To be a successful as a framework, a change in scale would be needed to accommodate the many individual projects, and that can range from small NRCS projects that are less than a sub watershed area, up to much larger scale projects such as Chesapeake Bay Program or National Estuary Program projects that encompass much larger regional watersheds or several regional watersheds potentially stretching across several states. As mentioned in Section 8, all Bank operations and credit/debit transactions will be presented in HUC 8 Catalog Units as SWG USACE prefers. However, the Mitigation Guidance Rule simply says in watersheds that include a tidal water body should also be located in a coastal watershed where practicable (§332.3(b)(1)), and the scale limit would be no larger than is appropriate to ensure that the aquatic resources provided through compensation activities will

effectively compensate for adverse environmental impacts resulting from activities authorized by DA permits, and consider relevant environmental factors (§332.3(c)(4)).

Whatever the geographical extent is chosen appropriate, the EPA suggests that under the Watershed Approach the characteristics to be considered should be ones designed to cover all aspects of the ecosystem; the chemical, physical, and biological aspects of integrity. This is also the mandate of the CWA protection generally under Section 101(a). Historically, several hydrological and ecosystem classifications have been used to better define or formulate plans to protect aquatic resources within WOTUS, and aquatic resource plans can even include protection and maintenance of surrounding terrestrial resources such as non-wetland riparian areas and uplands. But when these classifications are employed in the watershed framework they were deemed appropriate only when the identified resources contribute and/or improve the overall ecological functioning of the aquatic resource in the watershed. The goal of the Watershed Approach under the Mitigation Guidance Rule is defined in §332.3(c)(1) as simply to maintain and improve the quality and quantity of aquatic resources, and in the case of compensatory mitigation it is replacement of ecosystem services across a service area to compensate for the unavoidable adverse impacts to waters of the U.S. due to permitting. Thus, the Mitigation Guidance Rule and the EPA Watershed Approach agree in placing geographic limits on plans so that they support the integrity of the chemical, physical, and biological ecosystem services.

In inland areas, watersheds can be a valuable management consideration to achieve maintenance of the integrity of chemical, physical, and biological aspects of a waterbody if used correctly. The practical development of the Watershed Approach to compensatory mitigation in most USACE districts, including SWG, has been the adopted use of the USGS HUC Unit or Catalog codes. This approach of using HUC Unit Codes works somewhat better in inland waterways as it has a logic underpinning based on unidirectional flow and the intent of cataloging being to describe one drainage. The SWG rule of thumb is based on the HUC8 watershed as a unit of interest, and historically they have typically utilized a primary watershed of the HUC8 Unit where the project is located and a secondary service area of the adjacent HUC8 Units. The SWG method suggests the use of the 8 digit HUC (HUC8) classifications as one of the factors in setting appropriate service areas in inland areas, and EPA Level III Ecoregions. However, they use them in relation in limiting relevant relationships using them as an “and” statement or an intersection in set theory. The method can be expressed as

Hydrologic Classification ∩ Ecoregional Classification approximates the appropriate service area.

9.2 Hydrologic Classifications in support of the Watershed Approach

Site selection, sustainability, and mitigation strategies are considered under the Mitigation Guidance Rule (33 CFR §332.3). The factors stipulated to be addressed in consideration of the Watershed Approach are in §332.3(c). The USACE has historically used the USGS Hydrologic Unit Code (HUC) as a hydrologic classification to help define mitigation service areas. A hydrologically based geographical limit on compensatory mitigation would be an important consideration in the formation of service areas so that aquatic functions can be replaced through mitigation that will maintain the biological, chemical, and physical integrity of the Nation's waters under the CWA. However, because the Bank is in a tidal area some of the contributions or ecosystem services provided to the surrounding ecosystem are more complex than for typical inland systems. While defining a relevant watershed in general can be at times problematic, it remains an important conceptual factor or aspect in defining a basic management strategy, and identifying a relevant watershed if done correctly can be supportive of the Watershed Approach.

The reason that the USACE uses hydrologic groupings in general in implementing Mitigation Guidance Rule is that with the movement of water there are linked ecological factors that can be correlated with the replacement of services. In using hydrology metrics to set service areas, it is also assumed that the functions predominantly occur locally and taper sharply with linear distance, meaning that this model states that there are no significant contributions to regional ecosystem services and functions such as when life stage movement is minimal, or that the geochemistry of one area is not affected by surrounding regional factors. These assumptions are not consistent with the biogeochemistry of tidal systems because in tidal systems there very well may be physical, chemical, and biological contributions that occur bidirectionally, regionally, and across hydrologic boundaries. Cross-boundary contribution are not a new ideas with migratory lifestyles being common in estuaries, and the geochemistry of estuaries. These aspects are roughly reflected in classifications like ecoregions. But ecoregions typically rely heavily on terrestrial vegetation and most ignore diadromous lifecycles, again concentrating on average conditions of a specific geolocation. It is not that either classification structure is incorrect or that the union of sets between classifications cannot be valid, only that simple set theory may not adequately describe the contributions to the chemical, physical, and biological

aspects of integrity, which is the mandate of the CWA under Section 101(a). Thus, the consideration of several types of classifications such as ecoregions and hydrologic classifications over a variety of geographic scales that fit the intent of the project have been used appropriately to help define service areas for compensatory mitigation. Consideration of several classifications that not only consider catchment and flow, but also geomorphology, geochemistry, and the ecology which are important to support the Watershed Approach. As such, simple basin and flow portions of hydrology are usually only one part of consideration in protecting and restoring the chemical, physical, and biological integrity of the Nation's waters as described in CWA section 101(a).

9.2.1 USGS HUC Classifications

The USGS Hydrologic Unit Codes (HUCs) were developed in the mid 1970's with the intent to technically have a structure or standardized system for reporting basic physical hydrologic data such as flow or storage volumes. And the USGS states that HUC geographic polygons are simply a cataloging numbering system originally built mainly for water supply (USGS 2019). The original HUC database framework was limited to support of data such as gauge height, flood stage, volume, and hydrographic data estimates of flow, which is a unidirectional vectoral flow measures in inland systems where water supply is a concern. Later additions to the basic framework starting in the 1990's added climatical type records, records of water quality, and other water resource data. But this information was mapped over the original catalog units. Then the original system was then further developed into the National Hydrography Dataset (NHD), and then into NHDPlus system. This resulted in the substantive involvement of other agencies to add additional data such as the USEPA, NOAA and NWS, the USDA, NRCS, and brought in the USGS National Geospatial Program. The data from these programs were again all integrated into the original basic cataloging framework, and ultimately an extra HUC12 level was added as well. This framework is useful as it allowed data to be pulled by geolocation, and can aid in model development and assessments. It was useful to have hydrologically ordered data that could be pulled and that including data from other datasets such as EPA STORET data on water quality or dischargers, or NWS flood stages. However, the modern framework remains built on the original vectorized water supply framework where flow direction defines the hydrologic connectivity and breaks between segments were made where estimates of flow or storage were needed.

The inland rule of thumb used by SWG is to base a primary service area as a HUC8 code where the project is located and a secondary service area as adjacent HUC 8 catalog units. Areas outside these HUCs are assumed not to contribute. The logic behind the rule is that the chemical, physical, and biological integrity will be most served locally hydrologically and local biological use. However, a general hydrology study of the HUC system indicated that roughly half the Catalog Units are not even true watersheds in terms of a catchment or as a drainage basin. Importantly, studies have also indicated that simple geographic distance measures had greater classification strengths than HUC classification in explaining patterns in water quality or in vertebrate assemblages (Omernik et al. 2017). This is a recognized general programmatic issue in using HUCs to define a service area for compensatory mitigation since the Mitigation Guidance Rule has a goal not based strictly on variables that describe water supply such as annual flow or storage volumes, but the intent is to support the CWA objectives of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters.

The issues arise from the original data framework and the subsequent application of HUCs to define a service area for compensatory mitigation because this application utilizes data that originally was grouped with the intent to make a vector dataset to describe flows and volumes for water supply tracking. The USGS also addressed these concerns and issues with application in their 2007 assessment of the HUC codes in relation to the Watershed Approach, and they recommended a more comprehensive interrelated approach to watershed and natural resources management that recognizes the interrelationships of all natural resources including: soil, water, plants, and animals. They also state that while the typical solution has been focused on an 8-digit hydrologic unit, large-scale regional efforts can also be appropriate, and they cite success in the Chesapeake and the Klamath Basin (USGS 2007). Most importantly the USGS recognized that water programs in water quality, total maximum daily load analysis, and the analysis of regional and national water quality patterns should also use caution with Unit selection even in inland systems where there could be significant contributions in many other hydrologic units that extend far beyond the Unit boundaries (USGS 2007). Strictly, hydrology does not make the assumption that the nature of flowing water is unidirectional and downstream. However, the HUC cataloging system is vectoral and does make this assumption. Because of this, for inland systems this is usually appropriate because elevational differences produce flow vectors. However, this model implicitly argues against the bidirectional flows of an estuary, and also the diadromous migratory lifestyle common in estuaries. HUC watersheds also are rather subjectively defined areas for cataloging flow and storage, and this becomes

exacerbated in coastal systems as there is no storage and many large basins consolidate in these areas. Thus, the use of HUCs may or may not be a strong indicator of the ability of a compensatory mitigation site to mitigate for offsite impacts to ecosystem services.

The Mitigation Guidance Rule under Part §332.3(b)(1) also acknowledges the problematic issue in using HUC units in stating that when considering location of compensatory mitigation to successfully replace lost functions and services, features as aquatic habitat, habitat connectivity, relationships of hydrologic sources, and ecological benefits should be considered. And states that defining the contributions of services to a watershed can become especially problematic in marine and coastal watersheds, and this is true in the case of this Bank when applying HUC Catalog Units. In Chapter 40 CFR 230.98(d)(6)(ii)(A) for mitigation banks it is indicated that in rural areas several contiguous 8-digit HUCs, a 6-digit HUC may be an appropriate service area as these areas contribute to a single coastal basin. But due to the HUC framework of the original Units for flows and volumes for water supplies, in this case, the nearest adjacent HUC that would fit the Watershed Approach for contribution to a single coastal basin would be a 4-digit HUC change. Chapter 230.98 also indicates that delineation of the service area should consider any locally developed standards and criteria that may be applicable. This allows for the use of HUC Catalog Units in general as a portion of the consideration of site selection and service area determination. But it recognizes the goal of meeting the Watershed Approach in mitigation strategies, or to set mitigation services areas, under for replacement, maintenance, or improving ecological functions at times are not well supported by HUCs or they may be difficult to apply appropriately.

There are also general issues that arise specific to HUCs in coastal regions because they were originally a cataloging numbering system designed as a water supply framework for river basins. This type of framework design can create false barriers at the coastal estuarine ends of the river basins, as it does here locally within the Sabine Lake ecosystem. The Bank is located within Region 12, which is the overall Texas Gulf Region. In that region, the Subregion 1201 is the Sabine River basin. And within that Subregion of the Sabine River basin there are a series of Cataloging Units in close proximity that are the HUC8 level, that are the SWG USACE preferred level to use in their service area establishment. The Bank is located within HUC8 named The Lower Sabine (12010005). This HUC is the most proximal to the estuary. Unlike inland systems, the edge of this HUC8 is the hydrological confluence of three Subregional level HUC waterbodies (1201, 1202, and 1204) within approximately 4 miles. Importantly for The Mitigation Guidance Rule in consideration of the Watershed Approach, all three of these

Subregional units contribute substantially to each other, and all are significant contributors to the biogeochemical dynamics of the Sabine Lake ecosystem. However, the implication of the rule of thumb typically used by SWG on inland waterways is that under Section 404 and in support of the CWA, is that the service of chemical physical and biological resources drops significantly beyond the HUC8 Cataloging Unit level, and there would not be any significant ecosystem services served across the Subregional units. The inland typical situation is that the USGS HUC framework results in a Unit that is surrounded by other HUC8 Categorical Units within a single Subregional Basin. However, the HUC8 reach where the Bank is located terminates a Subregion, but contributes to the hydrology, biology, and geochemical processes of the upper estuarine system, which are in three different Subregions. Thus, significant contributions involving HUC 12010005 are made to and from three subregional units as was discussed in depth above in Section 4.3.

The inland rule of thumb is based on the HUC8 watersheds and SWG typically utilizes a primary watershed as a HUC8 code where the project is located and a secondary service area as adjacent HUC8s. This cannot be applied to the Bank in HUC8 12010005. Using the Bank HUC8, the only adjoining HUC8 in the Sabine basin is inland of the bank, and above a major dam (Toledo Bend Reservoir -12010004). Because of the isolation of these two Units from each other due to the dam, the chemical, physical, and biological resources of the Toledo Bend area will not be shared between the two reaches and resources will not be significantly replaced by the Bank in a compensatory mitigation action. Therefore, Toledo Bend does not seem to be part of an appropriate service area under the Watershed Approach. Conversely, the only downstream HUC8 is 12040201 (Sabine Lake). The bank does contribute to the biogeochemistry of Sabine Lake which is in Subregion 1204. However, this Subregion 1204 would not follow the SWG HUC8 rule. Additionally, the single HUC8 is the entire Sabine Lake area because HUC was designed to catalog water supply volumes, and it covers the lower Sabine Lake ecosystem down to the pass. Thus, from a Watershed Approach most of the Sabine Lake HUC8 would not have similar physicochemical parameters to the Sabine, although at least the Sabine River contributes significantly to this estuarine system and the tidal river does receive chemical, physical, and biological contributions from the estuary. Despite these contributions and linkages, because most of this HUC8 would not share similar physicochemical parameters, it would not seem to be part of an appropriate service area under the Watershed Approach. However, it could be argued that within the Sabine Lake HUC8 there are some sections of that HUC8 Unit in the HUC12 Subwatersheds, such as 120402010100 (Taylor

Bayou), and 120402010200 (Hillebrandt Bayou), of 12040201 Sabine Lake in Subregion 1204 that may be appropriate. These subwatersheds look to share physicochemical attributes with the Lower Sabine (12010005), and by the limited amount of water quality data do have similar physicochemical ranges. Thus, at least in theory under the Watershed Approach ecosystem services and functions could be replaced in these areas HUC12 Units that share similar ecology. But while these small bayous would share physiochemistry and some ecological attributes, they do not appear to have the flow volume to support the allochthonous loading to develop an extensive juvenile nursery habitat that the Sabine and Neches lower Units would have. While the Sabine and Neches Units are also very similar in physiochemistry and biology, and the geographic distance between them is small, this technically would be across two HUC Subregions (1201, to 1204, to 1202) and is a great illustration of the artificial nature of the HUC database structure in the local coastal area. But the best illustration of the capricious nature of HUC delineating coastal boundaries in this project region is that of Sabine Lake (12040201) that is directly adjacent to the Bank HUC8. Sabine Lake is part of the Galveston Bay–San Jacinto Basin (1204). And Sabine Lake's only connection to this basin is over 40 miles of the Intercoastal Waterway, which is an artificial canal that is only 125 feet wide and 12 feet deep MLLW. The nearest HUC8 to Sabine Lake within Basin 1204 is East Galveston Bay (12040202) that starts nearly 20 miles down the Intercoastal Waterway. Due to the nature of the Intercoastal, there would be very little chemical, physical, and biological contributions between the two HUC8 areas, and this would of course fail the Watershed Approach.

Both the Sabine (1201) and Neches(1202) rivers enter Sabine Lake physically very close to each other, and based on the HUC framework the two river basins confluence with Sabine Lake, which as noted is a separate Subregion basin 1204. Based on the HUC maps the two river mouths are within 4 miles of each other. Using the HUC8 Catalog Units, the Bank is in 12010005 and 12020003 Lower Neches is the last HUC8 in Subregion 1202. Both these rivers do discharge into the same oligohaline portion of the estuary, and they discharge into a channelized section along the northern edge of the estuary. However, this is not quite an accurate portrayal of the upper estuary as the hydrology of this part of the system is affected by the local the bathometry, and that part of the system is better shown on NOAA navigation chart 11343 (NOAA 2013). The navigational chart details the bathymetry of the upper Sabine Lake estuary including the navigational infrastructure and features that are part of the system. The last HUC8 on the Sabine and the last HUC8 of the Neches actually discharge into the Sabine Neches Canal and this navigational canal is actually the confluence of the Sabine and the

Neches rivers. The Canal crosses the top of the estuary at a maintained at a depth of 31'MLLW, and it crosses from west to east across the northern edge of the shallow oligohaline portion of Sabine Lake. The canal due to its construction is somewhat isolated from the upper Sabine Lake by a series of Placement Islands shallow open water spoil areas that were used historically to deepen the natural Sabine channel for the Port of Orange. Due to this structure, it acts somewhat as a flow spreader for lower density freshwater from the rivers to sheet discharge into the upper estuary across the shallow but mostly submerged southern top slope of the Sabine Neches Canal. Flow occurs between the placement islands and across the shallow spoil areas which have depths mostly between 1 to 3 feet into the upper estuary that roughly is 6 feet deep. Thus, because the areas are similar, and contribute to the Sabine estuary both in the same area, it would appear that replacement of functions due to permitted activities would be possible to occur through compensatory mitigation with Bank resources in these two areas. From a Watershed Approach under the Mitigation Guidance Rule, it would appear that an appropriate service area for compensatory mitigation could be formulated that would allow replacement of the biological, chemical, and physical ecosystem services to maintain the integrity of the Sabine Lake ecosystem under the CWA.

Thus, in contradiction to the typical application of the inland rule of thumb using the adjacent HUC8 structure, the Catalog Unit 12010004 (Toledo Bend Reservoir) would not appear to be appropriate under the Watershed Approach, while 12020003 (Lower Neches) due to the proximity, hydrology, and physicochemical parameters of the system would be supported. This is HUC8 is technically in Subunit 1202 and would not fit under the SWG preferred HUC8 structure, but it would be appropriate under the Watershed Approach. Also, while Sabine Lake HUC8 12040201 is actually mapped adjacent, not all of that unit would be appropriate under the Watershed Approach. However, there are smaller portions of Sabine Lake that are HUC12 Units that maybe appropriate because they share physicochemical and biological parameters.

9.2.2 Water Quality Standards Segment Classification

The data from both the Texas Water Quality Standards (WQS) and the Surface Water Quality Monitoring (SWQM) are also types of hydrologic datasets but they concentrate on aquatic physicochemical and biological data. Water Quality Segments have a different use than HUCs and therefore boundaries are also slightly different between the two classifications, but these differences were usually minor and could be accommodated in a comparison to look at areas with similar physiochemistry. This water quality data could be used to better determine areas

that may support the Watershed Approach. States are required to adopt water quality standards to protect water quality and serve the purposes of the Clean Water Act as authorized under Sections 402, 303, and 305. To accomplish this, WQS are set by State to provide for water quality protection (Section 402, TAC §307), and water quality of surface water is also monitored and published (Sections 305b and 303d).

In Texas for purposes of water quality management and designation of site-specific standards the TCEQ has classified major surface waters of the State and designated in the WQS these as classified segments. The original water quality framework that was developed and evolved into the Texas Water Quality Standards (WQS or Standards) was done under State authority that predating the CWA (the Texas Water Quality Act of 1965) and over time given shifting emphasis from interstate to both interstate and intrastate waters. The dataset was the surface water bodies in the State, and these were divided into segments based their ambient or supportable physicochemical parameters, as well as fish, shellfish, and recreational uses. The criteria used that separate the segments are usually the basic elements water quality in the State water quality standards, and expressed as constituent concentrations, levels, or narrative statements. The data is collected on these segments with the intent of using the data under the Texas Pollutant Discharge Elimination System (TPDES), which is the promulgated program of the National Pollutant Discharge Elimination System (NPDES) of the USEPA. To look at areas that may support the Watershed Approach, the mean and maximum salinity was used as a proxy in the water quality hydrological comparisons of the Segments. This measure was chosen as it is usually strongly linked to other biogeochemical processes.

The 1972 Standards named the Neches Coastal Basin as the basin containing Sabine Lake (Texas Water Quality Board 1972). Tidal waters in the 1972 Standards were assumed to be interstate waters, and the Neches Coastal Basin included all these tidal waters from the tidal rivers (both the Sabine and Neches) to Sabine Pass. The modern Sabine Lake segment, 2412, is defined as being Sabine Lake to the Mean High Tide Line in Appendix A of the Standards. As required the TCEQ monitors the chemical and biological attributes from over 1800 SWQM sites statewide for assessment of both classified and unclassified waterbodies. This data is available in several formats including the 305b and 303d Integrated Report of Surface Water Quality as well as all the raw data or portions of the raw data being integrated in various other databases such as TCEQ SWQMIS, EPA STORET, or the NHD built from the HUC framework. The segment water quality data summaries are no longer published. Historically the 305b report, or the Water Quality Inventory report, included a summary of Field Measurements and Water

Chemistry by segment or assessment unit. This summary is no longer available, and only an integrated report is published with the data now only scored for exceedances of the Standards in an Integrated Report of Surface Water Quality with no values given. Values can still be calculated from the raw data in STORET or SWQMIS, but this would require the downloading and processing of hundreds of thousands of lines of raw pipe delimited text data from the dozens to hundreds of SWQM sites and then integrating them by assessment unit. However, long term water quality data is not likely to change markedly, and the latest published 305b summaries available were used (TCEQ 1997).

The Bank site is within HUC8 12010005. And the Bank crosses WQS Segments 0501 Sabine River Tidal and 0502 Sabine River above Tidal, with approximately the upper 1.6 stream miles of the Bank being within Segment 502. Segments 0501 and 0502 are the geographic extent of HUC8 12010005 where the Bank is located. The 2018 Standards changed the inland extent of Segment 0501, extending it further upstream to within 1.6 miles of the top of the bank. Segment 0501 averages a salinity about 2.5 ppt and can have high values of up to about 19 ppt (TCEQ 1997). There is also a SWQM station within the bank reach with a mean reported salinity of 2.91 ppt maximum of 16.95 ppt (Section 4.3.2, TCEQ 2021a). Segment 502 is essentially fresh with the nearest SWQM monitoring station to the Bank being over 13 river miles upstream of the northern edge of the bank.

Following SWG USACE general geolocational framework in the use of the 8 digit HUCs in setting service areas, there are two HUCs that are adjacent to the HUC8 of the bank 12010005; the Sabine Lake HUC (12040201) and the Toledo Bend Reservoir HUC (12010004). There is a nearby confluence with HUC Subunit 1202 in the Neches River Basin. As discussed in Section 9.2.1, the chemical, physical, and biological resources of the Toledo Bend HUC8 12010004 due to the isolation of the dam, will not be significantly served by the bank, and thus it does not seem to be part of an appropriate service area under the Watershed Approach.

The elimination of Toledo Bend as a viable secondary service areas means that the only adjacent HUC8 is Sabine Lake (12040201). The Sabine Lake HUC8 is in Subregion 1204 but is the only HUC8 that is adjacent. Sabine Lake HUC8 12040201 is essentially the same in geographic extent as WQS Segment 2412. While there are some differences in drawing boundaries between HUC and the WQS, these are minor, and boundaries are almost fully equal in extent if Taylor and Hillebrandt Bayous are included, which are separated in the WQS as Segments 0701 and 0704 respectively. These two Segments are essentially HUC 12 Subunits

of the HUC of Sabine Lake; HUC12 120402010100 (Taylor Bayou), and 120402010200 (Hillebrandt Bayou). The Water Quality Inventory summary of WQS Segment 2412 that is most of the open water area of the HUC 8 Sabine Lake overall, indicates that it has higher average salinities and would not have similar physiochemistry to WQS Segment 0501 or 0502. This is also supported by the aerials of the area showing a different vegetive communities, which are typically strongly linked with long term average water chemistry. Thus, while the Sabine Lake HUC8 is strongly linked and contributed to by the Lower Sabine (HUC8 12010005 or WQS Segments 501 and 502) including biological, chemical, and physical ecosystem services, because the intent of compensatory mitigation is the replacement of ecosystem services that are impacted unavoidable adverse impacts, then because within Sabine Lake WQS Segment 2412 this replacement may not occur with Bank resources. Because the ecosystem services may not be replaced through the compensatory migration at the Bank, from a Watershed Approach under the Mitigation Guidance Rule, WQS Segment 2412, which is most of the open water area of the HUC8 12040201 would not be an appropriate service area for compensatory mitigation.

The summaries of WQS Segments 0701 and 0704 (Taylor and Hillebrandt Bayous) do have an average, a range, and extreme salinity values that would indicate that they likely share physicochemical parameters and ranges with WQS Segments 0501 and 0502 (the Lower Sabine). As part of development of the NHD, the EPA links Watershed Reports for stream segments and both these portions of the WQS Segments are listed as tidal segments as well. These WQS Segments also look to have similar vegetative communities along parts of the reaches, indicating that these portions are likely freshwater tidal portions of the Sabine Lake ecosystem. These WQS Segments would contribute similar biological, chemical, physical ecosystem services to the Sabine Lake estuary. Thus, in these Segments that are limited to have similar vegetive communities there could be replacement of ecosystem services for the purposes of offsetting unavoidable adverse impacts due to permitted activities within these HUC12 Subunits and that compensatory mitigation could occur with Bank resources. From a Watershed Approach under the Mitigation Guidance Rule, the water quality data would suggest that a physicochemical based appropriate service area for compensatory mitigation could be formulated that would limit compensatory mitigation to these two HUC12 Subunits and that a service area could allow replacement of the biological, chemical, and physical functions and ecosystem services for the purposes of offsetting unavoidable adverse impacts under the CWA. These HUC12 Subunits may be appropriate under the Watershed Approach, but this does not fit

well into the SWG preferred HUC8 structure as most of the open water Sabine Lake HUC (12040201) is not an appropriate service area.

As discussed in Section 9.2.1, both the Sabine and Neches basins enter Sabine Lake in close proximity to each other, and within an oligohaline portion of the estuary. The HUC8 12020003-Lower Neches ends at the confluence with the Sabine Neches Canal as does the Lower Sabine HUC8 12010005 where the Bank is located. Thus, the Sabine Neches Canal is the actual confluence of the Sabine and the Neches rivers, and the last HUC8 on the Sabine river and the last HUC8 of the Neches river actually discharge into the Sabine Neches Canal that crosses east to west across the top of the estuary. The Neches HUC8 like the Sabine HUC8 is split into two WQS Segments: 0601 and 0602. These Neches WQS Segments also share a similar average, a range, and extreme salinity values of WQS Segments 0501 and 0502. They also have similar hydrology and surrounding vegetive communities that could indicate that they also share important physicochemical parameters and ranges with Segments 0501 and 0502. It is likely that these segments would also contain and contribute similar biological, chemical, and physical functions and values, and provide these ecosystem services to the Sabine Lake ecosystem. Thus, replacement of functions in Segments 0601 and 0602 due to permitted activities could occur through compensatory mitigation with Bank resources. From a Watershed Approach under the Mitigation Guidance Rule, the water quality data would suggest that a hydrologically based geographical limit or appropriate service area for compensatory mitigation could be formulated that would allow replacement of the biological, chemical, and physical functions and values and maintain the integrity of the Sabine Lake ecosystem under the CWA. However, while these Segments 0601 and 0602, and the HUC8 12020003, would be appropriate under the Watershed Approach, and despite their proximity and hydrology of the system at the confluence, this is technically a Unit in Subregion 1202 and does not fit under the preferred HUC8 structure.

9.2.4 Summary of Bank Site Hydrologic Classifications

Under the Mitigation Guidance Rule, it is suggested that compensatory mitigation service areas be set in consideration of the Watershed Approach (§332.3(c)). The USACE has historically used the USGS Hydrologic Unit Code (HUC) as a hydrologic classification to help define mitigation service areas and has historically used the HUC8 Cataloging Unit to support the Watershed Approach. The USGS states HUC geographic polygons are a cataloging numbering system built for water supply (USGS 2019) and originally the HUC framework supported data

such as gauge height, flood stage, and hydrographic data estimates of flow or volume. This results in a vectoral framework that is appropriate in many inland systems. However, the use of HUCs that are based on water supply variables such as storage volumes or annual flow volumes, to support the CWA objectives of restoring and maintaining the chemical, physical, and biological integrity of the Nation's waters may not always be appropriate.

The data from both the Standards and the surface water quality monitoring is also a type of hydrologic dataset that concentrates on physicochemical data and biological data, and data could be used to support the Watershed Approach. Consistent with the physicochemical attributes, the Surface Water Quality Standards separate the Bank portion of the river into a tidal reach (Segments 0501, 0502). It should also be noted that the lower Sabine and the lower Neches even share an unusual and similar geomorphology, with both containing alluvial channel anastomose flow or anabranches of both the present and paleochannels (Phillips 2014, RPS 2021). The Bank on the Lower Sabine, the lower Neches (0601, 0602), as well as all or portions of Pine Island (0607), Taylor (0701) and Hillebrandt Bayous (0704) all share similar characteristic physicochemical parameters.

The USGS HUC framework set up a series of Cataloging Units in the local region. However, unlike in inland systems the HUC8 of the location of the Bank is within approximately 4 miles of the confluences of three Subregional level HUC classifications (1201, 1202, and 1204). This is likely due to the original design of the HUCs to be a cataloging numbering system for water supply accounting. Thus, the framework of this system creates false barriers that would not be an accurate proxy to represent chemical, physical, and biological aspects of ecosystem integrity, which are the mandate of the CWA, and the goal of the Watershed Approach.

From a Watershed Approach under the Mitigation Guidance Rule, the hydrological and physicochemical water quality data would suggest that a hydrologically and physicochemical based geographical limits as appropriate service areas for compensatory mitigation could be formulated that would allow replacement of the biological, chemical, and physical ecosystem services purposes of offsetting unavoidable adverse impacts and maintaining the integrity of the Sabine Lake ecosystem under the CWA. It appears an appropriate service area can be set but would not follow the typical SWG rule of thumb that prefers the HUC8 Catalog Unit level that is restricted to the Subregion. The Bank on the Lower Sabine (HUC8 12010005), the Lower Neches (HUC8 12020003), Pine Island Bayou (HUC 8 12020007), and portions of Taylor (HUC12 120402010100) and Hillebrandt Bayous (HUC12 120402010200) all share

characteristic physicochemical parameters, and all or portions of these Segments by present and historical aerials support that they have similar surrounding vegetative communities. By the HUC framework as well as the WQS Segment framework all would make significant and similar contributions to both the local ecosystem services, as well provide ecosystem services to the Sabine Lake estuarine ecosystem as outlined in the Mitigation Guidance Rule for the purposes of offsetting unavoidable adverse impacts and in support of the Watershed Approach.

9.3 Ecological Classification support of the Watershed Approach

Ecological classifications have also been commonly used to help define mitigation service areas and they are applicable because of the mandate of the CWA of the restoration and maintenance of the chemical, physical, and biological integrity of Waters. Again, the SWG method suggests the use of a hydrologic classifications as one of the factors in setting appropriate service areas, in conjunction with an ecoregional classification. However, they suggest USGS HUC and USEPA Ecoregions in the intersection.

Several community and systematic ecosystem classifications have been used to set service areas and they exist at international, national, state and local scales, including the USEPA Ecoregions. These tools are hierarchical classifications and mapping of related ecosystems. The intent of the classifications is to depict zones or areas that have similar biological communities, groups, or associations. Community associations or biological groups have also been used in general conservation ecology and in ecological mitigation banking because service areas should reflect the proper community associations for the preservation of biodiversity, ecosystem resiliency, gene flow, and population viability. The implication of using them in defining compensatory mitigation service areas is that if there are similar communities is that there are also have similarly functioning ecosystems that contribute to the integrity of the Nation's waters, and in this way ecological classifications support the Watershed Approach. It is important to note that the intent of the Watershed Approach as stated is not to be limited only a particular sized watershed, but the approach extends to affected ecosystems with the intent of the Approach to support the integrity of the Nation's waters. Thus, consideration of community type is another tool in establishing proper mitigation service areas under the Mitigation Guidance Rule.

Efforts to divide areas into ecological regions historically have been based primarily on the distribution of climate, and then divided into vegetation zones. Several mapping efforts have been carried out by the United States government. For instance, while at the USDA the

sustainability scientist Robert Bailey produced an ecoregion map of the United States published in 1975 (Bailey 1983). This map, not unexpectedly, looks very similar to the more modern Level III maps from EPA and this is because they cite similar methods for classification. Ecological region maps have a very long history in general ecology, and in North America were produced by Herbertson 1905, James 1951, Biasutti 1962, Udvardy 1975. These historical maps all used hierarchal rule structures, and they have been useful both in environmental assessment, management, to identify critical habitat for the preservation of biodiversity and ecosystems, and all are based heavily on terrestrial vegetation that are smoothed to various extents into zones or regions. There are several modern hierarchal classifications such as EPA's ecoregions and the International Ecological Classification Standards (IECS) used in the World Wildlife Fund groupings and NatureServe classifications. Ecological classifications are also a useful and appropriate tool to help define mitigation service areas. By intent these are mappings of the biological aspects of ecosystem function and integrity, and that is part of the mandate of the CWA. The mapping also are basically identifying a community that developed in response to baseline environmental variables and those variables have worked together to define the ecosystems that are present. This is also the same ecological theory underlying structural changes on populations, community responses, or changes in ecosystem functions due to stressors such as with natural stressors such as environmental gradients or pollutants. As such the community similarities observed are a long term integrated multivariate representation of the environmental chemical, and physical aspects that produce the biological community observed. Therefore, the ecosystem classifications to some extent are correlated or represent the chemical, physical, as well as the biological aspects of ecosystem services. These are the mandate of the CWA and the goal of the Watershed Approach, and to which the Mitigation Guidance Rule under Part §332.3(b)(1) does acknowledge should be considered in the location of compensatory mitigation to successfully offset unavoidable adverse impacts to aquatic ecosystems.

9.3.1 Bank Onsite Ecological Dominants Classification

The extensive field work and evaluation of remote sensing data including LiDAR (TWDB 2018-2022), in support of the AJD and the implementation of the iHGM also provided the information needed to estimate and map the wetland communities on the Bank. The area of cypress tupelo, oak sweetgum, and pine dominated communities were estimated, and the community identification and area estimates provide an ecological classification to support the potential service area with similarly functioning areas within the ecosystem. The onsite community

structure varied from a cypress/tupelo dominated community of approximately 636.23 acres of semi permanently to the seasonally flooded areas (PFO1/2F and PFO1/2C) that have higher silt and clays in the soils, to an oak/sweetgum dominated community of approximately 819.46 acres that occupied the slightly higher elevations and are seasonally flooded to temporarily flooded (PFO1C and PFO1A) with more fine sand in the soils. These two communities are found not only on the Bank but across the freshwater tidal areas of the upper Sabine Lake estuarine ecosystem indicating that the long term physicochemical ranges are also likely similar across this freshwater tidal zone of the estuarine ecosystem, and thus the chemical, physical, and biological attributes would also likely be similar.

9.3.2 USEPA Ecoregion Classification

The USEPA ecoregions are general purpose regions that have been used in Texas for many years by several state and federal agencies for a variety of purposes such as assessment, management, and monitoring of ecosystems and ecosystem components. The EPA ecoregions has different level designations, and the Level III has 12 Texas classes, and the Level IV ecoregions separate 56 classes. The origins of the USEPA ecoregions are stated to be based on perceived patterns of a combination of causal and integrative factors. However, there is not an exhaustive list of the separations used in ecoregions separations this area and their relative contributions, but it is stated that it can include natural vegetation, soils, land uses, land surface form, wildlife, and an analysis of the environmental factors that most probably acted as selective forces in creating variation in ecosystems (Omernik 1987). However, the results that are presented seem to heavily be in terms of the 1970 Potential Natural Vegetation by Kuchler that is identified as a source by Omernik (1987). These maps also appear to be much like the USDA maps that proceeded them, and the methods to produce them also appear similar (Baily 1976).

The proposed Bank is just within EPA Ecoregion 35 (South Central Plains) as 35b floodplains and low terraces. The Bank is less than 3 miles from the intersection of Ecoregion 35 (South Central Plains) and Ecoregion 34 (Western Gulf Coastal Plain). The Bank Site shares many of the same species and communities within Ecoregion 34. As such, the functions and values of this Bank also likely extend across these bright boundaries, as it is located within a transition zone between the two ecoregions. The EPA Ecoregions were formalized in 1997 with the EPA and the Commission for Environmental Cooperation (CEC) as the environmental side of the North American Free Trade Agreement, and subsequently were picked up in classifications of

ecosystems in regulatory actions. The summary table defining Ecoregion 34a specifically includes low gradient rivers and indistinct relict fluvial channels, and it also includes the adjacent riparian forests of bottomland hardwoods. The summary of Ecoregion 34c denotes it includes bottomland forests of pecan, water oak, live oak, and elm, with some bald cypress on larger streams (Daigle et al. 2006). Both the HUC8 of the Bank (12040201) and the Lower Neches (12010005) are both 35b Floodplains and Low Terraces surrounded by 35f Flatwoods. These two HUCs are separated by a section of 34a which is Northern Humid Gulf Coastal Prairies which starts about 3 miles downstream from the Bank and extends around the point to the Neches.

9.3.3 IECS Classification

The USEPA ecoregions are considered general purpose ecoregions. However, they are not the only classification that had been considered, or that have been used in Texas. TPWD has used another classification system in the Texas Ecosystem Analytical Mapper project (TEAM) and has remapped Texas using ecological data and vegetation communities into 398 classes using the NatureServe IECS classifications (NatureServe, 2009). The IECS community classification is actually a subset; International Vegetation Classification (IVC) system. These ecological classifications also concentrate on the vegetive communities as indicators of the average biogeochemistry and use this to separate ecosystems. Of course, because of these shared indicators these maps are clearly related to the general EPA Ecoregions. But the IECS results in slightly different classifications than the EPA classifications, and more clearly show transitions that occur across the traditional EPA Ecoregion boundaries. Using the IECS classification maps, the Bank contains several ecological Vegetation Community Macrogroups: Southern Floodplain Forest (Macrogroup M031) with the West Gulf Coastal Plain Pine-Hardwood Forest (CES203.378), and the West Gulf Coastal Plain Pine-Bottomland Baldcypress Swamp (CES203.488), and the tidal marshes under Macrogroup M066 as Chenier Plain Fresh and Intermediate Tidal Marsh (CES203.467). that are found in both the West Gulf Coastal Plain and the South Central Plain USEPA classifications.

9.3.4 IRT Tidal Service Area Classifications

For tidal waters in this region, the SWG IRT has acknowledged there are issues in setting an appropriate service areas, and they did not follow the SWG inland rule of thumb for a solution. Discussions of this issue have occurred both between the Agencies, as well as in responses and discussions with the Bank Sponsor early banking processes. As part of the process the

Bank Sponsor submitted a standalone report to the IRT on the Watershed Approach in Tidal Areas and Service Area Rationale. This report considered topics such as the relationship of functional values and regional contributions in tidal systems for consideration of the IRT workgroup in an apparent effort to address these topics under the Mitigation Guidance Rule §332.3(b)(1).

At this time, it does not appear that the IRT has finalized a formal Watershed Plan for the tidal Sabine as is defined under §332.2. However, the IRT has proposed and released modified service areas for the Sabine regional tidal areas. The geolocation of the bank is within this IRT proposed service area zone on Segment 501 except for the inland 0.85 river miles of the Bank (16%) fall just inland of this tidal service area zone. This area in the Bank near and just above the IRT tidal service area boundary has an interesting multi-channel flow morphology that normally forms under relatively low-energetic conditions near a local base level, implying that in this area the local base level is MSL, and thus supports that this area is likely near the head of tide.

The proposed IRT service areas do not closely match USGS HUCs, and they also do not match USEPA Level III or IV Ecoregions. Interestingly, they do extend inland along the Sabine and Neches to closely approach the inland limits of TCEQ Texas WQS Segments 501 (Sabine River Tidal), and WQS Segment 601 (Neches River Tidal) which ends at the Neches River saltwater barrier. These WQS Segments are both have physicochemical data that supports that they are tidal and have similar elevation on USGS Quadrangle maps. As far as the wetland vegetive communities along the inland edge of the tidal WQS segments, they also appear to be similar both visually and using IECS classifications. Although the IRT has not defined how the modified service areas were developed, they seem to be considering regional and local physicochemical aspects and may be using the WQS segments, vegetive communities, and even hydrology. The estuarine end of the IRT proposed modified service areas match the endpoints of the two WQS segment ends that are defined in the standards to include the tidal portion of rivers to the extent that they are confined in channels. That point occurs at the top of Sabine Lake, and at that point the two WQS segments 0501 and 0601 are less than 4 miles apart, and as discussed in 9.2.1 both discharge into the Sabine Neches Canal.

