Appendix C-3

Endangered Species Act – Biological Assessment

Job No. TGL18185

APPENDIX C-3

DRAFT
BIOLOGICAL ASSESSMENT FOR THE COASTAL TEXAS PROTECTION AND RESTORATION STUDY

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Acronyms and Abbreviations

ABC	American Bird Conservancy
BA	biological assessment
Coastal Texas Study	Coastal Texas Protection and Restoration Study
CSRM	Coastal Storm Risk Management
CWS	Canadian Wildlife Service
DIFR-EIS	Draft Integrated Feasibility Report-Environmental Impact Statement
ER	Ecosystem Restoration
ESA	Endangered Species Act
FR	*Federal Register*
GIWW	Gulf Intracoastal Waterway
GLO	Texas General Land Office
Gulf	Gulf of Mexico
IPaC	Information for Planning and Consultation
LRGV	Lower Rio Grande Valley
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NWR	National Wildlife Refuge
RSLR	relative sea level rise
SAV	submerged aquatic vegetation
STSSN	Sea Turtle Stranding and Salvage Network
TPWD	Texas Parks and Wildlife Department [
TSP	Tentatively Selected Plan
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

1.1 PURPOSE OF THE BIOLOGICAL ASSESSMENT

This biological assessment (BA) was prepared to fulfill the U.S. Army Corp of Engineers (USACE), Galveston District requirements as outlined under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended. The Coastal Texas Protection and Restoration Study (Coastal Texas Study) is being conducted by the USACE and the Texas General Land Office (GLO), which is the non-Federal sponsor. The proposed Federal action (also referred to as the Tentatively Selected Plan or TSP) consists of two Coastal Storm Risk Management (CSRM) measures, the Coastal Barrier (located along Galveston Bay, Galveston Island, and Bolivar Peninsula) and the South Padre Island Beach Nourishment, and nine Ecosystem Restoration (ER) measures located along the Texas Gulf coast from Chambers to Cameron counties. This BA evaluates the potential impacts the Coastal Texas Study's proposed TSP may have on Federally listed threatened and endangered species identified by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS).

The NMFS and USFWS Information for Planning and Consultation (IPaC) websites were referenced to determine species protected under the ESA with the potential to occur within the counties of the project area that should be included in this BA (NMFS, 2017b; USFWS, 2018) (Attachment 1). The NMFS website identified five species: blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*). The five whale species receive additional protection under the Marine Mammal Protection Act (MMPA) of 1972 (NMFS, 2018). The USFWS website identified the following 23 species as endangered, threatened, or candidate: Gulf coast jaguarundi (*Herpailurus yagouaroundi cacomitli*), ocelot (*Leopardus pardalis*), West Indian manatee (*Trichechus manatus*), Attwater's prairie chicken (*Tympanuchus cupido attwateri*), interior least tern (*Sterna antillarum*), northern aplomado falcon (*Falco femoralis septentrionalis*), piping plover (*Charadrius melodus*), rufa red knot (*Calidris canutus rufa*), red-crowned parrot (*Amazona viridigenalis*), whooping crane (*Grus americana*), green sea turtle (*Chelonia mydas*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), golden orb (*Quadrula aurea*), smooth pimpleback (*Quadrula houstonensis*), Texas fawnsfoot (*Truncilla macrodon*), Texas pimpleback (*Quadrula petrina*), slender rush-pea (*Hoffmannseggia tenella*), South Texas ambrosia (*Ambrosia cheiranthifolia*), Texas ayenia (*Ayenia limitaris*), and Texas prairie dawn-flower (*Hymenoxys texana*) (USFWS, 2018). Federally designated critical habitat for the piping plover and whooping crane are also addressed. Table 1 presents a list of threatened and endangered species addressed in this BA.

Table 1
Federally Listed Endangered, Threatened, or Candidate Species within Brazoria, Calhoun, Cameron, Chambers, Galveston, Harris, Kenedy, Matagorda, Nueces, and Willacy Counties[1]

Common Name	Scientific Name[2]	Status[3]	
		USFWS	NMFS
MAMMALS			
Gulf coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	E	N/A
Ocelot	*Leopardus pardalis*	E	N/A
West Indian manatee	*Trichechus manatus*	T	N/A
BIRDS			
Attwater's prairie chicken	*Tympanuchus cupido attwateri*	E	N/A
Interior least tern	*Sterna antillarum*	E	N/A
Northern aplomado falcon	*Falco femoralis septentrionalis*	E	N/A
Piping plover	*Charadrius melodus*	T w/CH	N/A
Red knot (rufa)	*Calidris canutus rufa*	T	N/A
Red-crowned parrot	*Amazona viridigenalis*	C	N/A
Whooping crane	*Grus americana*	E w/CH	N/A
REPTILES			
Green sea turtle	*Chelonia mydas*	T	T
Hawksbill sea turtle	*Eretmochelys imbricata*	E	E
Kemp's ridley sea turtle	*Lepidochelys kempii*	E	E
Leatherback sea turtle	*Dermochelys coriacea*	E	E
Loggerhead sea turtle	*Caretta caretta*	T	T
MOLLUSKS			
Golden orb	*Quadrula aurea*	C	N/A
Smooth pimpleback	*Quadrula houstonensis*	C	N/A
Texas fawnsfoot	*Truncilla macrodon*	C	N/A
Texas pimpleback	*Quadrula petrina*	C	N/A
PLANTS			
Slender rush-pea	*Hoffmannseggia tenella*	E	N/A
South Texas ambrosia	*Ambrosia cheiranthifolia*	E	N/A
Texas ayenia	*Ayenia limitaris*	E	N/A
Texas prairie dawn-flower	*Hymenoxys texana*	E	N/A

[1] According to the NMFS (2018a) and USFWS (2018).
[2] Nomenclature follows Chesser et al. (2018), NMFS (2018a), and USFWS (2018).
[3] E – Endangered; T – Threatened; C – Candidate; w/CH: with designated Critical Habitat.

