Attachment I

Biological Resources

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Biological Resources

This material is being provided in support of compliance with the federal Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and Section 68.002 and 68.015 Texas Parks and Wildlife Code. The purpose of this report is to present field data, habitat descriptions, and other pertinent information to document compliance with the regulations referenced above.

1.1 Vegetation and Habitat

This section provides information on water bodies and upland habitats within the project area. This section also confirms that the project area lies outside the Coastal Management Zone.

1.1.1 Wetlands and other Waters of the U.S., Riparian Area, and Aquatic Habitats

See Attachments B and C for detailed discussion of these resources.

1.1.2 Coastal Zone

The project area is not within a coastal zone management area (Texas General Land Office 2016).

1.1.3 Upland Habitats

Generally, Texas is divided into 10 natural regions or ecoregions: the Piney Woods, the Gulf Prairies and Marshes, the Post Oak Savanah, the Blackland Prairies, the Cross Timbers, the South Texas Plains, the Edwards Plateau, the Rolling Plains, the High Plains, and the Trans-Pecos. The project is located within the Gulf Prairies and Marshes, which includes barrier islands along the coast, salt grass marshes surrounding bays and estuaries, remnant tallgrass prairies, oak parklands and oak mottes scattered along the coast, and tall woodlands in the river bottomlands. Native vegetation consists of tallgrass prairies and live oak woodlands. Brush species such as mesquites (*Prosopis* spp.) and acacias (*Senegalia* spp. and *Vachellia* spp.) are more common now than in the past. Although much of the native habitat has been lost to agriculture and urbanization, the region still provides important habitat for migratory birds and spawning areas for fish and shrimp (TPWD 2016g).

Specifically, the proposed project is located within the Western Gulf Coastal Plain-Floodplains and Low Terraces ecoregion. The principal distinguishing characteristics of the region are its relatively flat topography and mainly grassland potential natural vegetation. Inland from this region the plains are older, more irregular, and have mostly forest or savanna-type vegetation potentials. Largely because of these characteristics, a higher percentage of the land is in cropland than in bordering ecological regions. Rice, grain sorghum, cotton, and soybeans are the principal crops. Urban and industrial land uses have expanded greatly in recent decades, and oil and gas production is common. Bottomland forests of pecan (*Carya illinoinensis*), water oak (*Quercus nigra*), southern live oak (*Quercus virginiana*), and elm (*Ulmus* spp.), are typical, with some bald cypress (*Taxodium distichum*) on larger streams. The Brazos River floodplains are a broad expanse of alluvial sediments. Soils include vertisols, mollisols, and entisols. Large portions of floodplain forest have been removed and land cover is now a mix of forest, cropland, and pasture (Griffith et.al. 2004).

Within the project area the eastern two-thirds of the property were converted to farmland and were used historically for corn and cotton production. The western third of the project area was historically maintained as grazed pastureland for the production of cattle. Typically, grazed areas within this

ecoregion may be invaded by exotic or native weedy grasses that will dominate the site. Bermudagrass (*Cynodon dactylon*), King Ranch bluestem (*Bothriochloa ishaemum*), Gordo bluestem (*Dichanthium aristatum*), Kleberg bluestem (*Dichanthium annulatum*), smutgrass (*Sporobolus indicus*), Johnsongrass (*Sorghum halepense*), and others are primary invaders. Some native grasses and shrubs remain, including are Indiangrass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), Eastern gammagrass (*Tripsacum dactyloides*) and Florida paspalum (*Paspalum floridanum*). Cool-season species are present in lesser amounts in the more open savannah type areas and are more abundant in areas with greater canopies.

The major cool-season grass species present included Canada (*Elymus canadensis*) and Virginia (*Elymus virginicus*) wildrye, Texas wintergrass (*Nassella leucotricha*) and sedges (*Carex* spp.). Very narrow corridors of wooded areas remain along surface waters throughout the property. Due to the erosion, there is limited vegetation on the river banks in the project area. Some early growth of black willow (*Salix nigra*) and cottonwood (*Populus deltoides*) occurs along portions of the river bank (HDR 2014).

1.1.4 Columbia Bottomlands

The Columbia Bottomlands is an ecologically-rich, 700,000-acre region that is a mix of native grasslands, hardwood forests, and coastal wetlands. The area covers most of Fort Bend and Brazoria counties and portions of Matagorda and Wharton counties (Nature Conservancy 2017).

Approximately half of the project site is mapped as Columbia Bottomlands by the Ecological Mapping System of Texas (EMST) (TPWD 2017). The majority of the area mapped as Columbian Bottomlands consists of grasslands. Smaller areas of deciduous shrubland, evergreen shrubland, hardwood forest and woodland, and live oak forest and woodland are mapped within the project site. The area mapped by the Ecological Mapping System of Texas as Columbia Bottomlands within the project site is shown on Figure I-1.

The majority of the area within in the project site corresponds with the Columbia Bottomlands habitat types as described in TPWD's EMST. Although not mapped as Columbia Bottomlands Herbaceous Wetlands by the EMST, the PEM wetlands identified within the project site support species described under the Columbia Bottomlands Herbaceous Wetlands habitat type. The PFO wetlands identified within the project site support many species described under the Columbia Bottomlands Hardwood Forest and Woodlands habitat type.