The IRT proposed tidal service area for the Sabine estuary also includes Pine Island Bayou, which is WQS Segment 0607 which is part of the Lower Neches HUC8 (12020007). Pine Island Bayou is much like Cow Bayou (0511), or Adams Bayou (0508), which are along the HUC8

Lower Sabine (12010005). All of these waterbodies remain tidally influenced for a considerable distancel Like Taylor and Hillebrandt Bayous (0701 and 0704), they have physicochemical parameters and ranges similar Segments 0501 and 0502. The EPA Watershed Reports (2023) for these portions of the stream segments are listed as tidal segments, and these areas also look to have similar vegetative communities along these parts of the WQS Segment reaches. Thus this WQS Segment would also contribute similar biological, chemical, and physical functions and values to the Sabine Lake ecosystem, as does Cow, and Adams Bayous along the lower Sabine River, as well as portions of Taylor and Hillebrandt Bayous. Thus, in areas with similar vegetive communities, replacement of functions due to permitted activities within Pine Island Bayou through compensatory mitigation would occur with Bank resources as long as they were limited to areas with similar vegetive ecosystems. From a Watershed Approach under the Mitigation Guidance Rule, the physicochemical water quality data would suggest that a hydrologically based geographical limit or appropriate service area for compensatory mitigation could be formulated that would allow replacement of the biological, chemical, and physical functions and values and maintain the integrity of the Sabine Lake ecosystem under the CWA.

9.3.5 Summary of Hydrologic and Ecological Classifications

While the general recommendations for compensatory mitigation under Mitigation Guidance Rule §332.3(b)(1) are not specific as to the range or limits on compensatory migration as it must cover many types of ecosystems, it does state that in general the compensation should replace lost functions and services while taking into account aquatic habitat diversity, habitat connectivity, relationships to hydrologic sources, and ecological benefits. For tidal areas the Subpart suggests that compensation for impacts to aquatic resources in coastal watersheds should also be located within a coastal watershed where practicable. However, the typical inland guidance used by SWG to set appropriate services areas would not seem to produce a service area that is supportive of the Watershed Approach if used in this area. The typical method uses the HUC8 where the project is located and a secondary service area of the adjacent 8-digit HUC watersheds that have the same first six digits and are within the same EPA Level III Ecoregion. However, in this case the Lower Sabine HUC 12010005, it crosses a Level III Ecoregion (34 and 35). And the only adjoining HUC8 in the Sabine basin is above a major dam (Toledo Bend Reservoir -12010004), and because of the isolation due to the dam,

the chemical, physical, and biological aquatic resources of the Toledo Bend area will not be significantly served by the bank, and thus it does not seem to be part of an appropriate service area under the Watershed Approach. The only adjacent downstream HUC8 is Sabine Lake (12040201), in Subregion 1204. Most of the open water area of that HUC would not share the same attributes 12010005 and thus much of it also would not appear to be an appropriate service area under the Watershed Approach.

An earlier report by the Sponsor on the application of Watershed Approach in Tidal Areas and Service Area Rationale was submitted to the IRT workgroup during the developmental stage of the IRT modified service areas as is suggested under §332.3(c)(1). This report started the formulation of the rationale presented in the prospectus to define a watershed appropriate for the bank was based on geolocation and the surrounding ecosystem services served, but was submitted before the IRT formulated their Tidal Service Area polygons presented in 9.3.4 (RPS 2021). The report suggested that two local HUC8 Units are very similar from chemical, physical, and biological attributes contributed to the estuarine watershed; Lower Sabine (12010005) and Lower Neches (12020003). Hydrological, physiochemical, and ecological classifications for these areas also supported the basic physiochemistry and vegetative ecology are also shared throughout the surrounding upper estuarine region of Sabine Lake, and support the conclusion of this prospectus that a service area under the Watershed Approach could be formulated to replace ecosystem services and offset unavoidable adverse impacts due to DA permitting.

Based on the hydrologic, physicochemical, and the ecological classifications presented in Sections 9.2 and 9.3 support the Watershed Approach. The lower portions of both the HUC8 segments 12010005 (Lower Sabine) and 12020003 (Lower Neches) share physicochemical, biological similarity, and both are an estuarine transition zone that contributes important physical, chemical, and biological ecosystem services to the Sabine Lake ecosystem. These areas share a confluence that is technically separarated by approximately 4 miles of a navigation channel they they both discharge into in subregion 1202. Both these drainages areas also contain an estuarine transition zone and contributes important physical, chemical, and biological ecosystem services to the Sabine Lake ecosystem. The physicochemical similarities can be seen in both the TCEQ SWQM data as well as the WQS segmentation. Both these areas also have similar chemical, physical, and biological contributions to the Sabine Lake estuary. Considering this information, HUC8 reach 12020003 would appear to be appropriate and supportive of the Watershed Approach and could serve the purpose of

offsetting unavoidable adverse impacts under Mitigation Guidance Rule §332.3(b)(1) and would appropriate to be included as part of a service area.

The Neches IRT proposed tidal service area includes part of HUC8 12020007, Pine Island Bayou, which is WQS Segment 0607. A review indicates that Pine Island Bayou is much like Cow Bayou (WQS 0511), or Adams Bayou (WQS 0508), both of which are located within the Lower Sabine HUC8 12010005. Pine Island Bayou remains tidally influenced for a considerable distance and has physicochemical parameters and ranges similar Segments 0501 and 0502 on the distal reach with similar vegetative communities along these parts of the WQS Segment reaches. Pine Island Bayou would also contribute similar biological, chemical, and physical functions and values to the Sabine Lake ecosystem, as does Cow and Adams Bayou. Considering this information, HUC8 12020007 would appear to be appropriate and supportive of the Watershed Approach and could serve the purpose of offsetting unavoidable adverse impacts under Mitigation Guidance Rule §332.3(b)(1) and would appropriate to be included as part of a service area.

The Watershed Approach could also be supported that within the Sabine Lake HUC8 in limited sections such as HUC12 120402010100 (Taylor Bayou), and 120402010200 (Hillebrandt Bayou), which are sub watersheds of Sabine Lake HUC8 12040201. This is because they share similar attributes with 12010005 when it comes to physicochemical parameters and vegetation communities. This support would be limited to the wooded areas of Taylor and Hillebrandt which would be only about 15 to 17% of those watersheds, and it would be further limited to replacement of wetland riparian forests. Thus, under the Watershed Approach ecosystem values impacted due to unavoidable adverse regulated actions could be replaced in these areas by resources of the Bank but only in areas that there are shared hydrology and ecosystems service types. But while portions of these bayous would share physiochemistry and some ecological attributes, they simply do not have the flow volume to support the allochthonous loading for an extensive juvenile nursery habitat that the Sabine and Neches provide to Sabine Lake.

9.3 Primary and Secondary Service areas considering the Watershed Approach

Under Mitigation Guidance Rule §332.3(b)(1) and supportive of the Watershed Approach, the proposed service areas consider hydrologic connectivity, physiochemistry, ecosystem services, and conservation ecology. Because the Galveston District, SWG USACE, prefers to use HUC Units in their service area establishment and in the Bank operations credit/debit transactions, all

service areas will be expressed in HUC Units for Bank operations and credit/debit transactions. The proposed primary service area consists of the Lower Sabine watershed where the Bank is located, and this follows the SWG preferred HUC8 inland method of setting service areas. Secondary service areas cannot follow the typical HUC8 method because of the geolocation of the Bank and the artificial framework of the HUC Catalog Unit system in coastal systems. The IRT has considered these issues associated with setting services areas in the regional coastal aera and also did not follow the typical HUC8 method in being supportive of the Watershed Approach. Therefore, secondary service areas proposed were also planned using hydrologic and ecological classifications to be supportive of the Watershed Approach to serve the purpose of offsetting unavoidable adverse impacts under Mitigation Guidance Rule. Because of the location of the bank near ecological boundaries, the physical, chemical, and biological services provided by the bank will likely cross boundaries to occur in both the South Central Plains and Western Gulf Coastal Plain Level III EPA Ecoregions, but would all be within in the Sabine Estuary which is where the Bank resources would contribute ecosystem services and would maintain the biological, chemical, and physical integrity of this upper estuarine ecosystem. The primary and secondary service areas are detailed below.

The primary service area is the Sabine Lake Watershed, which includes the following (Figure 17, HUC Service Areas):

- Lower Sabine (8-digit HUC 12010005).

There are no Adjacent HUC8 Catalog Units in the same Subregion that would be appropriate service areas under the Mitigation Guidance Rule and be supportive of the Watershed Approach as detailed in Sections 9.1, 9.2, and 9.3. Secondary service areas cannot follow the SWG USACE preferred HUC8 inland procedure because Units cannot be directly adjacent to the primary service area due to the framework of the HUC coding system in coastal systems as is detailed in Section 9.2. Appropriate secondary service areas were instead chosen to be supportive of the Watershed Approach so that they could serve the purpose of offsetting unavoidable adverse impacts under Mitigation Guidance Rule §332.3(b)(1). The secondary service areas which include the following (Figure 17, HUC Service Areas):

- Lower Neches (8-digit HUC 12020003)
- Pine Island Bayou (8-digit HUC 12020007). A portion of Pine Island Bayou is included within the IRT proposed modified service area. In addition, Pine Island Bayou remains

tidal beyond the intersection of Little Pine Bayou 120200070203. This is very much like WQS Segments 501 and 502 (on the Lower Sabine), or 601 and 602 (the Lower Neches).

- Portions of Taylor Bayou (HUC12 120402010100), and Hillebrandt Bayou (HUC12 120402010200), which are sub watersheds of the adjacent HUC8 12040201 Sabine Lake. This service area should be limited to areas that share the similar surrounding vegetive community to 12010005-Lower Sabine, as they would also likely contain similar hydraulic and physicochemical parameters that provide ecosystem services to the Sabine Lake ecosystem. From aerials of those watersheds, it looks like only about 15 to 17% that is wooded and a much smaller area would possibly have similar wooded wetland areas. Thus, with this restraint under the Watershed Approach the ecosystem services impacted due to unavoidable adverse regulated actions could be replaced in these areas by resources of the Bank because of the shared hydrology and ecosystems services.

The proposed geographic primary and secondary service areas were developed with the Watershed Approach considering ecological and hydrological factors for defining service areas for compensatory mitigation. The following is the procedures and rationale for determination of the service area:

- Primary Service Area is the HUC8 containing the bank and local areas directly benefiting from physical, chemical, and biological services provided by the Bank. This primary service area follows the SWG USACE preferred HUC8 procedure.
- Appropriate secondary service areas for compensatory mitigation need to be formulated following the Watershed Approach area to allow replacement of the biological, chemical, and physical functions and provide ecosystem services for the purposes of offsetting unavoidable adverse impacts. However, the USACE HUC8 procedure in this coastal ecosystem would not be supportive of the Watershed Approach.
- The USGS assessment of the Watershed Approach in relation to HUC codes stated that an approach should examine the natural resource conditions and needs and identify programs and other resources to solve those needs. Importantly the USGS recognized there could be significant downstream contributions in many hydrologic units that extend far beyond the unit boundaries even in inland systems (USGS 2007). The methods used for this bank utilized hydrology, physiochemistry, and ecological community structure to set an appropriate service area.

- In consultation with IRT members it was suggested that HUC8 12010004 (Toledo Bend Reservoir) could be considered as part of a secondary service area. However, this area was above a major dam and upon consideration the applicant's agent rejected it as not being viable under the Mitigation Rule as it would not support the Watershed Approach.
- Secondary service areas were limited to areas that have an ecological linkage as part of the Sabine Lake estuary system. Under the Watershed Approach these service areas must have common ecosystem services to allow the resources at the bank to replace the biological, chemical, and physical functions and provide ecosystem services for the purposes of offsetting unavoidable adverse impacts. This approach actually resulted in a reduction of approximately 313800 acres over the IRT suggested application of the rule, but produced secondary services that supported the Watershed Approach under the Mitigation Rule.
- The Bank will provide a substantial water quality benefit and protection to the upper Sabine estuary to help maintain water quality of the region in an area where it is one of the few watersheds in the lower Sabine lacking a TMDL.
- All service areas were translated into the appropriate HUC8 or HUC12 watersheds as they are preferred by USACE for Bank operations and credit/debit transactions.
- Wetlands will provide for flood storage to reducing flooding and pulse flows to the lower Sabine, where the USACE is considering construction of CSRM projects.
- Proposed Service Areas are based on ecological needs within the watershed and are supportive of the Watershed Approach.
- Proposed service area has the potential to have significant growth with limited mitigation banking options servicing the region.
- Due to the lack of bank credits within the watershed, after the Bank is permitted it will allow the avoidance of less desirable PRM projects to offset permitted impacts.
- The Bank is strategically located within a series of hydrogeomorphic adjacent or connected preservation areas, thereby making the overall benefits to the watershed greater than if the Bank were a stand-alone conservation area or bank plot (e.g. it is adjacent to Blue Elbow Swamp and Sabine Island).
- Proposed service areas are supported by a Watershed Approach analysis and is necessary for the economic viability of the bank. The economic viability is substantiated by the future and historical demand and associated geographic location of impacts.

Several of the above subsections provide a more detailed description of the Watershed Approach and hydrological and ecological classifications relevant to defining the service areas.

Section 10 Mitigation Work Plan

Since the mature wetlands exist and a preservation-based area is proposed. There is neither a grading plan, nor changes in micro-topography, hydroperiod, or construction schedules. Therefore, no formal mitigation work plan is needed. However, maps marking the boundaries of the proposed Bank have been provided and the types and quality of the resources in Bank have been discussed. Finally, a perpetual conservation easement held by an accredited land trust with proper metes and bounds will define the Bank. These actions could be considered part of a work plan to define and preserve the Bank resources and assure its viability in perpetuity.

Section 11 Long-term Water Budget

A long-term water budget involving surface water for this project is not needed to show sufficiency to sustain long-term wetland hydrology. The area is sustainable and self-maintaining with direct precipitation and shallow groundwater connections alone. Orange, Texas, the nearest long term NWS gage that supports the NRCS Climate Analysis for Wetlands Tables (WETS Table), indicates that the area receives an annual average of 62.1 inches of precipitation. The area is humid, and pan evaporation is also only 62.1 inches a year (NOAA 1982). Thus, there is not a deficit between precipitation and evaporation.

Water budgets can be quite complex considering the many variables that contribute to energy and mass budgets, but for precipitation there is a simple irrigation model that uses the relationship between pan and reference evapotranspiration (ETo) to estimate a water balance. Water typically evaporates more rapidly from the pan than through evapotranspiration, and the pan to ETo ratios are typically in the range of 0.6 or 0.7 for a reference crop (Brown 1998). In Orange, this would suggest a surplus of precipitation to reference evapotranspiration would occur and thus precipitation alone would support typical reference crops. Pan and evapotranspiration can be estimated, and these estimates are then used for specific communities of interest to get a crop coefficient (K_c) which are specific to the vegetation or crop. Since this type of budget is typically used in farming for irrigation, most of the K_c values are for farmed crops. However, there are K_c values of riparian forests in the literature, but they are somewhat rare and are variable. The USGS did a study on riparian forests and found a range of values that was lower in the winter and had a maximum Kc in the summer of 0.42 (USGS 2008), which would support that the riparian forest community could likely be maintained from precipitation alone provided that there was not deep percolation into the soils.

In addition to direct precipitation and local climate, due to the geolocation of the Bank the local MSL (Section 2.2.1, 2.2.2) results in shallow groundwater due to the hypsography of the site (Section 2.2.3). This shallow groundwater table prevents deep percolation into the soils, and also has the potential to provide quite a bit of water to the water balance on the site since the capillary effects place this water within the root zone for much of the year if not continually (Section 2.2.3).

The reach of the Sabine River fronting the Bank is, in addition to being within the local MSL (Section 2.2.1 and 2.2.2), also a stable controlled source of freshwater due to operational control of on channel reservoirs. Flow variability and minimum stream flows (subsistence flows) within

the river as well as freshwater inflows to the bay are also supported by the Texas environmental flow program applicable to this basin (see Texas Senate Bill 2, 2001; 2007). The TCEQ Environmental Flows Standards (30 TAC § 298.280) has subsequently set a flow standard (30 TAC § 298(C)) that was adopted August 8, 2012 using the nearby Ruliff gage, including pulse flows to maintain an ecological environment that supports a healthy diversity of aquatic life, sustains a full complement of important species, provides for all major habitat types including rivers and estuaries, and sustains key ecosystem processes including longitudinal connectivity.

The natural rainfall, shallow groundwater due to the proximity of MSL, and flow onto or through the flood plain sets the hydrology for the Bank. As such, long-term hydrology maintenance will not depend on the diversion of state water from a watercourse. The hydrologic information summarized above was formally presented to the TCEQ Water Rights and Permitting and Availability Section in a January 23, 2023 presentation, and TCEQ responded with a February 22, 2023 letter stating that the West of Neutral Mitigation Bank project does not require a water rights permit (Appendix H). The Bank has been and is anticipated to continue to be self-sustaining in this hydrological and regulatory setting.

Section 12 References

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Section 13 Figures

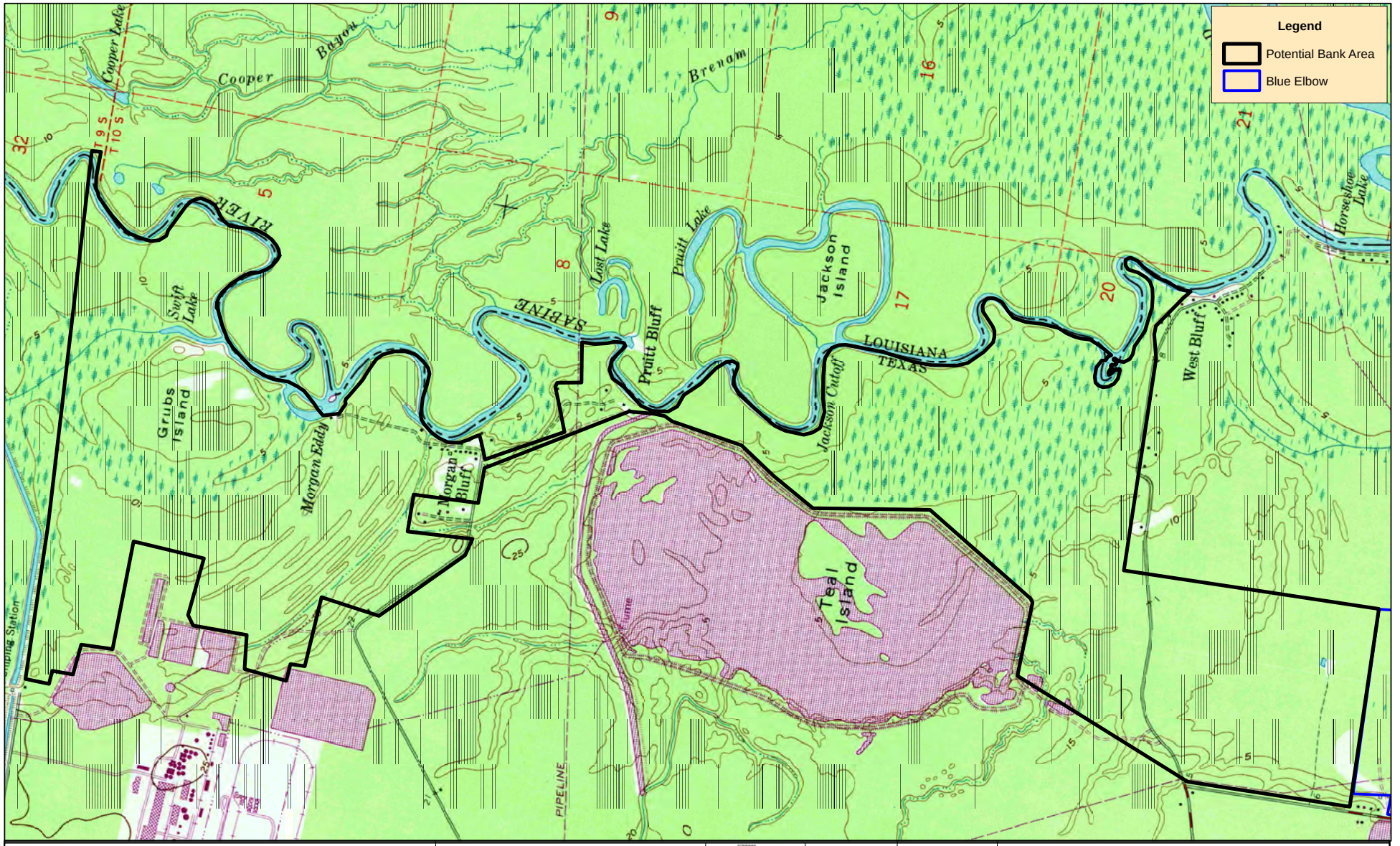

Figure 1. IP Potential Bank Regional Location.

Map of the location of the proposed International Paper Bank site in Orange County Texas.

DATE: December 14, 2019

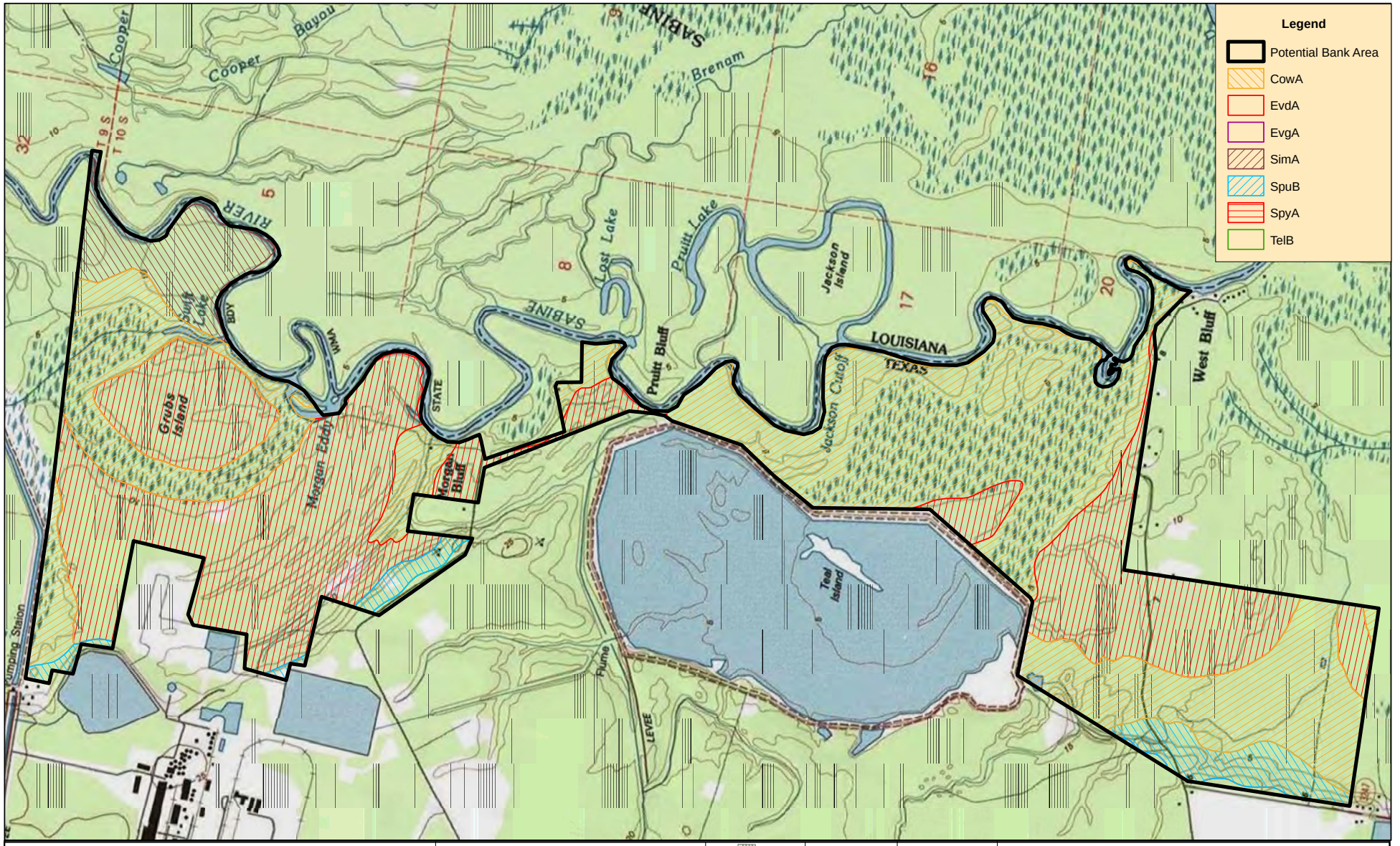

Figure 2. IP Potential Bank NRCS Soils

Map of the NRCS Soil data for the potential bank area.

DATE: December 14, 2019

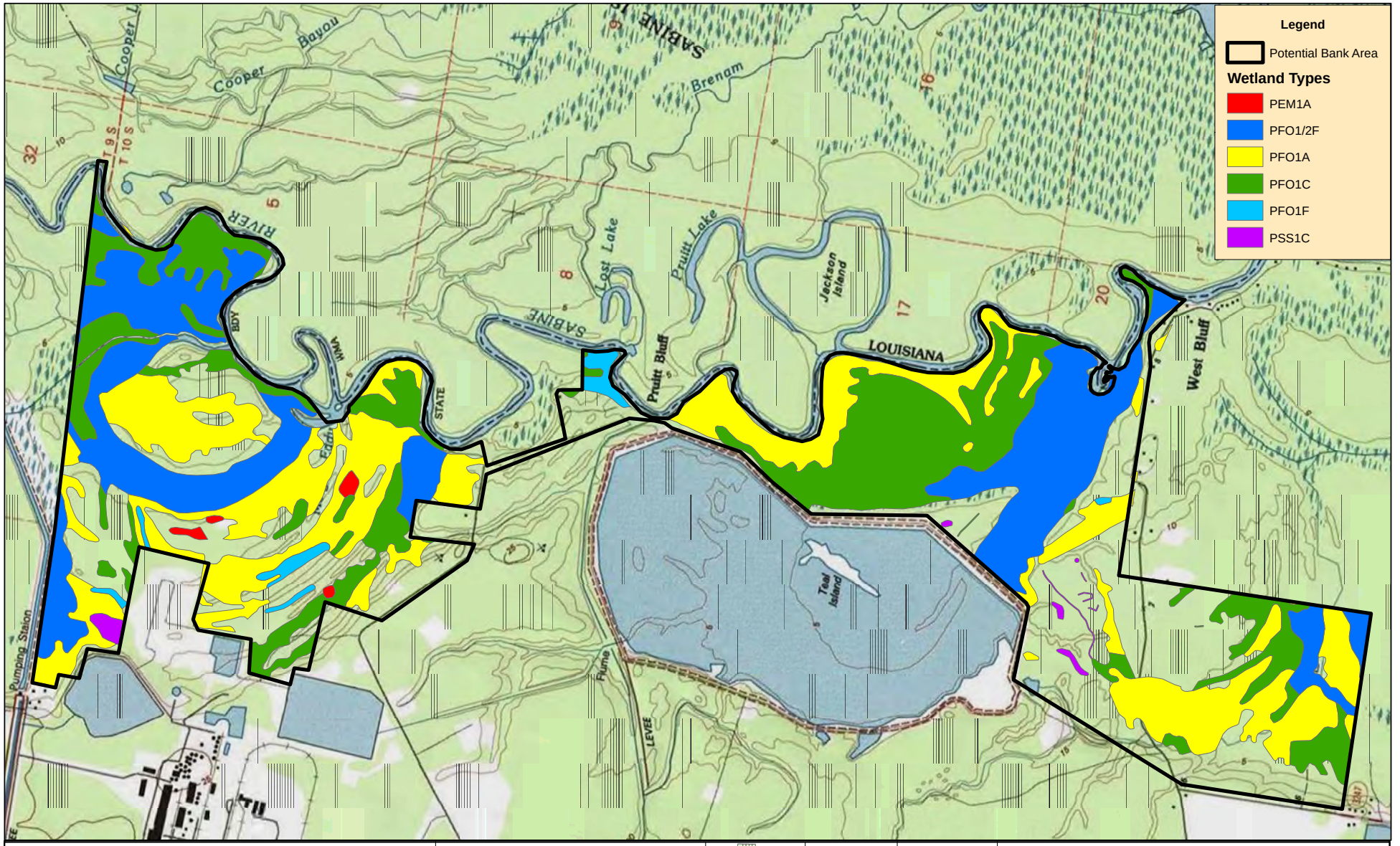

Figure 3. IP Potential Bank NWI resource types.

USFWS National Wetland Inventory data for the potential bank area.

DATE: December 14, 2019

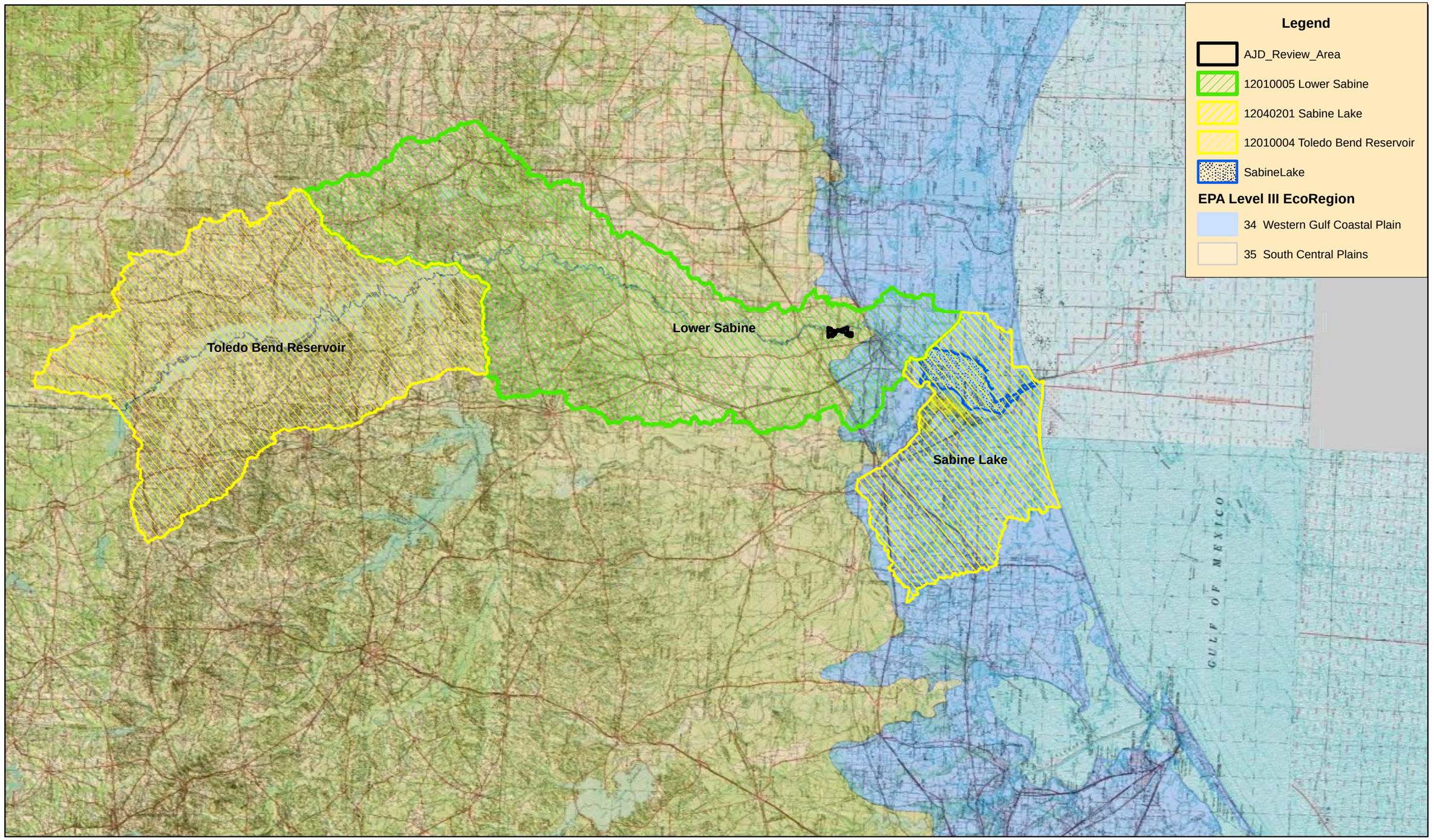

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Figure 4. Bank Ecoregions and Adjacent HUC Watersheds

Level III Ecoregions, and USGS Hydrologic Unit Code (HUC) 12010005, and adjacent HUC watersheds.

DATE:May 3, 2023

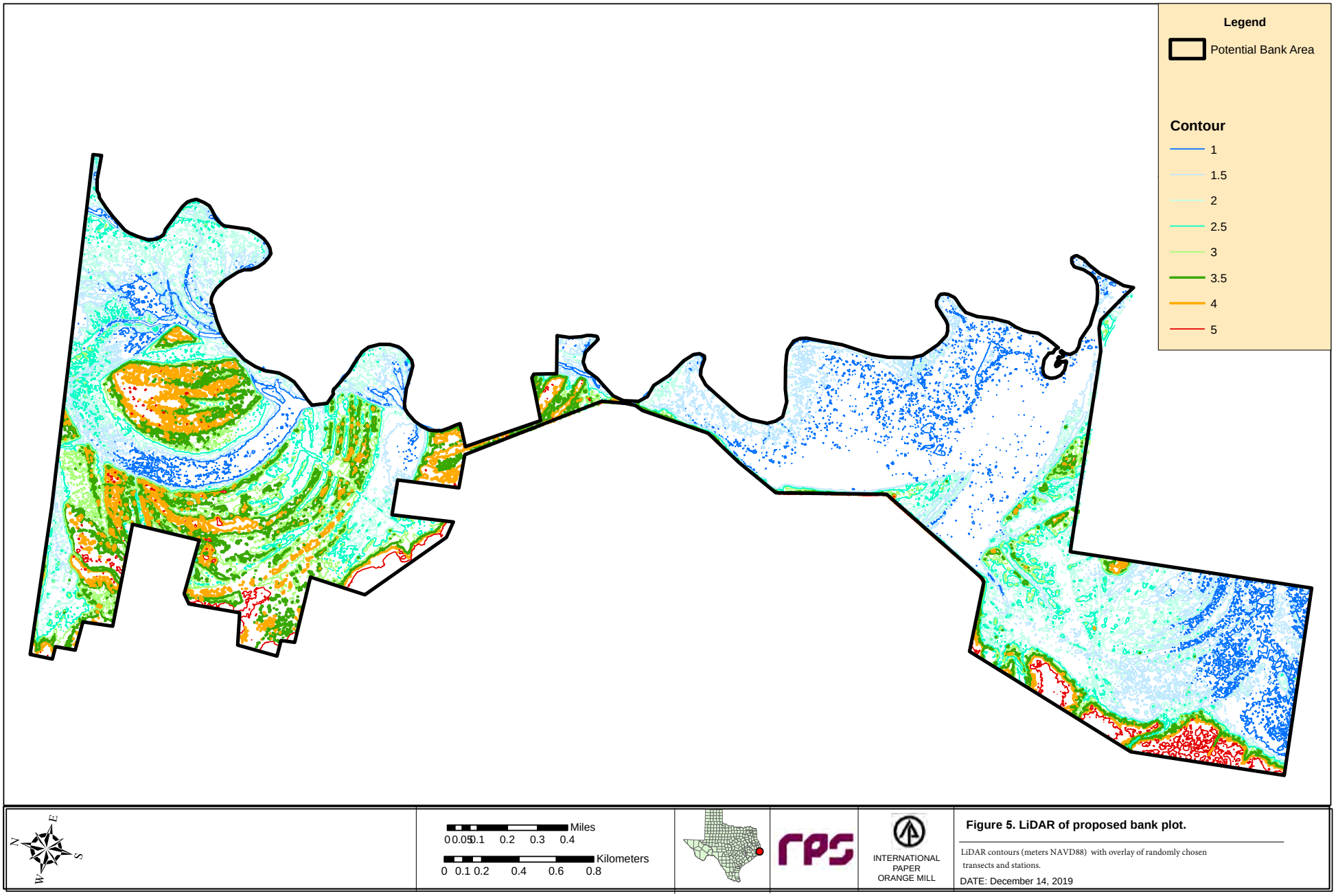


Figure 5. LiDAR of proposed bank plot.

LiDAR contours (meters NAVD88) with overlay of randomly chosen transects and stations.

DATE: December 14, 2019

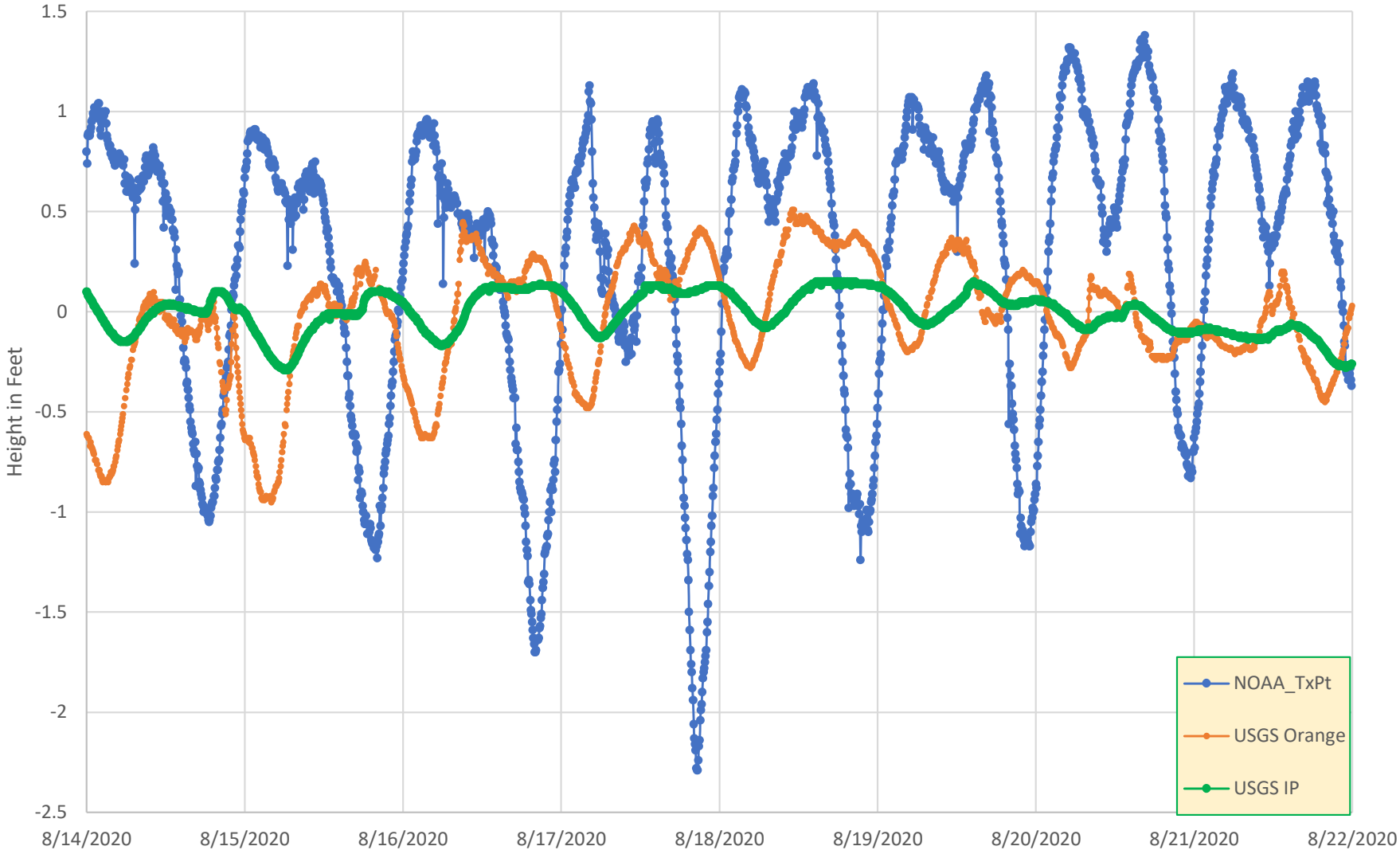


Figure 6. Tidal Oscillation around Median; Tx Pt.,Orange, to IP.