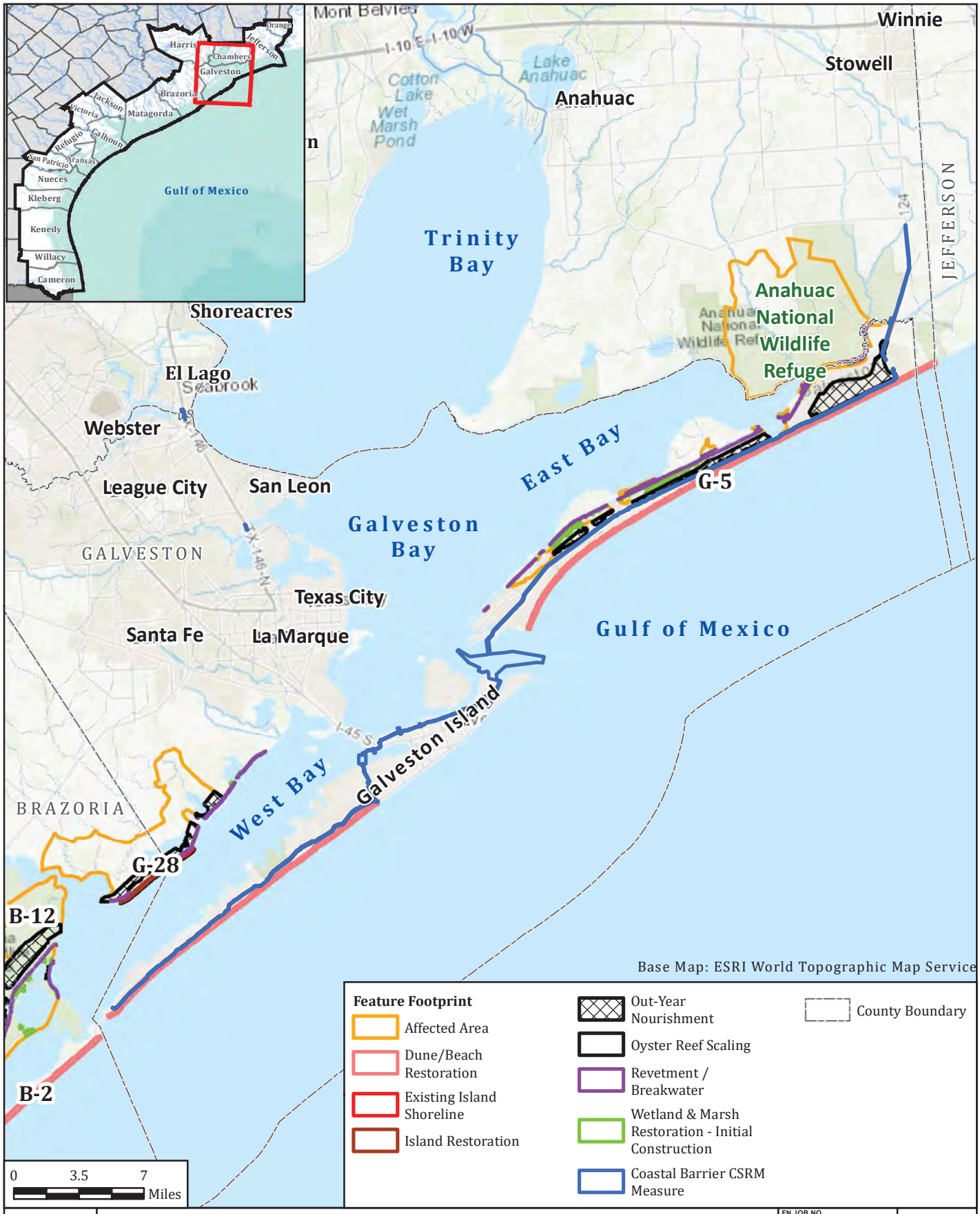
This BA also describes the avoidance, minimization, and conservation measures proposed for this project relative to habitat and species referenced in the BA. The BA is offered to assist the NMFS and USFWS in fulfilling their obligations under the ESA. A Draft Integrated Feasibility Report-Environmental Impact Statement (DIFR-EIS) has also been prepared to further address the potential effects resulting from the proposed project.

1.2 PROJECT SETTING

There are two CSRM measures proposed. The Coastal Barrier CSRM system project area is in the northwest Gulf of Mexico (Gulf) in Chambers, Harris and Galveston counties. Approximately 4.9 million people reside within these three counties, including the fourth largest U.S. city (Houston) and other large metropolitan areas like Galveston and Texas City. Population of these three counties is expected to reach up to 6.7 million by 2050 (Texas Demographic Center, 2018). In addition to the potential population at risk, 3 of the world's 9 largest oil refineries, 40 percent of the Nation's petrochemical industry, and 3 of the 10 largest U.S. seaports are in the study area (Galveston Bay Estuary Program, 2013). The South Padre Island CSRM measure project area is located on the lower Texas coast in Cameron county. The resident population of the island was estimated to be 2,816 in 2010. South Padre Island is a popular tourism area for resort vacation and recreation. The island's average annual visitation is approximately 4.3 million visits (South Padre Island Economic Development Corporation, 2014) (Figures 1a–e).

The ER measures encompass eight counties along the Gulf coast: Galveston, Brazoria, Matagorda, Calhoun, Nueces, Kenedy, Willacy, and Cameron counties (Figures 1a–e). Approximately 1.5 million people live within these 8 counties. The population of these counties is projected to reach 2.2 million by 2050 (Texas Demographic Center, 2018). The Texas Gulf coast is a popular destination for recreational and commercial fishing, birdwatching, camping, swimming, and resorts (Travel Texas, 2018). The Gulf coast is also important for shipping along the intercoastal waterway and ports (Texas Department of Transportation, 2018).

The project area is defined as those areas that will be directly affected by construction or operation activities resulting from potential alternative plans of the Coastal Texas Study and is therefore a smaller area compared to the 18-county study area.



USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Coastal Barrier Alternative
Coastal Barrier CSRM Measure & ER Measures

FN JOB NO	TGL18185
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DESIGNED	KLC
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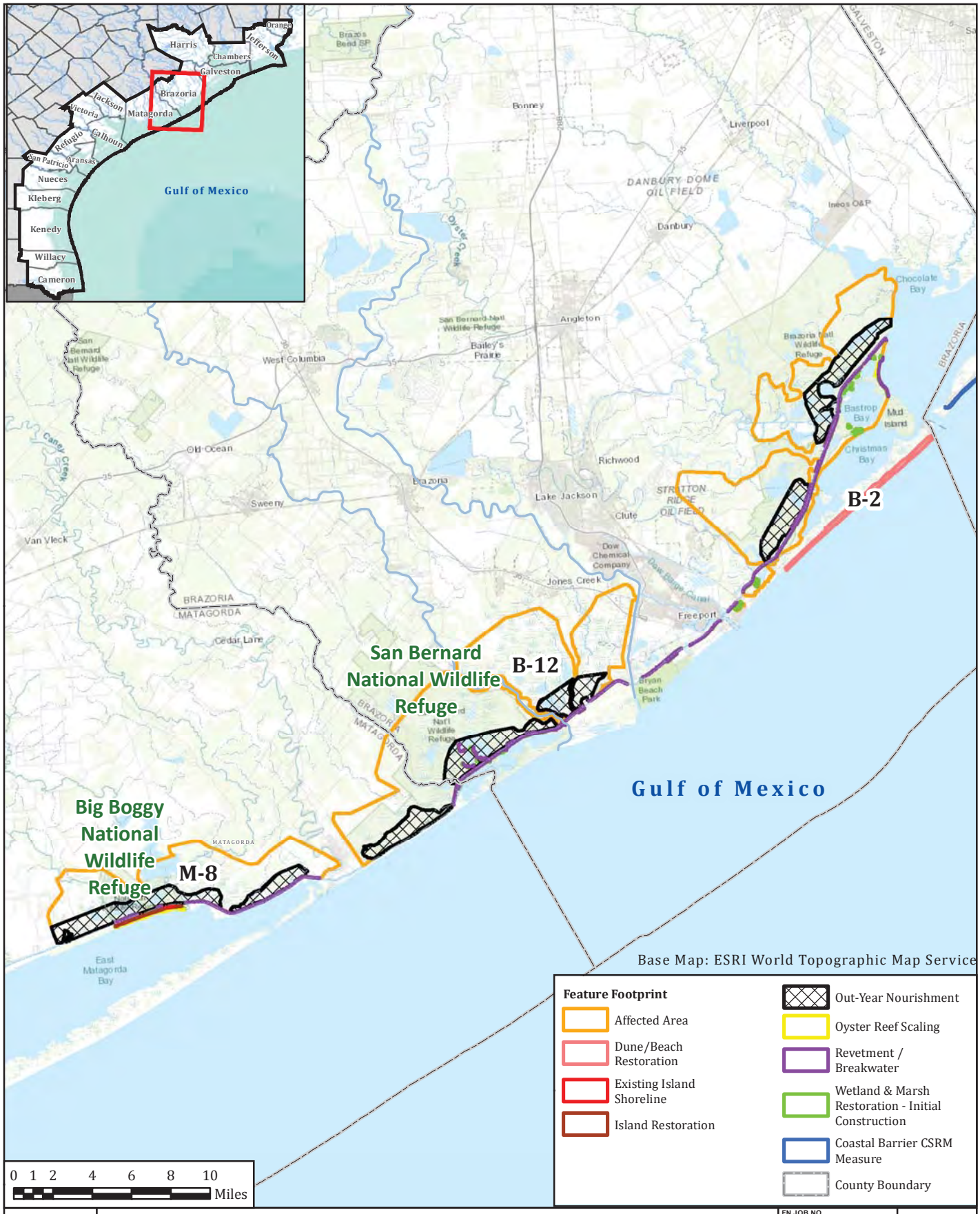
1a
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Coastal Barrier Alternative
Coastal Barrier CSRM Measure & ER Measures