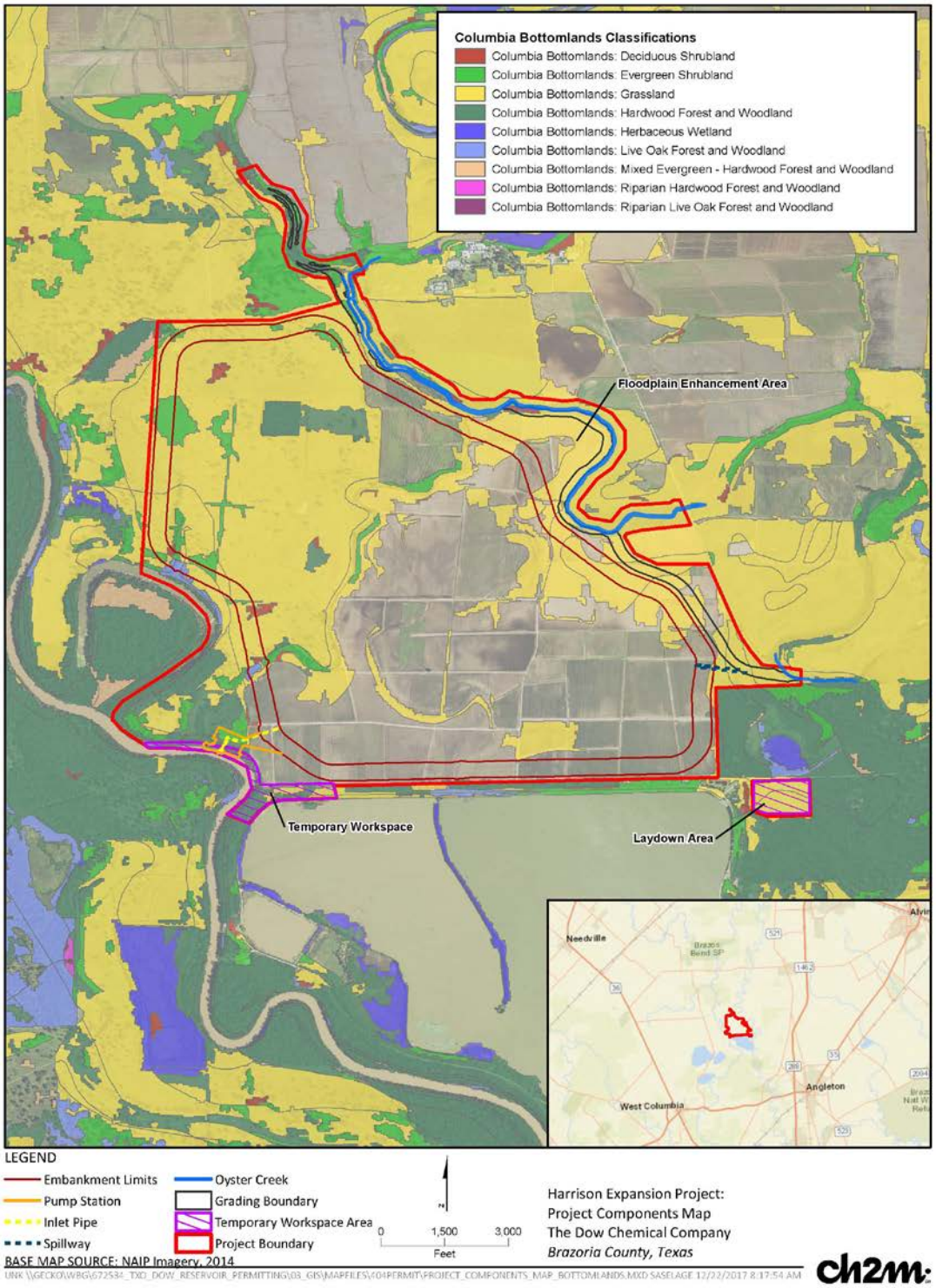

Figure I-1. Ecological Mapping Systems of Texas
Harris Expansion Project Individual Permit Application

1.2 Wildlife and Fisheries

This section describes wildlife and fisheries in the area including recreationally and economically important species, avian species, fisheries, freshwater mussel and other wildlife.

The proposed project is located within the Western Gulf Coastal Plain (Level III) and Floodplains and Low Terraces (Level IV) ecoregion (Griffith et al. 2004). Many of the most common fauna occurring in the Floodplains and Low Terraces ecoregion are opportunistic and are capable of survival in a variety of habitats.

The diversity of the project site with respect to vegetation, soils, and available water resources provides habitat for a large number of native wildlife species such as those described in the following sections. Scrub shrub uplands, forested uplands, forested wetlands, emergent wetlands, ephemeral and intermittent streams, and a series of man-made drainage ditches are present on the site.

1.2.1 Recreationally and Economically Important Species

No recreational public hunting grounds have been identified in the project area. Nearby counties allow public and private hunting of dove, quail, waterfowl, wild turkey, and white-tailed deer. All these species that are hunted in nearby counties for recreation may occur in the project area. Non-consumptive recreation, such as wildlife viewing and birdwatching, are not known to occur in the project area. Because the land is private and is used for agriculture and grazing, it is not considered a high quality recreation, viewing, or birding area. The only commercially valuable species identified in the project area is domestic cattle, which graze in parts of the project area.

No public recreational fishing grounds have been identified in the project area. However, the project area is bordered by three waterbodies used for recreational fishing: Brazos River, Harris Reservoir (limited access), and Oyster Creek. Recreationally important game fish species known to occur within these waterbodies include: blue catfish (*Ictalurus furcatus*), channel catfish (*Ictalurus punctatus*), largemouth bass (*Micropterus salmoides*), and white crappie (*Pomoxis annularis*) (Linam and Kleinsasser 1987). Threatened or endangered species are described in Section 1-3.

1.2.2 Resident and Migratory Birds

Avian species that may occur in the project site include year-round residents and many migratory species. The project site is located within the Central Flyway, a migration route that generally follows the Great Plains states. The scrub shrub and forested habitats of the project site provide shelter, food, and nesting protection for a variety of upland birds. Bird species that can occur in these habitats include a wide assortment of song birds, hawks, owls, and game birds. These birds rely on the areas with dense vegetation for cover and the abundant food source of fruits and insects common to these habitats.

The project site is located on the Brazos River floodplain, where wetland habitats and aquatic resources are common. Aquatic habitats, such as bottomland hardwood forests, emergent wetlands, intermittent, and ephemeral ditches are present throughout the site. Ducks and migratory birds use wetlands for resting areas on migration routes and for nesting. However, portions of the project area have had agricultural activities for a number of years which would result in resident and migratory birds avoiding these areas.

1.2.3 Fisheries

Game and non-game fish species in Texas are regulated and protected by the USFWS and the TPWD in accordance with the *U.S. Fish and Wildlife Conservation Act of 1980* (16 USC 2901-2911) and the *U.S. Fish and Wildlife Coordination Act of 1958*.

As discussed in Section 3.7, several ephemeral streams, intermittent streams, man-made ponds, and a series of man-made drainage ditches were identified within the proposed project site. The project site is also bordered by the Brazos River to the southwest, Harris Reservoir to the south, and Oyster Creek to the northeast. A representative list of common game and non-game fish species known to occur in the surrounding waterbodies and that likely occur in the project site is presented in Table I-1.