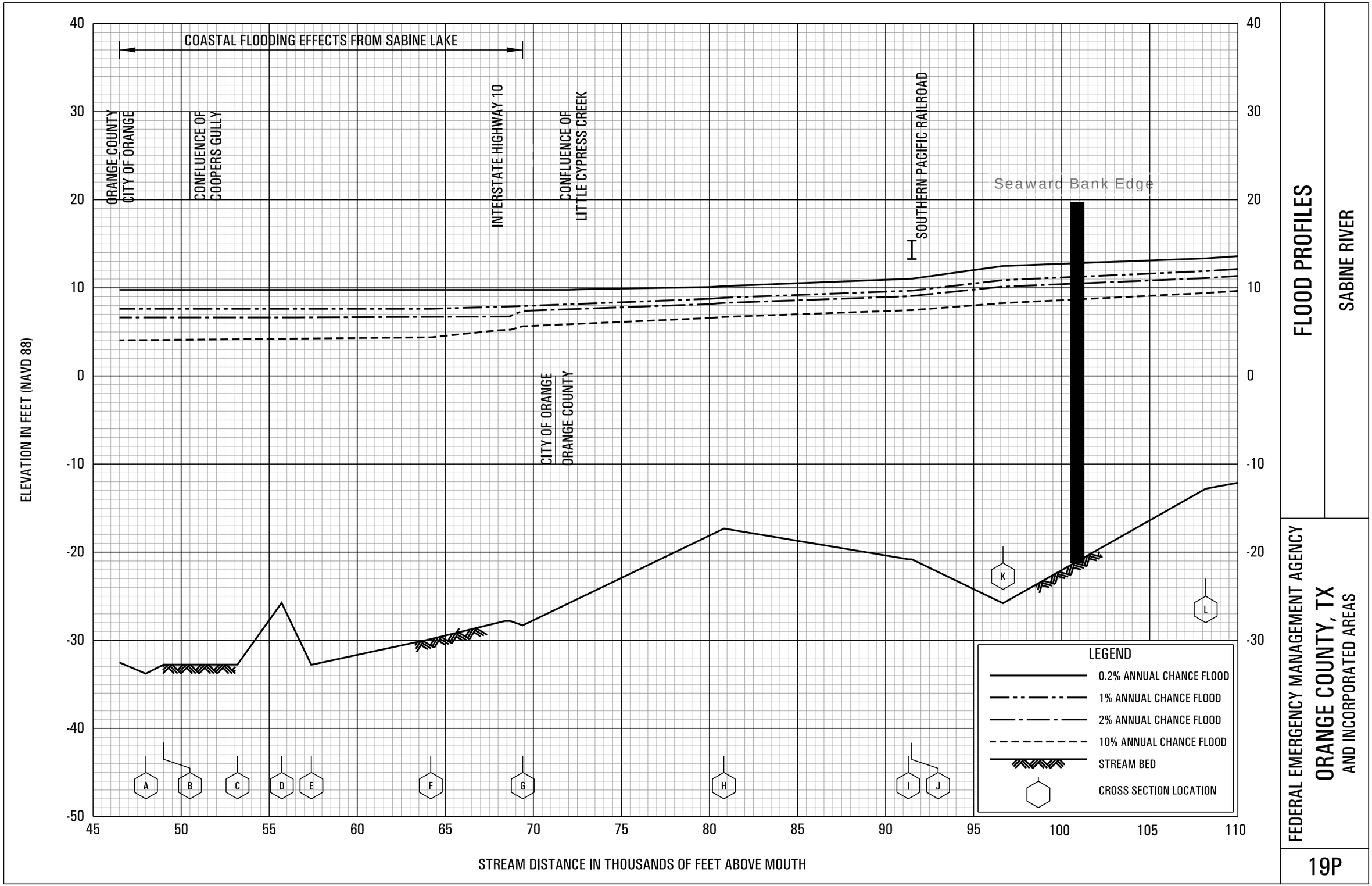


Figure 7. Orange FIS Sheet 19P

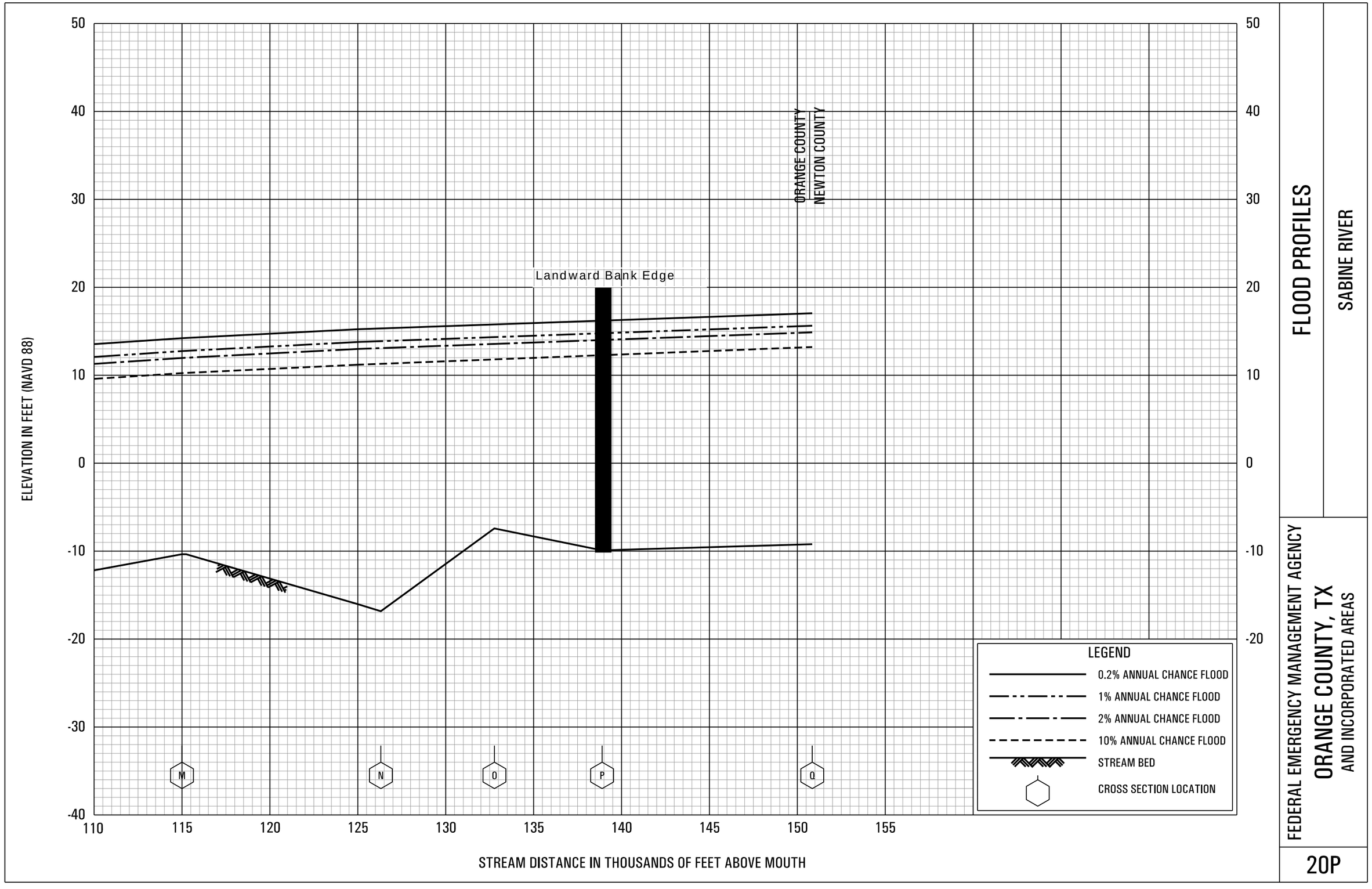


Figure 8. Orange FIS Sheet 20P

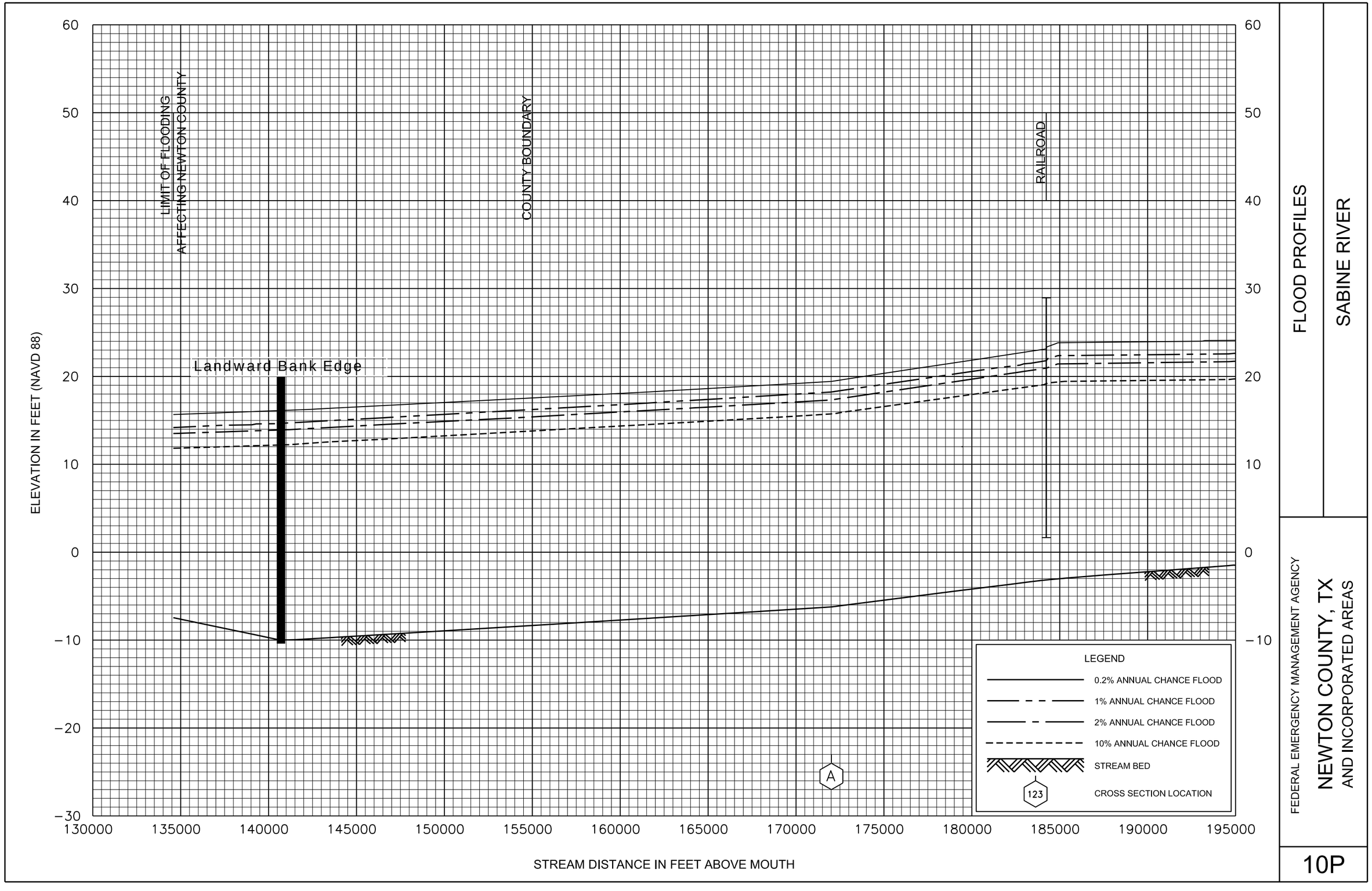
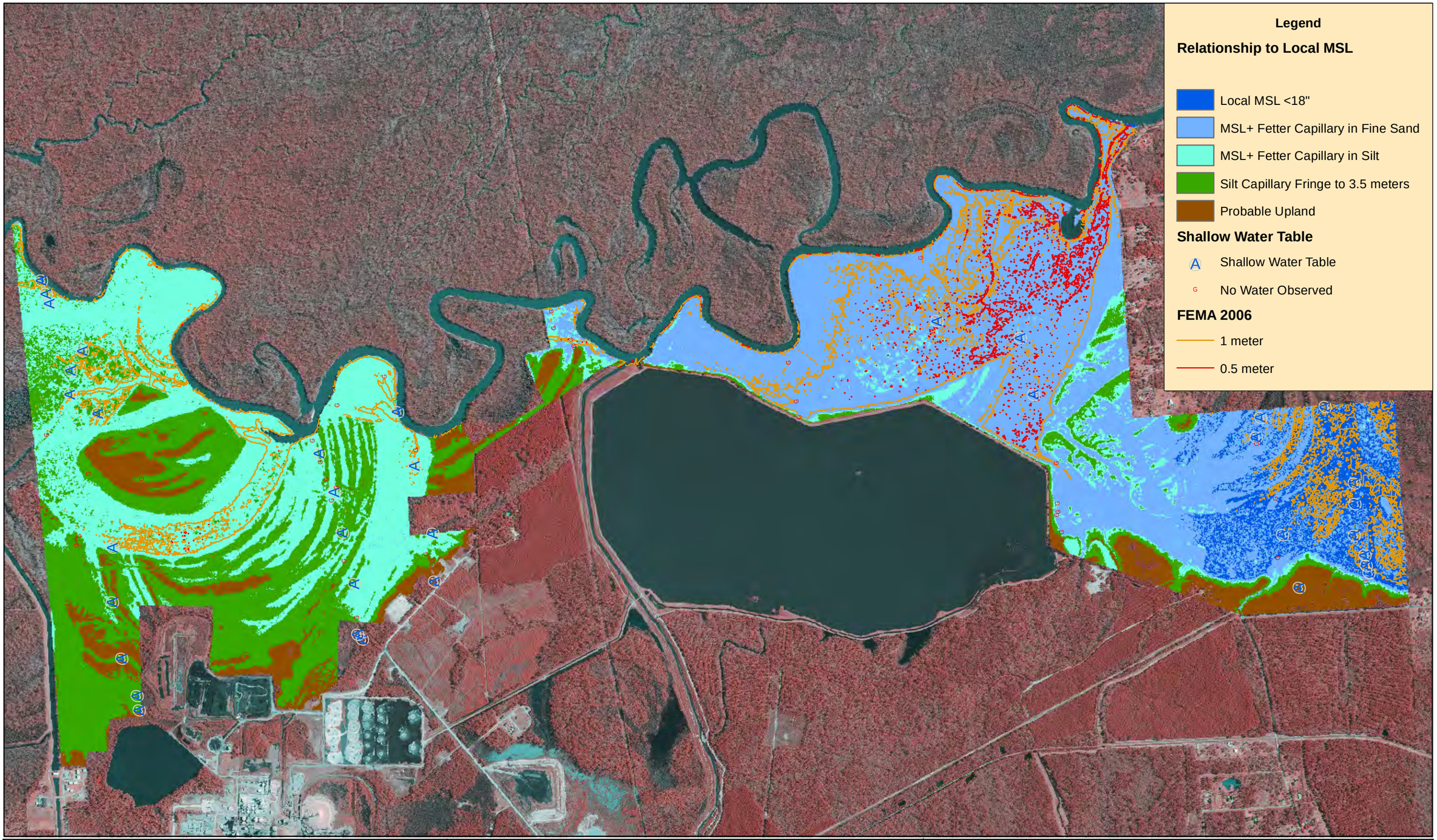


Figure 9. Newton FIS Sheet 10P



5

0 0.05 0.1 0.2 0.3 0.4 Miles

0 0.1 0.2 0.4 0.6 0.8 Kilometers

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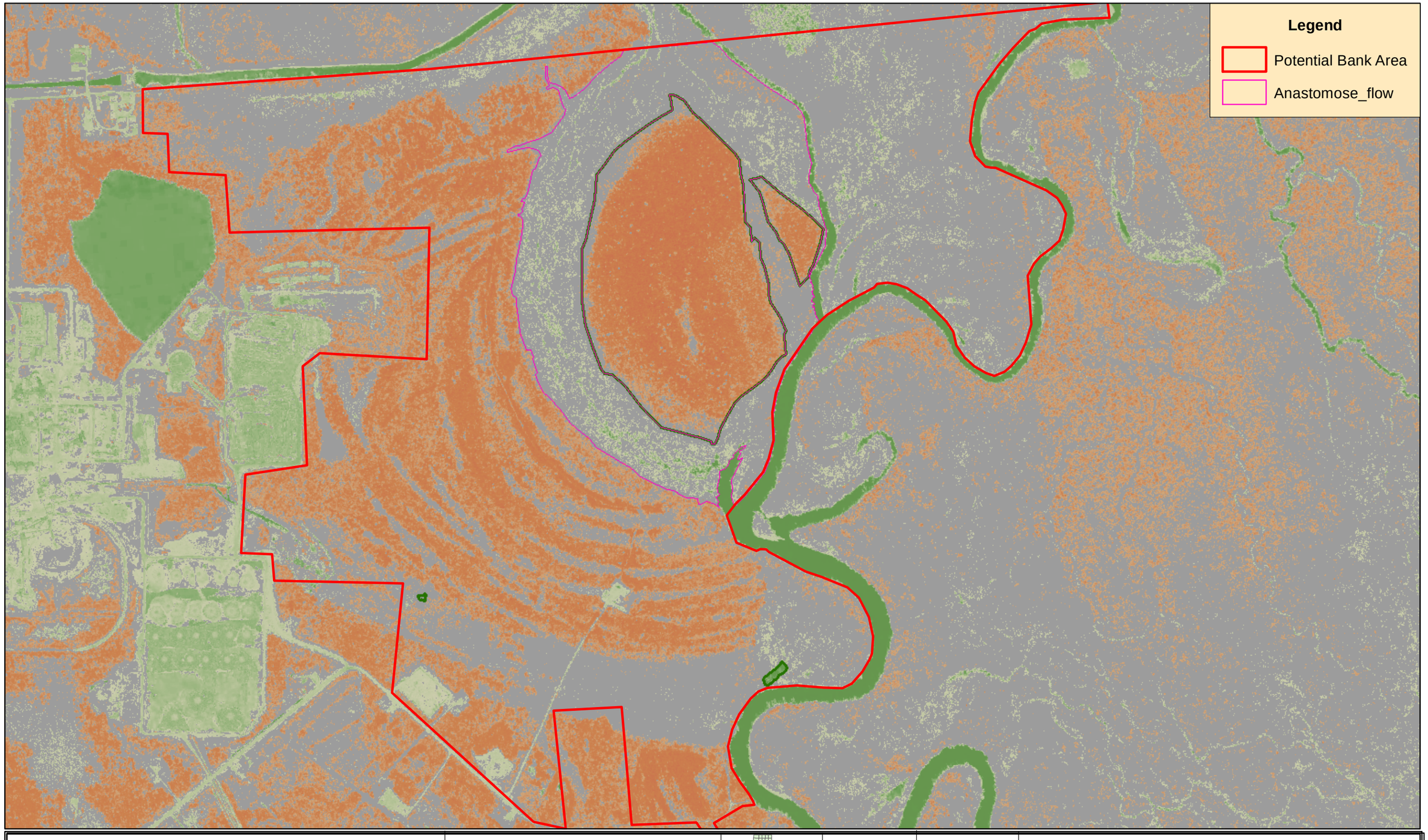
Figure 10. Estimated Shallow Groundwater Levels.

Observed Shallow Ground Water and estimates of elevations where saturation could potentially reach the surface based on local MSL and laboratory soil capillary fringe height estimates.

DATE:November 3, 2021



5

0 0.04 0.08 0.16 0.24 0.32 Miles

0 0.05 0.1 0.2 0.3 0.4 Kilometers

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Figure 11. Anastomose flow.

Northern portion of Potential Bank showing anastomose flow around Grubs Island and Swift Lake.

DATE:Febuary 22, 2021

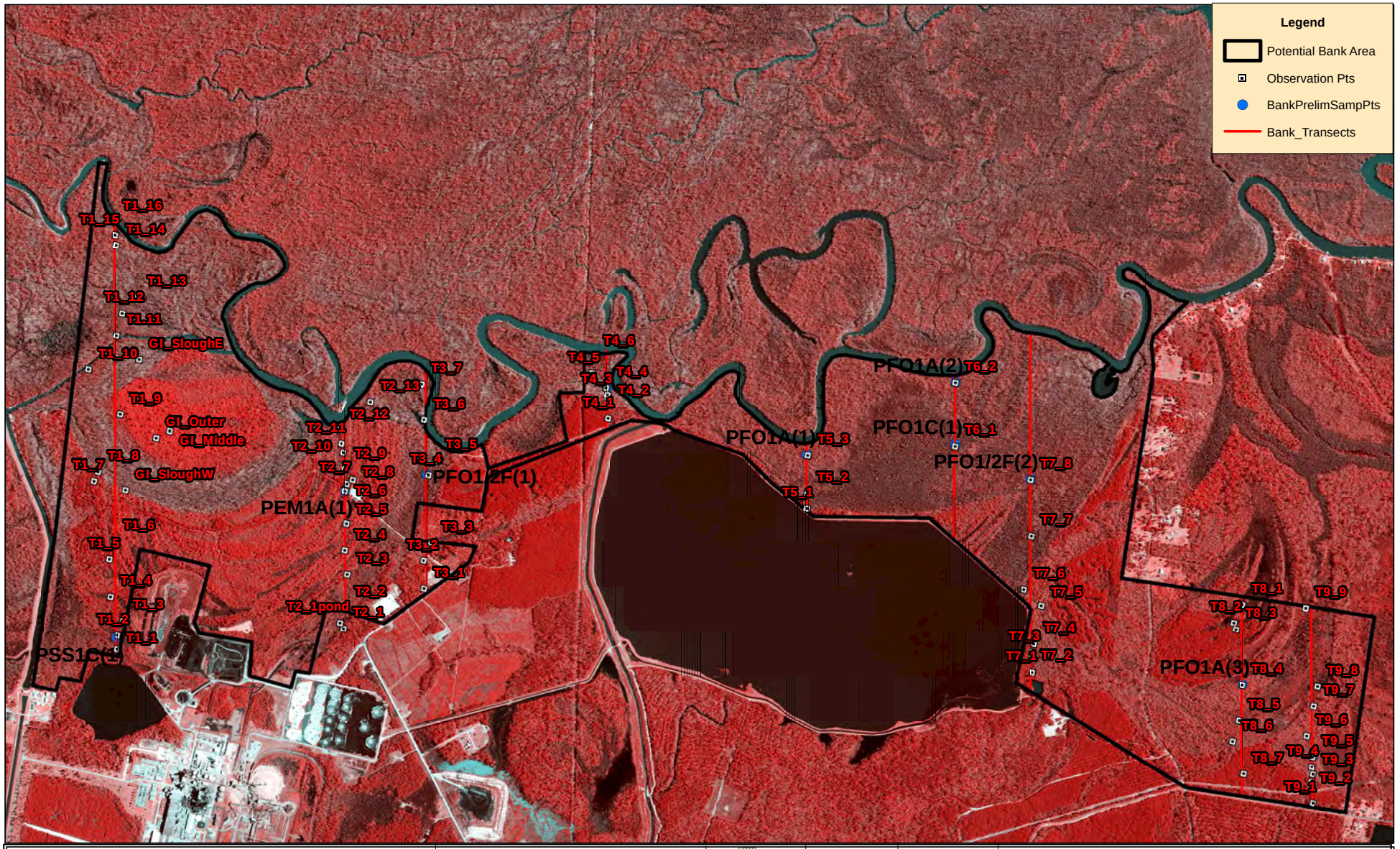


Figure 12. Observation Points plotted on false color IR

Observation points plotted on 2014/2015 Color IR for the potential bank area.

DATE: December 14, 2019

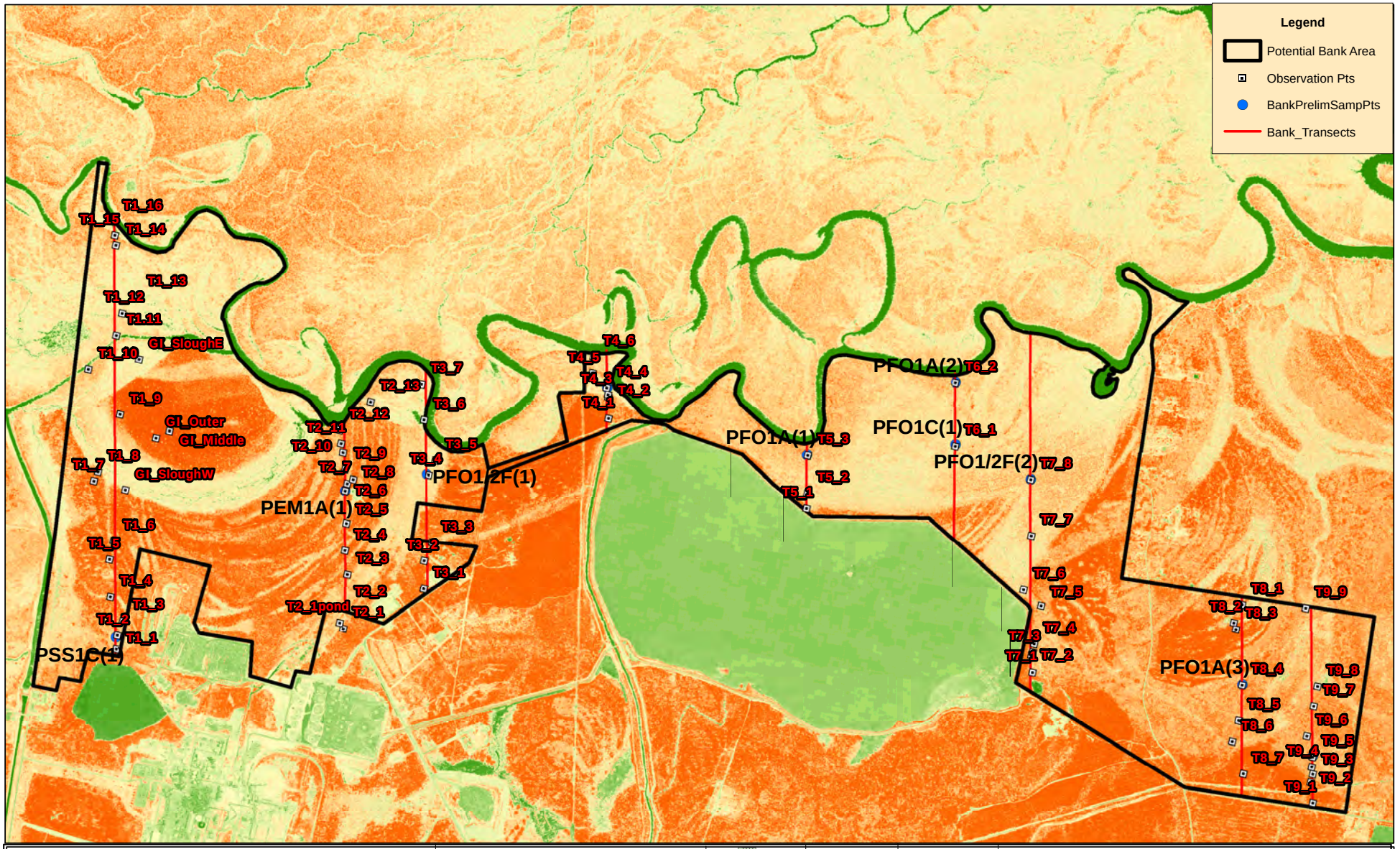


Figure 13. Observation Points plotted on NDVI raster

Observation points plotted on 2014/2015 NDVI for the potential bank area.

DATE: December 14, 2019

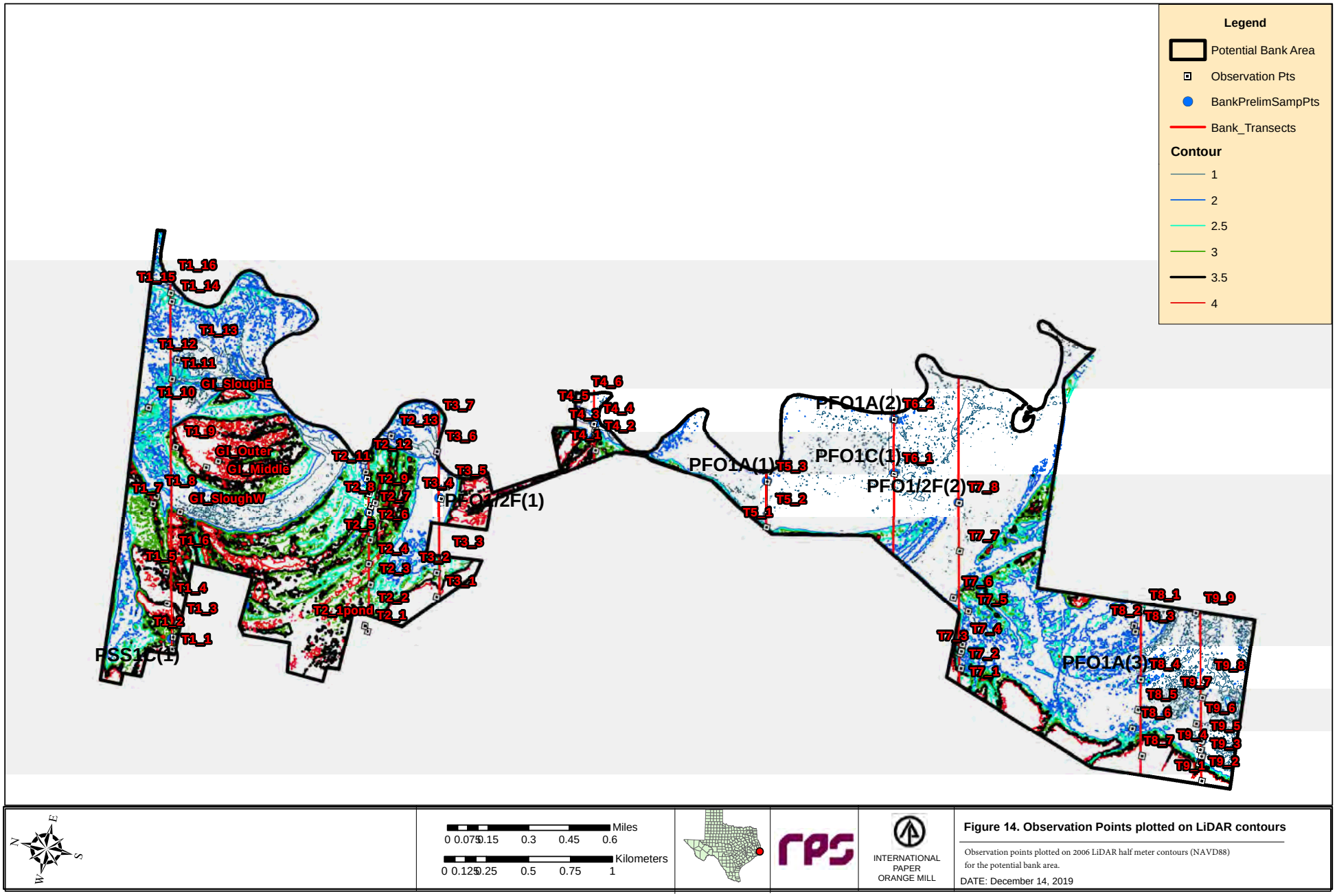
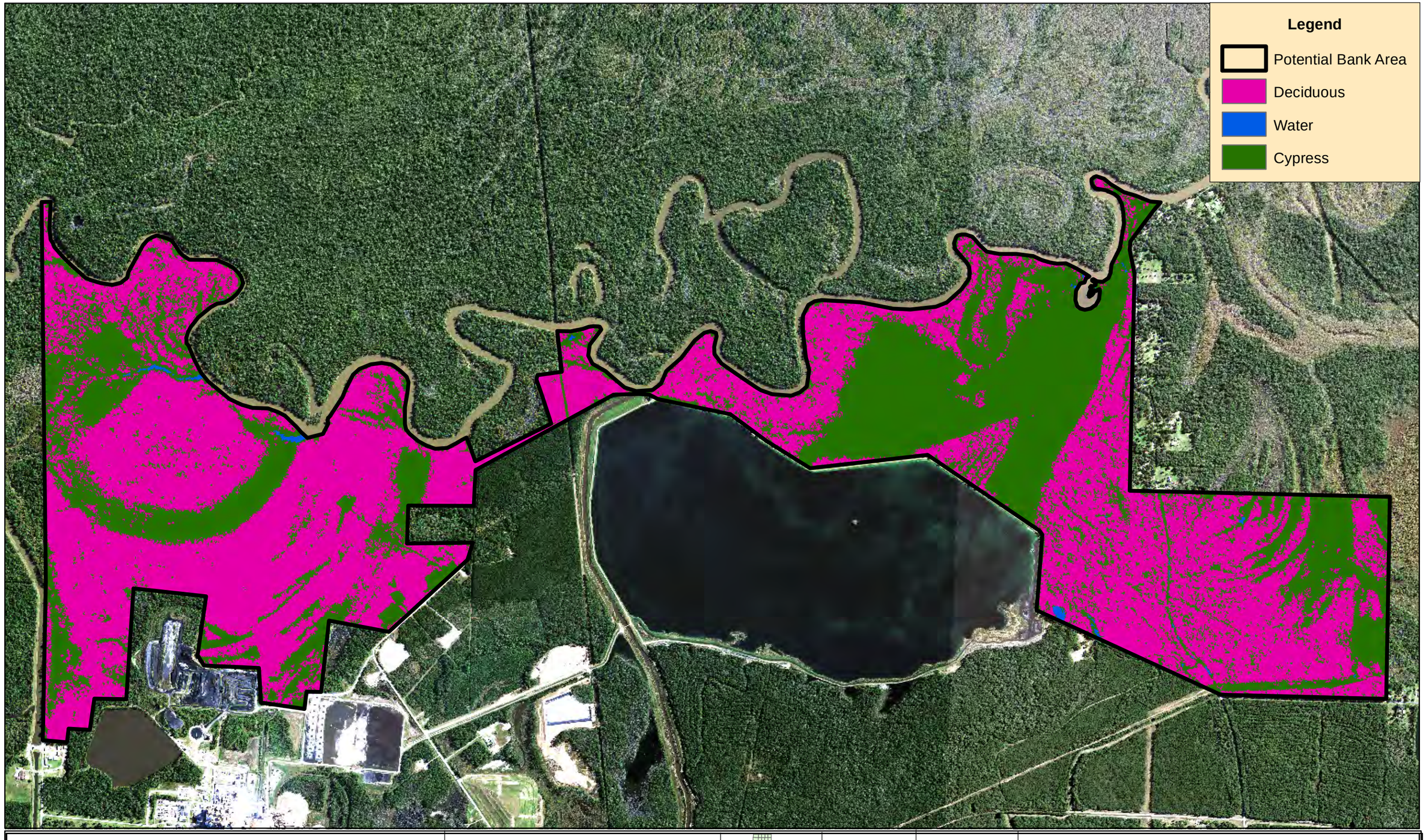


Figure 14. Observation Points plotted on LiDAR contours

Observation points plotted on 2006 LiDAR half meter contours (NAVD88) for the potential bank area.

DATE: December 14, 2019



5

Miles
0 0.05 0.1 0.2 0.3 0.4

Kilometers
0 0.1 0.2 0.4 0.6 0.8

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Figure 15. Post Processed NAIP Classification

Post Processed smoothing of Wetland type from supervised maximum likelihood classification of NAIP 2018 image.

DATE:Febuary 22, 2021

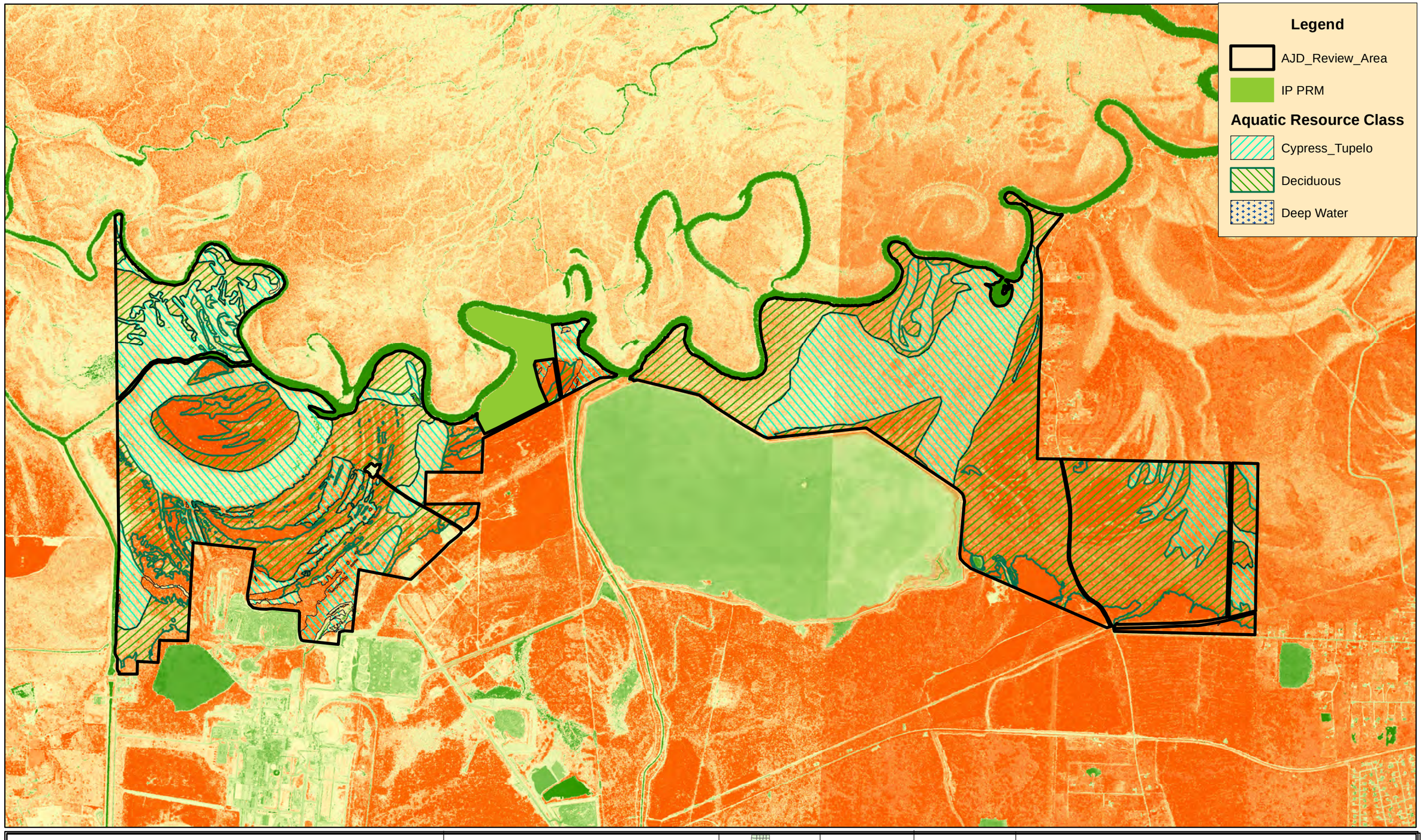

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Figure 16. WAA Separations over 2018 NAIP NDVI

AJD aquatic resource classes overlayed on the 2018 National Agriculture Imagery Program (NAIP).

DATE:March 15, 2022

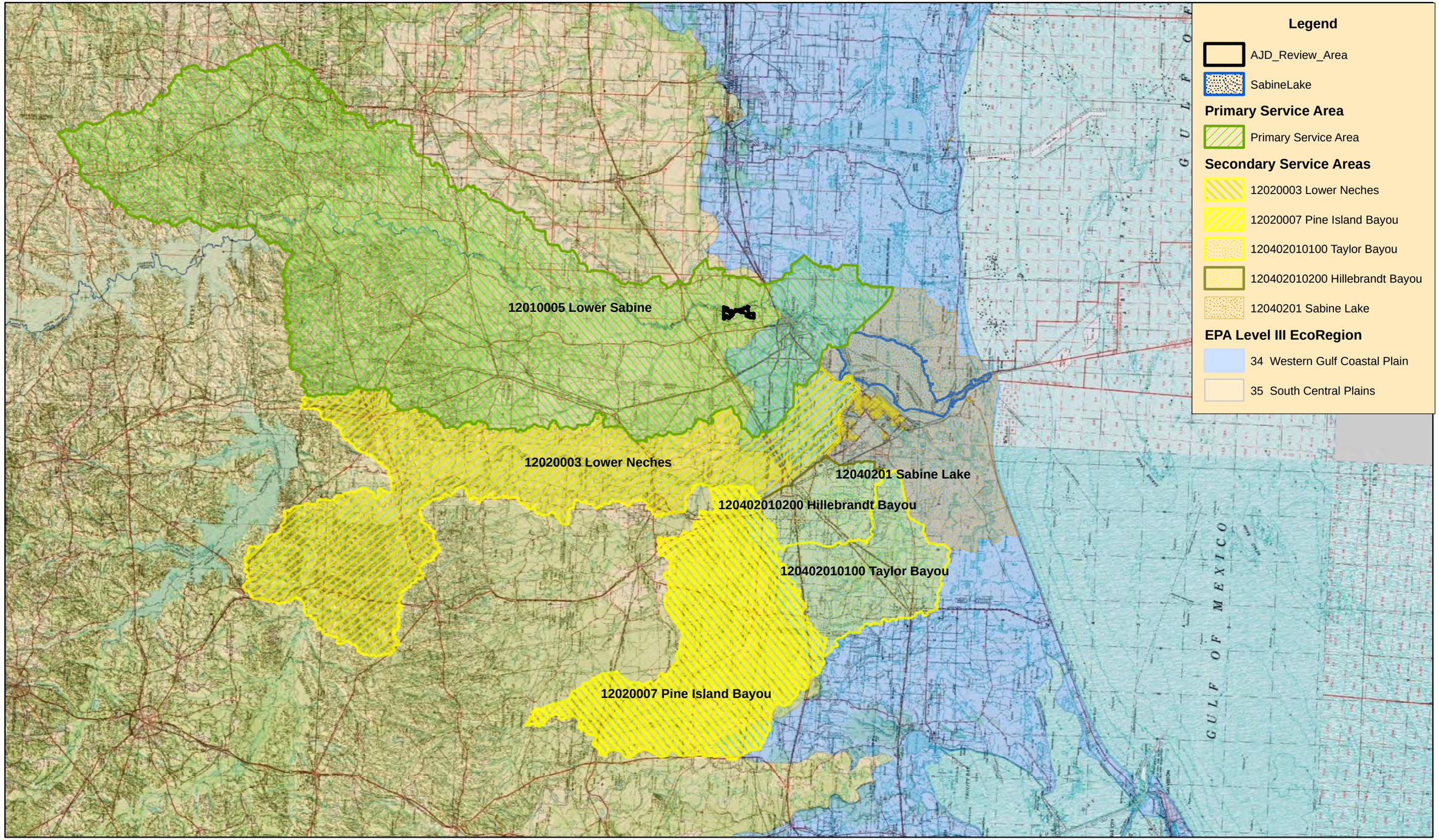


Figure 17. IP Potential Bank and HUC Service Areas

Level III Ecoregions, and USGS Hydrologic Unit Code (HUC) service areas.