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1b
FIGURE

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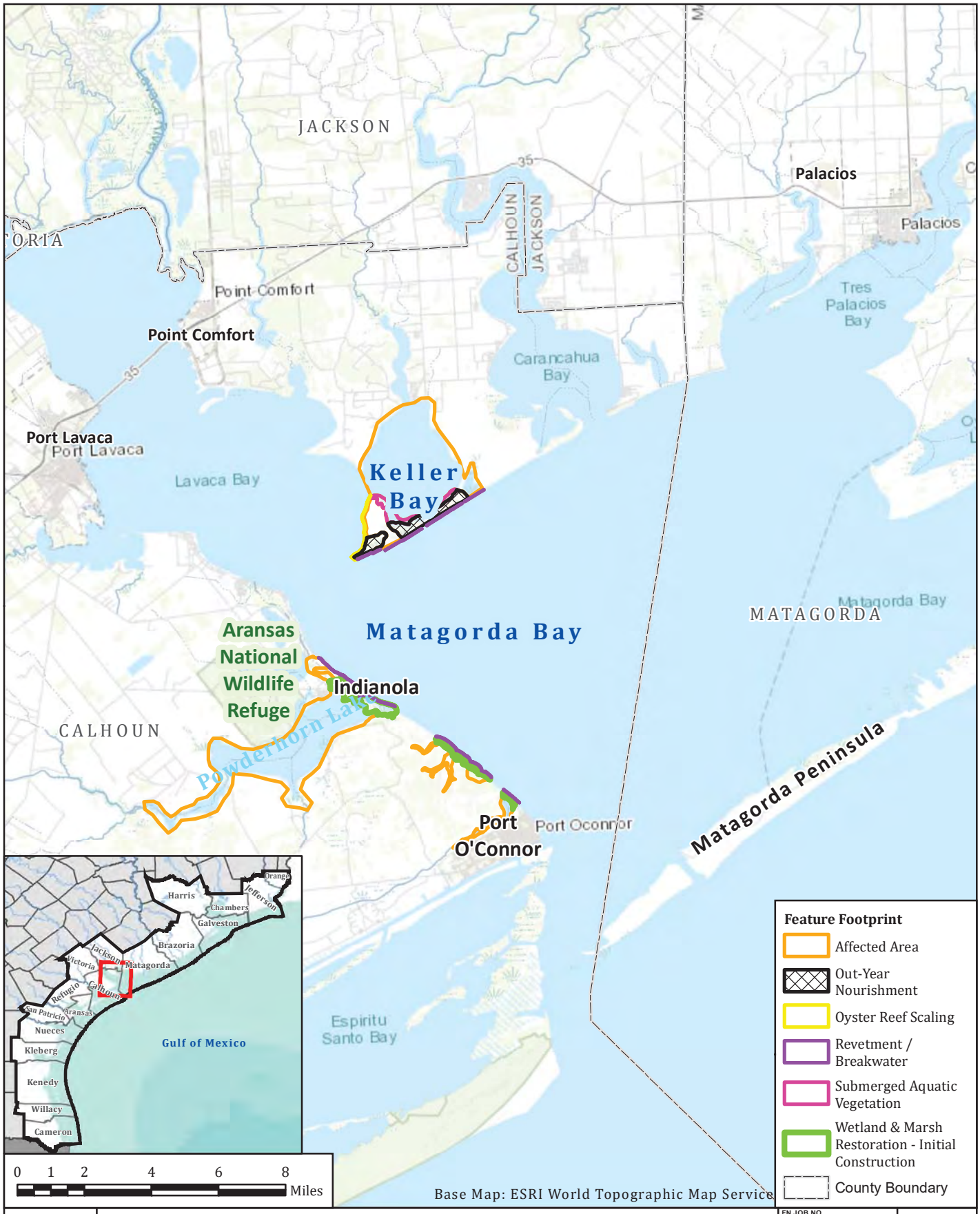

N W E S

USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Coastal Barrier Alternative
Coastal Barrier CSRM Measure & ER Measures