Table I-I. Fish Species Potentially Occurring in the Project Site
Harris Expansion Project Individual Permit Application

Common Name	Scientific Name
Blackstripe topminnow	*Fundulus notatus*
Blacktail shiner	*Cyprinella venusta*
Blue catfish	*Ictalurus furcatus*
Bluegill sunfish	*Lepomis macrochirus*
Bullhead minnow	*Pimephales vigilax*
Channel catfish	*Ictalurus punctatus*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Golden topminnow	*Fundulus chrysotus*
Goldfish	*Carassius auratus*
Green sunfish	*Lepomis cyanellus*
Largemouth bass	*Micropterus salmoides*
Longear sunfish	*Lepomis megalotis*
Mosquitofish	*Gambusia affinis*
Orangespotted sunfish	*Lepomis humilis*
Pirate perch	*Aphredoderus sayanus*
Pugnose minnow	*Opsopoeodus emiliae*
Red shiner	*Cyprinella lutrensis*
Sailfin molly	*Poecilia latipinna*
Silverband shiner	*Notropis shumardi*
Slough darter	*Etheostoma gracile*
Smallmouth buffalo	*Ictiobus bubalus*
Spotted gar	*Lepisosteus oculatus*
Tadpole madtom	*Noturus gyrinus*
Threadfin shad	*Dorosoma petenense*
Tidewater silverside	*Menidia peninsulae*
White crappie	*Pomoxis annularis*
Yellow bullhead	*Ameiurus natalis*

Source: Linam and Kleinsasser 1987; NatureServe Explorer 2016

1.2.4 Freshwater Mussels

There are approximately 300 freshwater mussel species recognized in the United States. Of these, 53 species are native to Texas. Fifteen species of mussels maintain a state status of threatened in Texas; of which one is a candidate for federal protection, and 11 others are currently petitioned for listing under the U.S. Endangered Species Act (ESA) (Winemiller et al. 2010). The smooth pimpleback

(*Quadrula houstonensis*) and Texas fawnsfoot (*Truncilla macrodon*), both state listed threatened species, are restricted to the Colorado and Brazos River drainages.

The smooth pimpleback typically occurs in mud, sand, or gravel substrates in small to moderate-sized rivers with slow to moderate flows. Surveys conducted from 1980 to 2006 have noted steep declines in the number of extant populations of smooth pimpleback in both river systems (TPWD 2009). In the Brazos River drainage, scattered groups or individuals have been found alive in the Brazos from the Waco area to the mouth of the Navasota River and in the Little Brazos River, Leon River, and other tributaries (Howells 2002). The nearest known location of smooth pimpleback is approximately 85 miles upstream of the project site.

Little is known about habitat requirements for the Texas fawnsfoot. It probably prefers sand, gravel, and perhaps sandy-mud bottoms in moderate flow rivers and streams (NatureServe Explorer 2016). A recently discovered population in the Brazos River between Possum Kingdom and the mouth of the Navasota River represents the only known surviving population (TPWD 2009). The nearest known location of Texas fawnsfoot is located more than 85 miles upstream of the project site.

A 2012 mussel survey conducted approximately 3,970 feet downstream of the project site found no evidence of live mussel, shell, or shell fragments. Substrate appeared to be the primary limiting factor affecting the presence of mussels within this section of the river. The shallow shoreline areas were virtually devoid of fine substrates, but instead were composed of very dense, hard-packed clay, which may be unsuitable for mussel colonization (HDR 2012).

1.2.5 Mammals

Mammal species in the project area are those associated with Forest/Cropland/Pasture mosaics (Griffith et al. 2004). A representative list of common mammals known to occur in the Floodplains and Terraces ecoregion and that likely occur in the project site is presented in Table I-2.

Table I-2. Mammal Species Potentially Occurring in the Project Site
Harris Expansion Project Individual Permit Application

Common Name	Scientific Name
Baird's pocket gopher	*Geomys breviceps*
Bobcat	*Lynx rufus*
Common raccoon	*Procyon lotor*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern fox squirrel	*Sciurus niger*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern mole	*Scalopus aquaticus*
Eastern red bat	*Lasiurus borealis*
Eastern spotted skunk	*Spilogale putorius*
Evening bat	*Nycticeius humeralis*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
Hispid cotton rat	*Sigmodon hispidus*
Least shrew	*Cryptotis parva*
Nine-banded armadillo	*Dasypus novemcinctus*
Red fox	*Vulpes*

Table I-2. Mammal Species Potentially Occurring in the Project Site
Harris Expansion Project Individual Permit Application

Common Name	Scientific Name
Striped skunk	*Mephitis*
Virginia opossum	*Didelphis virginiana*
White-footed mouse	*Peromyscus leucopus*
White-tailed deer	*Odocoileus virginianus*

Source: NatureServe Explorer 2016; USFWS 2016a

1.2.6 Amphibians and Reptiles

Amphibian and reptile species occupying the project area are typically limited by their specific habitat requirements. Many species use different habitat types at different times of the year or at different life stages. Specific habitat needs for reptiles and amphibians vary widely by species and their life stage. The habitat types found throughout the project area provide suitable habitat for various amphibian and reptile species. Common amphibian and reptile species that are likely to occur within the project site are summarized in Table I-3.