DATE:May 3, 2023

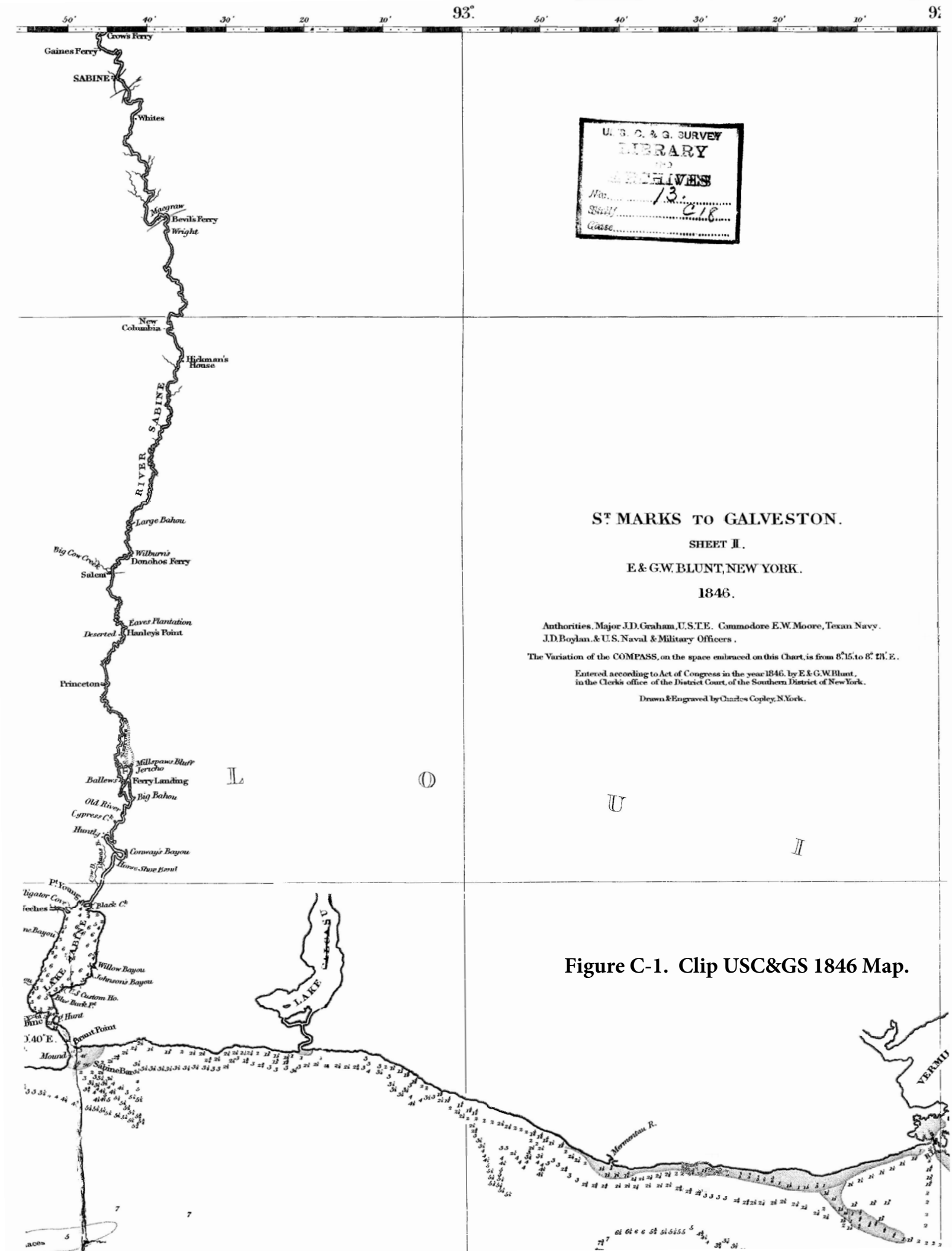
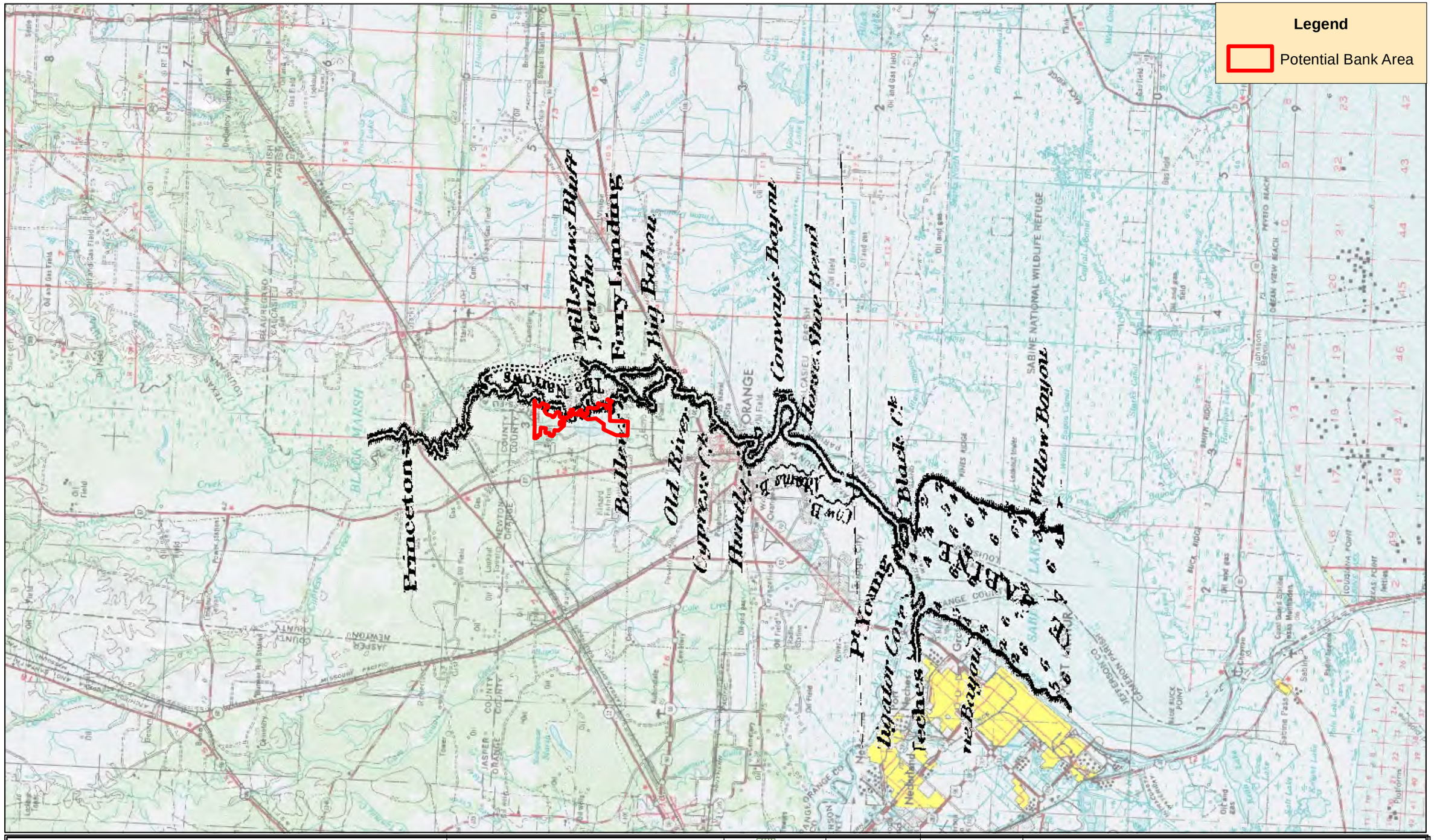


Figure C-1. Clip USC&GS 1846 Map.



5

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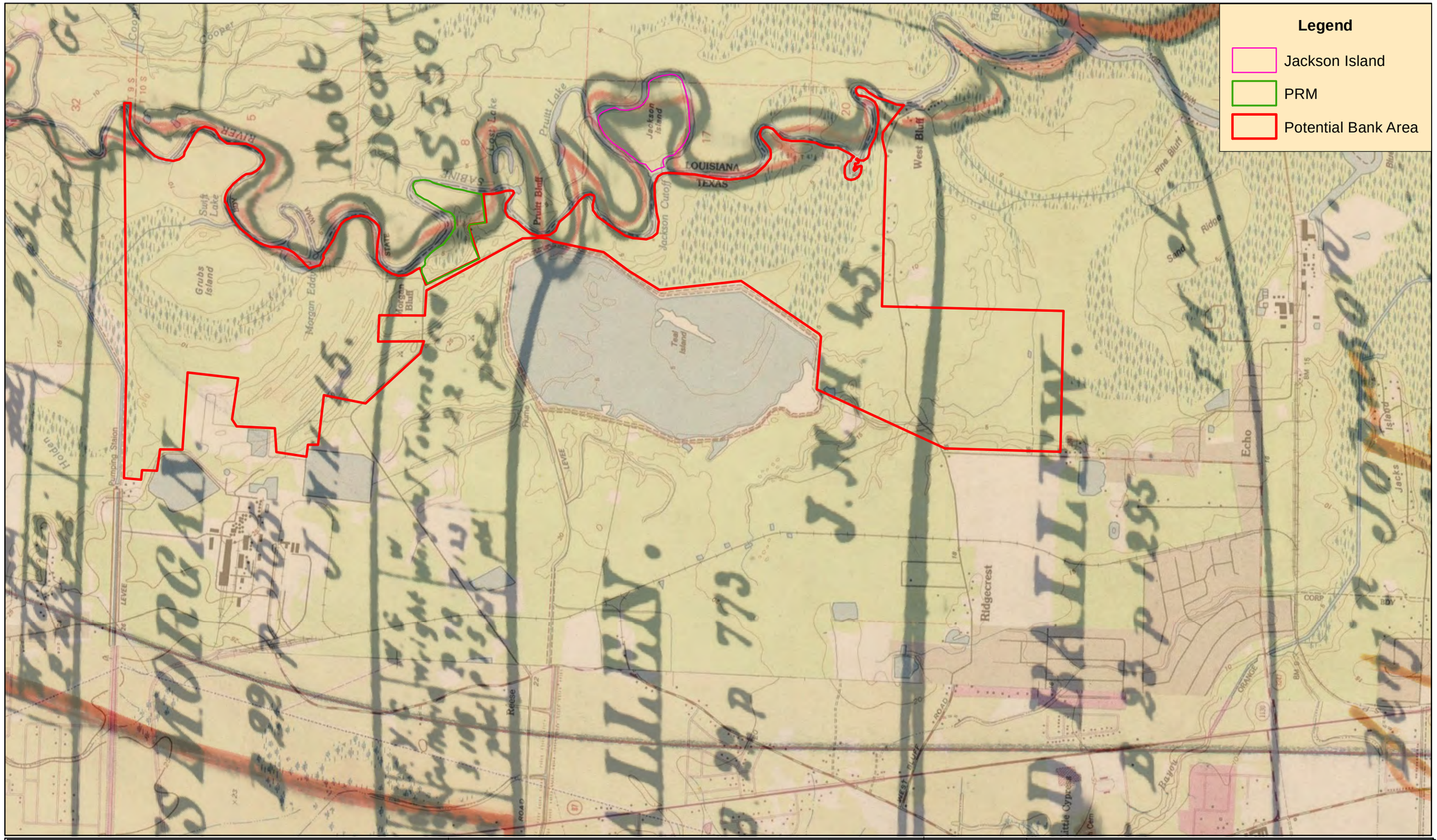
Figure C-2. IP Potential Bank with 1846 USC&GS map overlay.

Overlay of portion of the 1846 USC&GS map of the Sabine River and Sabine Lake with modern USGS maps and potential IP Bank.

DATE:Febuary 22, 2021



5

0 0.1 0.2 0.4 0.6 0.8 Miles

0 0.150.3 0.6 0.9 1.2 Kilometers

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Figure C-3. IP Potential Bank location on 1895 plot map.

Orthorectified 1897 plat map with USGS quadrangle basemap.

DATE:Febuary 22, 2021

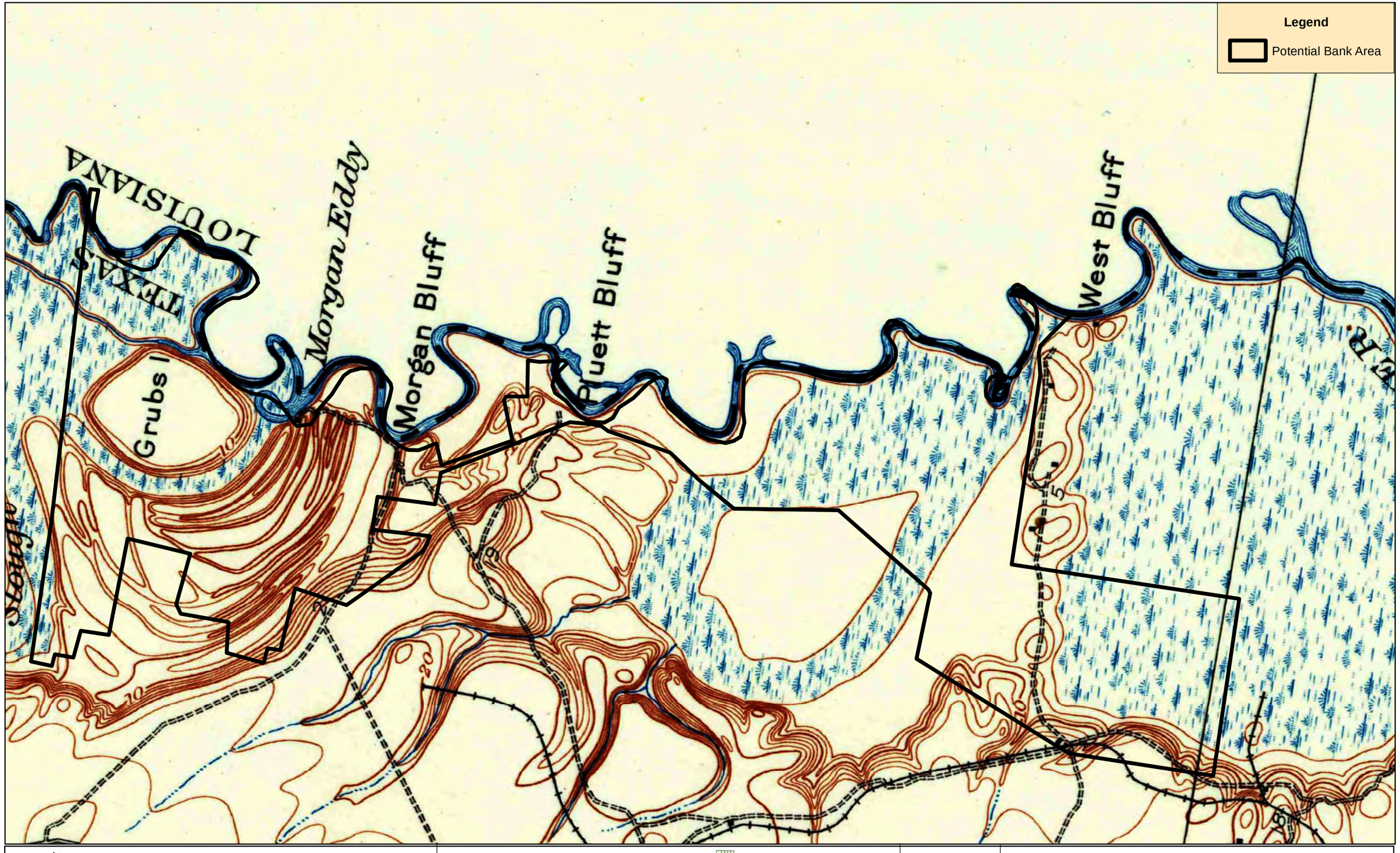

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Figure C-4. USGS 1932 Map

Location of the potential bank boundary on a 1932 USGS map.

DATE: December 9, 2019

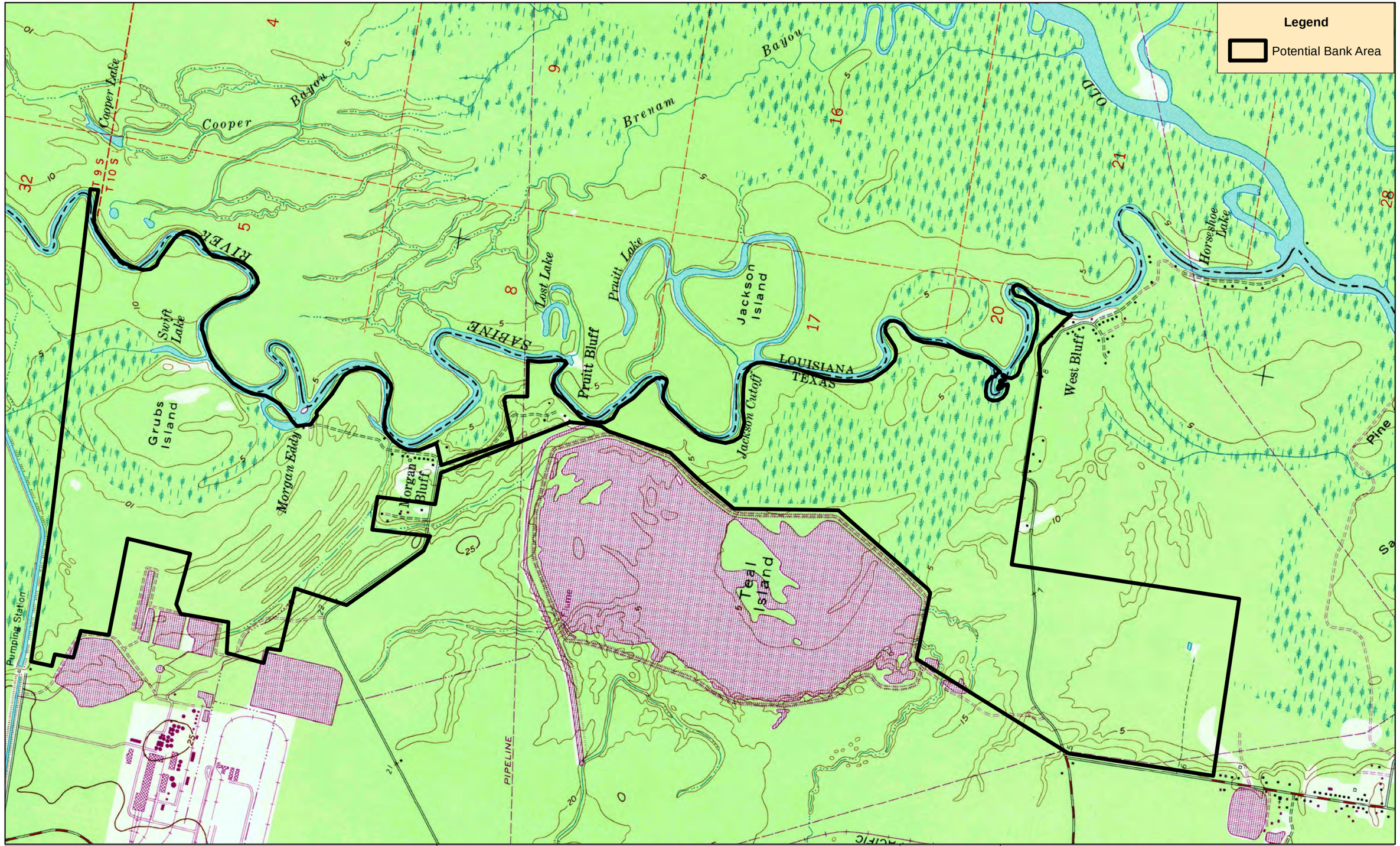

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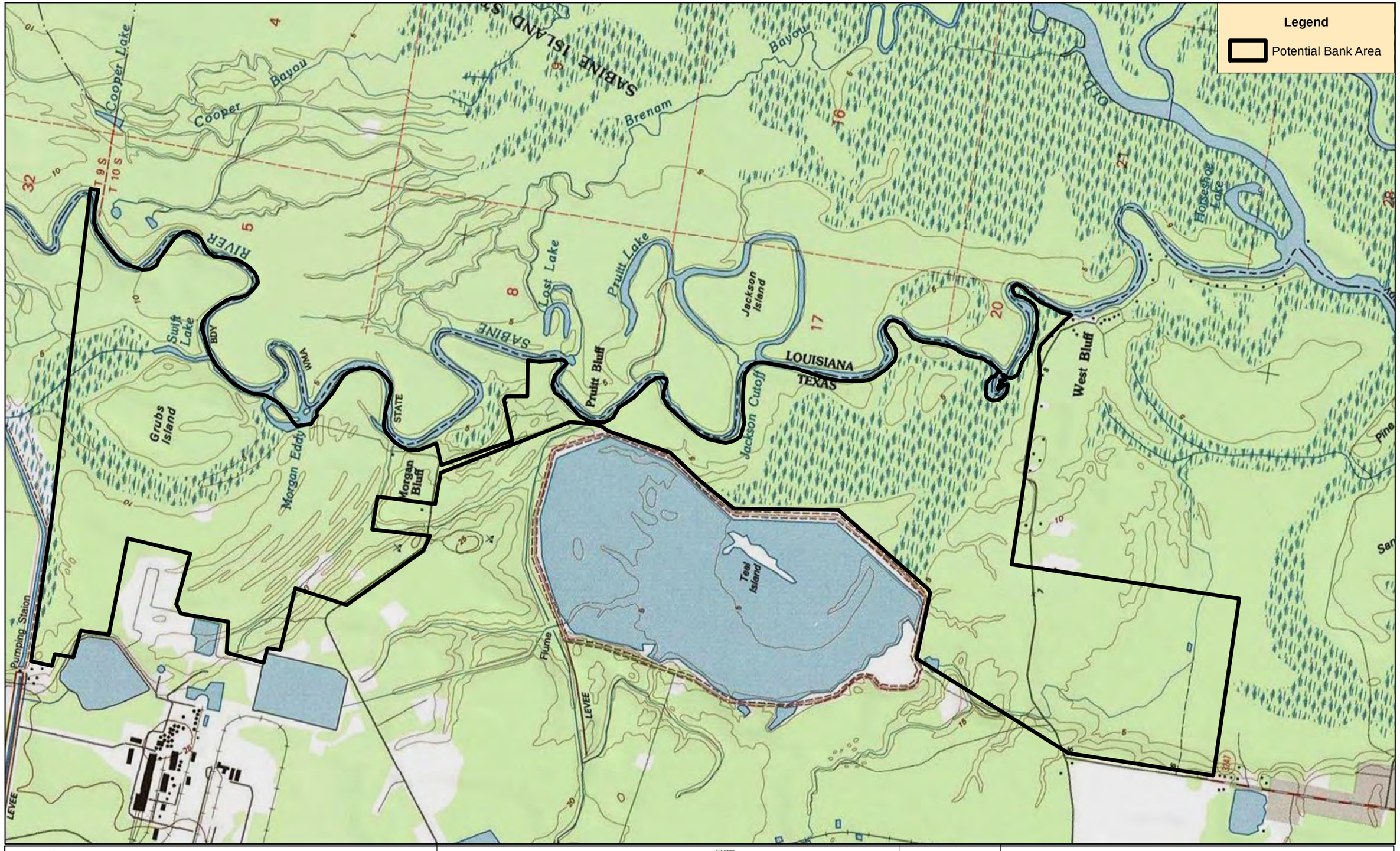
Figure C-5. USGS 1960 Echo Quadrangle

Location of the potential bank boundary on the 1960 USGS Echo Quadrangle map.

DATE: December 9, 2019



N E S W

0 0.075 0.15 0.3 0.45 0.6 Miles

0 0.125 0.25 0.5 0.75 1 Kilometers

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Figure C-6. USGS 1994 Echo Quadrangle

Location of the potential bank boundary on the 1994 USGS Echo Quadrangle map.

DATE: December 9, 2019

Section 14 Tables

Table 1 Observation Plot Characteristics

Determination plots values within the proposed bank area. The greyed-out columns are observation plots that did not meet the three indicator criteria for a jurisdictional wetland. Some of these characteristics are utilized in the iHGM field variable estimations, and percent tallow is presented for assessment of invasive species.

Station	NWI	Field	LiDAR (m)	Jurisdictional	Floodway	100yr	NRCS Soils	Tallow (T)	Tallow (S)
T1_1	None	PFO1A	3.44	Yes	No	Yes	Spurger fine sandy loam	0	0
T1_2	PSS1C	PFO1C	3.17	Yes	No	Yes	Spurger-Caneyhead	15	10
T1_3	PFO1A	PFO1/2A	3.34	Yes	No	Yes	Spurger-Caneyhead	5	10
T1_4	PFO1F	PFO1F	3.36	Yes	No	Yes	Spurger-Caneyhead	0	5
T1_5	None	None	3.89	No	No	Yes	Spurger-Caneyhead	0	0
T1_6	None	PFO1C	3.51	Yes	Yes	Yes	Spurger-Caneyhead	0	10
T1_7	None	None	3.7	No	Yes	Yes	Spurger-Caneyhead	0	10
T1_8	PFO1/2F	PFO1F	3.05	Yes	Yes	Yes	Spurger-Caneyhead	0	5
T1_9	PFO1A	PFO1A	3.37	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T1_10	PFO1C	PFO1C	2.43	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1_11	PFO1C	PFO1C	2.64	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1_12	PFO1/2F	PFO1/2F	1.83	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1_13	PFO1/2F	PFO1/2F	1.48	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1_14	PFO1C	PFO1C	2.25	Yes	Yes	Yes	Simelake clay	5	0
T1_15	PFO12F	PFO1C	2.74	Yes	Yes	Yes	Simelake clay	5	0
T1_16	PFO12F	PFO1F	2.38	Yes	Yes	Yes	Simelake clay	0	0
T1.GI_SE	PFO1/2F	PFO1/2F	0.98	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1.GI_SW	PFO1/2F	PFO1/2F	1.66	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T1.GI_Out	PFO1A	None	4.52	No	Yes	Yes	Spurger-Caneyhead	0	0
T1.GI_Mid	PFO1A	None	3.89	No	Yes	Yes	Spurger-Caneyhead	20	5
T2_1	None	PFO1A	3.54	Yes	No	Yes	Spurger fine sandy loam	0	5

Station	NWI	Field	LiDAR (m)	Jurisdictional	Floodway	100yr	NRCS Soils	Tallow (T)	Tallow (S)
T2_1Pond	None	PFO1F	2.93	Yes	No	Yes	Spurger-Caneyhead	5	0
T2_2	PFO1/2C	PFO1A	2.94	Yes	No	Yes	Spurger-Caneyhead	5	5
T2_3	None	PFO1/2A	2.99	Yes	No	Yes	Spurger-Caneyhead	0	0
T2_4	PFO1A	PFO1C	3.49	Yes	No	Yes	Spurger-Caneyhead	0	0
T2_5	PFO1A	PFO1C	2.62	Yes	No	Yes	Spurger-Caneyhead	0	0
T2_6	PEM1A	PF01C	2.59	Yes	Yes	Yes	Spurger-Caneyhead	0	30
T2_7	PEM1A	PFO1A	2.72	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T2_8	PEM1A	PFO1/2A	3.07	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T2_9	PFO1A	PFO1A	3.54	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T2_10	None	PFO1A	2.52	Yes	Yes	Yes	Spurger-Caneyhead	2	5
T2_11	PFO1A	PFO1C	2.24	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T2_12	PFO1A	PFO1C	1.57	Yes	Yes	Yes	Spurger-Caneyhead	5	10
T2_13	PFO1C	PFO1C	2.05	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T3_1	None	PFO1/2A	4.85	Yes	No	No	Texla silt loam	10	0
T3_2	None	PFO1A	2.87	Yes	No	Yes	Spurger-Caneyhead	0	0
T3_3	PFO1C	PFO1C	2.52	Yes	No	Yes	Spurger-Caneyhead	10	10
T3_4	PFO1/2F	PFO1/2F	1.13	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T3_5	PFO1/2F	PFO1F	0.9	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T3_6	PFO1C	PFO1F	1.22	Yes	Yes	Yes	Spurger-Caneyhead	0	5
T3_7	PFO1A	PFO1/2C	1.88	Yes	Yes	Yes	Spurger-Caneyhead	2	0
T4_1	None	--	3.76	No	Yes	Yes	Spurger-Caneyhead	10	0
T4_2	PFO1F	--	3.48	No	Yes	Yes	Spurger-Caneyhead	0	0
T4_3	PFO1F	PFO1F	1.74	Yes	Yes	Yes	Spurger-Caneyhead	0	0
T4_4	PFO1F	PFO1/2F	1.26	Yes	Yes	Yes	Cowmarsh mucky silty clay	10	5
T4_5	PFO1C	PFO1C	1.9	Yes	Yes	Yes	Cowmarsh mucky silty clay	5	0
T4_6	PFO1F	PFO1F	1.7	Yes	Yes	Yes	Cowmarsh mucky silty clay	10	20
T5_1	PFO1C	PFO1/2C	1.74	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	5
T5_2	PFO1C	PFO1C	0.87	Yes	Yes	Yes	Cowmarsh mucky silty clay	5	7
T5_3	PFO1A	PFO1A	1.54	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T6_1	PFO1C	PFO1/2F	0.87	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T6_2	PFO1A	PFO1A	1.69	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T7_1	None	PFO1A	2.24	Yes	No	Yes	Cowmarsh mucky silty clay	15	5

Station	NWI	Field	LiDAR (m)	Jurisdictional	Floodway	100yr	NRCS Soils	Tallow (T)	Tallow (S)
T7_2	None	PFO1A	2.65	Yes	No	Yes	Cowmarsh mucky silty clay	0	0
T7_3	None	PFO1A	1.93	Yes	No	Yes	Cowmarsh mucky silty clay	10	5
T7_4	None	PFO1A	2.55	Yes	No	Yes	Spurger-Caneyhead	5	0
T7_5	None	PFO1/2F	1.43	Yes	No	Yes	Spurger-Caneyhead	5	10
T7_6	PFO1/2F	PFO1/2F	0.79	Yes	No	Yes	Cowmarsh mucky silty clay	0	0
T7_7	PFO1/2F	PFO1/2F	0.69	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T7_8	PFO1/2F	PFO1/2F	0.8	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T8_1	PFO1C	PFO1C	1.32	Yes	Yes	Yes	Cowmarsh mucky silty clay	10	10
T8_2	None	PFO1/2C	1.62	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T8_3	None	PFO2C	1.97	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	5
T8_4	PFO1A	PFO1A	2.04	Yes	No	Yes	Cowmarsh mucky silty clay	0	0
T8_5	PFO1A	PFO1C	1.31	Yes	No	Yes	Cowmarsh mucky silty clay	5	10
T8_6	None	PFO1A	1.93	Yes	No	Yes	Cowmarsh mucky silty clay	5	0
T8_7	None	PFO1/2A	4.97	Yes	No	No	Spurger very fine sandy loam	5	0
T9_1	None	PFO2A	4.99	Yes	No	No	Spurger very fine sandy loam	0	0
T9_2	None	PFO12A	2.61	Yes	No	Yes	Spurger very fine sandy loam	0	0
T9_3	PSS1A	PFO1C	1.61	Yes	No	Yes	Cowmarsh mucky silty clay	5	0
T9_4	PFO1C	PFO1C	0.96	Yes	No	Yes	Cowmarsh mucky silty clay	5	0
T9_5	PFO1C	PFO1C	0.96	Yes	No	Yes	Cowmarsh mucky silty clay	5	15
T9_6	PFO1A	PFO1A	1.29	Yes	No	Yes	Cowmarsh mucky silty clay	5	0
T9_7	PFO1A	PFO1F	1.12	Yes	Yes	Yes	Cowmarsh mucky silty clay	25	40
T9_8	PFO1/2A	PFO2F	1.11	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
T9_9	PFO1C	PFO1F	0.99	Yes	Yes	Yes	Cowmarsh mucky silty clay	0	0
Average			**2.32**					**2.9%**	**3.5%**
Median			**2.24**					**0.000**	**0.000**

Table 2 Field HGM Variable Scores

Determination plot iHGM field variable scores within the proposed bank area. The greyed-out columns are observation plots that did not meet the three indicator criteria for a jurisdictional wetland.

Station	Vdur	Vfreq	Vtopo	Vcwd	Vwood	Vtree	Vrich	Vbasal	Vdensity	Vmid	Vherb	Vdetritus	Vredox	Vsorpt	Vconnect	WAA Polygon Class
T1_4	1	0.75	1	1	1	1	0.8	1	1	1	1	1	1	1	1	Cypress_Tupelo
T1.GI_Slough_E	1	1	1	1	1	1	0.6	1	1	0.25	0.3	1	1	1	1	Cypress_Tupelo
T1.GI_Slough_W	1	1	1	1	1	1	0.4	1	1	0.25	0.3	1	1	1	1	Cypress_Tupelo
T1_10	1	1	1	1	1	1	0.8	1	1	1	0.5	0.3	1	0.1	1	Cypress_Tupelo
T1_11	1	1	1	1	1	1	1	1	1	0.75	1	0.5	1	1	1	Cypress_Tupelo
T1_12	1	1	1	1	1	1	0.8	1	1	0.5	0.3	1	0.1	1	1	Cypress_Tupelo
T1_13	1	1	1	1	1	1	0.6	1	1	0.5	0.3	1	0.1	1	1	Cypress_Tupelo
T2_4	1	1	1	1	0.75	1	0.8	0.8	1	1	1	1	0.1	0.1	1	Cypress_Tupelo
T2_5	1	1	1	1	0.75	1	0.4	1	1	0.75	1	1	1	0.5	1	Cypress_Tupelo
T3_3	1	1	1	1	1	0.8	0.8	0.8	0.6	0.75	1	1	1	1	1	Cypress_Tupelo
T3_4	1	1	1	1	0.75	1	0.8	1	1	0.5	0.3	1	1	1	1	Cypress_Tupelo
T3_5	1	1	0.7	1	1	1	0.8	0.8	1	0.75	1	1	1	1	1	Cypress_Tupelo
T3_6	1	1	1	0.5	1	1	1	0.8	1	1	0.5	0.3	1	1	1	Cypress_Tupelo
T3_7	1	1	1	1	1	1	1	1	1	0.75	0.5	0.3	1	0.5	1	Cypress_Tupelo
T4_4	1	1	1	1	1	1	1	1	1	0.5	1	0.5	1	0.5	1	Cypress_Tupelo
T5_1	1	1	1	1	1	1	0.6	1	1	0.5	1	0.5	1	1	1	Cypress_Tupelo
T6_1	1	1	0.7	1	1	1	0.4	1	1	0.75	0.3	1	1	1	1	Cypress_Tupelo
T7_5	1	1	1	1	1	1	1	1	1	0.5	1	1	1	1	1	Cypress_Tupelo
T7_6	1	1	0.7	1	1	1	0.8	1	1	1	1	1	1	1	1	Cypress_Tupelo
T7_7	1	1	0.4	0.5	0.75	0.8	0.4	1	1	0.75	0.3	1	1	1	1	Cypress_Tupelo
T7_8	1	1	0.7	0.3	0.75	0.8	0.4	1	1	0.5	0.3	1	1	1	1	Cypress_Tupelo
T8_5	1	1	1	1	0.75	1	1	1	0.6	1	1	1	1	1	1	Cypress_Tupelo
T9_8	1	1	1	1	0.75	0.8	0.4	0.8	0.6	0.5	0.3	1	1	1	1	Cypress_Tupelo
T9_9	1	1	1	1	0.75	0.5	0.6	0.8	0.6	1	0.5	1	1	1	1	Cypress_Tupelo
T1_1	0.75	0.75	1	1	1	1	0.6	0.8	1	0.75	1	1	1	1	1	Deciduous
T1_14	1	1	1	1	1	1	1	1	1	1	1	0.5	1	1	1	Deciduous
T1_15	1	1	1	1	1	1	1	0.8	0.6	1	1	1	1	1	1	Deciduous
T1_16	1	1	1	0.5	0.75	1	1	0.8	1	1	1	1	1	1	1	Deciduous

Station	Vdur	Vfreq	Vtopo	Vcwd	Vwood	Vtree	Vrich	Vbasal	Vdensity	Vmid	Vherb	Vdetritus	Vredox	Vsorpt	Vconnect	WAA Polygon Class
T1_2	1	0.75	1	1	0.75	0.8	0.6	0.6	0.4	1	0.3	1	0.1	1	1	Deciduous
T1_3	0.75	0.75	1	1	0.75	1	0.8	1	1	1	0.3	1	1	0.5	1	Deciduous
T1_6	1	1	0.7	0.5	1	1	0.8	0.6	0.6	1	0.3	0.5	1	0.5	1	Deciduous
T1_8	1	1	1	1	1	1	0.4	0.8	0.6	1	1	0.3	1	0.5	1	Deciduous
T1_9	0.75	1	0.7	1	1	1	0.6	1	0.6	1	0.3	1	1	0.1	1	Deciduous
T2_2	1	0.75	1	1	0.75	0.8	1	0.8	0.6	1	0.75	1	1	1	1	Deciduous
T2_3	0.5	0.75	1	1	1	1	1	0.8	1	1	0.3	1	1	0.1	1	Deciduous
T2_6	1	1	1	1	1	0.3	1	0.6	0.4	1	0.5	0.5	1	0.5	1	Deciduous
T2_7	1	1	1	1	1	1	0.8	0.8	1	1	1	1	1	0.5	1	Deciduous
T2_8	0.75	1	0.7	1	1	1	0.6	0.8	1	0.75	1	1	1	0.1	1	Deciduous
T2_9	0.75	1	0.7	1	1	1	0.8	0.8	0.6	1	1	1	1	0.1	1	Deciduous
T2_10	0.75	1	0.7	1	1	1	1	0.8	0.4	1	0.3	1	0.1	0.5	1	Deciduous
T2_11	1	1	1	1	1	1	0.8	0.8	0.6	1	0.3	1	1	0.5	1	Deciduous
T2_12	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1	Deciduous
T2_13	1	1	1	1	1	1	1	1	1	0.75	0.5	0.3	1	0.1	1	Deciduous
T3_2	0.75	1	0.7	1	1	1	1	0.6	0.6	1	0.5	1	1	0.5	1	Deciduous
T4_3	1	1	1	1	1	1	0.6	0.8	0.6	0.25	1	0.3	1	0.5	1	Deciduous
T4_5	1	1	1	1	1	1	1	0.8	0.6	0.75	0.3	1	1	1	1	Deciduous
T4_6	1	1	1	1	1	0.5	0.8	0.8	0.4	1	1	1	1	1	1	Deciduous
T5_2	1	1	0.7	1	1	1	1	1	1	0.75	1	0.5	1	1	1	Deciduous
T5_3	1	1	1	1	1	1	1	0.8	1	0.5	1	0.3	1	1	1	Deciduous
T6_2	1	1	0.7	1	1	1	0.6	1	1	0.5	1	0.3	1	1	1	Deciduous
T7_1	0.75	0.75	1	1	1	0.5	0.8	1	0.6	0.75	1	1	1	1	1	Deciduous
T7_2	0.75	0.75	0.7	0.5	1	1	1	0.8	0.4	0.75	1	1	1	0.5	1	Deciduous
T7_3	0.75	0.75	0.7	1	1	0.8	0.8	0.8	0.6	0.75	1	1	1	1	1	Deciduous
T7_4	0.75	0.75	1	0.5	1	1	1	1	1	0.75	1	1	0.1	0.5	1	Deciduous
T8_1	1	1	1	1	1	1	1	1	1	0.75	0.3	1	1	0.5	1	Deciduous
T8_2	1	1	1	1	0.75	1	0.6	0.8	1	0.75	0.3	1	1	0.5	1	Deciduous
T8_3	1	1	0.4	1	1	1	0.8	1	1	0.75	1	1	0.1	1	1	Deciduous
T8_4	0.75	0.75	0.7	1	1	1	1	0.8	0.6	1	1	1	0.1	0.5	1	Deciduous
T8_6	0.75	0.75	1	1	1	1	1	0.8	1	1	1	1	1	1	1	Deciduous
T9_2	0.75	0.75	0.7	1	1	1	1	0.8	1	1	0.5	1	0.1	1	1	Deciduous

Station	Vdur	Vfreq	Vtopo	Vcwd	Vwood	Vtree	Vrich	Vbasal	Vdensity	Vmid	Vherb	Vdetritus	Vredox	Vsorpt	Vconnect	WAA Polygon Class
T9_3	1	1	0.7	1	1	1	0.6	0.8	1	1	1	1	1	1	1	Deciduous
T9_4	1	1	1	1	1	1	1	1	0.6	1	1	1	0.1	1	1	Deciduous
T9_5	1	1	1	1	1	1	1	0.8	1	1	1	1	0.1	0.5	1	Deciduous
T9_6	1	1	1	1	0.75	1	1	0.8	0.6	1	1	1	0.1	1	1	Deciduous
T9_7	1	1	0.7	0.5	0.75	0.3	0.4	0.8	0.4	1	0.3	1	1	1	1	Deciduous
T1_5	0.1	0.75	0.4	1	1	1	0.6	0.8	1	1	0.3	0.3	0.1	0.5	0.5	Upland
T1_7	0.1	0.75	0.4	1	1	1	1	1	1	1	1	0.3	0.1	0.1	0.5	Upland
T1.GI_Middle	0.25	0.75	0.4	0.5	0.5	0.3	0.8	0.6	0.6	1	1	0.3	0.1	0.1	0.5	Upland
T1.GI_Outer	0.25	0.75	0.4	0.5	0.5	0.8	0.4	0.6	0.4	1	0.3	0.3	0.1	0.1	0.5	Upland
T2_1	1	1	1	1	1	1	1	1	1	1	0.5	1	0.1	0.5	1	Outside AJD
T2_1Pond	1	0.75	1	1	0.5	0.3	0.8	0.4	0.4	0.5	1	1	0.1	1	1	Outside AJD
T3_1	0.5	0.5	0.4	0.3	0.5	0.8	0.8	0.4	0.4	0.5	0.3	1	1	1	1	Upland
T4_1	0.1	1	0.4	1	1	0.8	1	1	1	0.5	0.3	0.3	0.1	0.1	0.5	Upland
T4_2	0.25	1	0.7	1	1	1	1	1	1	0.5	0.3	0.3	0.1	0.1	0.5	Upland
T8_7	0.5	0.5	0.4	1	1	1	1	1	0.6	0.75	1	1	1	0.5	1	Upland
T9_1	0.5	0.5	0.4	1	0.75	1	0.8	1	1	1	1	1	0.1	0.1	1	Upland
Model	n	Vdur	Vfreq	Vtopo	Vcwd	Vwood	Vtree	Vrich	Vbasal	Vdensity	Vmid	Vherb	Vdetritus	Vredox	Vsorpt	Vconnect
One WAA																
Average	65	0.938	0.950	0.898	0.935	0.942	0.934	0.800	0.880	0.828	0.815	0.719	0.860	0.834	0.757	1.000
Median	65	1.000	1.000	1.000	1.000	1.000	1.000	0.800	0.800	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Cypress Tupelo																
Average	24	1.000	0.990	0.925	0.929	0.917	0.946	0.717	0.950	0.933	0.698	0.654	0.850	0.888	0.863	1.000
Median	24	1.000	1.000	1.000	1.000	1.000	1.000	0.800	1.000	1.000	0.750	0.500	1.000	1.000	1.000	1.000
Oak Sweetgum																
Average	41	0.902	0.927	0.883	0.939	0.957	0.927	0.849	0.839	0.766	0.884	0.757	0.866	0.802	0.695	1.000
Median	41	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.800	0.600	1.000	1.000	1.000	1.000	0.500	1.000

Table 3 Functional Capacity Index Scores by Observation Plot

Determination plot Functional Capacity Index Scores (FCI) within the proposed bank area. The greyed-out columns are observation plots that did not meet the criteria for to be considered a jurisdictional wetland in the AJD. These plot values were not used in the calculation of the central tendencies and were excluded from the FCU calculations.