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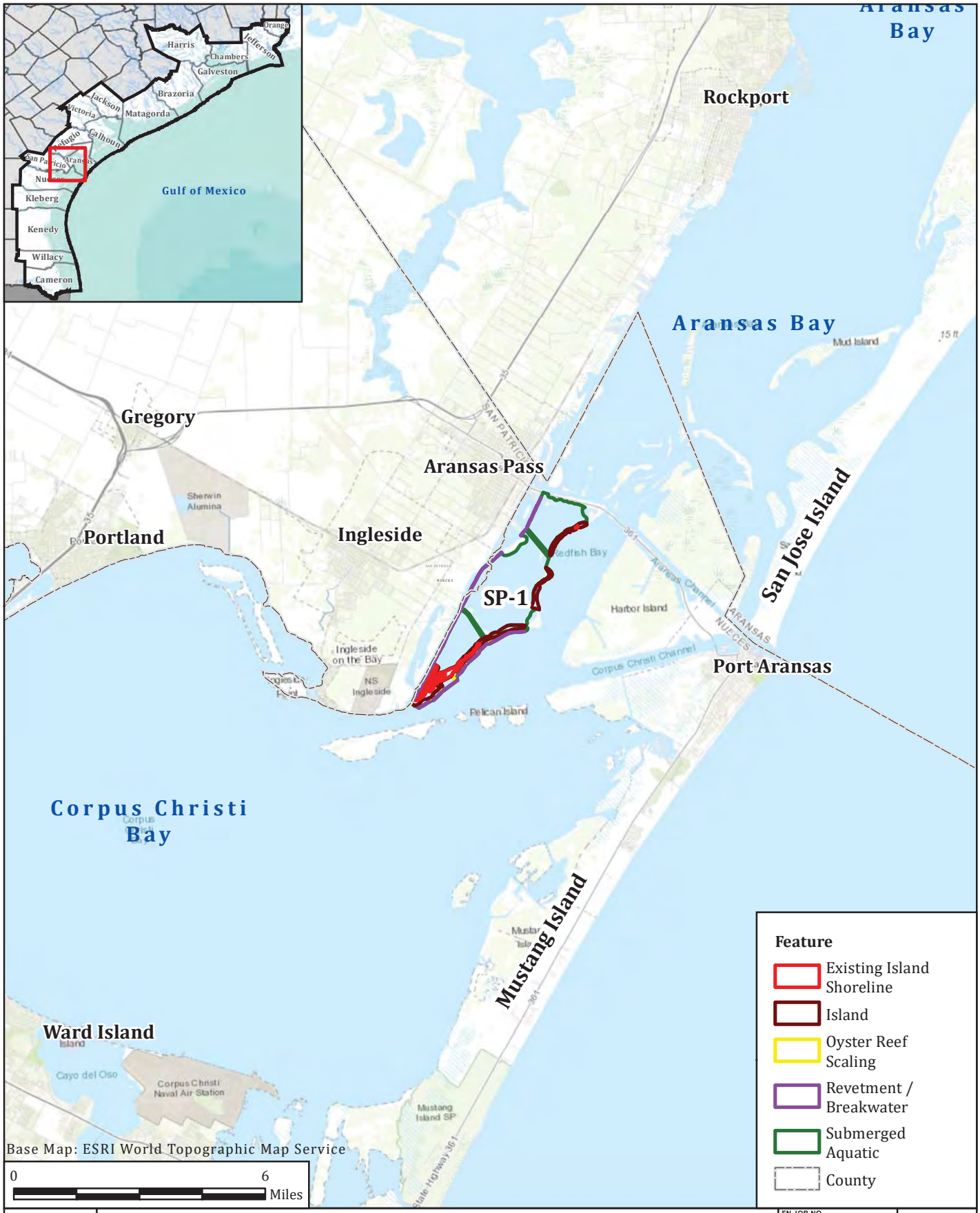
1c
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Coastal Barrier Alternative
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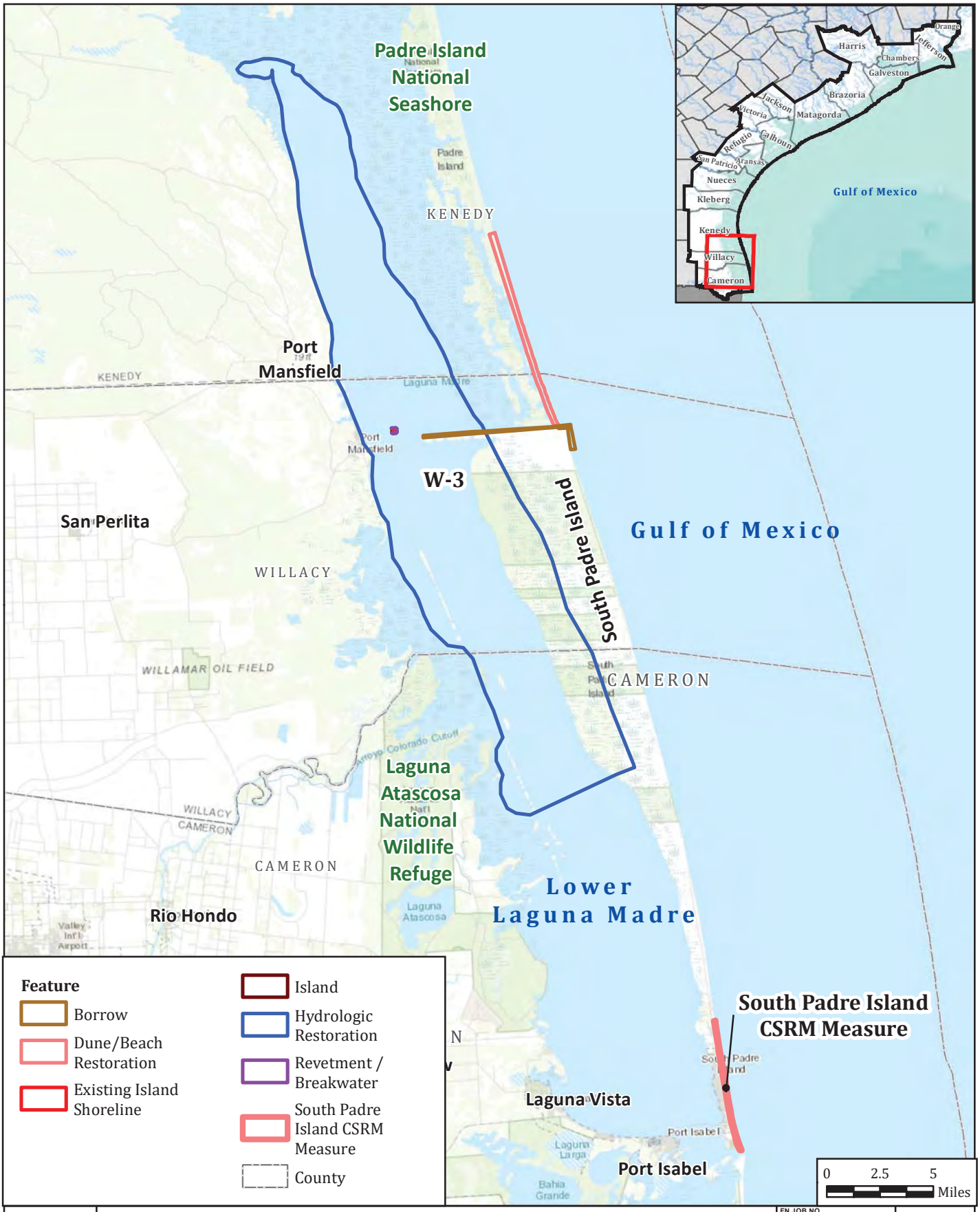
1d
FIGURE

GCS North American 1927



USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Coastal Barrier Alternative
South Padre Island CSRM Measure & ER Measure

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1e
FIGURE

1.3 PROJECT AREA HABITAT DESCRIPTION

The project area stretches along a large portion of the Texas coast and is located within the Tamaulipan, Texan, and Austroriparian biotic provinces (Blair, 1950). It is in the Western Gulf Coastal Plains region and includes the Northern Humid Gulf Coastal Prairies, Texas-Louisiana Coastal Marshes, Mid-Coast Barrier Islands and Coastal Marshes, and Laguna Madre Barrier Islands and Coastal Marshes. The topography is relatively flat from sea level to 38 feet above sea level in High Island. The project area habitat includes barrier islands, coastal dunes, coastal grasslands, tidal flats, estuaries, fresh to saline marshes, bays, and open-water habitats (Griffith et al., 2007).

The Coastal Barrier measure is located along Galveston Bay, a 384,000-acre estuary system on the Texas upper coast. The Galveston Bay estuary habitat types include uplands, wetlands, open bay water, open bay bottom, oyster reefs, seagrass meadows, and intertidal mud flats. Existing habitat within the proposed project footprint includes developed and urbanized land, armored and natural shorelines, beaches, tidal flats, brackish to saltwater wetlands, submerged aquatic vegetation (SAV), oyster reefs, uplands, sand dunes, coastal prairie, and Chenier plains (USFWS, 2017a). The South Padre Island measure is located on South Padre Island, which consists of sand dunes, beach, grasslands, marshes, and tidal flats (National Park Service [NPS], 2018). The ER measures are located through the lower, middle, and upper Texas coast. Habitats found within the study area include developed and urbanized land, armored and natural shorelines, tidal flats, brackish to saltwater wetlands, SAVs, dunes, uplands, oyster reefs, hypersaline lagoon, barrier islands, coastal prairie, sand dunes, beaches, mudflats, and bottomland hardwood forests (USFWS, 2017a).

1.4 ALTERNATIVES CONSIDERED

1.4.1 No-Action Alternative

The No-Action Alternative provides a means to evaluate the environmental impacts that would occur if the proposed CSRM and ER measures were not constructed. The characterization of the No-Action Alternative provides a baseline for comparison of performance and impacts of the Preferred Alternative.

1.4.2 Coastal Barrier Alternative (TSP or Preferred Alternative)

The Coastal Barrier Alternative proposes the construction of two CSRM measures, the Coastal Barrier CSRM System (Coastal Barrier) on the upper Texas coast and the South Padre Island CSRM Measure, and the construction of nine ER measures along the entire Texas coast.

The Coastal Barrier includes levees/floodwalls along Bolivar Peninsula and Galveston Island, improvements to the Galveston seawall, a ring levee around the city of Galveston, floodwalls (inverted T-walls), floodgates (both highway and railroad floodgates), drainage structures, pump stations, and navigable gate structures on the Gulf Intracoastal Waterway (GIWW) near High Island and near the mouths of Offatts Bayou, Dickinson Bayou, and Clear Creek. The biggest feature of the Coastal Barrier is the

crossing at the Houston Entrance Channel between Bolivar Peninsula and Galveston Island. This crossing is approximately 11,000 feet across, and the feature would span that distance with a floating sector gate with a 1,200-foot-wide opening and approximately 39 environmental vertical lift gates along the length of the barrier. The floating sector gate and environmental vertical lift gates are collectively called surge barrier gates.