Table I-3. Amphibian and Reptile Species Potentially Occurring in the Project Site
Harris Expansion Project Individual Permit Application

Common Name	Scientific Name
Amphibians	
Blanchard's cricket frog	*Acris crepitans blanchardi*
Bullfrog	*Lithobates catesbeianus*
Bronze frog	*Lithobates clamitans*
Central newt	*Notophthalmus viridescens louisianensis*
Cope's gray tree frog	*Hyla chrysoscelis*
Dwarf American toad	*Anaxyrus americanus charlesmithi*
Eastern gray tree frog	*Hyla versicolor*
Eastern narrow-mouth toad	*Gastrophryne carolinensis*
Great plains narrow-mouthed toad	*Gastrophryne olivacea*
Green tree frog	*Hyla cinerea*
Gulf coast toad	*Incilius valliceps*
Hurter's spadefoot	*Scaphiopus hurterii*
Marbled salamander	*Ambystoma opacum*
Northern spring peeper	*Pseudacris crucifer*
Small-mouthed salamander	*Ambystoma texanum*
Southern crawfish frog	*Lithobates areolatus*
Southern leopard frog	*Lithobates sphenocephala*
Spotted chorus frog	*Pseudacris clarkii*
Squirrel tree frog	*Hyla squirella*
Strecker's chorus frog	*Pseudacris streckeri*
Upland chorus frog	*Pseudacris feriarum*
Reptiles	
Bloctched water snake	*Nerodia erythrogaster transversa*
Broad-banded water snake	*Nerodia fasciata confluens*

Table I-3. Amphibian and Reptile Species Potentially Occurring in the Project Site
Harris Expansion Project Individual Permit Application

Common Name	Scientific Name
Broad-headed skink	*Plestiodon laticeps*
Canebrake rattlesnake	*Cratalus horridus*
Checkered garter snake	*Thamnophis marcianus*
Common musk turtle	*Sternotherus odoratus*
Common snapping turtle	*Chelydra serpentina*
Diamondback water snake	*Nerodia rhombifer*
Eastern garter snake	*Thamnophis sirtalis*
Eastern hognose snake	*Heterodon platirhinos*
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*
Glossy crayfish snake	*Regina rigida*
Graham's crayfish snake	*Regina grahamii*
Green anole	*Anolis carolinensis*
Ground skink	*Scincella lateralis*
Gulf coast ribbon snake	*Thamnophis proximus orarius*
Mississippi map turtle	*Graptemys pseudogeographica kohnii*
Mississippi mud turtle	*Kinosternon subrubrum hippocrepis*
Prairie kingsnake	*Lampropeltis calligaster*
Red-eared slider	*Trachemys scripta elegans*
Rough earth snake	*Virginia striatula*
Rough green snake	*Opheodrys aestivus*
Southern copperhead	*Agkistrodon contortrix*
Speckled kingsnake	*Lampropeltis holbrooki*
Texas coral snake	*Micrurus tener*
Texas rat snake	*Pantherophis obsoletus lindheimeri*
Texas river cooter	*Pseudomys texana*
Western coachwhip	*Coluber flagellum testaceus*
Western cottonmouth	*Agkistrodon piscivorus leucostoma*
Western slender glass lizard	*Ophisaurus attenuatus*
Yellow mud turtle	*Kinosternon flavescens*

Source: NatureServe Explorer 2016; USFWS 2016b

1.3 Threatened and Endangered Species

Any federal action, including permits, requires compliance with the federal ESA. Protection of critical habitat for federal listed endangered and threatened species is a regulatory requirement under the ESA. Critical habitat is defined within Section (3) (5) (A) of the ESA as:

> *"areas within a listed species' current (at time of listing) range that contain the physical or biological features that are essential to that species' conservation or that for some reason require special management; and areas outside the species' current range that the secretary determines to be essential to its conservation."*

Additionally, Texas statute and TPWD regulations prohibit the taking, possession, transportation, or sale of any of the animal species designated by state law as endangered or threatened without the issuance of a permit.

1.3.1 Federal

The U.S. Fish and Wildlife Service (USFWS) endangered species list includes nine federally-listed species: piping plover (*Charadrius melodus* – threatened), red knot (*Calidris canutus rufa* – threatened), whooping crane (*Grus americana* – endangered), West Indian manatee (*Trichechus manatus* – endangered), green sea turtle (*Chelonian mydas* – threatened), hawksbill sea turtle (*Eretmochelys imbricata* – endangered), leatherback sea turtle (*Dermochelys coriacea* – Endangered), Kemp's Ridley sea turtle (*Lepidochelys kempii* – Endangered), and loggerhead sea turtle (*Caretta caretta* – threatened); and two Candidate species: smooth pimpleback (*Quadrula houstonensis*) and Texas fawnsfoot (*Truncilla macrodon*), with the potential to occur in the project area. Table I-4 identifies and provides additional detail on these species.

Table I-4. Federally Listed Species Having Potential to Occur Within or in the Vicinity of the Project Area
Harris Expansion Project Individual Permit Application

Species (Latin Name)	Federal Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Birds				
Whooping Crane (*Grus americana)*	Endangered	A bi-annual migrant, traveling between its summer habitat in central Canada, and its wintering grounds on the Texas coast. Whooping cranes occupy winter areas for almost half a year. Prefer sites with minimal human disturbance. Whooping cranes primarily use shallow, seasonally, and semi-permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands. Wintering habitat in the Aransas National Wildlife Refuge, Texas, includes salt marshes and tidal flats on the mainland and barrier islands.	Whooping cranes migrate through the Great Plains in April to mid-May and mid-September to October, occupying their wintering grounds along the Texas coast for more than half the year.	Moderate
Piping Plover (*Charadrius melodus)*	Threatened	In Texas, piping plovers inhabit barren sand and gravel shores of rivers and gulf beaches. In addition, they use barren river sandbars. Plovers avoid dense vegetation. Beaches used by piping plovers generally are 10 to 40 yards wide.	Texas is the wintering home for 35 percent of the known population of piping plovers. They begin arriving in late July or early August, and will remain for up to 9 months.	Low

Table I-4. Federally Listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

Harris Expansion Project Individual Permit Application

Species (Latin Name)	Federal Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Red Knot (*Calidris canutus rufa*)	Threatened	The Red Knot prefers the shoreline of coasts and bays and also uses inland mudflats. Primarily utilized seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Primary prey items include coquina clam (*Donax spp*.) on beaches and dwarf surf clam (*Mulinia lateralis*) in bays, at least in the Laguna Madre.	Wintering Range includes: Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy counties.	Low
Mollusks				
Smooth Pimpleback *(Quadrula houstonensis)*	Candidate	Utilizes mud, sand, and gravel substrates in as little as 3 to 4 centimeters of water, but appears susceptible to dramatic water level fluctuations, scoured bedrock, and shifting sand substrates. Able to tolerate very slow to moderate stream flow velocities (NatureServe 2016).	The smooth pimpleback is endemic to central Texas and historically occurred throughout the Colorado and Brazos River basins, but is now found only in nine distinct locations, mostly in the Brazos River basin (Federal Register 2012).	Low
Texas Fawnsfoot *(Truncilla macrodon)*	Candidate	Rivers and large streams with sand, gravel, and perhaps sandy-mud bottoms with moderate flows. No specimens have been documented in reservoirs. As with other freshwater mussel species, the Texas fawnsfoot would be susceptible to dramatic water level fluctuations, scoured bedrock, shifting sand substrates, and dewatering (NatureServe 2016).	The Texas fawnsfoot is endemic to central Texas and historically occurred in the Trinity, Brazos, and Colorado River basins. More recently, the fawnsfoot have only been found in five locations, and only the three populations in the Brazos River basin appear to be sustainable (Federal Register 2012).	Low
Mammals				