Station	Random Station	Temporary Storage & Detention of Storage Water	Maintain Plant & Animal Community	Removal & Sequestrian of Elements & Compounds
T1_1	--	0.866	0.896	0.900
T1_2	Yes	0.891	0.758	0.823
T1_3	--	0.829	0.908	0.800
T1_4	--	0.931	0.967	0.950
T1_5	--	0.468	0.775	0.590
T1_6	--	0.856	0.758	0.880
T1_7	--	0.468	0.917	0.563
T1_8	--	1.000	0.850	0.920
T1_9	--	0.883	0.842	0.870
T1_10	--	1.000	0.925	0.893
T1_11	--	1.000	0.979	0.967
T1_12	--	1.000	0.867	0.940
T1_13	--	1.000	0.833	0.940
T1_14	--	1.000	1.000	0.967
T1_15	--	1.000	0.950	1.000
T1_16	--	0.866	0.900	0.900
T1.GI_SE	--	1.000	0.813	1.000
T1.GI_SW	--	1.000	0.779	1.000
T1.GI_Outer	--	0.450	0.558	0.427
T1.GI_Middle	--	0.450	0.617	0.427
T2_1	--	1.000	0.958	0.907
T2_1Pond	--	0.850	0.708	0.757
T2_2	--	0.891	0.896	0.883
T2_3	--	0.783	0.925	0.790
T2_4	--	0.957	0.950	0.813

Station	Random Station	Temporary Storage & Detention of Storage Water	Maintain Plant & Animal Community	Removal & Sequestrian of Elements & Compounds
T2_5	--	0.957	0.879	0.900
T2_6	Yes	1.000	0.758	0.933
T2_7	--	1.000	0.950	0.967
T2_8	--	0.883	0.896	0.870
T2_9	--	0.883	0.917	0.870
T2_10	--	0.883	0.875	0.837
T2_11	--	1.000	0.858	0.967
T2_12	--	1.000	1.000	0.967
T2_13	--	1.000	0.938	0.893
T3_1	--	0.447	0.617	0.580
T3_2	--	0.883	0.892	0.897
T3_3	--	1.000	0.863	1.000
T3_4	Yes	0.957	0.867	0.933
T3_5	--	0.949	0.929	0.980
T3_6	--	0.913	0.858	0.920
T3_7	--	1.000	0.938	0.920
T4_1	--	0.503	0.783	0.613
T4_2	--	0.671	0.817	0.663
T4_3	--	1.000	0.821	0.920
T4_4	Yes	1.000	0.958	0.933
T4_5	--	1.000	0.871	1.000
T4_6	--	1.000	0.817	1.000
T5_1	--	1.000	0.892	0.967
T5_2	--	0.949	0.979	0.947
T5_3	Yes	1.000	0.942	0.953
T6_1	Yes	0.949	0.821	0.980
T6_2	Yes	0.949	0.892	0.933
T7_1	--	0.866	0.829	0.900
T7_2	--	0.742	0.829	0.813

Station	Random Station	Temporary Storage & Detention of Storage Water	Maintain Plant & Animal Community	Removal & Sequestrian of Elements & Compounds
T7_3	--	0.822	0.863	0.880
T7_4	--	0.791	0.896	0.773
T7_5	--	1.000	0.958	1.000
T7_6	--	0.949	0.967	0.980
T7_7	--	0.742	0.704	0.860
T7_8	Yes	0.764	0.650	0.867
T8_1	--	1.000	0.921	0.967
T8_2	--	0.957	0.838	0.900
T8_3	--	0.894	0.946	0.900
T8_4	Yes	0.822	0.950	0.787
T8_5	--	0.957	0.967	0.933
T8_6	--	0.866	0.983	0.900
T8_7	--	0.632	0.946	0.727
T9_1	--	0.599	0.967	0.573
T9_2	--	0.822	0.942	0.820
T9_3	--	0.949	0.917	0.980
T9_4	--	1.000	0.967	0.940
T9_5	Yes	1.000	0.983	0.907
T9_6	--	0.957	0.950	0.873
T9_7	--	0.806	0.575	0.880
T9_8	--	0.957	0.717	0.933
T9_9	--	0.957	0.758	0.933

Table 4 IP Bank FCI calculations

Calculated Functional Capacity Indices for the Proposed IP Bank utilizing Mean and Median Variable scores.

WAA Consideration	Number of Observations	Temporary Storage & Detention of Storage Water	Maintain Plant & Animal Community	Removal & Sequestrian of Elements & Compounds
One WAA Mean	65	0.935	0.931	0.904
One WAA Median	65	1.000	1.000	0.966
Cypress Tupelo Mean	24	0.959	0.868	0.939
Cypress Tupelo Median	24	1.000	0.904	1.000
Deciduous Mean	41	0.920	0.890	0.900
Deciduous Median	41	1.000	0.950	0.967

Table 5 IP Bank FCU Calculations using the Mean

Calculated Functional Capacity Units for the Proposed IP Bank utilizing Mean Variable scores.

Resource Area	Cypress Tupelo FCU	Deciduous FCU	Combined	One WAA FCU
Acres of Resource	636.23	819.46	1455.70	1455.70
Temporary Storage & Detention of Storage Water	609.85	754.29	1364.14	1360.72
Maintain Plant & Animal Community	552.39	729.02	1281.41	1354.53
Removal & Sequestrian of Elements & Compounds	597.61	737.65	1335.26	1316.40
Number of Samples in Database	24	41	65	65

Table 6 IP Bank FCU Calculations using the Median

Calculated Functional Capacity Units for the Proposed IP Bank utilizing Median Variable scores.

Resource Area	Cypress Tupelo FCU	Deciduous FCU	Combined	One WAA FCU
Acres of Resource	636.23	819.46	1455.70	1455.70
Temporary Storage & Detention of Storage Water	636.23	819.46	1455.69	1455.70
Maintain Plant & Animal Community	575.26	778.49	1353.74	1455.70
Removal & Sequestrian of Elements & Compounds	636.23	792.14	1428.37	1406.34
Number of Samples in Database	24	41	65	65

Section 15 Appendixes

Appendix A Copy of Available Deeds

TITLE SEARCH/TITLE REPORT

SECURITY ABSTRACT AND TITLE CO.

3800 N. 16th Street
Orange, Texas 77632
(409) 883-4514

THIS REPORT IS NOT TITLE INSURANCE. Liability hereunder is limited to the amount paid for same. This report is furnished solely as an accommodation to the party requesting same and should not be relied upon as a warranty or representation as to the title to the property described herein and may not be given to or used by any third party. Fidelity National Title and Chicago Title assumes no liability whatsoever for the accuracy of this report nor for any omission or error with respect hereto. **YOU AGREE TO RELEASE, INDEMNIFY AND HOLD HARMLESS FIDELITY NATIONAL TITLE AND CHICAGO TITLE BECAUSE OF ANY NEGLIGENCE BY FIDELITY NATIONAL TITLE AND CHICAGO TITLE (WHETHER SOLE, JOINT OR OTHERWISE) FOR ANY CLAIM, LIABILITY OR DAMAGES ARISING OUT OF THIS REPORT.** This report is not title insurance. If a policy of title insurance is purchased, any liability there under shall be determined solely by the terms of such policy.

Date: May 25, 2018

ATTN: Kevin Havens
FILE NO. GF# 1830737
SEARCH THROUGH DATE: May 15, 2018

CURRENT OWNER OF THE PROPERTY:
TIN, Inc. (formerly known as Temple-Inland Forest Products Corporation) as set forth in Affidavit of Corporate Mergers and Name Changes recorded under Clerk's File No. 279956 and Clerk's File No. 322338, Official Public Records of Orange County, Texas.

HOW THE PROPERTY WAS CONVEYED TO THE CURRENT OWNER:
General Warranty Deed (Correction) dated July 12, 1989, filed July 18, 1989 under Volume 725, Page 630 from Owens-Illinois, Inc., a Delaware corporation to Temple-Inland Forest Products Corporation, a Delaware corporation, formerly known as Temple-EasTex Incorporated.

LIENS:
None found of record.

LEGAL DESCRIPTION:
All that certain land situated in Orange County, Texas and described in Exhibit "A" as attached hereto and made apart hereof for all purposes.

SECURITY ABSTRACT AND TITLE CO.

By: Cullin Smith

Exhibit A

TRACT NO. 402
Tract A

Telephone - Area Code 409-634-4934 EAST TEXAS ENGINEERING & SURVEYING, INC. 118 E. Lufkin Ave., Lufkin, Texas 7

February 12, 1987

JOHN ALLEN SURVEY, ABSTRACT 1
RICHARD BALLIEW SURVEY, ABSTRACT 2
F. Y. C. GUTHRIE SURVEY, ABSTRACT 90
CHAS. MORGAN SURVEY, ABSTRACT 18
WILLIAM MORGAN SURVEY, ABSTRACT 266
JACOB TOWNSEND SURVEY, ABSTRACT 180
WM. G. WRIGHT SURVEY, ABSTRACT 235
ORANGE COUNTY, TEXAS

FIELD NOTES FOR 4,231.674 ACRES OF LAND

BEING 4,231.674 acres of land situated in the John Allen Survey, Abstract 1, the Richard Balliew Survey, Abstract 2, the F. Y. C. Guthrie Survey, Abstract 90, Chas. Morgan Survey, Abstract 18, the William Morgan Survey, Abstract 266, the Jacob Townsend Survey, Abstract 180, and the Wm. G. Wright Survey, Abstract 235, all in Orange County, Texas, and being all that certain called 25 acres of land as described in a deed from Knox Kinard to Owens-Illinois, Inc., dated March 17, 1966, and recorded in Volume 351, Page 614, being all of Tract A and part of Tract B of Exhibit "A" of a deed from Powell Lumber Company to Owens-Illinois, Inc., dated February 24, 1966, and recorded in Volume 350, Page 118, being part of Parcel Numbers 1, 4 and 5 of Exhibit "A" from a deed from W-K-N Development Corporation to Owens-Illinois, Inc., dated February 24, 1966, and recorded in Volume 350, Page 148, being all of that certain tract of land as described in a deed from Nelda C. Stark, Executrix, et al., to Owens-Illinois, Inc., dated January 12, 1966, and recorded in Volume 348, Page 9, being all that certain Tract One and Tract Two as described in a deed from James S. Wooten, Sr. et ux to Owens-Illinois, Inc., dated May 20, 1965 and recorded in Volume 337, Page 212, being that certain called 1.01 acre tract of land as described in a deed from Casey J. Peveto, Sr. et ux to Owens-Illinois, Inc., dated May 20, 1965 and recorded in Volume 337, Page 157, being those certain Tract One and Tract Two as described in a deed from J. R. Peveto et ux to Owens-Illinois, Inc., dated May 20, 1965 and recorded in Volume 337, Page 160, all of the above referenced deeds being recorded in the Deed Records of Orange County, Texas, said 4,231.674 acres of land to be more particularly described by metes and bounds as follows:

BEGINNING at a 1 1/4" iron pipe found for corner on the West bank of the Sabine River, said point being the Southeast corner of Tract A of Exhibit "A" as described in a deed from Powell Lumber Company to Owens-Illinois, Inc., and recorded in Volume 350, Page 118 of the Deed Records of Orange County, Texas, from said point for corner a 15" Cypress bears North 05° West, distance of 95.5 feet, a 12" Hickory bears North 16° West, a distance of 57.6 feet and a 6" Tallow bears North 38° West, a distance of 8.2 feet, all marked with a new //X//;

THENCE South 89° 07' 14" West, a distance of 5,118.46 feet with the South boundary line of said Tract A to a railroad rail found for an ell corner of Tract A, from said point for corner a 4" Willow Oak bears North 33° East, a distance of 7.4 feet, a 7" Sweet Gum bears South 68° West, a distance of 18.9 feet, both trees marked with an old X, a 6" Willow Oak bears North 30° West, a distance of 23.0 feet and a 14" Water Oak bears South 49° West, a distance of 28.6 feet, both marked with a new //X//;

THENCE South 00° 52' 39" East, a distance of 4,303.69 feet with the Southerly East boundary line of Tract A and the East line of that certain Parcel No. 5, Exhibit "A" from W-K-N Development Corp. to Owens-Illinois and recorded in Volume 350, Page 148, and along a green painted line to a 1/2" iron rod set for corner at the most Easterly Southeast corner of said Parcel No. 5, from said point for corner a 10" Locust bears North 70° West, a distance of 27.7 feet, a 14" Cypress bears North 43° West, a distance of 30.9 feet and a 6" Willow Oak bears North 28° West, a distance of 32.7 feet, all marked with a new //X//;

TRACT NO. 402
Tract A

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 2

THENCE South 89° 05' 12" West, a distance of 5,290.13 feet with the South boundary line of Parcel 5 and with a green painted line to a 1/2" iron rod replacing a Pine knot found for an ell corner of Parcel No. 5, from said point for corner a 22" Pine bears South 20° East, a distance of 4.5 feet, a 6" Sweet Gum bears North 20° East, a distance of 15.4 feet and a 6" Black Gum bears East, a distance of 8.4 feet, all marked with a new //X//;

THENCE South 00° 37' 46" West, a distance of 1,649.45 feet with the Southerly East boundary line of Parcel No. 5 to a 6" X 6" concrete monument marked GSU found for the Westerly Southeast corner of Parcel No. 5, from said point for corner a 12" Water Oak bears North 21° West, a distance of 22.5 feet, an 18" Water Oak bears North 63° West, a distance of 4.7 feet and a 6" Water Oak bears South 58° West, a distance of 19.2 feet, all marked with a new //X//;

THENCE South 88° 19' 52" West, a distance of 1,727.88 feet with the Westerly South boundary line of Parcel No. 5 to a 1/2" iron rod set for the Southwest corner of Parcel No. 5, from said point for corner a 12" Elm bears North 34° East, a distance of 10.5 feet, a 14" Pine bears South 70° East, a distance of 2.4 feet and a 12" Post Oak bears South 14° East, a distance of 31.6 feet, all marked with a new //X//;

THENCE North 00° 55' 44" West, a distance of 3,567.70 feet with the Southerly West boundary line of Parcel No. 5 and a green painted line to a 1/2" iron rod set for the Westerly Northwest corner of Parcel No. 5, from said point for corner a 12" Red Oak bears South 23° East, a distance of 8.5 feet, a 6" Pine bears South 46° East, a distance of 27.9 feet and a 16" Pine bears South 74° East, a distance of 37.0 feet, all marked with a new //X//;

THENCE North 88° 07' 13" East, a distance of 379.71 feet with the Westerly North line of Parcel No. 5 to a fence post found for an ell corner of Parcel No. 5, from said point for corner an 11" Pine bears North 54° East, a distance of 50.1 feet and a 24" Red Oak bears South 27° West, a distance of 11.2 feet, both marked with a new //X//;

THENCE South 19° 01' 10" East, a distance of 130.07 feet with a green painted line to a fence post found for an ell corner of Parcel No. 5;

THENCE South 89° 23' 53" East, a distance of 277.43 feet to a 1/2" iron rod set for an ell corner of Parcel No. 5, from said point for corner a 9" Holly bears South 83° East, a distance of 14.0 feet, an 18" White Oak bears South 60° East, a distance of 14.4 feet and a 22" White Oak bears South 63° West, a distance of 2.1 feet, all marked with a new //X//;

THENCE North 12° 38' 27" West, a distance of 137.21 feet to a 1" crimped pipe found for an ell corner of Parcel No. 5, from said point for corner a 6" Sweet Gum bears South 67° East, a distance of 22.6 feet, a 17" White Oak bears South 63° East, a distance of 53.8 feet and a 16" Sweet Gum bears South 40° East, a distance of 33.5 feet, all marked with a new //X//;

THENCE North 89° 08' 13" East, a distance of 1,115.80 feet with a North boundary line of Parcel No. 5 and a green painted line to a 1" iron rod found for an ell corner of Parcel No. 5, from said point for corner a 6" Ash bears South 20° East, a distance of 24.4 feet, marked with an old green X, an 8" Red Oak bears North 08° West, a distance of 8.0 feet, marked with an old X// and a 7" Sweet Gum bears North 40° East, a distance of 33.9 feet, marked with a new //X//;

THENCE North 00° 52' 45" West, a distance of 1,708.51 feet with the most Northerly West boundary line of Parcel No. 5 and a West boundary line of said Tract A and along a green painted line to a 1/4" iron rod found for an ell corner of Tract A, from said point for corner a 6" Sweet Gum bears South 05° East, a distance of 9.5 feet, marked with an old X/, a 12" Pine bears South 64° East, a distance of 33.3 feet and a 6" Water Oak bears South 70° East, a distance of 26.4 feet, both marked with a new //X//;

THENCE North 88° 54' 03" East, a distance of 226.81 feet to a 4" round concrete monument found for an ell corner of Tract A, from said point for corner an 8" Sweet Gum bears North 89° East, a distance of 15.7 feet and a 20" Pine bears South 40° East, a distance of 11.0 feet, both marked with an old X//, a 6" Water Oak bears South 76° East, a distance of 21.7 feet and a 10" Water Oak bears South 75° West, a distance of 21.8 feet, both marked with a new //X//;

THENCE North 00° 18' 22" East, a distance of 1,546.34 feet with a West boundary line of said Tract A and an old silver and orange paint line to a 5/8" iron rod set in concrete found for an ell corner of Tract A and being in the North line of said Balliew Survey and the South line of said Allen Survey, from said point for corner a 6" Pine bears North 73° East, a distance of 17.5 feet, a 5" Pine bears North 24° East, a distance of 17.8 feet, a 6" Privet bears South 52° East, a distance of 12.6 feet, all marked with a new //X// and a 12" Snag bears North 45° East, a distance of 13.7 feet, marked with an old X;

THENCE South 89° 10' 00" West, a distance of 1,515.73 feet with a South boundary line of Tract A and with the division line between said surveys to a 3/8" iron rod in concrete found for an ell corner of Tract A, from said point for corner a 9" Black Gum bears South 75° East, a distance of 9.9 feet, marked with an old X, a 20" Pine bears North 35° East, a distance of 5 feet and a 9" Water Oak bears South 65° West, a distance of 3.7 feet, both marked with a new //X//;

THENCE North 00° 45' 07" West, a distance of 157.72 feet with a West boundary line of Tract A to a 1" iron rod in concrete found for an ell corner of same, from said point for corner a 10" Willow Oak bears South 45° West, a distance of 16.7 feet, marked with an old X, a 10" Willow Oak bears North 88° East, a distance of 22.5 feet and an 8" Post Oak bears South 38° East, a distance of 11.5 feet, both marked with a new //X//;

THENCE North 89° 49' 37" West, a distance of 570.98 feet with a South boundary line of Tract A and a green painted line to a 1 1/2" shaft found for an angle corner, from said point for corner a 6" Water Oak bears North 35° East, a distance of 28.0 feet, a 16" Water Oak bears North 08° East, a distance of 11.5 feet and a 13" Sweet Gum bears North 68° West, a distance of 15.7 feet, all marked with a new //X//;

THENCE South 89° 12' 40" West, a distance of 158.10 feet with a South boundary line of Tract A to a 5/8" iron rod found for an ell corner of same, from said point for corner a 6" Tallow bears North 05° East, a distance of 18.8 feet, a 7" Pine bears South 69° West, a distance of 46.8 feet and a 14" Water Oak bears North 80° West, a distance of 42.0 feet, all marked with a new //X//;

THENCE South 01° 23' 29" East, a distance of 153.89 feet with an East boundary line of Tract A to a 1/2" iron pipe found for an ell corner of Tract A and the Westerly Northeast corner of Parcel No. 4 of Exhibit "A", from said point for corner a 6" Sweet Gum bears South 85° West, a distance of 58.5 feet, a 13" Pine bears North 86° West, a distance of 62.5 feet and a 12" Sweet Gum bears North 52° West, a distance of 55.7 feet, all marked with a new //X//;

THENCE South 01° 32' 30" East, a distance of 396.70 feet with the Northerly East boundary line of Parcel No. 4 to a 3" X 3" concrete monument found for an ell corner of same, from said point for corner an 18" White Oak bears South 50° West, a distance of 20.5 feet, marked with an old X, a 21" Pine bears North 87° West, a distance of 14.3 feet and a 6" Sweet Gum bears South 80° East, a distance of 10.5 feet, both marked with a new //X//;

THENCE North 89° 14' 34" East, a distance of 156.76 feet with a North boundary line of Parcel No. 4 to a 1/2" iron rod set for corner, from said point for corner a 9" Pine bears South 03° East, a distance of 19.1 feet, a 13" Pine bears South 65° West, a distance of 13.40 feet and a 7" Pine bears North 83° West, a distance of 12.8 feet, all marked with a new //X//;

THENCE South 01° 24' 30" East, a distance of 967.62 feet with the middle East boundary line of Parcel No. 4 and a green painted line to a 1/2" iron pipe found for the Easterly Southeast corner of Parcel No. 4, from said point for corner an 8" Sweet Gum snag bears South 23° East, a distance of 6.3 feet, marked with an old /X/, a 22" Water Oak bears North 86° West, a distance of 34.9 feet, a 21" Sweet Gum bears North 26° West, a distance of 45.1 feet and a 22" Water Oak bears North 45° West, a distance of 69.7 feet, all marked with a new //X//;

THENCE South 88° 27' 07" West, a distance of 1,348.50 feet with the Easterly South boundary line of Parcel No. 4 to a 3/4" iron pipe found for an ell corner of Parcel No. 4, from said point for corner a 21" White Oak (dead) bears South 05° East, a distance of 23.0 feet, a 15" Sweet Gum snag (dead) bears North 03° West, a distance of 32.2 feet and a 25" Pine bears North 10° West, a distance of 20.2 feet, all marked with an old X, a 6" Black Gum bears South 85° West, a distance of 29.3 feet and an 8" Water Oak bears North 53° East, a distance of 27.0 feet, both marked with a new //X//;

THENCE South 01° 26' 40" East, a distance of 1,101.25 feet with the Southerly East boundary of Parcel No. 4 and with a green painted line to a 1/2" iron rod set for the Westerly Southeast corner, from said point for corner a 14" Pine bears North 35° West, a distance of 7.1 feet and a 14" Sweet Gum bears North 45° East, a distance of 43.3 feet, both marked with an old X and a 14" Red Oak bears West, a distance of 44.9 feet, marked with a new //X//;

THENCE South 88° 31' 56" West, a distance of 973.04 feet with the Westerly South boundary line of Parcel No. 4 to a 1/2" iron rod set for corner in the Southwest boundary line of West Bluff Road, from said point for corner a 34" Willow Oak bears South 47° East, a distance of 14.0 feet, no marks, a 20" Willow Oak bears North 24° East, a distance of 77.8 feet and a 22" Pine bears North 70° East, a distance of 77.7 feet, both marked with a new //X//;

THENCE North 61° 02' 47" West, a distance of 368.57 feet with the Southwest boundary line of West Bluff Road and the Southwest boundary line of Parcel No. 4 to a 1" iron pipe found for corner, from said point for corner an 18" Pine bears North 09° East, a distance of 85.2 feet, an 8" Sweet Gum bears North, a distance of 74.4 feet and an 8" Pine bears North 14° East, a distance of 63.4 feet, all marked with a new //X//;

THENCE North 00° 53' 48" West, a distance of 2,308.52 feet with the West line of Parcel No. 4 and a painted line to a 1" iron rod found for the Northwest corner of Parcel No. 4 in the North line of said Balliew Survey and the South boundary line of said Allen Survey, from said point for corner an 11" Water Oak bears North 67° East, a distance of 12.0 feet, a 15" Water Oak bears South 57° East, a distance of 4.6 feet and an 8" Post Oak bears North 03° East, a distance of 13.1 feet, all marked with a new //X//;

THENCE North 89° 22' 04" East, a distance of 669.53 feet with the North boundary line of Parcel No. 4 and with the division line between said surveys to a 3/4" bolt found for the Southwest corner of said Tract A, from said point for corner a 27" White Oak bears South 69° East, a distance of 6.2 feet, a 21" White Oak bears North 11° East, a distance of 40 feet and a 5" Pine bears South 66° West, a distance of 23.1 feet, all marked with an old green X;

THENCE North 00° 18' 49" West, a distance of 3,610.10 feet with the West boundary line of Tract A to a 1/2" iron rod set for the Northwest corner of Tract A in the East boundary line of Old Highway 87, from said point for corner a 13" Post Oak bears North 51° East, a distance of 34.6 feet, a 14" Pine bears North 47° West, a distance of 67.9 feet, both marked with a new //X// and a chain link fence post bears North 89° 27' East, a distance of 8.0 feet;

THENCE South 89° 28' 15" West, a distance of 2,539.75 feet crossing Old Highway 87 and with the South boundary line of said Tract "B" of Exhibit "A" to a 1/2" iron rod found for the Easterly Southwest corner of Tract "B" in the East boundary line of State Highway 87, from said point for corner a 4" double Water Oak bears North 45° East, a distance of 4.4 feet, marked with an old X, a 12" Elm snag (dead) bears North 78° East, a distance of 33.2 feet, marked with an old /X/, a 15" Pine bears North 30° East, a distance of 12.8 feet, a 19" Pine bears North 20° East, a distance of 29.0 feet and a 7" Hickory bears North 80° East, a distance of 22.0 feet, all marked with a new //X//;

THENCE North 01° 28' 52" West, a distance of 1,050.34 feet to a 1/2" iron pipe found for corner;

THENCE North 01° 02' 10" West, a distance of 126.38 feet to a 1/2" iron pipe found for corner;

THENCE North 01° 41' 06" West, a distance of 371.41 feet to a I 1/4" iron pipe found for corner;

THENCE North 01° 45' 53" West, a distance of 695.36 feet to a 5/8" iron rod found for an ell corner of Tract "B", from said point for corner a 7" Water Oak (dead) bears North 87° East, a distance of 4.9 feet, marked with an old X, a 16" Black Gum bears North 44° East, a distance of 18.7 feet, marked with an old /X/, a 12" Water Oak bears South 67° East, a distance of 19.7 feet and an 11" Water Oak bears North 65° West, a distance of 18.4 feet, both marked with a new //X//;

THENCE South 89° 52' 59" West, a distance of 329.74 feet with a South boundary line of Tract "B" and a green painted line to a 2" pipe found for an ell corner in the East boundary of State Highway 87, from said point for corner a 6" Sweet Gum bears North 40° East, a distance of 23.1 feet, an 8" Water Oak bears North 56° East, a distance of 19.3 feet and a 9" Water Oak bears North 84° East, a distance of 17.2 feet, all marked with a new //X//;

THENCE North 09° 51' 19" West, a distance of 1,347.90 feet with the East boundary line of State Highway 87 to a 1/2" iron rod set for corner in the North boundary line of said Allen Survey and the South boundary line of the Adolph Phrajin Survey, Abstract 267, from said point for corner a 21" Pine bears South 66° East, a distance of 32.2 feet, an 11" Pine bears South 52° East, a distance of 28.2 feet and a 16" Pine bears South 30° East, a distance of 41.7 feet, all marked with a new //X//;

THENCE North 89° 12' 00" East, a distance of 174.06 feet with a North boundary line of Tract "B" and with the division line between said surveys to a 1/2" iron rod set for an ell corner of said Tract "B" and the Southeast corner of said Phrajan Survey and the Southeast corner of said Guthrie Survey, from said point for corner a 10" Water Oak bears South 15° West, a distance of 18.8 feet, a 13" Water Oak bears South 33° West, a distance of 19.6 feet and a 13" Water Oak bears South 60° West, a distance of 30.0 feet, all marked with a new //X// and a 1/2" iron rod found bears North 01° 19' 27" West, a distance of 40.93 feet;

THENCE North 01° 19' 27" West, a distance of 2,765.52 feet with the Northerly West boundary line of Tract "B" and with the East boundary line of said Phrajin Survey and the West boundary line of said Guthrie Survey to a 5/8" iron rod found for the Northwest corner of Tract "B" in the South line of Parcel No. 1 of Exhibit "A" and in the South boundary line of said Morgan Survey, said point for corner being the Northeast corner of said Phrajan Survey and the Northwest corner of said Guthrie Survey, from said point for corner a 22" Pine bears East, a distance of 20.8 feet, marked with an old //X//, an 18" Pine bears South 25° East, a distance of 20.2 feet and a 22" Pine bears North 11° West, a distance of 13.5 feet, both marked with a new //X//;

THENCE South 88° 09' 30" West, a distance of 588.21 feet with the South boundary line of Parcel No. 1 and the South line of said Morgan Survey to a 5/8" iron rod found for the Southwest corner of said Parcel No. 1 in the East boundary line of State Highway 87, from said point for corner a 23" Pine bears North 51° East, a distance of 41.5 feet, a 15" Water Oak bears North 43° East, a distance of 22.8 feet and a 24" Pine bears North 11.0 feet, all marked with a new //X//;

THENCE North 09° 52' 02" West, a distance of 7,013.32 feet with the East boundary line of State Highway 87 to a 1/2" iron rod set for corner in the West boundary line of that certain 25 acre tract from Knox Kinard to Owens-Illinois, Inc., as recorded in Volume 351, Page 614 of the Deed Records of Orange County, Texas, and being also in the South boundary line of that certain called 8.2953 acre tract as described in a deed from Owens-Illinois, Inc. to the County of Orange, Texas and recorded in Volume 388, Page 158 of the Deed Records of Orange County, Texas;

THENCE North 89° 08' 23" East, a distance of 8,048.33 feet with the South boundary line of said 8.2953 tract and the South boundary line of that certain 2.33 acre tract of land as described in a deed from Owens-Illinois, Inc., to the County of Orange, Texas, and recorded in Volume 348, Page 898 to a 1/2" iron rod set for the Easterly Northwest corner of the plant site;

THENCE South 03° 23' 25" West, a distance of 1,800.00 feet to a 1/2" iron rod set for corner;

THENCE North 86° 36' 35" West, a distance of 573.90 feet to a 1/2" iron rod set for corner;

THENCE South 03° 23' 25" West, a distance of 421.31 feet to a 1/2" iron rod set for corner, said point for corner being 5 feet North of a chain link fence;

THENCE North 86° 36' 35" West, a distance of 2,112.75 feet to a 1/2" iron rod set for corner on the East side of the Sabine River and Northern Railroad Company main tract, said point for corner being 100 feet at right angles from the centerline of the main track of said railroad;

THENCE South 13° 14' 29" East, a distance of 3,192.45 feet parallel with and 100 feet from the centerline of said main track to a 1/2" iron rod set for corner;

THENCE South 86° 36' 35" East, a distance of 3,085.48 feet to a 1/2" iron rod set for corner on the West side of a road and levy around the effluent lake;

THENCE South 03° 23' 25" West, a distance of 493.57 feet with the West side of said road and levy to a 1/2" iron rod set for corner;

THENCE South 86° 36' 35" East, a distance of 423.94 feet with the South side of said road and levy to a 1/2" iron rod set for corner;

THENCE South 25° 02' 45" East, a distance 462.34 feet to a 1/2" iron rod set for corner on the Northwest side of Morgan Bluff Road;

THENCE South 52° 42' 37" West, a distance of 1,907.13 feet with the Northwest side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner a 5/8" iron rod found beside a 6" iron pipe bears South 00° 55' 45" East, a distance of 56.52 feet;

THENCE South 00° 55' 45" East, a distance of 683.83 feet to a 6" iron pipe found for corner, from said point for corner an 18" Pine bears North 59° East, a distance of 52.7 feet, another 18" Pine bears North 31° 30' West, a distance of 66.4 feet and a 12" Pine bears South 79° 15' West, a distance of 53.3 feet, all marked with a new //X//;

THENCE North 89° 01' 28" East, a distance of 1,000.01 feet to a 5/8" iron rod found by a 6" orange pipe for corner, from said point for corner a 6" Sweet Gum bears North 17° West, a distance of 13.8 feet and an 8" Sweet Gum bears North 35° East, a distance of 18.7 feet, both marked with a new //X//;

THENCE North 00° 55' 44" West, a distance of 1,199.67 feet to a 5/8" iron rod found beside a 6" orange pipe for the Northeast corner of the William Morgan Survey, Abstract 266 and being also the Northwest corner of the Jacob Townsend Survey, Abstract 180, said point for corner being also in the South boundary line of the Charles Morgan Survey, Abstract 18;

THENCE South 88° 48' 29" West, a distance of 215.24 feet to a 6" iron pipe found for corner on the Southeast side of Morgan Bluff Road;

THENCE North 52° 42' 37" East, a distance of 982.05 feet with the Southeast side of Morgan Bluff Road to a 1/2" iron rod set for corner on the Southwest side of another road, from said point for corner a vent pipe bears South 15° East, a distance of 28.0 feet, a 6" gate post bears North 87° East, a distance of 37.8 feet and another 6" gate post bears North 75° East, a distance of 56.4 feet;

TRACT NO. 402
Tract A

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 7

THENCE South 25° 02' 45" East, a distance of 3,117.47 feet with the Southwest side of said road to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears South 30° East, a distance of 31.2 feet, a 6" Pine bears South 02° East, a distance of 10.0 feet and a 6" Sweet Gum bears South 85° West, a distance of 22.6 feet, all marked with a new //X//;

THENCE South 68° 19' 45" East, a distance of 637.70 feet with the Southwest side of said road to a 1/2" iron rod set for corner, from said point for corner a 10" Pine bears South 18° East, a distance of 45.8 feet, an 8" Pine bears North 74° West, a distance of 12.3 feet and another 8" Pine bears North 47° West, a distance of 11.9 feet, all marked with a new //X//;

THENCE South 32° 45' 48" East, a distance of 178.47 feet with the Southwest side of said road to a 1/2" iron rod set for corner at the intersection of the North side of another road going around the clearing lake, from said point for corner a 6" Pine bears West, a distance of 21.9 feet, another 6" Pine bears North 64° West, a distance of 21.1 feet and a 7" Pine bears North 22° West, a distance of 15.8 feet, all marked with a new //X//;

THENCE South 59° 22' 32" West, a distance of 404.84 feet with the North side of said road to a 1/2" iron rod set for corner, from said point for corner a 9" Pine bears South 53° West, a distance of 5.5 feet, a 10" Pine bears South 86° West, a distance of 17.6 feet, a 9" Pine bears North 16° East, a distance of 27.7 feet, all marked with a new //X//;

THENCE South 17° 58' 53" East, a distance of 377.03 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 10" Sweet Gum bears South 34° West, a distance of 25.0 feet, an 11" Red Oak bears North 86° West, a distance of 7.3 feet and a 6" Pine bears North 40° West, a distance of 25.7 feet, all marked with a new //X//;

THENCE South 05° 41' 33" West, a distance of 872.39 feet with the West side of said road to a 1/2" iron rod set for corner;

THENCE South 13° 25' 50" West, a distance of 856.71 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 38° West, a distance of 9.0 feet, a 13" Pine bears South 74° West, a distance of 35.1 feet and a 14" Pine bears West, a distance of 47.5 feet, all marked with a new //X//;

THENCE South 00° 19' 44" East, a distance of 313.42 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears South 21° East, a distance of 7.4 feet, an 8" Pine bears South 51° West, a distance of 14.2 feet and a 6" Pine bears North 69° West, a distance of 12.6 feet, all marked with a new //X//;

THENCE South 22° 11' 22" West, a distance of 522.15 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears North 12° East, a distance of 14.4 feet, a 6" Pine bears North 68° East, a distance of 19.4 feet and a 7" Pine bears North 87° East, a distance of 14.3 feet, all marked with a new //X//;

THENCE South 18° 45' 10" West, a distance of 470.50 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears South 52° East, a distance of 35.8 feet, another 6" Pine bears South 06° West, a distance of 18.6 feet and a 6" Pine bears South 26° West, a distance of 9.0 feet, all marked with a new //X//;

THENCE South 07° 43' 32" East, a distance of 453.49 feet with the West side of said road to a 1/2" iron rod set for corner;

THENCE South 07° 06' 18" East, a distance of 506.11 feet with the West side of said road to a 1/2" iron rod set for corner;

THENCE South 16° 53' 15" East, a distance of 332.17 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 41° East, a distance of 16.6 feet, an 8" Pine bears South 36° East, a distance of 26.4 feet and another 8" Pine bears South 17° East, a distance of 8.7 feet, all trees marked with a new //X//;

THENCE South 23° 35' 21" East, a distance of 362.02 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 10" Pine bears South 50° West, a distance of 40.0 feet, a 6" Pine bears South 84° West, a distance of 37.2 feet and a 9" Pine bears North 84° West, a distance of 39.1 feet, all marked with a new //X//;

THENCE South 04° 54' 56" East, a distance of 332.13 feet to a 1/2" iron rod set for corner on the West side of said road, from said point for corner a 7" Sweet Gum bears South 45° East, a distance of 7.2 feet, a 12" Pine bears South 15° West, a distance of 34.0 feet and a 13" Water Oak bears South 83° West, a distance of 6.9 feet, all trees marked with a new //X//;

THENCE South 61° 42' 45" East, a distance of 336.36 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 10" Pine bears North 07° East, a distance of 44.6 feet, a 9" Pine bears South 84° East, a distance of 45.4 feet, an 11" Pine bears South 61° East, a distance of 44.7 feet, all marked with a new //X//;

THENCE South 16° 07' 31" East, a distance of 354.54 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears North 89° West, a distance of 8.4 feet, a 12" Pine bears North 66° West, a distance of 21.6 feet and a 17" Hickory bears South 86° East, a distance of 15.1 feet, all marked with a new //X//;

THENCE South 05° 44' 10" East, a distance of 539.83 feet with the West side of said road to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 63° East, a distance of 11.8 feet, a 10" Red Oak bears North 66° West, a distance of 34.8 feet and a 13" Red Oak bears North 35° West, a distance of 26.8 feet, all marked with a new //X//;

THENCE South 23° 56' 07" East, a distance of 370.96 feet with the West side of said road to a 1/2" iron rod set for corner on the South side of the road and levy going around the clearing lake, from said point for corner a 13" Pine bears South 13° East, a distance of 9.3 feet, a 12" Pine bears North 73° West, a distance of 13.6 feet and a 7" Pine bears North 43° West, a distance of 5.5 feet, all marked with a new //X//;