The South Padre Island CSRM Measure includes a beach and dune feature with a 10-year renourishment interval. The ER measures are made up of a combination of the following features: revetment/breakwater, island restoration, wetland and marsh restoration, oyster reef creation, dune/beach restoration, and out-year marsh nourishment based on relative sea level rise (RSLR) in 2065.

1.4.3 Bay Rim Alternative

The Bay Rim Alternative proposes the construction of two CSRM measures, the Bay Rim CSRM System on the upper Texas coast and the South Padre Island CSRM Measure, and the construction of nine ER measures along the entire Texas coast. The Bay Rim CSRM System consists of a levee/floodwall along the western rim of Galveston Bay, improvements to the Galveston seawall, a ring levee around the city of Galveston, surge barrier gates, and combi-wall at the Houston Ship Channel, and surge barrier gates near the mouths of Offatts Bayou, Dickinson Bayou, Clear Creek, and the Highland Bayou Diversion Channel.

The ER measures and South Padre Island CSRM Measure are the same as described for the Coastal Barrier Alternative.

For the purposes of this BA, the TSP (Coastal Barrier Alternative) was used to assess potential project area impacts, as described above. A comparison of potential threatened and endangered species impact results from the Bay Rim Alternative is provided in the Environmental Supporting Document (Appendix C-1).

1.5 TSP PROJECT COMPONENTS AND ACTIONS

The TSP (Coastal Barrier Alternative) consists of both CSRM and ER measures. Although the Coastal Barrier CSRM measure would reduce storm damage risks, it would also have some effects to Galveston Bay's hydrology. ER measures, however, are inherently positive actions over the larger time scales but may result in localized and temporary impacts. The following information summarizes the project actions associated with the TSP's project components.

- Coastal Barrier CSRM Measure (surge barrier gates and levees) – Structures placed across Bolivar Roads, and structures placed across Dickenson Bayou, Offatts Bayou, and Clear Lake, would create a tidal constriction. Placement of materials and infrastructure would also displace bay bottom habitats. During storm events, the Coastal Barrier CSRM measure may protect certain habitat from the impacts of large-scale disturbances (e.g., it could prevent barrier island sediments from burying East Bay oyster reefs during a hurricane, or colonial bird nesting islands may

experience less storm damages). Information on the potential hydrological impacts of the Coastal Barrier CSRM measure is provided in Section 3.0.

- South Padre Island CSRM Measure – This CSRM measure consists of beach nourishment along the upper coast in the City of South Padre Island with a 10-year renourishment cycle, a dune width of 20 feet, and a beach berm width of 100 feet. This CSRM measure would also yield ecological benefits since it would provide habitat by sustaining dunes and berms on a highly eroding beach.
- Beach and Dune Restoration – Large-scale restoration is proposed for Bolivar Peninsula, Galveston Island, Follets Island, and South Padre Island. Although temporary localized impacts may occur, long-term effects are beneficial as these actions would address RSLR and erosion and sustain beach and dune habitats.
- Marsh Restoration – Large-scale restoration is proposed for marshes adjacent to the GIWW in Galveston Bay and a small portion of East Matagorda Bay. Large-scale marsh restoration would also occur in other areas including the Oyster Lake area in Galveston Bay, Redfish Lake in west Matagorda Bay, and adjacent to Powderhorn Lake in west Matagorda Bay. Although temporary localized impacts may occur, long-term effects are beneficial as these actions would address RSLR and erosion.
- Bird Island Restoration – Several islands are targeted for proposed restoration and are intended to function as bird nesting islands for colonial coastal birds. The islands are in West Bay, East Matagorda Bay, Redfish Bay, and the Lower Laguna Madre. Placement of sediments would impact bay bottom, but the long-term intent is to improve population resiliency of a variety of colonial nesting birds occurring along the Texas coast by providing more nesting sites.
- Breakwaters and Revetments – Marsh restoration and bird island restoration actions would also include breakwaters and revetments. Breakwaters would impact bottom habitat but would be needed to contain marsh restoration sediments or protect marsh or islands from erosion. Revetments would impact less bay bottom and are also intended to protect restoration materials from eroding. Both breakwaters and revetments are also anticipated to function as living shorelines with oyster colonization of the substrates.
- Oyster Reef Restoration – Several restoration actions include the placement of oyster cultch. These areas occur in Galveston Bay, Matagorda Bay, and Redfish Bay. Bay bottom habitat would be affected by the placement, but a variety of long-term benefits are anticipated from oyster establishment and habitat provision.

Sediment Management and Placement – Restoration actions will require a relatively large volume of sediments. Although details associated with the sediment sources have not been finalized at this phase of the study, it is anticipated that several sources would be used including the beneficial use of channel maintenance material, beneficial use of new work material (from future navigation channel expansions), commercially available sources, and offshore sources (e.g., Sabine and Heald banks, paleo river channels, etc.).

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2.0 STATUS OF LISTED SPECIES

Species identified by USFWS IPaC (2018) and NMFS (2018a) sites for this BA are listed in Table 1. The following section presents the natural history of each considered species relevant to its potential occurrence in the counties of the project areas. Section 3.0 presents the potential of the proposed actions to affect these species.

2.1 GULF COAST JAGUARUNDI

Gulf Coast jaguarundi is one of the rarest cats in Texas. This species received Federal protection as an endangered species in 1976 (41 *Federal Register* [*FR*] 24062–24067, USFWS, 1976). They are slightly larger than the domestic housecat and have a dark brown, black, or rusty-colored coat. Adults weigh from 8.4 to 20 pounds. Population of jaguarundis in Texas has been in decline due to habitat destruction of their native thorn brush scrublands through pasture conversion and human development (Campbell, 2003). They are one of the few feline species active during the day and can occur within the same areas as ocelots. Jaguarundi diet consists of birds, small mammals, and reptiles. Threats to the Gulf Coast jaguarundi include habitat destruction and fragmentation, vehicle collision, and increased urbanization along the border area (USFWS, 2013a).

2.1.1 Habitat

Jaguarundis are typically found in the Tamaulipan Biotic Providence in thorny shrublands, grasslands, and woodlands with dense canopy cover. Typical habitat consists of vegetation such as brasil (*Condalia hookeri*), desert yaupon (*Schaefferia cunefolia*), Carolina wolfberry (*Lycium carolinianum*), lantana (*Lantana achyranthifolia*), and honey mesquite (*Prosopis glandulosa*) (USFWS, 2013a). Jaguarundis are also known to use riparian corridor habitats along rivers and creeks (Campbell, 2003).

2.1.2 Range and Distribution

The United States contains a small portion of the Gulf Coast jaguarundi's range. Historically, the jaguarundi ranged from the Lower Rio Grande Valley (LRGV) to eastern Mexico from Coahuila to Veracruz. There have been no historical records of jaguarundis existing north of the Rio Grande Valley. Camera-mounted and live-trapping surveys at Santa Ana, Lower Rio Grande, and Laguna Atascosa National Wildlife Refuges (NWRs) in south Texas from 1982 to 2013 have documented no jaguarundis. The last confirmed Texas jaguarundi sighting was a roadkill specimen in 1986 near Brownsville, Texas. The USFWS has not designated critical habitat for the Gulf Coast jaguarundi within the United States (USFWS, 2013a).