Table I-4. Federally Listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

Harris Expansion Project Individual Permit Application

Species (Latin Name)	Federal Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
West Indian Manatee (*Trichechus manatus*)	Endangered	Occupies marine, brackish, and fresh water systems where they feed on submerged, emergent, and floating vegetation, preferring shallow sea grass beds with access to deep channels. Often use canals, creeks, and lagoons associated with coastal rivers and sloughs in which to feed, rest, mate, and calving. Critical habitat was designated in Florida in 1976 (USFWS 2001).	Historic distribution is thought to be very similar to the manatee's current distribution concentrating in the warm waters of Florida, with some seasonal migration west to Texas. Seasonal movements are dependent on water temperatures and seasonal availability of plant species (USFWS 2001). Individuals seen along the Texas Gulf Coast may be wanders from populations along the Mexican Gulf Coast (NatureServe 2016).	Low
Reptiles				
Green Sea Turtle (*Chelonia mydas*)	Threatened	A global species in tropical and subtropical seas with water temperatures above 20 degrees Celsius. Feed in shallow sea grass and algae beds. Known to rest on shallow rocky bottoms and coral reefs, sometimes out of the water (NMFS and USFWS 1998a).	Nest in tropical beach habitats around the world and adult females return to their natal beach to lay eggs. There are no green sea turtle nesting beaches in Texas, but individuals are seen along the Texas coast during migration (TPWD 2012a).	Low
Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	Occurs throughout the world in tropical and subtropical regions, spending the majority of their lifecycle in the ocean, only coming to shore to lay eggs. Generally, juvenile and adult hawksbill are benthic in their feeding nature, consuming a variety of sponges and invertebrates.	Occur in the Gulf of Mexico and juveniles and hatchlings have been recorded along the Texas coast, believed to have originated from Mexican nesting beaches. No nesting beaches are known along the Texas coast (USFWS 2016c).	Low

Table I-4. Federally Listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

Harris Expansion Project Individual Permit Application

Species (Latin Name)	Federal Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	Lay eggs on coastal beaches, hatchlings leave the coast for deeper water and grow before returning to near shore habitats as juveniles and adults. Adults primarily occur in the Gulf of Mexico, and utilize shallow near-shore and inshore bay habitats. Are primarily carnivorous, feeding on a variety of crustaceans, including various crab species (NMFS, USFWS, and SEMARNAT 2011).	Kemp's ridley sea turtles have a much more restricted distribution than other sea turtles, nesting primarily in Mexico, Texas, and a few other states in the United States (NMFS, USFWS, and SEMARNAT 2011).	Low
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	Unlike other sea turtle species, the leatherback sea turtle is a pelagic species, foraging on jellyfish, squid, fish, and crustaceans. They are highly migratory and only use the deep waters of the Gulf of Mexico for foraging, rarely coming close to shore following schools of prey.	Occurs throughout the world's oceans. Designated critical habitat has been established in the U.S. Virgin Islands (Federal Register 1979). There are no known nesting beaches in the continental United States. The majority of known nest beaches are located in the eastern Pacific, western Pacific, and Indian Ocean (NMFS and USFWS 1998b).	Low
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	Terrestrial habitats of coastal beaches are utilized for egg laying and incubation. Near shore habitat is utilized by juveniles and adults for feeding. Open ocean habitat is used for migration. Loggerheads occasionally nest on beaches in estuarine zones with coarse sandy beaches between the high tide line and the dunes (NMFS and USFWS 2008)	In Texas, loggerhead sea turtles do inhabit the Gulf of Mexico, occasionally are documented along the Texas coast, and only minor solitary nesting activity has been recorded along the Gulf coast.	Low

1.3.1.1 State

TPWD's county lists includes several species that are federally listed under the ESA but are not considered by the USFWS as potentially occurring in Brazoria County. A brief description, including status, habitat requirement, and range, of the federal and state listed species that TPWD indicates have the potential to occur in Brazoria County are provided in Table I-5. Figure I-2 presents known occurrences of federal- and state-listed species and native plant communities within 10 miles of the project site.