THENCE North 87° 18' 33" East, a distance of 328.07 feet with the South side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 89° East, a distance of 17.2 feet, a 6" Pine bears South 61° East, a distance of 18.7 feet and a 9" Pine bears South 32° East, a distance of 29.0 feet, all marked with a new //X//;

THENCE North 46° 20' 25" East, a distance of 172.69 feet with the Southeast side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 34° East, a distance of 21.1 feet, an 8" Pine bears South 03° East, a distance of 13.8 feet and an 8" Pine bears South 22° West, a distance of 14.4 feet, all trees marked with a new //X//;

THENCE South 88° 06' 05" East, a distance of 1,238.23 feet with the South side of said road to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears North 41° East, a distance of 3.7 feet, an 11" Pine bears South 61° East, a distance of 6.5 feet and an 8" Pine bears South 73° West, a distance of 4.9 feet, all marked with a new //X//;

THENCE North 31° 35' 07" East, a distance of 1,425.04 feet with the Southeast side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 12" Pine bears South 53° East, a distance of 21.1 feet, a 10" Pine bears South 66° East, a distance of 24.9 feet and a 6" Sweet Gum bears South 81° East, a distance of 16.8 feet, all marked with a new //X//;

THENCE North 32° 05' 01" East, a distance of 864.02 feet with the Southeast side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 6" Ash bears North 22° 30' East, a distance of 18.5 feet and a 16" Sweet Gum bears North 71° East, a distance of 26.1 feet and an 8" Ash bears South 22° 30' East, a distance of 7.3 feet, all marked with a new //X//;

TRACT NO. 402
Tract A

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 9

THENCE North 08° 49' 03" West, a distance of 1,923.57 feet with the East side of said road and levy to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears South 46° East, a distance of 29.6 feet and a 12" Cottonwood bears South 66° East, a distance of 4.5 feet and a 15" Pine bears North 82° East, a distance of 13.7 feet, all marked with a new //X//;

THENCE North 27° 45' 18" East, a distance of 889.40 feet with the Southeast side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 6" Sweet Gum bears South 50° East, a distance of 14.3 feet, a 13" Pine bears South 69° East, a distance of 7.1 feet and another 13" Pine bears North 51° East, a distance of 12.1 feet, all marked with a new //X//;

THENCE North 35° 23' 04" East, a distance of 737.88 feet with the Southeast side of said road and levy to a 1/2" iron rod set for corner, from said point for corner a 10" Cottonwood bears South 45° West, a distance of 17.5 feet, a 17" Pine bears South 51° East, a distance of 23.7 feet and an 8" Pine bears South 69° East, a distance of 25.2 feet, all marked with a new //X//;

THENCE North 10° 31' 39" East, a distance of 1,272.03 feet with the East side of said road and levy to a 1/2" iron rod set for corner on the South side of the discharge channel, from said point for corner a 20" Sweet Gum bears South 68° East, a distance of 20.2 feet, a 7" Water Oak bears South 59° West, a distance of 6.9 feet and a 12" Ash bears North 50° West, a distance of 17.9 feet, all trees marked with a new //X//;

THENCE North 66° 33' 02" East, a distance of 92.41 feet with the South side of said discharge channel to a 1/2" iron rod set for corner on the West bank of the Sabine River, from said point for corner a 14" Pine bears South 18° 30' West, a distance of 22.7 feet, a 7" Pine bears South 30° West, a distance of 29.7 feet and an 18" Water Oak bears North 56° 30' West, a distance of 9.2 feet, all trees marked with a new //X//;

THENCE in a Southeasterly direction with the meanders of the West bank of the Sabine River as follows: South 42° 30' 25" East, a distance of 133.40 feet; South 61° 14' 33" East, a distance of 260.27 feet; South 43° 15' 53" East, a distance of 334.85 feet; South 56° 30' 15" East, a distance of 383.42 feet; South 30° 51' 21" East, a distance of 170.36 feet; South 17° 48' 16" West, a distance of 107.02 feet; South 84° 24' 01" West, a distance of 273.85 feet; South 67° 03' 38" West, a distance of 88.00 feet; South 33° 28' 55" West, a distance of 965.34 feet; South 07° 43' 39" West, a distance of 289.00 feet; South 02° 23' 21" East, a distance of 200.00 feet; South 19° 05' 01" East, a distance of 235.69 feet; South 81° 49' 02" East, a distance 200.00 feet; North 89° 40' 58" East, a distance of 113.00 feet; North 80° 09' 15" East, a distance of 697.59 feet; South 85° 05' 50" East, a distance of 285.45 feet; South 46° 14' 53" East, a distance of 187.92 feet; South 15° 56' 02" East, a distance of 239.91 feet; South 02° 20' 49" East, a distance of 435.25 feet; South 06° 04' 30" West, a distance of 923.70 feet; South 10° 33' 43" East, a distance of 424.46 feet; South 25° 58' 15" East, a distance of 205.00 feet; South 38° 16' 01" East, a distance of 262.23 feet; South 61° 28' 48" East, a distance of 345.00 feet; North 69° 34' 58" East, a distance of 197.12 feet; North 52° 26' 38" East, a distance of 255.34 feet; North 85° 42' 20" East, a distance of 144.06 feet; South 52° 24' 54" East, a distance of 123.41 feet; South 08° 46' 42" West, a distance of 155.63 feet; South 48° 03' 47" West, a distance of 131.87 feet; South 32° 24' 14" West, a distance of 219.61 feet; South 02° 47' 59" West, a distance of 599.92 feet; South 14° 35' 35" West, a distance of 448.70 feet; South 01° 48' 36" West, a distance of 261.84 feet; South 19° 24' 58" West, a distance of 179.69 feet; South 49° 17' 40" West, a distance of 135.70 feet; North 70° 15' 08" West, a distance of 231.24 feet; South 83° 41' 20" West, a distance of 309.97 feet; South 10° 21' 28" West, a distance of 206.96 feet; South 42° 48' 24" East, a distance of 215.97 feet; South 80° 28' 24" East, a distance of 321.36 feet; South 48° 56' 27" East, a distance of 150.91 feet; South 78° 54' 37" East, a distance of 141.70 feet; South 70° 11' 49" East, a distance of 497.14 feet; North 88° 02' 25" East, a distance of 536.38 feet; North 62° 15' 17" East, a distance of 131.22 feet; North 37° 47' 57" East, a distance of 160.93 feet; North 17° 48' 06" East, a distance of 274.36 feet; North 84° 56' 24" East, a distance of 152.66 feet; South 26° 02' 14" East, a distance of 34.44 feet; South 32° 33' 26" West, a distance of 244.47 feet and South 23° 27' 02" West, a distance of 537.43 feet back to the place of beginning and containing 4,246.513 acres of land,

SAVE AND EXCEPT the following described 7.669 acres of land:

FIELD NOTES FOR 7.669 ACRES OF LAND

BEING 7.669 acres of land situated in the John Allen Survey, Abstract 1 of Orange County, Texas and being part of that certain "Tract Two" as described in a deed from J. R. Peveto, et ux to Owens-Illinois, Inc., dated May 20, 1965, and recorded in Volume 337, Page 160, being all that certain 6.670 acres of land as described in a deed from Owens-Illinois, Inc., to Sabine River & Northern Railroad Company, dated March 21, 1967, and recorded in Volume 367, Page 787, and being all that certain called 1.015 acre tract as described in a deed from Owens-Illinois, Inc. to Sabine River & Northern Railroad Company, dated January 31, 1975, and recorded in Volume 449, Page 346, all of the above referenced deeds being recorded in the Deed Records of Orange County, Texas, said 7.669 acres of land being more particularly described by metes and bounds as follows:

COMMENCING at a 1/2" iron rod set for corner at the Southwest corner of the F. Y. C. Guthrie Survey, Abstract 90 and the Southeast corner of the Adolph Phrajan Survey, Abstract 267, from said point for corner a 10" Water Oak bears South 15° West, a distance of 18.8 feet, a 13" Water Oak bears South 33° West, a distance of 19.6 feet and a 13" Water Oak bears South 60° West, a distance of 30.0 feet, all trees marked with a new //X//;

THENCE South 55° 26' 50" East, a distance of 4,201.16 feet to a 3/4" iron rod found for corner in the Southeast boundary line of Old State Highway 87, said point for corner also being the Southwest corner of said 6.670 acre tract and being the Point Of Beginning;

THENCE North 20° 10' 07" East, a distance of 139.94 feet with the Southeast boundary line of Old State Highway 87 to a 1/2" iron rod set for the Northwest corner of said 6.670 acre tract and the Southwest corner of said 1.015 acre tract;

THENCE North 14° 57' 26" East, a distance of 114.70 feet with the Southeast boundary line of Old Highway 87 and the Northwest boundary line of said 1.015 acre tract to a 1/2" iron rod found for the Northwest corner of said tract;

THENCE North 83° 41' 47" East, a distance of 362.42 feet with the North boundary line of said 1.015 acre tract to a 1/2" iron rod set for the Northeast corner of said tract and the Easterly Northwest corner of said 6.670 acre tract;

THENCE North 83° 39' 07" East, a distance of 1,010.71 feet with the Easterly North boundary line of said 6.670 acre tract to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 76° 22' 30", a radius of 349.86 feet, a length of 466.36 feet and whose chord bears North 19° 27' 49" East, a distance of 432.59 feet, from said point for corner a 12" Pine bears North 23° East, a distance of 34.8 feet and an 11" Pine bears North 48° West, a distance of 48.5 feet, both trees marked with a new //X//;

THENCE in a Northeasterly direction and with the above referenced curve to the left a distance of 466.36 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE North 18° 43' 26" West, a distance of 55.52 feet to a 1/2" iron rod set for corner in the Southwest boundary line of the Sabine River & Northern Railroad Company and 50.00 feet at right angles from the centerline of the main track, from said point for corner a 9" Pine bears South 07° East, a distance of 9.9 feet and an 8" Pine bears South 15° West, a distance of 1.1 feet, both trees marked with a new //X//;

THENCE South 25° 50' 19" East, a distance of 289.30 feet parallel with and 50 feet from the centerline of said main track to a 1/2" iron rod set for corner at the beginning of a curve to the right whose functions are as follows: an angle of 33° 45' 15", a radius of 449.86 feet, a length of 265.02 feet and whose chord bears South 29° 07' 54" West, a distance of 261.21 feet, from said corner a 7" Pine bears South 52° West, a distance of 43.0 feet, a 9" Pine bears South 65° West, a distance of 30.9 feet and an 11" Pine bears North 75° West, a distance of 21.4 feet, all trees marked with a new //X//;

THENCE in a Southwesterly direction and with the above referenced curve to the right a distance of 265.02 feet to a 1/2" iron rod set for corner at the end of said curve and the beginning of another curve to the right whose functions are as follows: an angle of 30° 30' 56", a radius of 527.47 feet, a length of 280.93 feet and whose chord bears South 76° 13' 55" East, a distance of 277.62 feet;

THENCE in a Southeasterly direction and with the above referenced curve to the right a distance of 280.93 feet to a 1/2" iron rod set for corner at the end of said curve in the Southwest boundary line of the Sabine River & Northern Railroad, said point being 50 feet at right angles from the centerline of the main track;

THENCE South 25° 50' 19" East, a distance of 308.05 feet with the Southwest boundary line and 50 feet at right angles from the centerline of the main track to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears South 08° West, a distance of 9.60 feet, a 6" Pine bears South 43° West, a distance of 6.9 feet and a 6" Pine bears North 10° East, a distance of 4.5 feet, all trees marked with a new //X//;

THENCE North 32° 58' 03" West, a distance of 57.98 feet to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 63° 22' 50", a radius of 427.47 feet, a length of 472.87 feet and whose chord bears North 64° 39' 28" West, a distance of 449.12 feet;

THENCE in a Northwesterly direction and with the above referenced curve to the left a distance of 472.87 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE South 83° 39' 07" West, a distance of 582.33 feet to a 1/2" iron rod set for corner;

THENCE North 05° 35' 53" West, a distance of 4.85 feet to a 1/2" iron rod set for corner;

THENCE South 83° 48' 07" West, a distance of 151.67 feet to a 1/2" iron rod set for corner;

THENCE South 05° 34' 53" East, a distance of 51.60 feet to a 1/2" iron rod set for corner;

THENCE South 80° 28' 04" West, a distance of 820.62 feet back to the place of beginning and containing 7.669 acres of land,

SAVE AND EXCEPT the following described 7.170 acres of land:

FIELD NOTES FOR 7.170 ACRES OF LAND

BEING 7.170 acres of land situated in the Richard Balliew Survey, Abstract 2, Orange County, Texas, and being those certain Tracts No. 1, 2 and 3 as described in a deed from Powell Lumber Company to the County of Orange, dated July 21, 1961, and recorded in Volume 335, Page 388 of the Deed Records of Orange County, Texas, said 7.170 acres of land being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2" iron rod set for corner at the Easterly Northwest corner of that certain Parcel Number 5 as described in a deed from W-K-N Development Corporation to Owens-Illinois, Inc., dated February 24, 1966 and recorded in Volume 351, Page 148 of the Deed Records of Orange County, Texas, said point being in the North boundary line of West Bluff Road;

THENCE North 83° 34' 15" East, a distance of 393.88 feet with the North boundary line of said road to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 03° 06' 00", a radius of 2,228.56 feet, a length of 120.57 feet and whose chord bears North 82° 01' 15" East, a distance of 120.55 feet;

THENCE in a Northeasterly direction with the North boundary line of said road and with the above referenced curve to the left a distance of 120.57 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE North 80° 28' 15" East, a distance of 750.00 feet with the North boundary line of said road to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 13° 30', a radius of 2,940.89 feet and a length of 692.93 feet and whose chord bears North 73° 43' 15" East, a distance of 691.33 feet;

THENCE in a Northeasterly direction with the North boundary line of said road and with the above referenced curve to the left a distance of 692.93 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE North 66° 58' 15" East, a distance of 413.54 feet with the North line of said road to a 1/2" iron rod set for corner;

THENCE South 01° 26' 15" West, a distance of 32.96 feet with said road to a 1/2" iron rod set for corner near the centerline of West Bluff Road;

THENCE North 66° 58' 15" East, a distance of 106.38 feet with the centerline of said road to a 1/2" iron rod set for corner;

THENCE South 23° 01' 45" East, a distance of 50.00 feet to a 1/2" iron rod set for corner;

THENCE South 66° 58' 15" West, a distance of 125.00 feet with the South boundary line of North Bluff Road to a 1/2" iron rod set for corner in the East boundary line of Elnira Road;

THENCE South 00° 50' 45" East, a distance of 2,727.39 feet with the East boundary line of Elnira Road to a 1/2" iron rod set for corner in the Easterly South boundary line of said Parcel Number 5;

THENCE South 89° 05' 12" West, a distance of 60.00 feet with the Easterly South boundary line of said Parcel Number 5 to a 1/2" iron rod set for corner in the West line of Elnira Road;

THENCE North 00° 50' 45" West, a distance of 2,694.84 feet with the West boundary line of Elnira road to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 112° 11' 00", a radius of 20.00 feet, a length of 29.16 feet and whose chord bears North 56° 56' 21" West, a distance of 33.20 feet;

THENCE in a Northwesterly direction and with the above referenced curve to the left a distance of 39.16 feet to a 1/2" iron rod set for corner at the end of said curve in the South boundary line of West Bluff Road;

THENCE South 66° 58' 15" West, a distance of 294.89 feet with the South boundary line of said road to a 1/2" iron rod set for corner at the beginning of a curve to the right whose functions are as follows: an angle of 13° 30' 00", a radius of 3,000.89 feet, a length of 707.07 feet and whose chord bears South 73° 43' 15" West, a distance of 705.44 feet;

THENCE in a Southwesterly direction with the South boundary line of said road and with the above referenced curve to the right a distance of 707.07 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE South 80° 28' 15" West, a distance of 750.00 feet with the South line of said road to a 1/2" iron rod set for corner at the beginning of a curve to the right whose functions are as follows: an angle of 03° 06' 00", a radius of 2,288.56 feet, a length of 123.81 feet and whose chord bears South 82° 01' 15" West, a distance of 123.80 feet;

THENCE in a Southwesterly direction with the South boundary line of said road and with the above referenced curve to the right a distance of 123.81 feet to a 1/2" iron rod set for corner at the end of said curve;

TRACT NO. 402
Tract A

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 13

THENCE South 83° 34' 15" West, a distance of 399.72 feet with the South boundary line of said road to a 1/2" iron rod set for corner in the Northerly West boundary line of said Parcel Number 5;

THENCE North 00° 52' 45" West, a distance of 60.00 feet with the Northerly West boundary line of Parcel Number 5 back to the place of beginning and containing 7.170 acres of land, leaving a net acreage of 4,231.674 acres of land.

NOTE: All bearings as stated in these field notes are based on Polaris Observation.

James E. Weaver

James E. Weaver
Registered Public Surveyor
State of Texas No. 1757

REP/sw
O15/4231-13

Exhibit A

TRACT NO. 402
Tract B

Telephone - Area Code 409-634-4934 EAST TEXAS ENGINEERING & SURVEYING, INC. 118 E. Lufkin Ave., Lufkin, Texas

October 8, 1986

FIELD NOTES FOR OWENS-ILLINOIS, INC.
CHAS. MORGAN SURVEY, ABSTRACT 18
JACOB TOWNSEND SURVEY, ABSTRACT 180
ORANGE COUNTY, TEXAS

FIELD NOTES FOR 1,104.408 ACRES OF LAND

BEING 1,104.408 acres of land situated in the Chas. Morgan Survey, Abstract 18 and the Jacob Townsend Survey, Abstract 180, both in Orange County, Texas, being a part of that certain called 5,995.21 acre tract described as Parcel 1 of Exhibit "A" in a deed from W-K-N Development Corporation to Owens-Illinois, Inc., dated February 24, 1966, and recorded in Volume 350, Page 148, being a part of that certain called 160 acre tract as described in a deed from Carl G. Trussel et ux to Owens-Illinois, Inc., dated June 21, 1966, and recorded in Volume 356, Page 569, being a part of that certain tract of land as described in a deed from Nelda C. Stark, Executrix, et al., to Owens-Illinois, Inc., dated January 12, 1966, and recorded in Volume 348, Page 9 and being part of that certain called 25 acre tract as described in a deed from Velma Miller, et al., to Owens-Illinois, Inc., dated May 25, 1965, and recorded in Volume 337, Page 632, all of the above referenced deeds are recorded in the Deed Records of Orange County, Texas, said 1,104.408 acres of land to be more particularly described by metes and bounds as follows:

BEGINNING at a 1/2" iron rod set for corner on the West bank of the Sabine River, said point for corner being the Northeast corner of the above said 5,995.21 acre tract and being in the North line of the Charles Morgan Survey, Abstract 18, from said point for corner an 11" Water Oak bears North 04° West, a distance of 36.3 feet, a 12" Water Oak bears North 33° East, a distance of 31.8 feet and a 9" Tupelo bears North 55° East, a distance of 25.2 feet, all marked with a new //X//, from said point for corner a 1 1/2" iron pipe found bears South 51° 37' 55" West, a distance of 58.34 feet;

THENCE Southwesterly with the meanders of the West bank of the Sabine River as follows: South 40° 31' 35" West, a distance of 712.96 feet; South 09° 46' 32" West, a distance of 439.00 feet; South 30° 08' 58" East, a distance of 172.08 feet; South 61° 55' 58" East, a distance of 700.01 feet; South 36° 42' 10" East, a distance of 130.81 feet; South 00° 53' 40" East, a distance of 240.13 feet; South 32° 33' 38" West, a distance of 81.89 feet; South 54° 02' 17" West, a distance of 258.20 feet; South 28° 27' 05" West, a distance of 104.17 feet; South 01° 00" 29" East, a distance of 264.41 feet; South 06° 23' 51" West, a distance of 317.55 feet; South 21° 40' 05" West, a distance of 134.85 feet; South 38° 07' 53" West, a distance of 261.22 feet; South 75° 16' 42" West, a distance of 137.70 feet; North 49° 57' 56" West, a distance of 321.35 feet; North 11° 27' 24" East, a distance of 127.00 feet; North 46° 30' 19" West, a distance of 663.57 feet; North 81° 38' 17" West, a distance of 305.51 feet; South 69° 28' 58" West, a distance of 280.75 feet; South 55° 59' 33" West, a distance of 404.40 feet; South 33° 54' 51" West, a distance of 657.49 feet; South 09° 21' 39" West, a distance of 574.31 feet; South 21° 00' 02" West, a distance of 158.09 feet; South 38° 24' 10" West, a distance of 442.82 feet; South 39° 48' 30" West, a distance of 188.88 feet; South 46° 06' 54" East, a distance of 441.95 feet; North 24° 42' 06" East, a distance of 50.87 feet; South 52° 58' 48" East, a distance of 273.95 feet; South 68° 49' 05" East, a distance of 475.37 feet; South 45° 40' 54" East, a distance of 211.39 feet; South 20° 34' 57" East, a distance of 438.39 feet; South 17° 24' 03" West, a distance of 403.79 feet; North 81° 30' 21" West, a distance of 156.92 feet; South 88° 58' 13" West, a distance of 598.09 feet; South 63° 29' 23" West, a distance of 348.55 feet; South 18° 55' 14" West, a distance of 506.50 feet; South 13° 52' 40" East, a distance of 139.22 feet; South 34° 09' 22" East, a distance of 349.91 feet; South 64° 32' 56" East, a distance of 258.73 feet; South 42° 45' 38" East, a distance of 620.16 feet; South 57° 49' 55" East, a distance of 312.37 feet; South 86° 14' 24" East, a distance of 150 feet; North 74° 36' 19" East, a distance of 153.42 feet; North 28° 22' 06" East, a distance of 973.57 feet; North 62° 37' 08" East, a distance of 163.25 feet; South 75° 51' 33" East, a distance of 174.41 feet; South 12° 15' 48" East, a distance of 176.62 feet;

South 11° 22' 07" West, a distance of 1,342.03 feet; South 05° 52' 29" West, a distance of 99.74 feet; South 11° 00' 50" East, a distance of 166.74 feet; South 15° 05' 07" East, a distance of 412.88 feet; South 01° 51' 49" West, a distance of 85.53 feet; South 71° 34' 55" West, a distance of 49.96 feet; North 75° 17' 06" West, a distance of 146.96 feet; North 17° 56' 55" East, a distance of 94.86 feet; North 87° 17' 43" West, a distance of 225.00 feet; South 75° 17' 17" West, a distance of 100.00 feet; South 41° 02' 30" West, a distance of 675.25 feet; South 21° 12' 34" West, a distance of 300.93 feet and South 11° 34' 02" West, a distance of 146.09 feet to a 1/2" iron rod set for corner on the West bank of the Sabine River, from said point for corner a 6" Pine bears South 60° West, a distance of 14.8 feet, a 12" Pine bears South 87° West, a distance of 22.3 feet and a 16" Water Oak bears North 45° West, a distance of 41.0 feet, all marked with a new //X//;

THENCE North 89° 32' 19" West, a distance of 129.48 feet along the North side of a discharge channel to a 1/2" iron rod set for corner, from said point for corner an 8" Pine bears North 41° East, a distance of 6.2 feet, a 13" Pine bears South 64° East, a distance of 6.9 feet and a 9" Pine bears South 17° 15' West, a distance of 29.0 feet, all marked with a new //X//;

THENCE North 30° 18' 50" West, a distance of 890.06 feet with the Northeast side of a plant road and levee to a 1/2" iron rod set for corner, from said point for corner a 10" Pine bears South 08° West, a distance of 15.5 feet, an 11" Pine bears South 82° West, a distance of 9.4 feet and another 11" Pine bears North 16° West, a distance of 5.7 feet, all marked with a new //X//;

THENCE North 85° 46' 30" West, a distance of 1,309.86 feet with the North side of said road and levee to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears South 82° East, a distance of 8.7 feet, a 12" Pine bears South 18° East, a distance of 10.3 feet and a 9" Pine bears South 60° West, a distance of 14.8 feet, all marked with a new //X//;

THENCE South 81° 39' 04" West, a distance of 881.04 feet with the North side of said road and levee to a 1/2" iron rod set for corner, from said point for corner a 7" Pine bears North 73° East, a distance of 3.3 feet, an 8" Pine bears South 65° West, a distance of 11.3 feet and a 9" Pine bears North 12° West, a distance of 12.4 feet, all marked with a new //X//;

THENCE South 57° 13' 01" West, a distance of 1,190.21 feet with the North side of said road and levee to a 1/2" iron rod set for corner at the intersection with the East side of a plant road;

THENCE North 32° 45' 48" West, a distance of 204.10 feet with the Northeast side of said plant road to a 1/2" iron rod set for corner;

THENCE North 68° 19' 45" West, a distance of 631.62 feet with the Northeast side of said plant road to a 1/2" iron rod set for corner;

THENCE North 25° 02' 45" West, a distance of 3,103.09 feet with the Northeast side of said plant road to a 1/2" iron rod set for corner on the Southeast side of Morgan Bluff Road;

THENCE North 52° 42' 39" East, a distance of 1,462.99 feet with the Southeast side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner an 18" Pine bears North 78° West, a distance of 81.8 feet and another 18" Pine bears North 10° West, a distance of 67.6 feet, both marked with a new //X//;

THENCE North 89° 03' 24" East, a distance of 238.81 feet to a 1/2" iron rod set for corner in the Southwest side of Morgan Bluff Road, from said point for corner a 24" Pine bears South 30° East, a distance of 44.6 feet, a 26" Pine bears North 66° West, a distance of 6.2 feet and a 6" Sweet Gum beara North 73° East, a distance of 63.7 feet, all marked with a new //X//;

THENCE South 45° 21' 28" East, a distance of 1,962.76 feet with the Southwest side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears South 07° East, a distance of 8.1 feet, an 8" Pine bears South 68° West, a distance of 22.2 feet and a 9" Pine beara South 42° East, a distance of 17.3 feet, all marked with a new //X//;

THENCE South 59° 58' 23" East, a distance of 153.95 feet with the Southwest side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears South 10° East, a distance of 22.6 feet, a 7" Pine bears South 02° West, a distance of 31.3 feet and a 7" Pine bears South 65° West, a distance of 41.6 feet, all marked with a new //X//;

THENCE South 77° 21' 34" East, a distance of 179.69 feet with the Southwest side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner a 9" Pine bears South 11° East, a distance of 50.0 feet, an 11" Pine bears South 17° West, a distance of 47.7 feet and a 6" Pine bears South 57° West, a distance of 57.7 feet, all marked with a new //X//;

THENCE North 89° 50' 13" East,a distance of 648.86 feet with the South side of Morgan Bluff Road to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears North 75° West, a distance of 13.6 feet, a 16" Pine bears North 14° West, a distance of 53.0 feet and a 12" Pine bears North 06° East, a distance of 53.5 feet, all marked with a new //X//;

THENCE North 00° 09' 47" West, a distance of 1,078.47 feet to a 1/2" iron rod set for corner;

THENCE South 89° 50' 13" West, a distance of 602.25 feet to a 1/2" iron rod set for corner, from said point for corner a 12" Water Oak bears North 82° East, a distance of 38.5 feet, a 13" Water Oak bears South 80° East, a distance of 38.7 feet and an 8" Water Oak bears South 70° East, a distance of 20.2 feet, all marked with a new //X//;

THENCE South 00° 09' 47" East, a distance of 1,028.48 feet to a 1/2" iron rod set for corner in the North side of Morgan Bluff Road;

THENCE South 89° 50' 13" West, a distance of 41.00 feet with the North side of Morgan Bluff Road to a 1/2" iron rod set for corner;

THENCE North 77° 21' 30" West, a distance of 166.43 feet with the Northeast line of Morgan Bluff Road to a 1/2" iron rod set for corner;

THENCE North 59° 58' 22" West, a distance of 139.89 feet with the Northeast side of Morgan Bluff Road to a 1/2" iron rod set for corner;

THENCE North 45° 21' 28" West, a distance of 1,500.00 feet with the Northeast line of Morgan Bluff Road to a 1/2" iron rod set for corner;

THENCE North 03° 23' 25" East, a distance of 1,015.38 feet to a 1/2" iron rod set for corner;

THENCE North 86° 36' 35" West, a distance of 1,211.05 feet to a 1/2" iron rod set for corner on the East side of the plant road;

THENCE North 03° 23' 25" East, a distance of 375.00 feet with the East side of said plant road to a 1/2" iron rod set for corner on the North side of another plant road;

THENCE North 86° 36' 35" West, a distance of 306.30 feet with the North side of said plant road to a 1/2" iron rod set for corner at the intersection with the East side of another plant road;

THENCE North 03° 23' 25" East, a distance of 757.07 feet with the East side of said plant road to a 1/2" iron rod set for corner at the intersection with the South side of another plant road;

THENCE South 86° 36' 35" East, a distance of 532.73 feet with the South side of said plant road to a 1/2" iron rod set for corner, from said point for corner an 8" Cottonwood bears South 42° East, a distance of 43.3 feet, an 8" Cottonwood bears South 13° East, a distance of 11.3 feet and a 1/2" iron rod set bears North 06° 55' 54" East, a distance of 25.16 feet, both marked with a new //X//;

TRACT NO. 402
Tract B

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 4

THENCE North 03° 23' 25" East, a distance of 1,025.87 feet with the East side of said plant road to a 1/2" iron rod set for corner;

THENCE South 86° 36' 35" East, a distance of 1,171.53 feet to a 1/2" iron rod set for corner;

THENCE North, a distance of 1,280.78 feet to a 1/2" iron rod set for corner;

THENCE West, a distance of 1,728.57 feet to a 1/2" iron rod set for corner, from said point for corner a 26" Water Oak bears North 12° East, a distance of 41.6 feet, a 21" Water Oak bears North 54° 15' East, a distance of 21.3 feet and an 8" Cottonwood bears North 72° 15' West, a distance of 21.4 feet, all marked with a new //X//;

THENCE North, a distance of 506.71 feet to a 1/2" iron rod set for corner;

THENCE West, a distance of 667.39 feet to a 1/2" iron rod set for corner, from said point for corner a 10" Cottonwood bears North 12° East, a distance of 46.4 feet, an 11" Cottonwood bears North 22° East, a distance of 36.9 feet and a 9" Cottonwood bears North 29° 45' West, a distance of 51.6 feet, all marked with a new //X//;

THENCE North, a distance of 358.45 feet to a 1/2" iron rod set for corner;

THENCE North 89° 54' 56" West, a distance of 180.46 feet to a chain link fence corner found for the Southeast corner of the Sabine Water Authority 5 acre tract as described in Volume 58, Page 175;

THENCE North 00° 19' 41" East, a distance of 419.19 feet with the East boundary line of said 5 acre tract to a 1/2" iron rod set for the Northeast corner of said 5 acre tract in the North line of said 5,995.21 acre tract, said point being in the North line of the Morgan Survey and the South line of the M. Holden, Jr. Survey, Abstract 423, from said point for corner a chain link fence corner bears South 00° 19' 41" West, a distance of 50.82 feet;

THENCE North 89° 03' 16" East, a distance of 8,135.55 feet with the North line of said 5,995.21 acre tract and the North line of said Chas. Morgan Survey back to the place place of beginning and containing 1,104.408 acres of land.

NOTE: All bearings as stated in these field notes are based on Polaris Observation.

James E. Weaver

James E. Weaver
Registered Public Surveyor
State of Texas No. 1757

REP/sw

Exhibit A

TRACT NO. 408

Telephone - Area Code 409-634-4934 EAST TEXAS ENGINEERING & SURVEYING, INC. 116 E. Lufkin Ave., Lufkin, Texas

November 7, 1986

EUGENE WOOD SURVEY, ABSTRACT 477
G.C.&S.F.R.R. SURVEY, ABSTRACT 263
JULIUS CLABAR SURVEY, ABSTRACT 65
O. W. BURTON SURVEY, ABSTRACT 335
CHAS. MORGAN SURVEY, ABSTRACT 18
J. ROBINSON SURVEY, ABSTRACT 166
HARVEY VANWEY SURVEY, ABSTRACT 412
POWELL LUMBER CO. SURVEY, ABSTRACT 526
JOHN ALLEN SURVEY, ABSTRACT 1
DAVID SUDOTH SURVEY, ABSTRACT 179
ORANGE COUNTY, TEXAS

FIELD NOTES FOR 4,226.812 ACRES OF LAND

BEING 4,226.812 acres of land situated in the Chas. Morgan Survey, Abstract 18, the J. Robinson Survey, Abstract 166, the Harvey Vanwey Survey, Abstract 412, the Powell Lumber Co. Survey, Abstract 526, the John Allen Survey, Abstract 1 and the David Sudoth Survey, Abstract 179, the Eugene Wood Survey, Abstract 477, the G.C.&S.F.R.R. Survey, Abstract 263, the Julius Clabar Survey, Abstract 65 and the O. W. Burton Survey, Abstract 335, all in Orange County, Texas, and being all that certain 3.09 acre tract of land as described in a deed from Nelda C. Stark to Owens-Illinois, Inc., dated June 8, 1972, and recorded in Volume 424, Page 536 and being that certain Parcel Number 6 as recorded in a deed from W-K-N Development Corporation to Owens-Illinois, Inc., dated February 24, 1966, and recorded in Volume 350, Page 148 and being that certain called 25 acre tract of land as described in a deed from Texas Gold Coast Television, Inc., to Owens-Illinois, Inc., dated June 20, 1973, as recorded in Volume 430, Page 950, and being that certain called Tract No. One as described in a deed from the Sabine River Authority of Texas to Owens-Illinois, Inc., dated August 17, 1966, as recorded in Volume 359, Page 86, and being part of that certain Tract No. One and all of Tract No. Two and Tract No. Three as described in a deed from the Sabine River Authority of Texas to Owens-Illinois, Inc., dated August 17, 1966, as recorded in Volume 359, Page 82, all above referenced deeds are recorded in the Deed Records of Orange County, Texas, said 4,226.812 acres of land being more particularly described by metes and bounds as follows:

BEGINNING at a 1/2" iron rod set for corner at a fence corner, said point being the Westerly Southeast corner of said Parcel Number 6, from said point for corner a 20" Pine bears North 72° West, a distance of 33.2 feet, marked with an old /X/, a 6" Red Oak bears North 58° West, a distance of 13.1 feet and an 8" Pine bears North 43° West, a distance of 10.5 feet, both marked with a new //X//;

THENCE South 88° 37' 25" West, a distance of 9,382.73 feet with the Easterly South boundary line of said Parcel Number 6 and along a fence to a fence corner post found for the Easterly Southwest corner of said Parcel Number 6, from said point for corner a 25" Sweet Gum bears North 30° East, a distance of 12.4 feet, marked with an old X;

THENCE North 01° 34' 14" West, a distance of 1,719.67 feet with the Southerly West boundary line of said tract to a 5/8" iron rod found for the Southwest corner of that certain 3.09 acre tract as described in a deed from Owens-Illinois, Inc. to Nelda C. Stark, dated June 21, 1972, from said point for corner an 8" Sweet Gum bears South 63° East, a distance of 12.3 feet and a 20" Pine bears South 43° East, a distance of 10.3 feet, both marked with an old X and a 7" Black Gum bears South 16° East, a distance of 20.4 feet, marked with a new //X//;

THENCE North 87° 25' 24" East, a distance of 156.76 feet with the South boundary line of said 3.09 acre tract to a 5/8" iron rod found for the Southeast corner of said 3.09 acre tract, from said point for corner a 17" Pine bears South 45° West, a distance of 2.5 feet, a 6" Sweet Gum bears South 59° East, a distance of 14.3 feet and a 7" Sweet Gum bears North 80° East, a distance of 25.8 feet, all marked with an old X;

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 2

THENCE North 02° 31' 07" West, a distance of 720.75 feet with the East boundary line of said 3.09 acre tract to a 5/8" iron rod found for the Northeast corner of said 3.09 acre tract, from said point for corner a 6" Sweet Gum bears North 85° West, a distance of 5.1 feet and a 17" Pine bears South 85° West, a distance of 11.8 feet, both marked with an old X and an 18" Pine bears North 38° East, a distance of 3.5 feet, marked with a new X;

THENCE North 32° 08' 28" West, a distance of 316.12 feet with the Northeast boundary line of said 3.09 acre tract to a 1 1/4" iron pipe found for the Northwest corner of said 3.09 acre tract in the Southerly West boundary line of the above referenced Parcel Number 6, from said point for corner a 21" Red Oak bears North 60° West, a distance of 51.1 feet, a 6" Sweet Gum bears South 47° East, a distance of 24.5 feet and a 16" Willow Oak bears South 32° East, a distance of 35.1 feet, all marked with an old X;

THENCE North 02° 29' 21" West, a distance of 101.06 feet with the Southerly West boundary line of said Parcel Number 6 to a 1/2" iron rod set for the South corner of that certain 3.09 acre tract as described in Volume 424, Page 536, from said point for corner a 12" Pine bears North 12° West, a distance of 47.2 feet, a 6" Red Oak bears North 03° East, a distance of 36.7 feet and a 12" Red Oak bears South 64° East, a distance of 48.1 feet, all marked with a new //X//;

THENCE North 32° 13' 27" West, a distance of 795.76 feet with the Southwest boundary line of said 3.09 acre tract to a 1/2" iron rod set for the West corner of said 3.09 acre tract and being in a South boundary line of the above referenced Parcel Number 6, from said point for corner a 27" Pine bears North 83° West, a distance of 51.9 feet and a 6" Pine fence corner bears North 76° West, a distance of 56.5 feet, both marked with an old X;

THENCE South 88° 48' 51" West, a distance of 2,665.08 feet with a South boundary line of said 3.09 acre tract to a 1/2" iron rod set for a Southwest corner of said 3.09 acre tract in the West boundary line of Teal Road and in the West boundary line of said Allen Survey and the East boundary line of the John Bland Survey, Abstract 47, from said point for corner a 1" iron pipe found bears North 88° 48' 51" East, a distance of 53.99 feet;

THENCE North 00° 37' 52" West, a distance of 3,841.04 feet with the West boundary line of said Teal Road and with the East boundary line of said Bland Survey and with the East boundary line of the Frank M. Cooper Survey, Abstract 63, and with the West boundary line of said Allen Survey and with a West boundary line of said Parcel Number 6 to a 1/2" iron rod found for the Northwest corner of said Allen Survey in the South boundary line of the John S. Norris Survey, Abstract 255, from said point for corner a 13" Pine bears North 50° East, a distance of 28.4 feet and another 13" Pine bears North 20° East, a distance of 13.0 feet, both having no marks and a 19" Pine bears South, a distance of 8.1 feet, marked with a new //X//;

THENCE South 89° 36' 00" East, a distance of 2,981.84 feet with the North boundary line of said Allen Survey and the South boundary line of said Norris Survey and the South boundary line of said Robinson Survey, and the North boundary line of said Teal Road and with a North boundary line of said Parcel Number 6 to a fence corner post found for corner, from said point for corner a 13" Black Gum bears South 75° West, a distance of 12.1 feet, an 11" Willow Oak bears South 42° West, a distance of 20.7 feet and an 8" Sweet Gum bears North 44° East, a distance of 12.0 feet, all marked with new //X//;

THENCE North 00° 23' 42" East, a distance of 4,510.77 feet with a West boundary line of said Parcel Number 6 and along a fence to a 3/8" iron rod found for an ell corner of said Parcel Number 6, from said point for corner a 29" Willow Oak bears North 67° West, a distance of 30.4 feet, a 6" Water Oak bears North 18° East, a distance of 27.1 feet and a 13" Pine bears South 47° East, a distance of 17.0 feet, all marked with a new X;

THENCE North 89° 55' 02" West, a distance of 4,970.05 feet with a South boundary line of said Parcel Number 6 and along an old fence to a 3/4" iron rod found for an angle corner;

THENCE South 89° 59' 45" West, a distance of 1,240.70 feet with said South boundary line to a 1/2" iron rod set beside an old fence corner post for the Westerly Southwest corner of said Parcel Number 6 in the West boundary line of said Morgan Survey and an East boundary line of the P. C. Cooper Survey, Abstract 64;

THENCE North 00° 53' 23" West, a distance 2,365.72 feet with the Northerly West boundary line of said Parcel Number 6 and the West boundary line of said Morgan Survey and with an East boundary line of said Cooper Survey to a 1/2" iron rod set for the Southeast corner of that certain Tract No. 1 as described in Volume 359, Page 86;

THENCE South 89° 06' 37" West, a distance of 115.00 feet with the South boundary line of said Tract No. One to a 1/2" iron rod set for the Southwest corner of said Tract No. One;

THENCE North 00° 53' 23" West, a distance of 2,762.16 feet with the West boundary line of said Tract No. One to a 1/2" iron rod set for the Northwest corner of said Tract No. One;

THENCE North 89° 06' 30" East, a distance of 100.00 feet with the North boundary line of said Tract No. One to a 1/2" iron rod set for corner in the West boundary line of said Tract No. Three as described in Volume 359, Page 82;

THENCE North 00° 53' 23" West, a distance of 15.00 feet with the West boundary line of said Tract No. Three to a 1/2" iron rod set for the Northwest corner of said Tract No. Three, from said point for corner a 15" Water Oak bears South 79° East, a distance of 28.5 feet and a 12" Pine bears South 53° East, a distance of 29.4 feet, both marked with a new //X//;