2.1.3 Presence Within the Project Areas

The Gulf Coast jaguarundi has not been sighted in Texas in over 30 years, and suitable habitat is not found within the project area. It is unlikely that jaguarundi occur within the ER and CSRM project areas.

2.2 OCELOT

The ocelot is a small spotted feline found within a wide range of habitat from South America to isolated populations in Arizona and south Texas. The ocelot was Federally listed as endangered by the USFWS in July 1982 (47 *FR* 31670–31672, USFWS, 1982). Ocelots are nocturnal hunters, about twice the size of an average house cat. Threats to the ocelots include habitat loss and fragmentation, loss of genetic diversity, and illegal hunting. Ocelots are nocturnal predators and their diet consists of small mammals, reptiles, birds, and rodents (USFWS, 2016a).

2.2.1 Habitat

Ocelots inhabit a wide range of habitat from thornscrub woodlands, coastal grasslands in Texas, and tropical forests, rainforests, and cloud forests in its range in South America. Much of their range coincides with that of the jaguarundi. Ocelots in Texas require dense vegetation (greater than 75 percent canopy cover) with 95 percent shrub cover. Typical vegetation includes brasil, honey mesquite, granjeno (*Celtis pallida*), and elbowbush (*Forestiera angustifolia*) (USFWS, 2016a).

2.2.2 Range and Distribution

Ocelot range extends from southern Texas and southern Arizona through Central America, Ecuador, and Argentina. There are historical records of ocelots in Florida and California. In Texas, recent live and camera trapping survey found populations of ocelots on the Yturria Ranch and East El Sauz Ranch in Willacy County, the Laguna Atascosa NWR in Cameron County, and in Jim Wells, Kleberg, and Kenedy counties. In the United States, they are primarily found in Cameron County, Texas. There are an estimated 19 individual ocelots within the Laguna Atascosa NWR and 38 total individuals within Cameron County. The USFWS has not designated any critical habitat for the ocelot. Habitat fragmentation and range connectivity is a large concern for populations of ocelots. Many ocelots are victims of vehicle collisions (USFWS, 2016a).

2.2.3 Presence Within the Project Areas

Ocelots are found within the project area counties; however, they are not usually found along open coastal grasslands near Laguna Madre. It is highly unlikely that ocelots occur within the ER and CSRM project areas.

2.3 WEST INDIAN MANATEE

The West Indian manatee was Federally listed as endangered in 1967 (USFWS, 1967), the manatee was reclassified as a threatened in May 2017 (82 *FR* 16668, USFWS, 2017d). Adult manatees are typically 9.8 feet long and can weigh around 2,200 pounds. They have two front flippers and a wide tail. Man-made threats to the manatee include collisions with boats and ships, entrapment in gillnets and floodgates,

poaching, and ingesting marine debris. Natural mortality of manatees is caused by cold stress and outbreaks of red tide caused by algal blooms (USFWS, 2001).

2.3.1 Habitat

West Indian manatee are found in bays, estuaries, lakes, rivers, and shallow coastal waters. They are intolerant of prolonged exposure to waters cooler than 68 degrees Fahrenheit (°F). During the winter, they seek out and congregate in warmer waters at spring-fed rivers and power plant outfalls. They tend to avoid areas with strong currents. Manatees are herbivores and feed on a variety of submerged, floating, and emergent vegetation (USFWS, 2001). Critical habitat is designated in Florida, but none have been designated in Texas (USFWS, 2017b).

2.3.2 Range and Distribution

The United States is believed to have the largest population of manatees. Most of the U.S. population of manatees reside in Florida. During the warm summer months, manatees have been known to migrate towards Rhode Island or the Texas Gulf coast. Historically, manatees have been found in the Laguna Madre area. Outside of the United States, West Indian manatees occur in the Greater Antilles, Trinidad, on the east coast of Mexico and Central America, and along the northern coast of South America (USFWS, 2001).

2.3.3 Presence Within the Project Areas

Manatees have historically been an uncommon visitor along the Texas Gulf coast. Although extremely rare, records of manatees in Texas exist for Cow Bayou, Copano Bay, Bolivar Peninsula, near Sabine Lake, and at the mouth of the Rio Grande (David and Schmidly, 1994). Manatee sightings were observed near Rockport as recently as 2004, West Galveston Bay in 2012, and Trinity Bay in 2014 (Hooper, 2014; Rice, 2012; Texas Parks and Wildlife Department [TPWD], 2004). The USFWS has not designated critical habitat for the West Indian manatee along the Texas coast (USFWS, 2018). The occurrence of West Indian manatees in the project area is possible but not likely.

2.4 ATTWATER'S PRAIRIE-CHICKEN

The Attwater's prairie chicken are a subspecies of the greater prairie chicken (*Tympanuchus cupido*). The Attwater's prairie chicken was Federally listed as endangered in 1967 (32 *FR* 4001, USFWS, 1967). The birds are well known for their unique mating display where the males congregate at breeding grounds called leks in the springtime, inflate their air sacs, and produce a low 'booming' call to attract females. The main threats to the Attwater's prairie chicken are loss of grassland prairie habitat, depredation, invasive fire ants, and poor brood survival (USFWS, 2010a).

2.4.1 Habitat

The Attwater's prairie chicken require unfragmented tallgrass prairie habitat maintained by periodic wildfires. Common plant species associated in suitable habitat include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and switchgrass (*Panicum virgatum*). Optimal habitat contains abundant open spaces and little to no woody cover or artificial structures (USFWS, 2010a). No critical habitat has been designated by the USFWS (2017b).

2.4.2 Range and Distribution

Historical accounts of the Attwater's prairie chicken suggested a population of more than 1 million individuals on approximately 6 million acres of native coastal prairie from south Texas to Louisiana. Historically found in all counties along the Texas-Louisiana Gulf coast, the prairie chickens were extirpated from Louisiana in 1919. The population of the prairie chickens has steadily decreased from 8,000 individuals in 1937 to approximately 90 individuals in 2009. A small population was introduced to the Texas City Prairie Preserve in 2008, but subsequent reintroduction efforts were discontinued. There are presently only two populations of the Attwater's prairie chicken in Texas: the Attwater's Prairie Chicken NWR in Colorado County and at release sites in Goliad, Refugio, and Victoria counties (Williams and Harrell, 2009).

2.4.3 Presence Within the Project Areas

The Attwater's prairie chicken current range exists farther inland and would not be affected by any coastal ER or CSRM measures. They are extremely rare outside of their known and documented areas. It is highly unlikely that the Attwater's prairie chicken occur within the ER and CSRM measures.

2.5 INTERIOR LEAST TERN

The interior least terns are a subspecies of the least tern, which nest more than 50 miles inland from the coast on riverbanks and gravel bars. They are the smallest species of terns in North America. The species are associated with riverine habitat and freshwater prey. The birds were Federally listed as endangered on May 28, 1985 (50 *FR* 21784–21792, USFWS, 1985a). The interior least tern was listed due to declining population and loss of sand and gravel bars for nesting habitat, loss of habitat from riverine erosion, and recreational human disturbances (USFWS, 2013c).

2.5.1 Habitat

Interior least tern typically nest on sand and gravel islands or bars free of vegetation near adequate foraging areas. The availability of these nesting habitats depends on the flow and the sediment load of rivers. The birds are ground nesters, and most nests consist of simple scrapes in the sand. Nesting on islands and sandbars is effective at keeping predators away and within proximity to feeding grounds. Least terns have

also been known to nest on artificial habitats such as gravel pits, dike fields, ash disposal areas, reservoir shorelines, dredge islands, and rooftops (USFWS, 2013c). There are no critical habitat designations by the USFWS (2017b).