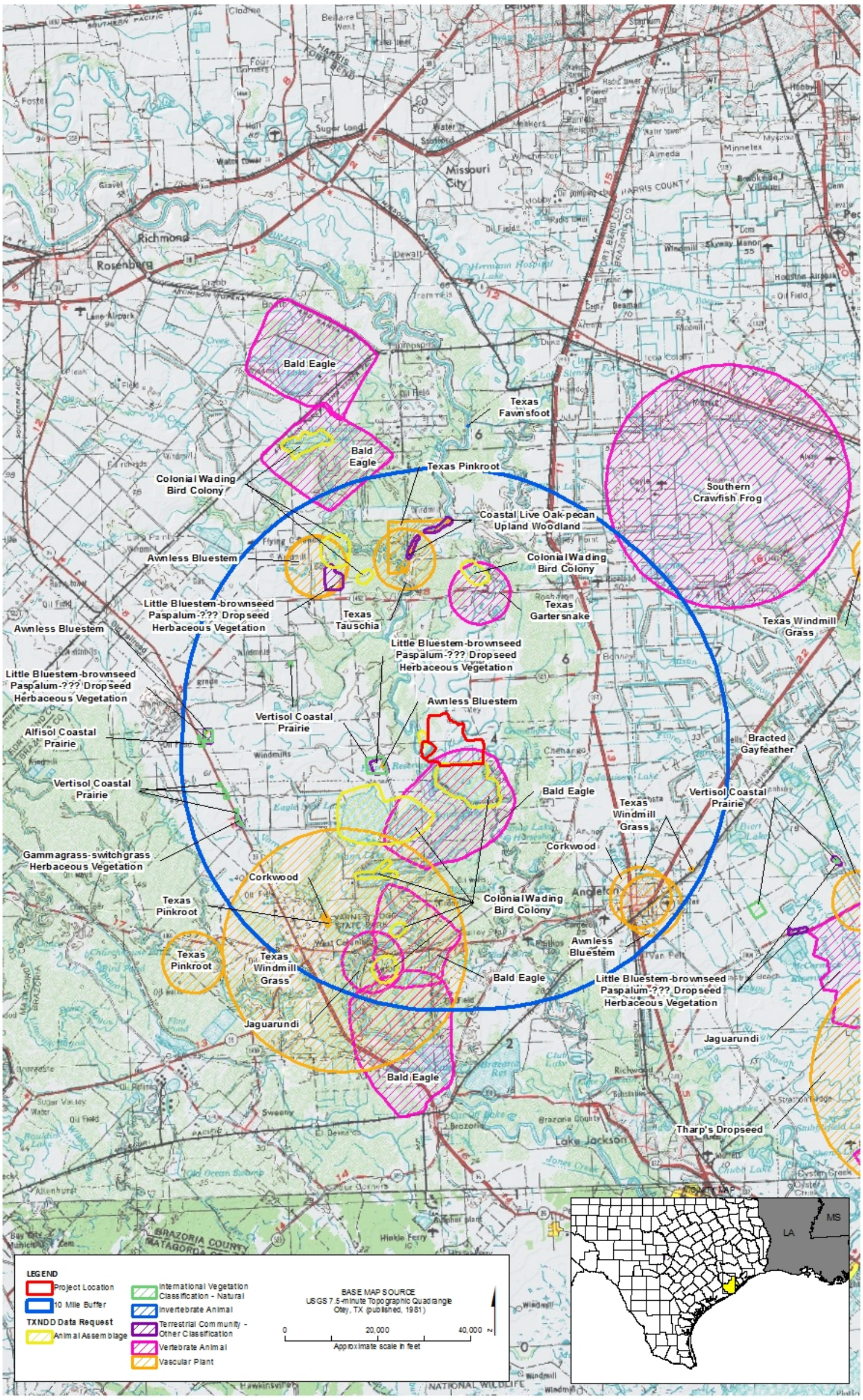

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Figure I-2. Texas Natural Diversity Database Results within 10 Miles of the Project Area
Harris Expansion Project Individual Permit Application

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

Harris Expansion Project Environmental Resource Document

Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
BIRDS				
American Peregrine Falcon *(Falco peregrinus anatum)*	Threatened	Year-round resident and local breeder in west Texas, nests in tall cliff eyries. Occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	Migrant across state from more northern breeding areas in United States and Canada, winters along coast and farther south.	Low
Bald Eagle (*Haliaeetus leucochephalus*)	Threatened	Occurs primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	Present year-round throughout Texas as spring and fall migrants, breeders, or winter residents. The population in Texas is divided into two populations: breeding birds and nonbreeding or wintering birds. Breeding populations occur primarily in the eastern half of the state and along coastal counties from Rockport to Houston. Nonbreeding or wintering populations are located primarily in the Panhandle, Central, and East Texas, and in other areas of suitable habitat throughout the state (TPWD 2016b).	High
Eskimo Curlew (*Neumenius borealis*)	Endangered	Is a tundra nesting species that migrates through the prairies of the U.S., and is thought to winter in the Pampas lowlands, in South America (USFWS 2011).	The Eskimo curlew is so rare the last record of physical evidence was collected in 1963 in Barbados (USFWS 2011). Since that time, 39 potential sightings have occurred, but these reports were not able to be confirmed by physical evidence. Surveys of breeding territories, migration routes, and wintering grounds over the last few decades have not detected the species (USFWS 2011).	Low

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Peregrine Falcon (*Falco peregrinus anatum*)	Threatened	Occupies wide range of habitats during migration, including shores, coastlines, and barrier islands as well as urban areas.	Migrates across the state from more northern breeding areas in US and Canada to winter along coast and farther south. Resident breeder in west Texas. Another sub species, *F.p. tundrius*, is no longer listed in Texas.	Low
Piping Plover (*Charadrius melodus*)	Threatened	Beaches and bayside mud or salt flats.	Wintering migrant along the Texas Gulf Coast.	Low
Reddish Egret (*Egretta rufescens*)	Threatened	Utilizes brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear.	Occurs along the Gulf Coast of Texas and some parts of Louisiana and southern Florida. It is rare along the Gulf Coast of Mexico, West Indies and Baja California (TPWD 2016c).	Low
Sooty Tern (*Sterna fuscata*)	Threatened	Predominately "on the wing"; does not dive, but snatches small fish and squid with bill as it flies or hovers over water; breeding April through July. Breed along the coast on small islands. These terns prefer to nest in small colonies above flood tides, in flat, sparsely vegetated, and fairly open areas (Texas A&M AgriLife Extension 2016a).	Breeding sites for sooty terns along the central and south sections of the Texas coast in the Coastal Prairies, Coastal Sand Plain, and South Texas Brush Country regions (Texas A&M AgriLife Extension 2016a).	Low
White-faced Ibis (*Plegadis chihi*)	Threatened	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	It nests in isolated colonies from Oregon to Kansas, but its center of greatest abundance seems to be in Utah, Texas, and Louisiana. In Texas, they breed and winter along the Gulf Coast and may occur as migrants in the Panhandle and West Texas (TPWD 2016d).	Low
White-tailed Hawk (*Buteo albicaudatus*)	Threatened	Near coast on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral.	Breeding locations in Texas typically occur within Coastal Sand Plain, Coastal Prairies, and South Texas Brush Country regions (Texas A&M AgriLife Extension 2016b).	Low