THENCE North 89° 06' 30" East, a distance of 3,565.85 feet with the North boundary line of said Tract No. Three to a 1/2" iron rod set for the Northwest corner of that certain 3.74 acre tract as described in a deed from Owens-Illinois, Inc., to Orange County Drainage District, dated December 6, 1971, as recorded in Volume 413, Page 900;

THENCE South 00° 53' 30" East, a distance of 50.00 feet with the West boundary line of said 3.74 acre tract to a 1/2" iron rod set for corner, from said point for corner a 24" Water Oak bears South 81° East, a distance of 13.9 feet, marked with a new //X//;

THENCE South 69° 03' 52" East, a distance of 685.19 feet with the Southwest boundary line of said 3.74 acre tract to a 1/2" iron rod set for corner;

THENCE North 55° 23' 16" East, a distance of 100.00 feet with a Southeast boundary line of said 3.74 acre tract to a 1/2" iron rod set for corner, from said point for corner a 6" Pine bears North 27° West, a distance of 9.8 feet, a 6" Pine bears South 44° East, a distance of 13.2 feet and a 6" Pine bears South 58° West, a distance of 19.5 feet, all marked with a new //X//;

THENCE North 41° 19' 20" East, a distance of 269.02 feet with a Southeast boundary line of said 3.74 acre tract to a 1/2" iron rod set for the Southeast corner of said 3.74 acre tract;

THENCE North 00° 53' 30" West, a distance of 50.00 feet with the East boundary line of said 3.74 acre tract to a 1/2" iron rod set for the Northeast corner of said 3.74 acre tract in the North boundary line of said Tract No. Three;

THENCE North 89° 06' 30" East, a distance of 10,082.29 feet with the North boundary line of said Tract No. Three and the North boundary line of Tract No. Two and the North boundary line of Tract No. One as described in Volume 359, Page 82, to a 1/2" iron rod set for corner in the West boundary line of State Highway 87;

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 4

THENCE South 09° 52' 02" East, a distance of 7,075.68 feet with the West boundary line of State Highway 87 to a 5/8" iron rod found for corner in the South boundary line of said Morgan Survey and the North boundary line of the Adolph Phrajan Survey, Abstract 267 and a South boundary line of said Parcel Number 6, from said point for corner a 14" Water Oak bears North 60° West, a distance of 22.8 feet, marked with an old //X//, a 10" Pine bears North 76° West, a distance of 28.2 feet and a 14" Pine bears North 46° West, a distance of 33.3 feet, both marked with a new //X//;

THENCE South 88° 34' 06" West, a distance of 401.94 feet with the division line between said surveys and with a South boundary line of said Parcel Number 6 to a 1/2" iron rod found for the Northwest corner of said Phrajan Survey and the Northeast corner of said Sudoth Survey, from said point for corner an 18" White Oak bears North 85° West, a distance of 22.3 feet, a 9" Sweet Gum bears North 20° West, a distance of 23.6 feet and an 8" Red Oak bears North 53° East, a distance of 18.3 feet, all marked with a new //X//;

THENCE South 88° 36' 13" West, a distance of 1,935.74 feet with the South boundary line of said Morgan Survey and the North boundary line of said Sudoth Survey, and a South boundary line of said Parcel Number 6 to a 1/2" iron rod set for an ell corner of said Parcel Number 6, from said point for corner a 21" Pine bears North 87° East, a distance of 39.5 feet and a 24" Pine bears North 69° East, a distance of 34.5 feet, both marked with an old X and a 12" Sweet Gum bears North 04° East, a distance of 11.2 feet, marked with a new X;

THENCE South 01° 30' 47" East, a distance of 2,689.33 feet with an East boundary line of said Parcel Number 6 to a 1/2" iron rod set for corner in the North boundary line of Teal Road, from said point for corner a 14" Water Oak bears South 35° East, a distance of 64.8 feet, a 7" Water Oak bears South 15° West, a distance of 55.0 feet and an 11" Ash bears South 05° East, a distance of 53.1 feet, all marked with a new //X//;

THENCE North 89° 28' 57" East, a distance of 1,006.66 feet with the North boundary line of said Teal Road to a 1/2" iron rod set for corner;

THENCE South 55° 45' 53" East, a distance of 77.45 feet to a 1/2" iron rod set for corner, from said point for corner a 14" Pine bears South 34° West, a distance of 37.5 feet, marked with an old /X/, an 8" Pine bears North 10° East, a distance of 20.5 feet and another 8" Pine bears North 34° West, a distance of 27.8 feet, both having no marks;

THENCE South 34° 13' 57" West, a distance of 30.50 feet to a 1/2" iron rod set for corner in the South boundary line of said Sudoth Survey and the North boundary line of said Allen Survey, from said point for corner a 12" Pine bears South 10° East, a distance of 5.9 feet and a 14" Pine bears South 18° West, a distance of 7.3 feet, both marked with an old /X/;

THENCE South 88° 57' 57" West, a distance of 1,019.91 feet with the division line between said surveys to a 3/8" iron rod found for an ell corner of said Parcel Number 6, from said point for corner a 14" Pine bears North 53° West, a distance of 8.5 feet, marked with an old X, a 6" Water Oak bears North 13° East, a distance of 15.0 feet and an 8" Sweet Gum bears North 83° East, a distance of 7.8 feet, both marked with a new //X//;

THENCE South 01° 05' 06" East, a distance of 3,653.88 feet with an East boundary line of said Parcel Number 6 and along an old fence to a 1 1/4" iron pipe found for an ell corner of said Parcel Number 6, from said point for corner an 18" Pine bears South 68° East, a distance of 14.5 feet, marked with an old /X/, an 8" Willow Oak bears North 70° East, a distance of 31.0 feet, having no marks and a 9" Water Oak bears North 20° East, a distance of 3.4 feet, marked with a new //X//;

THENCE North 88° 48' 56" East, a distance of 1,013.93 feet with a North boundary line of said Parcel Number 6 to a 1 1/4" iron pipe found for an ell corner of said Parcel Number 6, from said point for corner a 13" Willow Oak bears North 25° East, a distance of 2.8 feet, marked with an old X and a 15" Willow Oak bears South 85° West, a distance of 49.8 feet, marked with a new //X//;

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 5

THENCE North 00° 59' 28" West, a distance of 3,629.81 feet with a West boundary line of said Parcel Number 6 to a 1/2" iron rod set for corner in the South boundary line of Teal Road at the beginning of a curve to the right whose functions are as follows: an angle of 20° 39' 08", a radius of 1,038.00 feet, a length of 374.14 feet and whose chord bears South 70° 23' 31" East, a distance of 372.12 feet, from said point for corner a 14" Pine bears South 35° West, a distance of 13.3 feet, a 14" Pine bears North 04° West, a distance of 14.6 feet and a 12" Pine bears North 10° East, a distance of 16.0 feet, all having no marks;

THENCE in a Southeasterly direction with the South boundary line of said Teal Road and with said curve to the right a distance of 374.14 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE South 60° 03' 57" East, a distance of 1,090.63 feet with the South boundary line of said Teal Road to a 1/2" iron rod set for corner at the beginning of a curve to the left whose functions are as follows: an angle of 39° 38' 09", a radius of 716.20 feet, a length of 495.45 feet and whose chord bears South 79° 53' 02" East, a distance of 485.63 feet;

THENCE in a Southeasterly direction with the South boundary line of said Teal Road with said curve to the left a distance of 495.45 feet to a 1/2" iron rod set for corner at the end of said curve;

THENCE North 80° 17' 54" East, a distance of 60.19 feet with the South boundary line of said Teal Road to a 1/2" iron rod set for corner in the West boundary line of State Highway 87;

THENCE South 09° 51' 19" East, a distance of 507.68 feet with the West boundary line of State Highway 87 and an East boundary line of Parcel Number 6 to a 1/2" iron rod set for corner, from said point for corner a 9" Pine bears North 40° West, a distance of 27.4 feet, an 8" Sweet Gum bears North 15° West, a distance of 8.7 feet and a 7" Sweet Gum bears North 72° West, a distance of 9.9 feet, all marked with a new //X//;

THENCE South 88° 49' 54" West, a distance of 327.41 feet with a South boundary line of said Parcel Number 6 and with a green paint line to a 5/8" iron rod found for an ell corner of said Parcel Number 6, from said point for corner a 4" Sweet Gum bears North 84° West, a distance of 4.8 feet, marked with an old X, a 20" Pine bears North 38° West, a distance of 34.4 feet and a 15" Pine bears North 22° West, a distance of 29.1 feet, both marked with a new //X//;

THENCE South 01° 08' 15" East, a distance of 1,229.45 feet with an East boundary line of said Parcel Number 6 to a 1/2" iron rod set for an ell corner of said Parcel Number 6, from said point for corner a 14" Sweet Gum bears North 31° West, a distance of 27.6 feet, marked with two old X's, a 13" Sweet Gum bears North 45° East, a distance of 7.2 feet and a 20" Pine bears North 20° West, a distance of 7.6 feet, both marked with an old X;

THENCE South 89° 35' 06" West, a distance of 778.83 feet with a South boundary line of Parcel Number 6 to a 1/2" iron rod set for an ell corner of said Parcel Number 6, from said point for corner a 6" Sweet Gum bears North 11° East, a distance of 8.6 feet, an 11" Pine bears North 17° West, a distance of 3.3 feet and a 20" Sweet Gum bears South 10° East, a distance of 53.5 feet, all marked with an old X, a 3/4" iron rod in a 1 1/2" iron pipe bears South 00° 03' West, a distance of 20.71 feet, a 12" Willow Oak bears North 59° East, a distance of 29.6 feet and a 20" Pine bears South, a distance of 19.5 feet, both marked with a new //X//;

THENCE South 01° 06' 15" East, a distance of 1,231.09 feet with an East boundary line of said Parcel Number 6 to a 1/2" iron rod set for an ell corner of said Parcel Number 6, from said point for corner a 1" pipe bears North 53° East, a distance of 4.4 feet and an 18" Water Oak bears North 32° East, a distance of 8.1 feet, marked with an old X;

THENCE North 88° 21' 54" East, a distance of 456.59 feet with a North boundary line of said Parcel Number 6 to a 5/8" hexagon iron rod found for an ell corner of said Parcel Number 6;

FIELD NOTES FOR OWENS-ILLINOIS, INC.
PAGE 6

THENCE South 00° 33' 47" East, a distance of 3,412.22 feet with the Southerly East boundary line of Parcel Number 6 back to the place of beginning and containing 4,365.281 acres of land,

SAVE AND EXCEPT the following described 138.469 acres of land;

FIELD NOTES FOR 138.469 ACRES OF LAND

BEING 138.469 acres of land situated in the L. A. Casey Survey, Abstract 514, Orange County, Texas, and being the same land as described in a deed from L. A. Casey to W. W. Winkler, dated January 10, 1940 and recorded in Volume 64, Page 227 of the Deed Records of Orange County, Texas, said 138.469 acres of land being more particularly described by metes and bounds as follows:

COMMENCING at a 1/2" iron rod found for the Northwest corner of the Adolph Phrajan Survey, Abstract 267 and the Northeast corner of the David Sudoth Survey, Abstract 179, from said point for corner an 18" White Oak bear North 85° West, a distance of 22.3 feet, a 9" Sweet Gum bears North 20° West, a distance of 23.6 feet and an 8" Red Oak bears North 53° East, a distance of 18.3 feet, all marked with a new //X//;

THENCE South 63° 05' 46" West, a distance of 6,355.07 feet to a 1/2" iron rod set for the Southeast corner of said Casey Survey and the Southwest corner of the Harvey Vanwey Survey, Abstract 412 in the North boundary line of the John Allen Survey, Abstract 1 in the North boundary line of Teal Road and being on the East side of another oil road, from said point for corner a 13" Sweet Gum fence corner bears North 42° East, a distance of 15.6 feet, marked with an old X, a 9" Willow Oak bears South 18° West, a distance of 55.2 feet and a 10" Sweet Gum bears South 40° East, a distance of 74.8 feet, both marked with a new //X// and a 5/8" iron pipe found bears South 88° 43' West, a distance of 40.29 feet;

THENCE South 88° 59' 26" West, a distance of 2,158.33 feet with the North boundary line of said Allen Survey and the South boundary line of said Casey Survey and the North boundary line of said Teal Road to a 1/2" iron rod found for the Southwest corner of said Casey Survey and the Southeast corner of the J. Robinson Survey, Abstract 166, from said point for corner a 24" Sweet Gum bears South 28° East, a distance of 71.3 feet, marked with an old X, an old Pine stump bears North 72° East, a distance of 28.1 feet and a 10" Sweet Gum bears North 47° West, a distance of 11.9 feet and a 20" Pine bears North 29° West, a distance of 20.0 feet, both marked with a new //X//;

THENCE North 00° 24' 42" East, a distance of 2,805.71 feet with the West boundary line of said Casey Survey and the East boundary line of said Robinson Survey to a 1/2" iron rod set for the Northwest corner of said Casey Survey and the Northeast corner of said Robinson Survey in the South boundary line of the Chas. Morgan Survey, Abstract 18, from said point for corner a 12" Pine bears South 15° West, a distance of 41.4 feet, marked with a new //X//, a 24" Pine bears South 45° East, a distance of 22.2 feet and a 13" Pine bears South 58° East, a distance of 27.0 feet, having no marks and a fence corner bears South 04° 19' East, a distance of 8.9 feet;

THENCE North 89° 18' 06" East, a distance of 2,151.32 feet with the North boundary line of said Casey Survey and the South boundary line of said Morgan Survey and the South boundary line of an oil road to a 1/2" iron rod set for the Northeast corner of said Casey Survey and the Northwest corner of said Vanwey Survey on the East side of said road, from said point for corner a 25" Willow Oak bears North 28° West, a distance of 7.5 feet;

THENCE South 00° 16' 24" West, a distance of 2,793.86 feet with the East boundary line of said Casey Survey and the West boundary line of said Vanwey Survey and along the East side of an oil road back to the place of beginning and containing 138.469 acres of land leaving a net acreage of 4,226.812 acres of land.

NOTE: All bearings as stated in these field notes are based on Polaris Observation.

James E. Weaver
James E. Weaver
Registered Public Surveyor
State of Texas No. 1757

REP/sw

Appendix B AJD Proposed Bank

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
2000 FORT POINT RD
GALVESTON, TEXAS 77550

February 18, 2022

Compliance Branch

SUBJECT: **SWG-2020-00178** – International Paper (IP), Approved Jurisdictional Determination (AJD), Proposed IP Mitigation Bank, Orange Mill, Orange County, Texas

Robert Burgess
RPS Group
4801 Southwest Parkway, Parkway 2, Suite 150
Austin, Texas 78735-8956

Dear Mr. Burgess:

This is in response to the December 31, 2019 request for a wetland delineation verification and approved jurisdictional determination (AJD) for an approximate 1,667-acre site of the proposed International Paper Mitigation Bank. The subject site review area was subsequently modified December 16, 2021. The subject site is located along the eastern site boundary of the International Paper Orange Mill facility at 1750 IP Way Road, Orange, Orange County, Texas (map enclosed).

Based upon the September 11, 2020, and October 7, 2020, site visits, the submitted wetland delineation report and maps, and detailed offsite data we have determined the subject site contains waters of the United States (U.S.), specifically approximately 1,455.7 acres of contiguous forested wetlands abutting the Sabine River, and approximately 0.78 acre of Sabine River impoundments. Wetlands within the subject site were identified using the Atlantic and Gulf Coastal Plain Region (Version 2.0) to the 1987 Corps of Engineers Wetland Delineation Manual which requires under normal circumstances, a predominance of hydrophytic vegetation, wetland soils, and sufficient hydrology at/or near the surface for adequate duration and frequency to support this aquatic ecosystem. The Sabine River is listed on the Galveston District Navigable Waters list (Section 10 list), is subject to the daily tidal ebb and flow, and has been used, is currently used, and has potential to be used in the foreseeable future for interstate or foreign commerce. Therefore, the Sabine River meets the 33 CFR 328.3(a)(1) water of the U.S. and 33 CFR 329.4 navigable water of the U.S. definitions. The subject site contains approximately 1,455.7 acres of contiguous forested wetland abutting the Sabine River. Therefore, the subject site wetlands meet the 33 CFR 328.3(c) adjacent definition. This approved jurisdictional determination will remain valid for five (5) years from the date of this letter unless new information warrants revision or reissuance prior to the expiration date.

Areas of Federal Interests (federal projects, and/or work areas) may be located within the proposed project area. Any activities in these federal interest areas would

also be subject to federal regulations under the authority of Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408 - Section 408). Section 408 makes it unlawful for anyone to alter in any manner, in whole or in part, any work (ship channel, flood control channels, seawalls, bulkhead, jetty, piers, etc.) built by the United States unless it is authorized by the Corps (i.e., Navigation and Operations Division).

Corps determinations are conducted to identify the limits of the Corps Clean Water Act jurisdiction for particular sites. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331.5. Also enclosed are a combined Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA to the Southwestern Division Office at the following address:

Mr. Jamie Hyslop
Administrative Appeals Officer
Southwestern Division, USACE (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1317
Telephone: 469-487-7061; FAX: 469-487-7199

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within **60 days** of the date of the NAP. It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

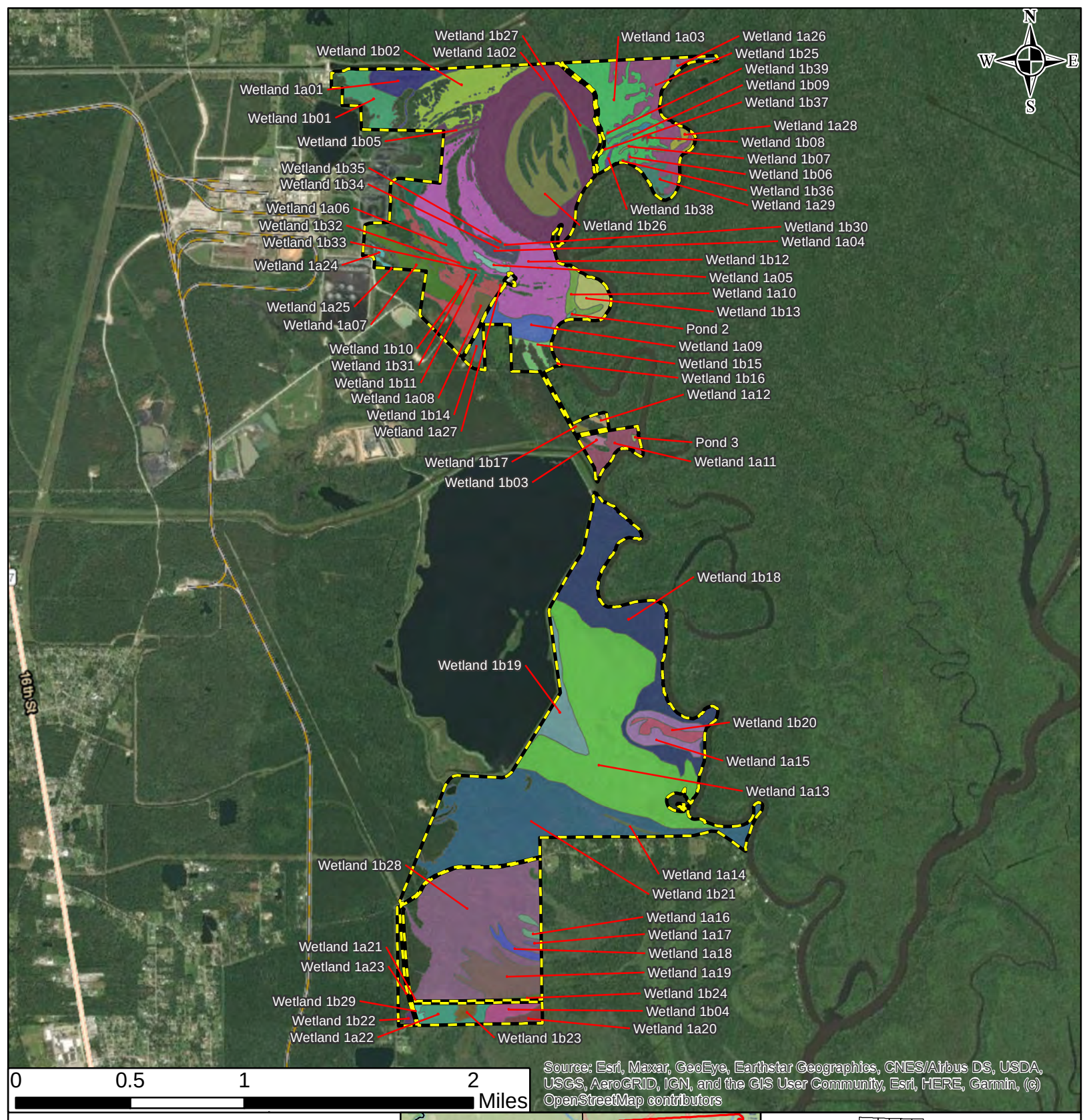
If you have questions concerning this matter, please reference file number **SWG-2020-00178** and contact me at the letterhead address, by e-mail at kevin.s.mannie@usace.army.mil, or by telephone at 409-766-3016. To assist us in improving our service to you, please complete the survey found at

https://regulatory.ops.usace.army.mil/customer-service-survey/ and/or if you would prefer a hard copy of the survey form, please let us know, and one will be mailed to you.

Sincerely,

Kevin Mannie
Project Manager, Compliance Branch

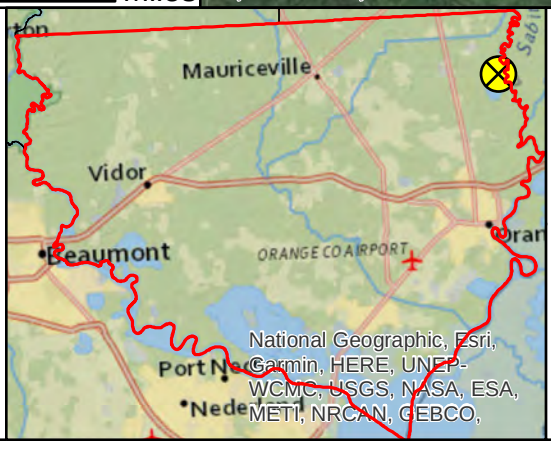
Enclosures

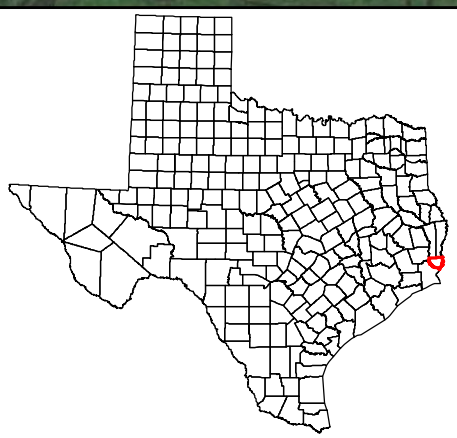


SWG-2020-00178
International Paper (IP)
Approved Jurisdictional Determination (AJD)
Approximate 1,640-Acre Tract
IP Mitigation Bank
Orange, Orange County, Texas

Review_Area ~ 1,640 ac

Note: Review Area reflects neither property boundary nor ownership





NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **INTERNATIONAL PAPER**	File Number: **SWG-2021-00178**	Date: **2/18/22**

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Kevin S. Mannie, Project Manager
Regulatory Division, Evaluation Branch (CESWG-RD-E)
U.S. Army Corps of Engineers, Galveston District
P.O. Box 1229
Galveston, Texas 77553-1229
Telephone: 409-766-3016; Fax: 409-766-3931
Email: kevin.s.mannie@usace.army.mil

If you only have questions regarding the appeal process you may also contact:

Mr. Jamie Hyslop, Administrative Appeals Review Officer
Southwestern Division (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1317
Phone: 469-216-8324
Email: jamie.r.hyslop@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

Appendix C Historical Review and Historical Maps

Since the bank type proposed does not included any earth moving, a pedestrian survey was not included in this report, although the nine random survey lines walked allowed a rough surface inspection, and over 70 sites had bulk soil samples examined for morphological signs of wetland chemistry indicators to a depth of approximately 16 inches. This was not a deliberate sieving for cultural resources but soil sampling for wetland delineation. No historic material, material evidence, or cultural features were observed. Although several samples displayed mottled strata, and thus may have been disturbed, these areas were predominantly in planted pine silviculture areas. It can't be said that it was determined that it was likely or not that there were significance cultural resources located within the proposed project area by using approved methods, as the field sampling done could hardly be considered a systematic investigation for cultural resources. Only that the informal pedestrian reconnaissance and observation of soil cores did not show evidence.

The area of potential effect (APE) under 106 is defined as any direct and/or indirect effect to historic properties listed or considered eligible for listing in the NRHP. There would be no direct APE because this is limited to areas of potential ground disturbance, and no earthwork is planned. The indirect APE is generally the geographic area from which any project activity has the potential to visually diminish or alter the setting of a NRHP-listed or NRHP-eligible property (36 CFR 800.16[d]). However, again there is no work planned or any usage changes that would diminish or alter the settings of a listed property.

Prehistory

Prehistory of the area is likely rich like along most of the Gulf Coast. The Sabine River has been the subject of studies from the headwaters to offshore studies of the mouth during the most recent glacial maximum. Studies have indicated that the area in general has been used for a long time with the suspected use by Paleoindian communities being in excess of approximately 8000 to 8500 BP based on rangia middens, charred bone, and produced stone (Pearson et al. 1986). These areas were associated with relict Deweyville channels, which studies have sampled up to 10nM offshore of the current mouth. Sites in the lower Sabine appear to have been uncommon, but perhaps they are just not well documented. Studies have been done in nearby areas such as at Nibbles Bluff Louisiana finding several periods of usage (Belvin, 2017). The limited literature review done suggests that there well may be better documentation, but it is limited in access to professional archeologists. Again, as noted above

the proposed bank does not involve earthwork as it is preservation dominated. Therefore, a general the progression of the region through prehistory is presented below.

In the Archaic period after the rapid post glaciation oceanic rise in this area occurring about 9000 to 7400 BP, which would have drowned many earlier sites and this has been documented (Pearson et al. 1986). However, the Sabine River being a major drainage with diverse habitats containing extensive resources that may have been utilized within the current valley. The sea level rise also expanded the estuarine and marsh environments into this reach as sea level rose onto the continental shelf. This expanded estuarine and marsh environment of the area is proposed to have allowed or encouraged regional habitation by around 3500 to 3000 BCE. The appearance of semi permanent habitation sites have been observed onshore in Texas and Louisiana during this period, and appears to have used locally sourced material for specialized jobs to live in this environment. This region in this period saw an expanding population and extensive mound building across the Gulf coast from Florida to Texas, and included the formation of trading routes for exotic materials. This period progressed in complexity in some ways and regressed in others with important milestones in hunting and farming such as the use of both native plums and grapes as well as the importation of non-native species such as squash. Agriculture progressed during this period and finally in the Marksville culture (around 400 CE) was thought to have surpassed the local aquatic resources as the food staple source. This age cumulated in the Mississippian culture, or the Caddoan-Mississippian culture encountered by the French and Spanish explorers. This section near the Gulf thought to have remained somewhat isolated from the other nations due to the nature of the terrain. In this area the Attakapa tribe lived as two groups; Hiyekiti Ishak (the sunrise people) in southwest Louisiana and western band Hikike Ishak (the sunset people) of southeast Texas (Williams 1988).

Protohistory, Colonial, Republic of Texas, and American Annexation

Early recorded history is documented with maps and journals being available. The bank site is located approximately 5 straight line miles north, or approximately 14 river miles north of the current location city of Orange in Orange County. The Orange area has a rich recorded history with Spain and France both claiming ownership of the surrounding area. The Attakapan tribes were reported in decline in 1779 numbering around 100 warriors, and by 1908 there were only 9 that were counted (Williams 1988).

Around the time of the Louisiana Purchase, Orange County was informally called a gateway to Texas and Orange the Gateway City in published brochures (Williams 1988). In 1803 Louisiana territory was acquired from France, but the boundary between the US and Spain was not well defined. This itself was due to the history of setting the location of the boundary between Spain and France. Originally an informal agreement between Spanish commander at the presidio of Los Adaes and the French commandant at Natchitoches set a vague boundary between the territories as the at the time it was a relatively unimportant boundary in a sparsely settled area. The location of the boundary became less specific south of the town of Natchitoches. This unspecific border was propagated through the Louisiana purchase. Spain and the U.S. recognized that this could increase the chance for clashes between between government troops, and to prevent this in 1806 Generals Wilkinson (U.S.) and Herrera (Spain) met and negotiated the Neutral Ground Agreement to prevent skirmishes in this disputed area. In this agreement the eastern border was still not set exactly but basically was starting at Longansport to the south it was the land lying west of the Calcasieu River, Kisatchie Bayou, and Arroyo Hondo. The agreement was more specific on the western border being the Sabine River. This strip of land between these waterbodies by the agreement was to be unoccupied by troops from either side, and thus unfortunately quickly became a lawless area that attracted criminals, exiles, and refugees including becoming being used by the pirate Jean Lafitte. In 1821 the strip was recognized to be part of the United States by the Adams-Onis Treaty and US patrols under future president Zachary Taylor began in 1822 to put an end to the lawlessness up to the Sabine River. Then in 1836 Texas defeated Santa Anna, and created the Republic of Texas. The border remained the Sabine River and the United States recognized the Republic of Texas in March 1837 but declined to annex the Republic until December 29, 1845.

Era of Dominance of Sabine River for Commercial Commerce

Regional and commercial travel of the early 1800's to the early 1900's depended heavily on the Sabine, with some evidence that the river was navigable at times for up to 800 river miles to Belzora in Smith County (Williams 1988). Early navigation was downstream using unpowered flatboats or keelboats, but these were large vessels that could carry 200 bales or more of cotton (50 tons). Their cargo was then unloaded to New Orleans cotton schooners in Sabine Lake usually near the pass where there was a natural shoal (Port of Orange 2021). Frequently the boats themselves were then dismantled and sold for lumber rather than reused (Block, 1976). In 1837 the US Congress appropriated money for mapping and removal of snags from Sabine Lake and the Sabine River for navigation use, and a sounding and gage trip was made by the

large steamer Velocipede that had a 5 foot draft to and from Sabinetown. Sabinetown was located at the confluence of Palo Gaucho Bayou and the Sabine River, which is now part of Toledo Bend Reservoir (Ferguson, 1995). The Palo Gaucho confluence is located approximately 361 river miles from the Gulf pass, 320 river miles north of Orange, and is over 65 straight line miles north of the proposed bank site. The trip gage documentation could not be found, but in a 5 foot steamboat it was reported that the trip was made without difficulty and without damage in December 1837 (Williams 1988). Records also indicated that regular steamboat service had already been established from Sabinetown to New Orleans by 1837, and the cost of shipping for interstate trade for bailed cotton was $3.50 a bail (Williams 1988). This supports that this was waters used at the time for interstate commerce in its natural state. The predecessor agency to NOAA, the United States Coast and Geodetic Survey (USC&GS), was commissioned by an act of Congress in 1842 and worked in conjunction with the Texas Navy and US Navy to produce a map detailing the nearshore, the passes, and the estuaries of the Gulf of Mexico from St. Marks just south of Tallahassee Florida to Galveston Texas (USC&GS, chart accessed 2021 from NOAA). The map was produced from several surveys across a number of years (1844 to 1849), with the portion involving Texas being stated as 1846. The copy of the map found was a digitized negative (a white map on black background), and likely originally a lithographic photonegative. This image was inverted (black map on white background), clipped, and enlarged to show the area of interest in detail, which shows the Sabine from Sabine Lake to Crows Ferry just north of Sabinetown, including a general sounding survey of Sabine Lake (Figure C1). This map could also be georeferenced in ArcGIS using ground control points such as passes, tributaries, roads, and places. The proposed Bank occurs along an area identified as The Narrows, where several intermittent flow lines are shown crossing between the Sabine and Old River (Figure C2). It is important to note that the navigation charts of the time had a somewhat different purpose than NOAA charts of today. Today's mariners plot relatively precise geolocations of their vessel which make accurate geolocated bathometric surveys valuable. With historical charts it was more important to show relative channels based on identifiable features such as tributaries, bearings for triangulation between features, basic bathometric information to show basic channels, and to show relevant ports along the river. The 1846 map shows two nearby ports to the proposed bank; Ballew's landing (now West Bluff) and Princeton (now Deweyville). Thus, the precision of the geolocation of the chart, or chart error, also becomes progressively dilated progressing inland. This would not be unexpected since measurement likely would have been from Sabine Lake with the stadiametric range finding, chains, and their angles. All resulting in additive errors due

to currents, pitching, and terrain. The course of the Sabine is also mostly north south, and at the time of this chart cartography tools available to limit error in a channel and control latitude was the use of a Sextant or Zenith telescope. Sextants would be very difficult to use accurately in this area, and Zenith telescopes were sophisticated tools that at the time were rare.

Other intrastate trade in the Orange County area used ferries to support trade across the Sabine. The Jefferson County Commissioners records show that an official ferry license was given to Richard Ballew, which operated one of the major launches located north of Orange that ran from West Bluff on the east side of the Sabine, across the Sabine, and up Old River to Niblett's Bluff in Louisiana (Figure C2). The USC&GS chart also shows Ballew's landing at West Bluff, and the corresponding landing at Niblett's Bluff, then called Millspaw's bluff (Martin, 2019). These locations still exist and are shown on modern USGS maps although the actual ferry launches look to be gone. The Ballew ferry was reported to be at the end of the road to West Bluff. This road crosses a southern portion of the bank running across a series high chenier ridges to the river (this road was removed from the bank as unprotected ROW). The navigation chart does not show additional features seen on USGS maps such as Morgan and Pruett bluffs, suggesting that these may not have been landings. The next landing shown as Princeton, which had a post office until 1881, but now been absorbed by Deweyville in Newton County (Wooster, 1995).

Early County Plat Maps and Property Deeds

The plats the make up the bank were identified in the 1862, 1880, 1895, and 1897. These maps are of varying quality and detail deeds on the basis of the metes and bounds for the bank location. Some of the plat maps were publicly available as low quality images to serve as illustrations in the GLO map store for map reproduction purchase. However, the 1897 map was publicly available as higher quality digital scan from the US Library of Congress (U.S. Library of Congress 2021).

The 1895 and the higher quality 1897 scan from the Library of Congress were manually roughly orthorectified in ArcGIS utilizing ground control features that could be located and were static over the many intervening decades. Sharp, stable, control points were chosen to spread across the raster image as is standardly done to control general error across the county such as county boundaries or stream confluences, but of course since these maps were over 100 years old, this was difficult. It should be noted that this method would also be a poor control of local errors and

other various sources of local distortions, and this error was not estimated. The 1897 map is presented in Figure C3.

The orthorectified plat maps could be overlaid on modern georeferenced map and aerials. The plot maps were still distorted by today's standards, but of much better accuracy than the 1848 USC&GS navigation chart as the intent of these maps were to define property metes and bounds by careful terrestrial surveying. They also provide support of the boundary between the States. The navigation chart, while it is a small scale map and distorted, does show the location of the bank and appears to show the Jackson Island area on modern USGS maps as being on the west side of the Sabine at that time as a peninsula (Figure C2), but the map is distorted. The county plat maps of 1895 and 1897 also both support that Jackson Island had not been cutoff by the time of the creation of the plat maps (Figure C3), which is well after statehood of both Louisiana and Texas. The County survey maps show the proposed bank area to be parts of the Charles Morgan, John Allen, and the Richard Ballew surveys, all of which were established in 1835 and were originally listed as each being a league, or approximately 4428 acres. Richard Ballew, a former lieutenant of Jean Laffite, had run a ferry from West Bluff as early as 1832. There is also small plot listed as J Townsend along the river to north of the PRM site. It is likely that the large deeds were issued as a land grant that could either been a fee grant from Mexico under the 1825 colonization rules, or from the Republic of Texas as headright grants for heads of families shown to have been in Texas prior to 1836. Either way the Orange County surveyor had recorded deeds by 1840 and had mapped them on the subsequent county maps. The modern recorded deeds for the proposed bank site are in Appendix A. A metes and bounds survey review will need to be done as part of joining and subdividing parcels per the banking guidance.

The deeds on the plat maps were filed after the Adams-Onis Treaty and recorded at least 12 years after Louisiana statehood. These county plat maps look to support that the area identified as Jackson Island was at the time represented as a peninsula which was just after the treaty. Thus, with the probable timeline of the progression of the cutoff it is probable that the area called Jackson Island on modern USGS maps was at the time of the Louisiana purchase, the Adams-Onis Treaty, and the two statehoods, a peninsula on the western side of the Sabine. As part of the Special Master 1969 recommendations to the U.S. Supreme Court it looks likely that this land would hold with Texas (Price 1975) as the Jackson Island area was still shown as a peninsula on both the 1895 and 1897 plat maps. The historical USGS quadrangles are not consistent through time on the exact boundary, with some showing Jackson Island in Louisiana

and some showing it as Texas, but the latest National Map from the USGS National Geospatial Program now indicates that this area is within Texas. While not recently surveyed, this area looks to currently be approximately 70 acres in size. The NWI classifies this area as PF01A, much like the area directly across the river, and probably has a community where approximately half the area is dominated by oak and sweetgum and half is dominated by cypress tupelo communities. If the area is within the plot survey, and if repatriation is not too onerous, it likely will be sampled and eventually added to the bank site area at a later date.

Early Developed Regional Infrastructure

As the area was better settled, infrastructure was placed to aid in the transference of goods and competed with the historical river based transportation. The Texas and New Orleans Railroad was nearing completion between Houston and Orange in 1861 when the Civil War began, and the company's Louisiana Division began construction as well, but rail did not become complete between Houston to New Orleans until 1881, which cemented rail dominance in commercial interstate shipping. Roadways were in general also improved. What became US 90 followed the earlier Opelousas or La Bahia trails and crossings, one of which was later called the Old Spanish Trail crossing the Sabine near the area and was reported to have probably crossed near West Bluff. Likewise, the famed El Camino Real was not a single road, but a series of trails and crossings concentrating just to the north of this area. These early roads and trails had been frequently established based on earlier indigenous trails and crossings. The early roadway travel used several ferry crossings to cross the Sabine and these persisted up into automotive era, but in 1927 the Sabine River Bridge opened just to the south of this area near Orange and allowed automotive traffic across the Sabine. This structure mostly ended the need and the era of river ferries in this area, which involved fees and substantial delays.

Riverine transportation of commercial goods continued but was gradually displaced by overland methods in the interior. Commercial trade on the river had originally grown many of the smaller settlements along the Sabine that were involved in transporting cotton and lumber. But with the coming of rail and road competition, the era of river steamboats had mostly passed by 1900 (Williams 1988). The alternative options of road and rail could provide for commercial shipping and transportation of moderate loads and lessened the importance of shipping on the inland Sabine. As a result, many of the towns along the Sabine that had grown up as landings became less relevant and were abandoned to become ghost towns or did not further develop in size. However, in the river near the top of Sabine Lake, shipping from ports were still the most

competitive means to transport heavy or bulky products. In the mid nineteenth century, oceangoing cargo vessels were converting from predominately sail to steam power and were also growing in draft which exceeded the bar depth of the natural pass (Port of Orange, 2021). Local industry to utilize these larger oceangoing ships would use lightering techniques and transfer cargos at the bar, but this could incur heavy demurrage charges. There were several locally sponsored efforts to channelize the bar in the mid part of the century, but River and Harbor Act actions in 1875, 1882, 1896, and 1916 brought federal support and the USACE modified the pass and removed the bar so that ports on Sabine Lake, the Sabine, and the Neches, such as Port of Beaumont and Port of Orange could dock and handle larger more modern steam ships. The ports at the time were predominantly used for agricultural products and lumber, then in 1901 Spindletop occurred and resulted in the industrial petrochemical age for this area, which utilized the estuary and rivers for heavy industry.

Historical USGS Maps

A preliminary review was also done using a series of historical USGS maps that were found and georeferenced so that the proposed bank site could be overlaid on these historic maps like the earlier USC&GS navigation chart, and County Plat maps (Figures C4-6). Field surveys were also done for Section 404 work and a USFWS Section 7 preliminary investigation. No extant historical structures were observed during the field work. The USGS was formed in 1879, and the earliest USGS map that could be found and georectified was 1932 USGS map (Figure C4). This map was not a quadrangle map (1:62,500). A 1947 map draft was also found that was submitted by the State of Louisiana Board of State Engineers to the USGS for inspection and editing to create the Toomey USGS quadrangle map, and notations on this map indicates that there could be a 1926 map for the Orange area, but this version was not found. It should also be noted that the Toomey Quadrangle shows the Jackson Island area as being part of a bifurcation in flow of the Sabine in 1947. This bifurcated flow is a progression of the meander to a chute cutoff which exists today. This map feature was surveyed 135 years after Louisiana statehood in 1812, 52 years after the 1895 Orange county plat map showing a meander around a peninsula, and 74 years before present.

The 1932 Orange map shows a couple of unimproved roadways in the proposed Bank area including an unimproved road extending to the northwest from the intersection with what is now named old Hwy 87 in the town of Reese (there is one structure now shown in Reese) into the Bank parcel. There is also a second roadway originating south of Reese and north of the town

of Little Cypress that also extends to the northwest and ends at the Sabine south of Morgan Bluff in an area identified as Pruitt Bluff. The 1932 map shows what will be called Teal Island, but does not name it, and this area is shown to be very much like Grubs Island to the north or Jackson Island to the east, being an old point bar cut left from a cutoff and surrounded by an oxbow. The 1932 map also shows the extant roadway to the West Bluff area as unimproved, which crosses a lower portion of the proposed bank parcel. There is a 1943 USDA aerial, but the available index scan is not of resolution to show any structures.