2.5.2 Range and Distribution

The interior least tern has historically bred along the Missouri, Arkansas, Mississippi, Ohio, Red, and Rio Grande river systems. Presently, they are documented on river systems from the Great Plains to the Lower Mississippi Valley, along more than 2,858 miles of river length. During the fall, some interior least tern migrants follow the major river basins to their confluences with the Mississippi River and Gulf coast where they are indistinguishable from coastal least terns. After wintering on the coast, the migratory species will fly inland (USFWS, 2013c).

2.5.3 Presence Within the Project Areas

Because some interior least tern populations migrate to the coast in the fall and winter, there would be no distinguishable attribute to differentiate them from year-round coastal populations. Most of the ER measures are planned along the Texas Gulf coast where large populations of coastal and wintering interior least terns are common. Since ER and CSRM measures are located on tidal flats and beaches along the Gulf coast, foraging and roosting habitat may be affected. After construction, least terns could benefit from the ER measures, such as stabilized shorelines, beach nourishment, and restored habitat.

2.6 NORTHERN APLOMADO FALCON

The northern aplomado falcon was Federally listed as endangered in 1986 (51 *FR* 6686, USFWS, 1986a). The northern aplomado falcon subspecies are generally larger with a darker cummerbund than other aplomado falcons (USFWS, 1990). The number of aplomado falcons began to decline through the 1900s. The cause of the northern aplomado falcon decline has been linked to the use of pesticides such as DDT (dichloro-diphenyl-trichloroethane), thinning egg shells, habitat loss, the effects of climate change on prey populations, and the increased presence of great-horned owls (*Bubo virginianus*), which predate on the falcons (USFWS, 2014a).

2.6.1 Habitat

Habitat for the northern aplomado falcon is typically coastal prairie and desert grasslands. In Texas, the falcons can be found in open honey mesquite, oak (*Quercus* sp.), acacia (*Acacia* sp.), and yucca (*Yucca* sp.) woodlands, grassland savannahs, and coastal prairie dunes. The falcons hunt in pairs over grasslands with low cover and an abundance of small mammals and insects. The northern aplomado falcon pairs prefer nesting on stick platforms abandoned by other raptors and corvids. Breeding pairs have also been known to nest on artificial structures such as powerlines, trees, yucca, and on the ground (USFWS, 2014a). No critical habitat has been designated for the northern aplomado falcon (USFWS, 2017b).

2.6.2 Range and Distribution

Historically, the northern aplomado falcon was found from Trans-Pecos and south Texas, southern New Mexico, and southeastern Arizona. In Mexico, the aplomado falcons can be found along the Atlantic region of Mexico from northern Veracruz to the Yucatan Peninsula (USFWS, 2014a). Since their listing, there have been reintroduction efforts of northern aplomado falcon in west Texas, the King Ranch in Kleberg County, Matagorda Island, and Laguna Atascosa NWR (TPWD, 2017). There are established nesting populations in Brownsville and on Matagorda Island in Texas (USFWS, 2014a).

2.6.3 Presence Within the Project Areas

The northern aplomado falcon range occurs within the project area. There are populations of northern aplomado falcon throughout the Gulf coast from South Padre Island to the Texas City Prairie Preserve (eBird, 2018a). Since the falcons are known to nest and hunt along the coastal barrier islands, there is a possibility that the Preferred Alternative may indirectly affect the falcon. The ER and CSRM construction activities are expected to temporarily impact falcon behavior but could provide increased availability of nesting and foraging habitat. It is likely populations of aplomado falcons would occur within the ER and CSRM project areas.

2.7 PIPING PLOVER

Piping plovers are small, white to gray-colored shorebirds with a thin, solid-black neck band. The Atlantic coast/Northern Great Plains population was Federally listed as threatened in 1985 (50 *FR* 50726–50734, USFWS, 1985b). Piping plovers that winter in Texas and Louisiana are from both the Northern Great Plains and Great Lakes populations. Approximately 35 percent of the global population of piping plovers winter along the Texas Gulf coast (USFWS, 2003). Piping plover populations are threatened due to habitat loss and degradation from commercial, residential, and recreational development on the coast, wetland drainage, damming and channelization of rivers, and egg depredation by predators (USFWS, 1996).

2.7.1 Habitat

From September to March, piping plovers are typically found along the Gulf coast shoreline using beaches, sandflats, tidal mudflats, dunes, and dredge islands as loafing and foraging areas (Haig and Elliott-Smith, 2004). Along their summer range in the Great Lakes, populations were found utilizing sparsely vegetated beaches, sandy substrates, unvegetated dunes, and inter-dune wetlands. The Northern Great Plains piping plover populations prefer gravelly substrates, alkali lakes, rivers, and reservoirs (USFWS, 2009). Although all populations winter along the Gulf coast, their summer ranges in the Great Lakes, Northern Great Plains, and Atlantic coast are discrete with no individual interactions between the two populations (USFWS, 2017b). There are seven USFWS-designated critical habitats for piping plover within the project area (Figures 2a–f). TX-3B, TX-3C, TX-3E: South Padre Island, TX-4: Lower Laguna Madre Mainland, TX-36: Bolivar Flats, and TX-37: Rollover Pass that may potentially be impacted. Impacted critical habitats

would be affected by construction noise and placement of fill material from the construction of breakwaters and dune/beach restoration. Although some portions of critical habitat would be directly affected by ER and CSRM construction by placement activities, these impacts would be localized and temporary. These CSRM and ER measures are intended to result in long-term benefits to these areas by reduced beach erosion, shoreline protection, and increased available habitat for foraging and roosting. Other piping plover critical habitats are not expected to be impacted from the ER and CSRM measures.

2.7.2 Range and Distribution

Piping plovers breed on the northern Great Plains (Iowa, Minnesota, Montana, Nebraska, North and South Dakota, Alberta, Manitoba, and Saskatchewan), on the Great Lakes (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and Ontario), and on the Atlantic coast from Newfoundland to Virginia. Wintering grounds are found along the Southern Atlantic and Gulf coast from North Carolina to Mexico (USFWS, 1985b).