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Whooping Crane (*Grus americana*)	Endangered	A bi-annual migrant, traveling between its summer habitat in central Canada, and its wintering grounds on the Texas coast. Whooping cranes occupy winter areas for almost half a year. Prefer sites with minimal human disturbance. Whooping cranes primarily use shallow, seasonally, and semi-permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands. Wintering habitat in the Aransas National Wildlife Refuge, Texas, includes salt marshes and tidal flats on the mainland and barrier islands.	Whooping cranes migrate through the Great Plains in April to mid-May and mid-September to October, occupying their wintering grounds along the Texas coast for more than half the year. Whooping cranes have been observed at Brazoria National Wildlife Refuge as recent as November 2015 (USFWS 2013).	Moderate
Wood Stork (*Mycteria americana*)	Threatened	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e., active heronries).	Breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960. Wood storks are federally listed AL, FL, GA, MS, NC, and SC.	Moderate
Fishes				

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Smalltooth Sawfish (*Pristis pectinata*)	Endangered	Young occur very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 feet (10 meter); in sheltered bays, on shallow banks, and in estuaries or river mouths. Adult sawfish occur in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths; feed on a variety of fish species and crustaceans.	Gulf of Mexico, Caribbean, western Atlantic, Pacific and Indian Oceans, with a core distribution in the United States in the coastal lagoons, reefs, mangroves, and bays of south Florida. Many individuals documented from Texas to the Atlantic coast of the United States are believed to originate from this breeding population (Federal Register 2001). In decades prior to 1970, the sawfish were considered "not uncommon" along the Texas coast, but since 1971 only three published or museum reported captured smalltooth sawfish have been documented from this region (Federal Register 2001).	Low
Mammals				
Jaguarundi (*Herpailurus yagouaroundi*)	Endangered	Jaguarundi occur in dense, thorny shrublands.	South Texas brush country and lower Rio Grande valley. Jaguarundis also occur in northern Mexico and central and south America (TPWD 2016e).	Low
Louisiana Black Bear (*Ursus americanus luteolus*)	Threatened	Typically inhabits bottomland hardwood forest habitat. Additional habitat types occasionally used include brackish and freshwater marshes, levees along canals and bayous, and agricultural fields.	Current breeding populations are concentrated in northeast and south central Louisiana within the Tensas and Atchafalaya River basins, which were designated Critical Habitat in 2009 (Federal Register 2009)	Low

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Ocelot (*Leopardus pardalis*)	Endangered	Utilizes areas with a dense shrub layer (95% cover) in a variety of forested and savanna habitats. In Texas, ocelots prefer shrub communities with greater than 95% shrub cover, and avoid areas with less than 75% shrub cover (USFWS, 2010).	Restricted to extreme southern Texas and southern Arizona. Two breeding populations are thought to exist in southern Texas, one located in Kennedy, and Willacy Counties and the second in Cameron County on the Laguna Atascosa National Wildlife Refuge (USFWS 2010). No additional breeding populations are thought to exist.	Low
Red Wolf (*Canis rufus*)	Endangered	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	Historically ranged throughout the southeastern U.S., from the Atlantic coast to central Texas, and from the Gulf Coast to central Missouri and southern Illinois. Were extirpated from most of the eastern portion of their range. A small number persisted in the wild in southeastern Texas and southwestern Louisiana until the late 1970s; however, by 1980, the species was declared extinct in the wild (NatureServe 2016).	Low
West Indian Manatee (*Trichechus manatus*)	Endangered	Occupies marine, brackish, and fresh water systems where they feed on submerged, emergent, and floating vegetation, preferring shallow sea grass beds with access to deep channels. Often use canals, creeks, and lagoons associated with coastal rivers and sloughs in which to feed, rest, mate, and calving. Critical habitat was designated in Florida in 1976 (USFWS 2001).	Historic distribution is thought to be very similar to the manatee's current distribution concentrating in the warm waters of Florida, with some seasonal migration west to Texas. Seasonal movements are dependent on water temperatures and seasonal availability of plant species (USFWS 2001). Individuals seen along the Texas Gulf Coast may be wanders from populations along the Mexican Gulf Coast (NatureServe 2016).	Low
Mollusks				

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Smooth Pimpleback (*Quadrula houstonensis*)	Threatened	Utilize mud, sand, and gravel substrates in as little as 3 to 4 centimeters of water, but appears susceptible to dramatic water level fluctuations, scoured bedrock, and shifting sand substrates. Able to tolerate very slow to moderate stream flow velocities (NatureServe 2016).	The smooth pimpleback is endemic to central Texas and historically occurred throughout the Colorado and Brazos River basins, but is now limited to nine distinct locations, mostly in the Brazos River basin (Federal Register 2012).	Low
Texas Fawnsfoot (*Truncilla macrodon*)	Threatened	Prefer rivers and large streams with sand, gravel, and perhaps sandy-mud bottoms with moderate flows. No specimens have been documented in reservoirs. As with other freshwater mussel species, the Texas fawnsfoot would be susceptible to dramatic water level fluctuations, scoured bedrock, shifting sand substrates, and dewatering (NatureServe 2016).	The Texas fawnsfoot is endemic to central Texas and historically occurred in the Trinity, Brazos, and Colorado River basins. More recently, the fawnsfoot have only been found in five locations, and only three populations in the Brazos River basin appear to be sustainable (Federal Register 2012).	Low
Reptiles				
Alligator Snapping Turtle (*Macrochelys temminckii*)	Threatened	Perennial waterbodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation.	Native to the southeastern region of the United States. They are confined to the river systems that drain into the Gulf of Mexico.	High
Atlantic Hawksbill Sea Turtle (*Eretmochelys imbricata*)	Endangered	Occurs throughout the world in tropical and subtropical regions, spending the majority of their lifecycle in the ocean, only coming to shore to lay eggs. Generally, juvenile and adult hawksbill are benthic in their feeding nature, consuming a variety of sponges and invertebrates.	Occur in the Gulf of Mexico and juveniles and hatchlings have been recorded along the Texas coast, believed to have originated from Mexican nesting beaches. No nesting beaches are known along the Texas coast (USFWS 2016c).	Low