A series of modern quadrangles were also available for review; 1960, 1975, and the 2016 USGS Quadrangles contain roadway, structure, and other activity symbols, and thus were reviewed for historical or extant use within the project plot. The earliest USGS 1:24,000 Quadrangle of the area is the 1960 Echo Quadrangle (Figure C5). This map was photorevised in 1967 and again in 1975. The roadways that were extant on the 1932 map are again shown as light duty unpaved roads. The areas near the Sabine in Morgan Bluff and Morgan Eddy now show approximately 30 small structures, and most of which are shown to have existed in 1960. A new roadway is shown running south to the Pruitt Bluff area from an intersection near Morgan Bluff, with the old roadway no longer being shown. The Pruitt Bluff area is now shown to have 6 structures all being extant in 1960. This map also shows Orange Mill as a photorevised feature as groundbreaking started at the mill in January 1966 (Owens-Illinois Administrative Records Accessed 2019.12.07). It also shows the addition of the mill's Teal Island Reservoir as a photorevision to the quadrangle, and it now names the island Teal Island. Because the reservoir is a photorevison, the quadrangle still shows the topography of the original point bar, and the oxbow around Teal Island.

The progression through the later Quadrangles indicates that there has not been an increase or maintenance in the number of structures or roads within the proposed bank area, but a decline of these features. The 1994 Quadrangle shows the unpaved roadways of the 1960 map remain, however only two structures remained in Morgan Bluff area, one structure remained in the area near Pruitt Bluff, and none were shown in Morgan Eddy area (Figure C6). The Flood Disaster Protection Act of 1973 came into effect in this period and mandated that by 7/1/1975 lending intuitions could not extend, increase, or renew any loans for properties or structures within Special Flood Hazard Areas, which was defined as the 100-year flood plain. Thus, the attrition seen in the maps from 1975 to 1994 may have been due to non-replacement of structures that were destroyed or damaged in floods after restrictions in lending.

The 2016 Echo Quarter Quad shows the same unimproved roadways, but shows no structures in any of these areas. It should be noted that all but one of these structures would have been in the floodway. FEMA performed a discovery on the lower Sabine for this HUC in 2012, and cited 9 disaster declarations from 2002 to 2012 for flooding (FEMA, 2012). No extant or pieces of ruined structures were observed during the field work. The roadways shown in the map are abandoned, in many areas are impassable, and in some areas unrecognizable. In addition, no earth work is proposed for this project, which may mean that this project might not meet the standards to be described as an Area of Potential Effects.

Appendix D iHGM Verification

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
2000 FORT POINT RD
GALVESTON, TEXAS 77550

June 9, 2022

Evaluation Branch

SUBJECT: **SWG-2020-00178** – International Paper (IP), Approved Jurisdictional Determination (AJD) and Hydrogeomorphic (HGM) Functional Assessment, Proposed IP Mitigation Bank, Orange Mill, Orange County, Texas

Robert Burgess
RPS Group
4801 Southwest Parkway, Parkway 2, Suite 150
Austin, Texas 78735-8956

Dear Mr. Burgess:

This is in response to the December 31, 2019, request for a wetland delineation verification, approved jurisdictional determination (AJD), and hydrogeomorphic (HGM) functional assessment for an approximate 1,667-acre site of the proposed International Paper Mitigation Bank. The subject site review area was subsequently modified. The subject site is located along the eastern site boundary of the International Paper Orange Mill facility at 1750 IP Way Road, Orange, Orange County, Texas (map enclosed).

Based upon the September 11, 2020, and October 7, 2020, site visits, the submitted wetland delineation report and maps, and detailed offsite data we have determined the subject site contains waters of the United States (U.S.), specifically approximately 1,455.7 acres of contiguous forested wetlands abutting the Sabine River. The wetlands are comprised of two (2) wetland assessment areas (WAAs), and each WAA was measured for its potential functional capacity as it relates to the Sabine River according to the Galveston District riverine forested interim Hydrogeomorphic (iHGM) wetland function model. Each WAA is scored independently based on various functional variables, and a functional capacity index (FCI) determined for each based on model formula each for Temporary Storage and Detention of Storage Water (TSDSW – physical), Maintain Plant and Animal Community (MPAC – biological), and Removal and Sequestration of Elements and Compounds (RSEC – chemical) functions. The overall physical, biological, and chemical functional capacity units (FCUs) is determined by multiplying the FCI by each WAA acreage. Based on the functional assessment review, the total existing riverine forested iHGM FCUs for the approximate 1,455.7 wetland acres on the subject site is 1,455.7 Physical FCUs, 1,345.8 Biological FCUs, and 1,455.7 Chemical FCUs.

This iHGM verification remain valid for the confirmed wetlands within the subject site and is based on the conditions existing at the time the model and delineation verification

was completed. If you have any questions, contact me at the letterhead address or by telephone at 409-766-3016 and reference file number **SWG-2020-00178**. To assist us in improving our service to you, please complete the survey found at: https://regulatory.ops.usace.army.mil/customer-service-survey/ and/or, if you would prefer a hard copy of the survey form, please let us know, and one will be mailed to you.

Sincerely,

Kevin Mannie
Regulatory Project Manager

Enclosures

cc: Ms. Diana Stevens, Policy Branch, Corps of Engineers, Galveston District

Appendix E AJD IP PRM

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON, TEXAS 77553-1229

January 12, 2018

Compliance Branch

SUBJECT: **SWG-2014-00706** – Approved Jurisdictional Determination, International Paper, Proposed Mitigation Area, Approximate 59.1-Acre Tract, 1750 IP Way (Inland) Road, Orange, Orange County, Texas

Mr. Robert Burgess
RPS Group, PLC
4801 Southwest Parkway
Austin, Texas 78735

Dear Mr. Burgess:

This letter is in response to the request for an approved jurisdictional determination, submitted on behalf of International Paper and received on June 2, 2017, for an approximate 59.1-acre tract of land. The subject site is located at 1750 IP Way (Inland) Road, Orange, Orange County, Texas (map enclosed).

Based on a review of submitted information, additional off-site data, and information acquired during a site visit conducted October 5, 2017, we determined that the subject 59.1-acre site contains approximately 52.2 acres of waters of the United States (WOUS), specifically wetlands abutting and neighboring, and therefore adjacent to the Sabine River, a traditional navigable water (TNW). The site wetlands are subject to Section 404 of the Clean Water Act (Section 404). As such the discharge of dredged and/or fill material into the site wetlands is subject to Section 404 and requires a Department of the Army (DA) permit. The wetlands were identified according to the 1987 Corps of Engineers Wetland Delineation Manual (Manual), and the Atlantic and Gulf Coastal Plain Region Supplement, and under normal circumstances exhibit wetland hydrology, a predominance of hydrophytic vegetation, and hydric soils. This approved determination is valid for 5 years from the date of this letter unless new information warrants a revision of the determination prior to the expiration date.

Corps determinations are conducted to identify the limits of the Corps Clean Water Act jurisdiction for particular sites. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331.5. Also enclosed are a combined Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA to the Southwestern Division Office at the following address:

Mr. Elliott Carman
Administrative Appeals Officer
Southwestern Division, USACE (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1317
Telephone: 469-487-7061; FAX: 469-487-7199

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within **60 days** of the date of the NAP. It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

If you have any questions please reference **SWG-2014-00706** and contact Mr. Kevin Mannie, Regulatory Specialist, at the letterhead address or by telephone at 409-766-3016. To assist us in improving our service to you, please complete the survey found at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Sincerely,

John Davidson
Compliance Branch Team Lead

Enclosures

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **INTERNATIONAL PAPER**	File Number: **SWG 2014-00706**	**Date: 01/12/2018**
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/appeals.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

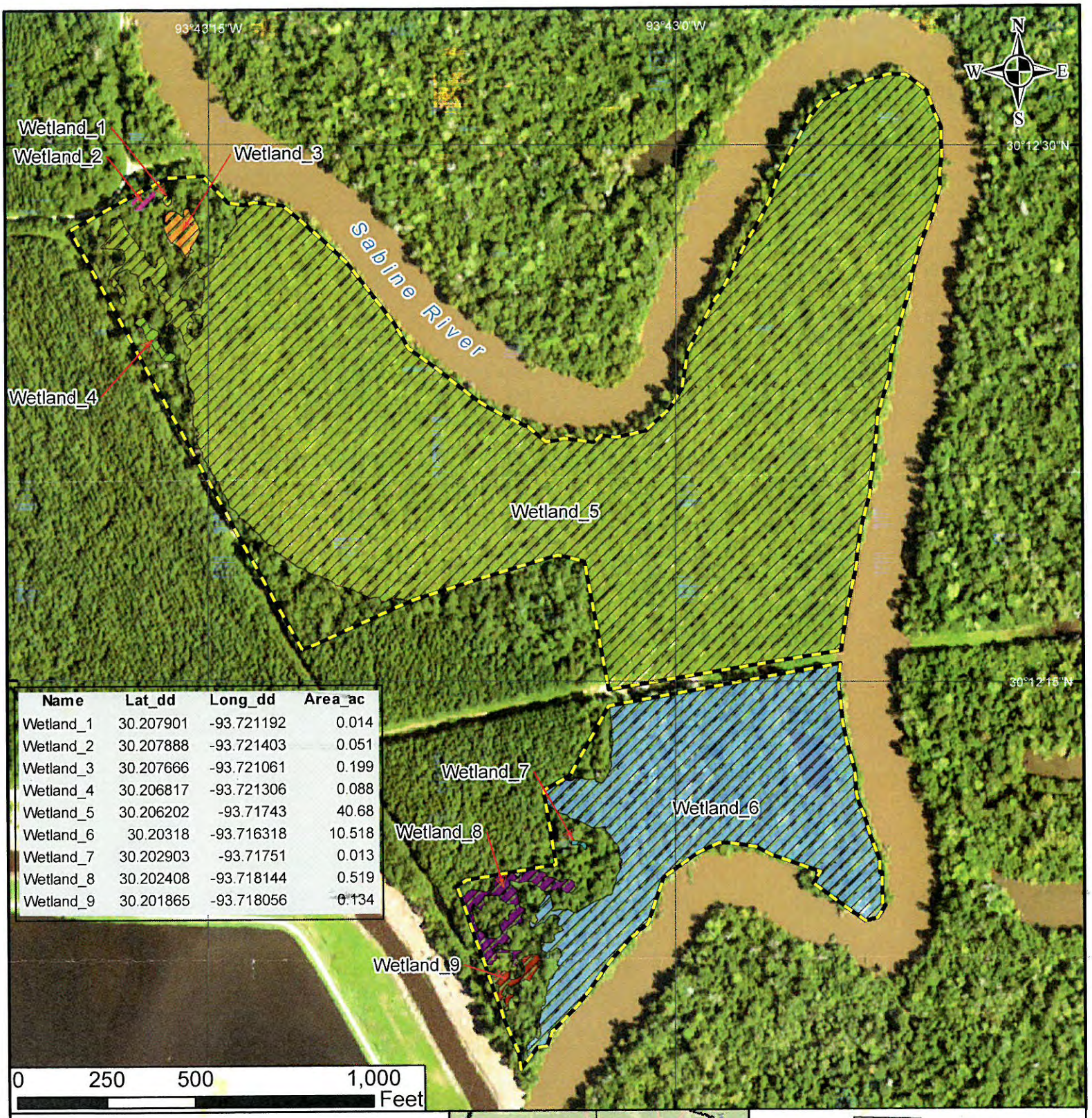
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:
Mr. Kevin Mannie
Project Manager
CESWG-RD-C
U.S. Army Corps of Engineers
P.O. BOX 1229
Galveston, Texas 77553-1229
Telephone: 409-766-3016; Fax: 409-766-3931

If you only have questions regarding the appeal process you may also contact:
Mr. Elliott Carman
Administrative Appeals Review Officer (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas , Texas 75242-1317
469-487-7061

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

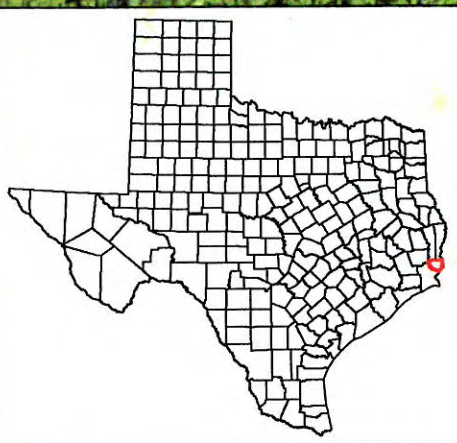


Name	Lat_dd	Long_dd	Area_ac
Wetland_1	30.207901	-93.721192	0.014
Wetland_2	30.207888	-93.721403	0.051
Wetland_3	30.207666	-93.721061	0.199
Wetland_4	30.206817	-93.721306	0.088
Wetland_5	30.206202	-93.71743	40.68
Wetland_6	30.20318	-93.716318	10.518
Wetland_7	30.202903	-93.71751	0.013
Wetland_8	30.202408	-93.718144	0.519
Wetland_9	30.201865	-93.718056	0.134

SWG-2014-00706
Inernational Paper, Inc.
59.1-Acre Site
Approved Jurisdictional Determination
Orange, Orange County, Texas

Review_Area ~ 59.1 ac

Image Source: 2016 National Agriculture Imagery Program (NAIP), 1.0-meter Near Color (CIR)
Note: Review Area reflects neither property boundary nor ownership



Appendix F Vegetation List

Plant list West of Neutral Mitigation Bank

Stratum	Common Name	Scientific Name	Indicator Status
Tree	American Elm	*Ulmus americana*	FAC
Tree	American Holly	*Ilex opaca*	FAC
Tree	Basswood	*Tilia americana*	FACU
Tree	Black Gum	*Nyssa sylvatica*	FAC
Tree	Black Willow	*Salix nigra*	OBL
Tree	Cedar Elm	*Ulmus crassifolia*	FAC
Tree	Chinese tallow	*Triadica sebifera*	FAC
Tree	Eastern Red Cedar	*Juniperus virginiana*	FACU
Tree	Green Ash	*Fraxinus pennsylvanica*	FACW
Tree	Hackberry	*Celtis laevigata*	FACW
Tree	Hercules Club	*Aralia spinosa*	FAC
Tree	Loblolly pine	*Pinus taeda*	FAC
Tree	Longleaf Pine	*Pinus palustris*	FACU
Tree	Musclewood	*Carpinus caroliniana*	FAC
Tree	Overcup oak	*Quercus lyrata*	OBL
Tree	Parsley Hawthorn	*Crataegus marshallii*	FAC
Tree	Pignut Hickory	*Carya glabra*	FAC
Tree	Red Bay	*Persea borbonia*	FACW
Tree	Red maple	*Acer rubrum*	FAC
Tree	Red Mulberry	*Morus rubra*	FACU
Tree	River Birch	*Betula nigra*	FACW
Tree	Southern Bald-Cypress	*Taxodium distichum*	OBL
Tree	Southern Magnolia	*Magnolia grandiflora*	FAC
Tree	Swamp chestnut oak	*Quercus michauxii*	FACW
Tree	Sweet Gum	*Liquidambar styraciflua*	FAC
Tree	Sweet-Bay	*Magnolia virginiana*	FAC
Tree	Water Hickory	*Carya aquatica*	OBL
Tree	Water Locust	*Gleditsia aquatica*	OBL
Tree	Water Oak	*Quercus nigra*	FAC
Tree	Water tupelo	*Nyssa aquatica*	OBL
Tree	White Oak	*Quercus alba*	FACU
Tree	Willow oak	*Quercus phellos*	FACW
Tree	Winged Elm	*Ulmus alata*	FACU
Shrub	American beautyberry	*Callicarpa americana*	FACU
Shrub	Buttonbush	*Cephalanthus occidentalis*	OBL
Shrub	Dahoon holly	*Ilex cassine*	FACW
Shrub	Mayhaw	*Crataegus opaca*	OBL

Stratum	Common Name	Scientific Name	Indicator Status
Shrub	Mexican Plum	*Prunus mexicana*	FACU
Shrub	Palmetto	*Sabal minor*	FACW
Shrub	Pokeweed	*Phytolacca americana*	FACU
Shrub	Possumhaw	*Ilex decidua*	FACW
Shrub	River Cane	*Arundinaria gigantea*	FACW
Shrub	RoughLeaf dogwood	*Cornus drummondii*	FAC
Shrub	Spicebush	*Lindera benzoin*	FACW
Shrub	Sweet Olive	*Elaeagnus angustifolia*	FACU
Shrub	Wax-myrtle	*Morella cerifera*	FAC
Shrub	Wild azalea	*Rhododendron canescens*	FACW
Shrub	Wild Olive	*Osmanthus americanus*	FAC
Shrub	Yaupon	*Ilex vomitoria*	FAC
Herbaceous	Alligator weed	*Alternanthera philoxeroides*	OBL
Herbaceous	Blue mistflower	*Conoclinium coelestinum*	FAC
Herbaceous	Bristleleaf chaffhead	*Carphephorus pseudoliatris*	OBL
Herbaceous	Bush's sedge	*Carex bushii*	FACW
Herbaceous	Cardinal flower	*Lobelia cardinalis*	FACW
Herbaceous	Cherokee Sedge	*Carex cherokeensis*	FACW
Herbaceous	Common duckweed	*Lemna minor*	OBL
Herbaceous	Common rush	*Juncus effusus*	OBL
Herbaceous	Crabgrass	*Digitaria sanguinalis*	FACU
Herbaceous	Creeping spotflower	*Acmella oppositifolia*	FACW
Herbaceous	Crowfoot	*Ranunculus sceleratus*	OBL
Herbaceous	Cutgrass	*Leersia oryzoides*	OBL
Herbaceous	Delta Duck Potato	*Sagittaria platyphylla*	OBL
Herbaceous	Dog Fennel	*Eupatorium capillifolium*	FACU
Herbaceous	Dollarweed	*Hydrocotyle bonariensis*	FACW
Herbaceous	Edible violet	*Viola esculenta*	FACW
Herbaceous	False Nettle	*Boehmeria cylindrica*	FACW
Herbaceous	Floating Seedbox	*Ludwigia octovalvis*	OBL
Herbaceous	Green Dragon	*Arisaema dracontium*	FACW
Herbaceous	Horned Beaksedge	*Rhynchospora corniculata*	OBL
Herbaceous	Horsetail	*Eleocharis equisetoides*	OBL
Herbaceous	Ice Plant	*Verbesina virginica*	FACU
Herbaceous	Inland Seaoats	*Chasmanthium latifolium*	FAC
Herbaceous	Lamance iris	*Iris brevicaulis*	OBL
Herbaceous	Lizard Tail	*Saururus cernuus*	OBL
Herbaceous	Marsh ladys tresses	*Spiranthes odorata*	OBL
Herbaceous	Parrot's feather	*Myriophyllum aquaticum*	OBL

Stratum	Common Name	Scientific Name	Indicator Status
Herbaceous	Pickerelweed	*Pontederia cordata*	OBL
Herbaceous	Pineland Beaksedge	*Rhynchospora perplexa*	OBL
Herbaceous	Pondweed	*Potamogeton nodosus*	OBL
Herbaceous	Rattlesnake Fern	*Botrychium virginianum*	FACU
Herbaceous	Resurrection Fern	*Pleopeltis polypodioides*	FAC
Herbaceous	Sensitive Fern	*Onoclea sensibilis*	FACW
Herbaceous	Seven Sisters Lili	*Crinum americanum*	OBL
Herbaceous	Slender Spikegrass	*Chasmanthium laxum*	FACW
Herbaceous	Smartweed	*Polygonum hydropiperoides*	FACW
Herbaceous	Southern blue flag	*Iris virginica*	OBL
Herbaceous	Southern Wildrice	*Zizania aquatica*	OBL
Herbaceous	Sump weed	*Iva annua*	FAC
Herbaceous	Swamp dock	*Rumex verticillatus*	FACW
Herbaceous	Switchgrass	*Panicum virgatum*	FAC
Herbaceous	Virginia buttonweed	*Diodia virginiana*	FACW
Herbaceous	Waterhyssop	*Bacopa caroliniana*	OBL
Herbaceous	Waterhyssop	*Bacopa caroliniana*	OBL
Herbaceous	Wood fern	*Thelypteris kunthii*	FACW
Herbaceous	Yellowroot	*Xanthorhiza simplicissima*	FACW
Vine	Climbing hempweed	*Mikania scandens*	FACW
Vine	Green Briar	*Smilax glauca*	FAC
Vine	Japanese Climbing Fern	*Lygodium japonicum*	FAC
Vine	Morning Glory	*Ipomoea cordatotriloba*	FACU
Vine	Mustang grape	*Vitis mustangensis*	FAC
Vine	Poison Ivy	*Toxicodendron radicans*	FAC
Vine	Southern dewberry	*Rubus trivialis*	FACU
Vine	Swamp Jessamine	*Gelsemium rankinii*	FACW
Vine	Trumpet Creeper	*Campsis radicans*	FAC

Appendix G USFWS ECOS Letters

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal Ecological Services Field Office
4444 Corona Drive, Suite 215
Corpus Christi, TX 78411
Phone: (281) 286-8282 Fax: (281) 488-5882
http://www.fws.gov/southwest/es/TexasCoastal/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

In Reply Refer To: March 01, 2021
Consultation Code: 02ETTX00-2020-SLI-0422
Event Code: 02ETTX00-2021-E-02654
Project Name: IP Orange Proposed Bank

Subject: Updated list of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: http://www.fws.gov/southwest/es/TexasCoastal/Map.html. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website http://ecos.fws.gov/ipac/ at regular intervals during project planning and implementation for updates to species list and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

Section 7

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

Is not likely to adversely affect - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

No effect - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at: http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

Section 10

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at: http://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf

Service Response

Please note that the Service strives to respond to requests for project review within 30 days of receipt, however, this time period is not mandated by regulation. Responses may be delayed due to workload and lack of staff. Failure to meet the 30-day timeframe does not constitute a concurrence from the Service that the proposed project will not have impacts to threatened and endangered species.

Proposed Species and/or Proposed Critical Habitat

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek conference from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

Candidate Species

Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem healh in the local area and ay avert potential future listing.

Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a

project, the Service recommends that that you implement the best management practices found at: http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at http://www.fws.gov/endangered/what-we-do/cca.html.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html.

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the Act on August 9, 2007. Both the bald eagle and the goden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For more information on bald and golden eagle management guidlines, we recommend you review information provided at http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf.

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at http://www.aplic.org/.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at: http://www.fws.gov/habitatconservation/communicationtowers.html, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at: http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html.

Wetlands and Wildlife Habitat

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to flood control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory flyways or corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE).

For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

Beneficial Landscaping

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

State Listed Species

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at: http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/.

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Texas Coastal Ecological Services Field Office
4444 Corona Drive, Suite 215
Corpus Christi, TX 78411
(281) 286-8282

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
(337) 291-3100

Project Summary

Consultation Code: 02ETTX00-2020-SLI-0422
Event Code: 02ETTX00-2021-E-02654
Project Name: IP Orange Proposed Bank
Project Type: LAND - PRESERVATION
Project Description: IP Orange is considering creating a mitigation bank at this location.
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.196979085000052,-93.71758237760938,14z

Counties: Louisiana and Texas

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee *Trichechus manatus*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.
Species profile: https://ecos.fws.gov/ecp/species/4469

Birds

NAME	STATUS
Piping Plover *Charadrius melodus*	Threatened
Red Knot *Calidris canutus rufa*	Threatened
Red-cockaded Woodpecker *Picoides borealis*	Endangered

Piping Plover *Charadrius melodus* — Threatened

Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.

There is **final** critical habitat for this species. The location of the critical habitat is not available.

This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/6039

Red Knot *Calidris canutus rufa* — Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/1864

Red-cockaded Woodpecker *Picoides borealis* — Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/7614

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
Phone: (337) 291-3100 Fax: (337) 291-3139

In Reply Refer To:
Consultation Code: 04EL1000-2020-SLI-0228
Event Code: 04EL1000-2021-E-02691
Project Name: IP Orange Proposed Bank

March 01, 2021

Subject: Updated list of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

***Due to the Louisiana Governor's mandatory quarantine order for the coronavirus (COVID-19), and in order to keep our staff and the public safe, we are unable to accept or respond in a timely manner to consultation request or project review/concurrence that we receive through the U.S. Mail. Please submit your request electronically to lafayette@fws.gov or call 337-291-3100.**

The enclosed species list identifies threatened, endangered and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337/291-3126) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services website (www.fws.gov/lafayette) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF or by contacting our office at the number above.

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting any necessary consultation. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm ; http://www.towerkill.com; and http://fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: www.fws.gov/lafayette or by calling 337/291-3100.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
(337) 291-3100

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Texas Coastal Ecological Services Field Office
4444 Corona Drive, Suite 215
Corpus Christi, TX 78411
(281) 286-8282

Project Summary

Consultation Code: 04EL1000-2020-SLI-0228
Event Code: 04EL1000-2021-E-02691
Project Name: IP Orange Proposed Bank
Project Type: LAND - PRESERVATION
Project Description: IP Orange is considering creating a mitigation bank at this location.
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.196979085000052,-93.71758237760938,14z

Counties: Louisiana and Texas

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee *Trichechus manatus*	Threatened

There is **final** critical habitat for this species. The location of the critical habitat is not available.
This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.
Species profile: https://ecos.fws.gov/ecp/species/4469

Birds

NAME	STATUS
Piping Plover *Charadrius melodus*	Threatened

Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.
There is **final** critical habitat for this species. The location of the critical habitat is not available.
This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/6039

Red Knot *Calidris canutus rufa*	Threatened

No critical habitat has been designated for this species.
This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/1864

Red-cockaded Woodpecker *Picoides borealis*	Endangered

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/7614

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058
Phone: (281) 286-8282 Fax: (281) 488-5882
http://www.fws.gov/southwest/es/TexasCoastal/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

In Reply Refer To: December 04, 2019
Consultation Code: 02ETTX00-2020-SLI-0422
Event Code: 02ETTX00-2020-E-00860
Project Name: IP Orange Proposed Bank

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Tx, and Corpus Christi, Tx, have combined administratively to form the Texas Coastal Ecological Services Field Office. A map of the Texas Coastal Ecological Services Field Office area of responsibility can be found at: http://www.fws.gov/southwest/es/TexasCoastal/Map.html. All project related correspondence should be sent to the field office responsible for the area in which your project occurs. For projects located in southeast Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058. For projects located in southern Texas please write to: Field Supervisor; U.S. Fish and Wildlife Service; P.O. Box 81468; Corpus Christi, Texas 78468-1468. For projects located in six counties in southern Texas (Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata) please write: Santa Ana NWR, ATTN: Ecological Services Sub Office, 3325 Green Jay Road, Alamo, Texas 78516.

The enclosed species list identifies federally threatened, endangered, and proposed to be listed species; designated critical habitat; and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project.

New information from updated surveys, changes in the abundance and distribution of species, changes in habitat conditions, or other factors could change the list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website http://ecos.fws.gov/ipac/ at regular intervals during project planning and implementation for updates to species list and information. An updated list may be

requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Candidate species have no protection under the Act but are included for consideration because they could be listed prior to the completion of your project. The other species information should help you determine if suitable habitat for these listed species exists in any of the proposed project areas or if project activities may affect species on-site, off-site, and/or result in "take" of a federally listed species.

"Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. In addition to the direct take of an individual animal, habitat destruction or modification can be considered take, regardless of whether it has been formally designated as critical habitat, if the activity results in the death or injury of wildlife by removing essential habitat components or significantly alters essential behavior patterns, including breeding, feeding, or sheltering.

Section 7

Section 7 of the Act requires that all Federal agencies consult with the Service to ensure that actions authorized, funded or carried out by such agencies do not jeopardize the continued existence of any listed threatened or endangered species or adversely modify or destroy critical habitat of such species. It is the responsibility of the Federal action agency to determine if the proposed project may affect threatened or endangered species. If a "may affect" determination is made, the Federal agency shall initiate the section 7 consultation process by writing to the office that has responsibility for the area in which your project occurs.

Is not likely to adversely affect - the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable, insignificant, or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effects. The Federal agency or the designated non-Federal representative should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect - adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal section 7 consultation with this office.

No effect - the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No further coordination or contact with the Service is necessary. However, if the

project changes or additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Regardless of your determination, the Service recommends that you maintain a complete record of the evaluation, including steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling Act requirements for your projects at: http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

Section 10

If there is no federal involvement and the proposed project is being funded or carried out by private interests and/or non-federal government agencies, and the project as proposed may affect listed species, a section 10(a)(1)(B) permit is recommended. The Habitat Conservation Planning Handbook is available at: http://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf

Service Response

Please note that the Service strives to respond to requests for project review within 30 days of receipt, however, this time period is not mandated by regulation. Responses may be delayed due to workload and lack of staff. Failure to meet the 30-day timeframe does not constitute a concurrence from the Service that the proposed project will not have impacts to threatened and endangered species.

Proposed Species and/or Proposed Critical Habitat

While consultations are required when the proposed action may affect listed species, section 7(a)(4) was added to the ESA to provide a mechanism for identifying and resolving potential conflicts between a proposed action and proposed species or proposed critical habitat at an early planning stage. The action agency should seek conference from the Service to assist the action agency in determining effects and to advise the agency on ways to avoid or minimize adverse effect to proposed species or proposed critical habitat.

Candidate Species

Candidate species are species that are being considered for possible addition to the threatened and endangered species list. They currently have no legal protection under the ESA. If you find you have potential project impacts to these species the Service would like to provide technical

assistance to help avoid or minimize adverse effects. Addressing potential impacts to these species at this stage could better provide for overall ecosystem healh in the local area and ay avert potential future listing.

Several species of freshwater mussels occur in Texas and four are candidates for listing under the ESA. The Service is also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends that that you implement the best management practices found at: http://www.fws.gov/southwest/es/TexasCoastal/FreshwaterMussels.html.

Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at http://www.fws.gov/endangered/what-we-do/cca.html.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Many may nest in trees, brush areas or other suitable habitat. The Service recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals or eggs. If project activities must be conducted during this time, we recommend surveying for active nests prior to commencing work. A list of migratory birds may be viewed at http://www.fws.gov/migratorybirds/regulationspolicies/mbta/mbtandx.html.

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the Act on August 9, 2007. Both the bald eagle and the goden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For more information on bald and golden eagle management guidlines, we recommend you review information provided at http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf.

The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new overhead lines or retrofitting of old lines, we recommend that project

developers implement, to the maximum extent practicable, the Avian Power Line Interaction Committee guidelines found at http://www.aplic.org/.

Meteorological and communication towers are estimated to kill millions of birds per year. We recommend following the guidance set forth in the Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning, found online at: http://www.fws.gov/habitatconservation/communicationtowers.html, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight into the effectiveness of the minimization measures. We request the results of any wildlife mortality monitoring at towers associated with this project.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files. If meteorological towers are to be constructed, please forward this completed form to our office.

More information concerning sections 7 and 10 of the Act, migratory birds, candidate species, and landowner tools can be found on our website at: http://www.fws.gov/southwest/es/TexasCoastal/ProjectReviews.html.

Wetlands and Wildlife Habitat

Wetlands and riparian zones provide valuable fish and wildlife habitat as well as contribute to flood control, water quality enhancement, and groundwater recharge. Wetland and riparian vegetation provides food and cover for wildlife, stabilizes banks and decreases soil erosion. These areas are inherently dynamic and very sensitive to changes caused by such activities as overgrazing, logging, major construction, or earth disturbance. Executive Order 11990 asserts that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial value of wetlands in carrying out the agency's responsibilities. Construction activities near riparian zones should be carefully designed to minimize impacts. If vegetation clearing is needed in these riparian areas, they should be re-vegetated with native wetland and riparian vegetation to prevent erosion or loss of habitat. We recommend minimizing the area of soil scarification and initiating incremental re-establishment of herbaceous vegetation at the proposed work sites. Denuded and/or disturbed areas should be re-vegetated with a mixture of native legumes and grasses. Species commonly used for soil stabilization are listed in the Texas Department of Agriculture's (TDA) Native Tree and Plant Directory, available from TDA at P.O. Box 12847, Austin, Texas 78711. The Service also urges taking precautions to ensure sediment loading does not occur to any receiving streams in the proposed project area. To prevent and/or minimize soil erosion and compaction associated with construction activities, avoid any unnecessary clearing of vegetation, and follow established rights-of-way whenever possible. All machinery and petroleum products should be stored outside the floodplain and/or wetland area during construction to prevent possible contamination of water and soils.

Wetlands and riparian areas are high priority fish and wildlife habitat, serving as important sources of food, cover, and shelter for numerous species of resident and migratory wildlife. Waterfowl and other migratory birds use wetlands and riparian corridors as stopover, feeding, and nesting areas. We strongly recommend that the selected project site not impact wetlands and riparian areas, and be located as far as practical from these areas. Migratory birds tend to concentrate in or near wetlands and riparian areas and use these areas as migratory flyways or corridors. After every effort has been made to avoid impacting wetlands, you anticipate unavoidable wetland impacts will occur; you should contact the appropriate U.S. Army Corps of Engineers office to determine if a permit is necessary prior to commencement of construction activities.

If your project will involve filling, dredging, or trenching of a wetland or riparian area it may require a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers (COE). For permitting requirements please contact the U.S. Corps of Engineers, District Engineer, P.O. Box 1229, Galveston, Texas 77553-1229, (409) 766-3002.

Beneficial Landscaping

In accordance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping (42 C.F.R. 26961), where possible, any landscaping associated with project plans should be limited to seeding and replanting with native species. A mixture of grasses and forbs appropriate to address potential erosion problems and long-term cover should be planted when seed is reasonably available. Although Bermuda grass is listed in seed mixtures, this species and other introduced species should be avoided as much as possible. The Service also recommends the use of native trees, shrubs, and herbaceous species that are adaptable, drought tolerant and conserve water.

State Listed Species

The State of Texas protects certain species. Please contact the Texas Parks and Wildlife Department (Endangered Resources Branch), 4200 Smith School Road, Austin, Texas 78744 (telephone 512/389-8021) for information concerning fish, wildlife, and plants of State concern or visit their website at: http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/texas_rare_species/listed_species/.

If we can be of further assistance, or if you have any questions about these comments, please contact 281/286-8282 if your project is in southeast Texas, or 361/994-9005, ext. 246, if your project is in southern Texas. Please refer to the Service consultation number listed above in any future correspondence regarding this project.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Texas Coastal Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058
(281) 286-8282

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
(337) 291-3100

Project Summary

Consultation Code: 02ETTX00-2020-SLI-0422

Event Code: 02ETTX00-2020-E-00860

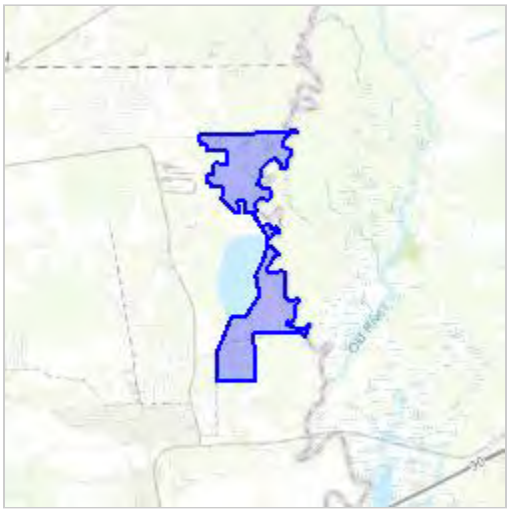
Project Name: IP Orange Proposed Bank

Project Type: LAND - PRESERVATION

Project Description: IP Orange is considering creating a mitigation bank at this location.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/30.196979085000052N93.71758237760938W



Counties: Calcasieu, LA | Orange, TX

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 3 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee *Trichechus manatus*	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.
This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.
Species profile: https://ecos.fws.gov/ecp/species/4469

Birds

NAME	STATUS
Least Tern *Sterna antillarum*	Endangered
Piping Plover *Charadrius melodus*	Threatened
Red Knot *Calidris canutus rufa*	Threatened

Least Tern *Sterna antillarum* — Endangered

Population: interior pop.

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/8505

Piping Plover *Charadrius melodus* — Threatened

Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered.

There is **final** critical habitat for this species. Your location is outside the critical habitat.

This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/6039

Red Knot *Calidris canutus rufa* — Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- Wind related projects within migratory route.

Species profile: https://ecos.fws.gov/ecp/species/1864

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
Phone: (337) 291-3100 Fax: (337) 291-3139

In Reply Refer To:
Consultation Code: 04EL1000-2020-SLI-0228
Event Code: 04EL1000-2020-E-00533
Project Name: IP Orange Proposed Bank

December 04, 2019

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered and candidate species, as well as designated and proposed critical habitat that may occur within the boundary of your proposed project and may be affected by your proposed project. The Fish and Wildlife Service (Service) is providing this list under section 7 (c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Changes in this species list may occur due to new information from updated surveys, changes in species habitat, new listed species and other factors. Because of these possible changes, feel free to contact our office (337/291-3126) for more information or assistance regarding impacts to federally listed species. The Service recommends visiting the ECOS-IPaC site or the Louisiana Ecological Services website (www.fws.gov/lafayette) at regular intervals during project planning and implementation for updated species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect Federally listed species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF or by contacting our office at the number above.

Bald eagles have recovered and were removed from the List of Endangered and Threatened Species as of August 8, 2007. Although no longer listed, please be aware that bald eagles are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at: http://www.fws.gov/southeast/es/baldeagle/NationalBaldEagleManagementGuidelines.pdf. Those guidelines recommend: (1) maintaining a specified distance between the activity and the nest (buffer area); (2) maintaining natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest occurs or is discovered within or adjacent to the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: http://www.fws.gov/southeast/es/baldeagle. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. The Division of Migratory Birds for the Southeast Region of the Service (phone: 404/679-7051, e-mail: SEmigratorybirds@fws.gov) has the lead role in conducting any necessary consultation. Should you need further assistance interpreting the guidelines or performing an on-line project evaluation, please contact this office.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm ; http://www.towerkill.com; and http://fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

Activities that involve State-designated scenic streams and/or wetlands are regulated by the Louisiana Department of Wildlife and Fisheries and the U.S. Army Corps of Engineers, respectively. We, therefore, recommend that you contact those agencies to determine their interest in proposed projects in these areas.

Activities that would be located within a National Wildlife Refuge are regulated by the refuge staff. We, therefore, recommend that you contact them to determine their interest in proposed projects in these areas.

Additional information on Federal trust species in Louisiana can be obtained from the Louisiana Ecological Services website at: www.fws.gov/lafayette or by calling 337/291-3100.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Louisiana Ecological Services Field Office
200 Dulles Drive
Lafayette, LA 70506
(337) 291-3100

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Texas Coastal Ecological Services Field Office
17629 El Camino Real #211
Houston, TX 77058
(281) 286-8282

Project Summary

Consultation Code: 04EL1000-2020-SLI-0228

Event Code: 04EL1000-2020-E-00533

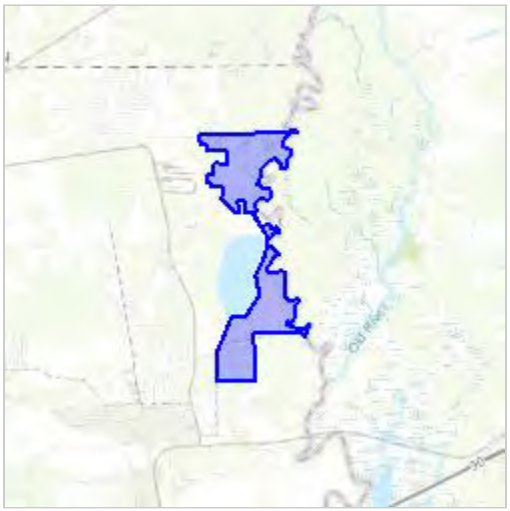
Project Name: IP Orange Proposed Bank

Project Type: LAND - PRESERVATION

Project Description: IP Orange is considering creating a mitigation bank at this location.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/30.196979085000052N93.71758237760938W



Counties: Calcasieu, LA | Orange, TX

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
West Indian Manatee *Trichechus manatus* There is **final** critical habitat for this species. Your location is outside the critical habitat. ***This species is also protected by the Marine Mammal Protection Act, and may have additional consultation requirements.*** Species profile: https://ecos.fws.gov/ecp/species/4469	Threatened

Birds

NAME	STATUS
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix H TCEQ Water Rights Letter

From: Alisa Patterson
To: Robert Burgess
Subject: West of Neutral Mitigation Bank - Water Rights Determination
Date: Wednesday, February 22, 2023 1:38:48 PM
Attachments:

Mr. Burgess,

Based on the information you have provided, the West of Neutral Mitigation Bank project does not require a water rights permit. Any modification to the plans provided may result in a different determination.

Thank you,

Alisa Patterson, P.E.
Section Hydrologist
Water Rights Permitting & Availability Section
Water Availability Division
Texas Commission on Environmental Quality
512.239.4613