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area

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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Green Sea Turtle (*Chelonia mydas*)	Threatened	A global species found in tropical and subtropical seas with water temperatures above 20 degrees Celsius. Feed in shallow sea grass and algae beds. Known to rest on shallow rocky bottoms and coral reefs, sometimes out of the water (NMFS and USFWS 1998a).	Nest in tropical beach habitats around the world and adult females return to their natal beach to lay eggs. There are no green sea turtle nesting beaches in Texas, but individuals are seen along the Texas coast during migration (TPWD 2012a).	Low
Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)	Endangered	Lay eggs on coastal beaches, hatchlings leave the coast for deeper water and grow before returning to near shore habitats as juveniles and adults. Adults primarily occur in the Gulf of Mexico, and utilize shallow near-shore and inshore bay habitats. Are primarily carnivorous, feeding on a variety of crustaceans, including various crab species (NMFS, USFWS, and SEMARNAT 2011).	Kemp's ridley sea turtles have a much more restricted distribution than other sea turtles, nesting primarily in Mexico, Texas, and a few other states in the United States (NMFS, USFWS, and SEMARNAT 2011).	Low
Leatherback Sea Turtle (*Dermochelys coriacea*)	Endangered	Unlike other sea turtle species, the leatherback sea turtle is a pelagic species, foraging on jellyfish, squid, fish, and crustaceans. They are highly migratory and only use the deep waters of the Gulf of Mexico for foraging, rarely coming close to shore following schools of prey.	Occurs throughout the world's oceans. Designated critical habitat is located in the U.S. Virgin Islands (Federal Register 1979). There are no known nesting beaches in the continental United States. The majority of known nest beaches are located in the eastern Pacific, western Pacific, and Indian Ocean (NMFS and USFWS 1998b).	Low

Table I-5. State-listed Species Having Potential to Occur Within or in the Vicinity of the Project Area
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Species (Latin Name)	State Status	Habitat	Distribution	Potential to Occur Within the Project Area (Low, Moderate, High)
Loggerhead Sea Turtle (*Caretta caretta*)	Threatened	Terrestrial habitats of coastal beaches are utilized for egg laying and incubation. Near shore habitat is utilized by juveniles and adults for feeding. Open ocean habitat is used for migration. Loggerheads occasionally nest on beaches in estuarine zones with coarse sandy beaches between the high tide line and the dunes (NMFS and USFWS 2008)	In Texas, loggerhead sea turtles do inhabit the Gulf of Mexico, occasionally are documented along the Texas coast, and only minor solitary nesting activity has been recorded along the Gulf coast.	Low
Texas Horned Lizard (*Phrynosoma cornutum*)	Threatened	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky.	Texas horned lizards range from the south-central United States to northern Mexico, throughout much of Texas, Oklahoma, Kansas and New Mexico	Low
Timber Rattlesnake (*Crotalus horridus*)	Threatened	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e., grapevines or palmetto.	Timber rattlesnakes occur in upland woods, swamps, floodplains, and riparian zones in the eastern United States; the eastern third of Texas (TPWD 2016f).	High

1.4 Survey Results

A reconnaissance-level biological survey and habitat assessment of the Project area was conducted April 11 through April 14, 2016 and April 13 through April 27, 2017 (Cardno Entrix 2017). No federally or state listed threatened or endangered species were observed near or within the Project area during the field surveys.

1.4.1 Federally Listed Species

The palustrine emergent wetlands and extensive croplands within the Project area could provide suitable foraging habitat for the federally endangered whooping crane. Whooping cranes have been documented on the Brazoria National Wildlife Refuge located approximately 20 miles southeast of the Project area (USFWS 2013). No whooping cranes were observed during the field surveys; however, based on the presence of suitable foraging habitat and the proximity of the Project area to the Brazoria National Wildlife Refuge, there is a moderate potential for the whooping crane to occur within the Project area.

The Brazos River and its tributaries could provide suitable habitat for the smooth pimpleback and Texas fawnsfoot, both of which are candidates for federal listing as well as state-listed species. These species are discussed in greater detail in Section 1.2.4. A 2012 mussel survey conducted in the Brazos River approximately 3,970 feet downstream of the project site found no evidence of live mussel, shell, or shell fragments (HDR 2012). The last known observed location of the smooth pimpleback was documented approximately 85 miles upstream of the project site at the confluence of the Navasota and Brazos Rivers (Howells 2002). The last known observed location of the Texas fawnsfoot was documented greater than 85 miles upstream of the project site between Possum Kingdom Lake and the mouth of the Navasota River (TPWD 2009). Therefore, there is a low potential for these species to occur within Oyster Creek and other tributaries within the Project area.

All other federally listed species were identified as having a low potential to occur within the project area due to a lack of suitable habitat.

1.4.2 State Listed Species

The federally and state listed whooping crane, smooth pimpleback, and Texas fawnsfoot are discussed in Section 1.4.1.

Bald eagles nest in tall trees near water, primarily rivers and large lakes. Harris Reservoir and the Brazos River provide suitable nesting and foraging habitat for bald eagles; however, no eagles or their nests were observed near these waterbodies or within other portions of the Project area during the field surveys. Based on the availability of suitable nesting and foraging habitat within and near the vicinity of the Project area, there is a high potential for bald eagles to occur within the Project area.

Wood storks use a variety of freshwater and estuarine wetlands for nesting, feeding, and roosting sites. Typical foraging sites throughout the species' range include freshwater marshes and stock ponds, shallow, seasonally flooded roadsides or agricultural ditches, narrow tidal creeks or shallow tidal pools, and managed impoundments (USFWS 1997). The palustrine emergent wetlands and numerous agricultural ditches within the Project area as well as Harris Reservoir provide suitable foraging habitat for wood storks; however, no wood storks were observed during the field surveys. Based on the assessment conducted, there is a moderate potential for wood storks to occur within the Project area.

Alligator snapping turtles inhabit deep water of rivers, canals, lakes, and oxbows, all of which are located within the Project area. No alligator snapping turtles were observed during the field surveys, however, there is a high potential for the species to occur within the Project area given the variety of deep water habitats present within the Project area.

Timber rattlesnakes prefer dense groundcover in swamps, floodplains, deciduous woodlands, riparian zones, and abandoned farmland. Several of these habitat types are present within the Project area and provide suitable habitat for the timber rattlesnake. No timber rattlesnakes were observed during the field surveys; however, there is a high potential for the species to occur within the Project area based on the presence of suitable habitat and the relatively undisturbed nature of these habitats.

All other state listed species were identified as having a low potential to occur within the project area due a lack of suitable habitat.

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