2.7.3 Presence Within the Project Areas

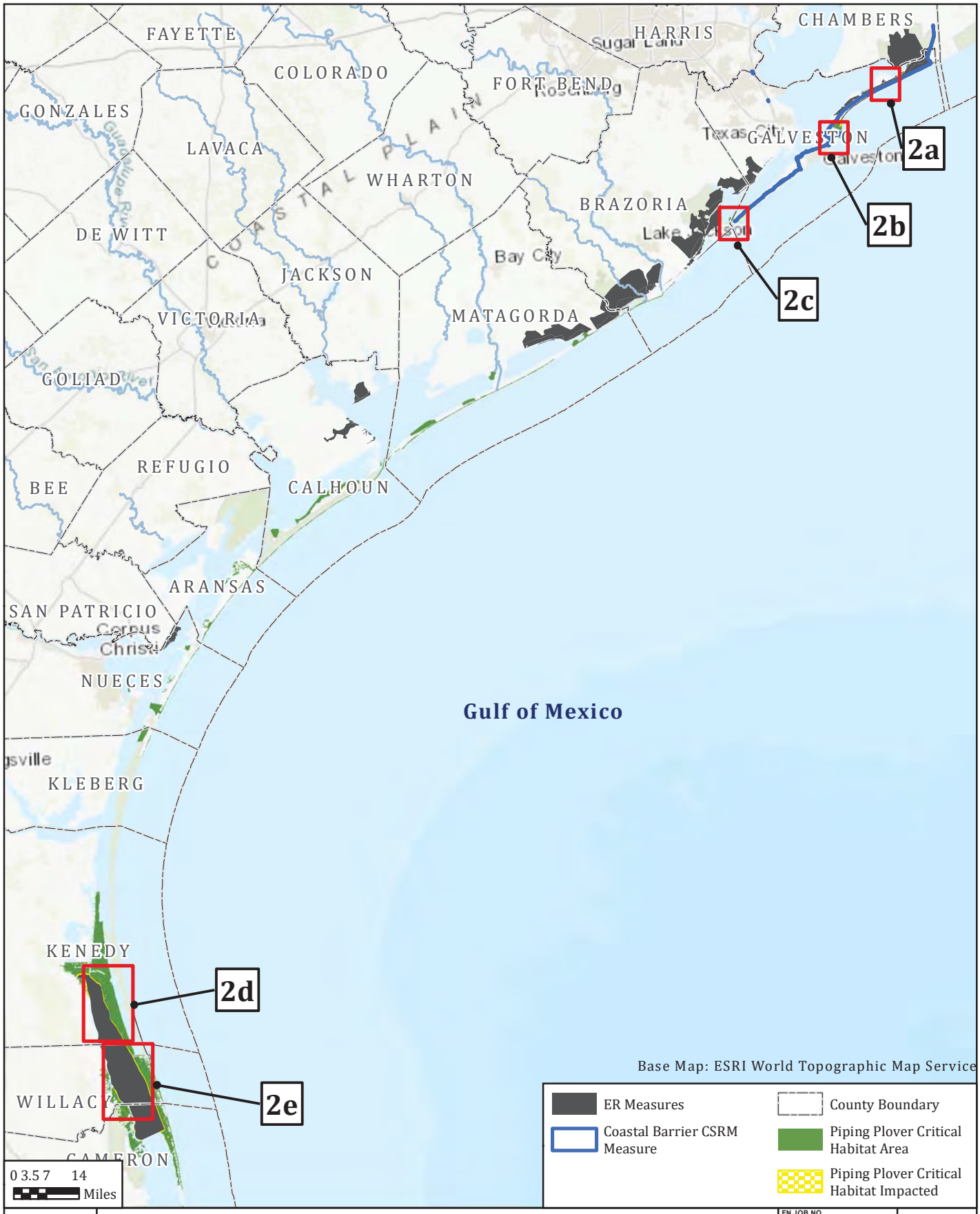
It is likely piping plovers occur within the designated critical habitats and ER and CSRM measures. The ER and CSRM measures would temporarily disturb piping plovers during construction; however, the completed ER projects are expected to increase the quantity and quality of habitat.

2.8 RUFA RED KNOT

Red knots of the *rufa* subspecies (*Calidris canutus rufa*) are medium-sized sandpipers known for their red plumage, bold eye stripe, and long migration route from the Arctic to the southern tip of South America, a migratory route of approximately 18,500 miles. The rufa red knot was Federally listed as a threatened species in 2014 (79 *FR* 73705–73748, USFWS, 2014b). Threats to the rufa red knot include habitat loss in wintering and breeding areas, reduction of food sources such as horseshoe crab eggs, and climate change (USFWS, 2013b).

2.8.1 Habitat

Along the Texas coast, rufa red knots use coastal marine and estuarine habitats such as large exposed intertidal flats on the bay sides of barrier islands, beaches, and oyster reefs (NatureServe Explorer, 2016). Rufa red knots forage for bivalves, gastropods, and crustaceans on beaches, oyster reefs, and exposed bay bottoms (Baker et al., 2013). In the evening, they roost on high sand flats and reefs protected from high winds and tides (NatureServe Explorer, 2016). Their nesting grounds in northern Canada are located in dry, slightly elevated tundra locations. Nests are scraped patches on low vegetation containing lichen, moss, and leaves (USFWS, 2013b). The USFWS does not have any designated critical habitat for the rufa red knot (USFWS, 2018). CSRM and ER measures are expected to temporarily impact red knot habitat along tidal



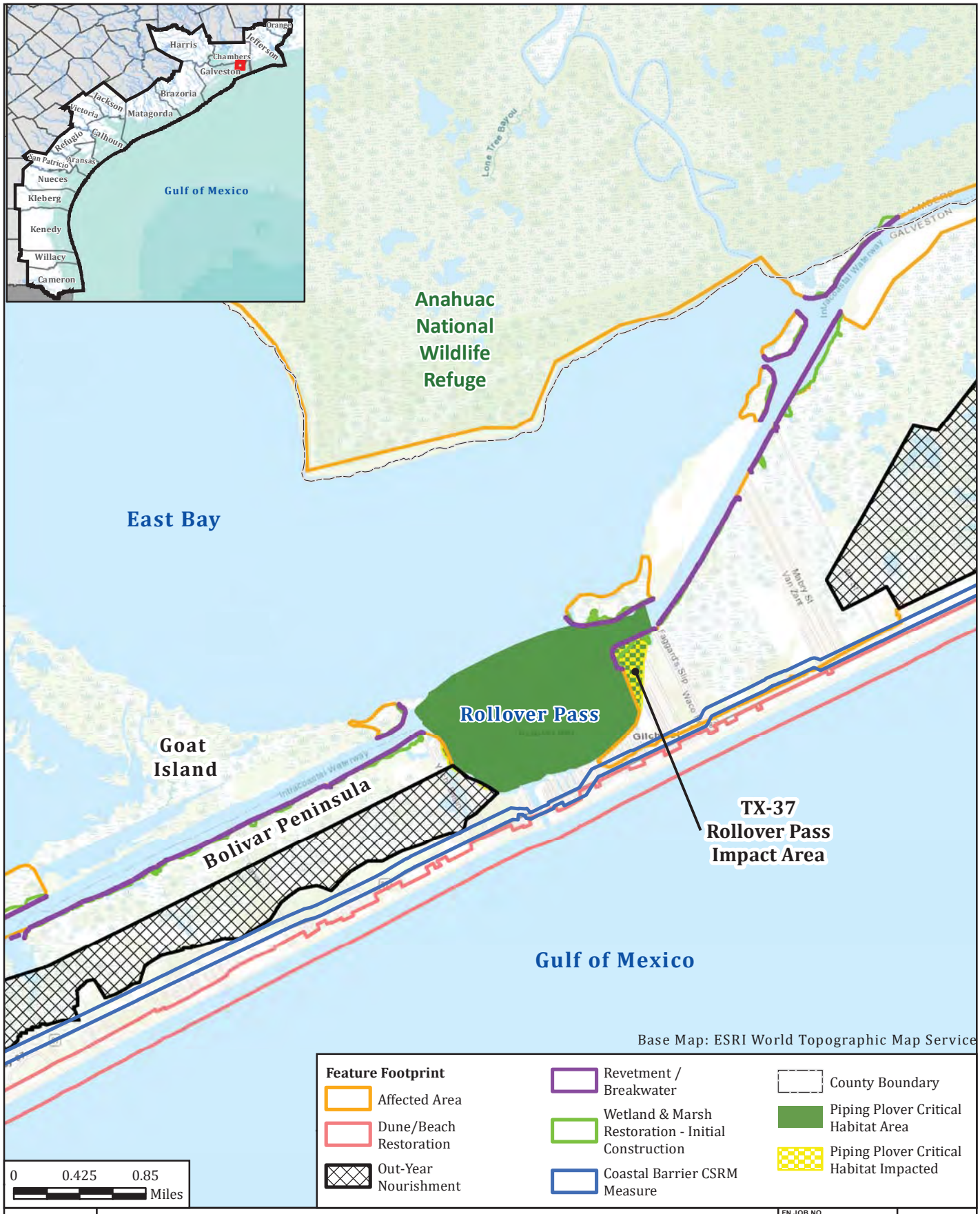
USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2_Overview_Critical_Habitat.mxd
DATE	7/10/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



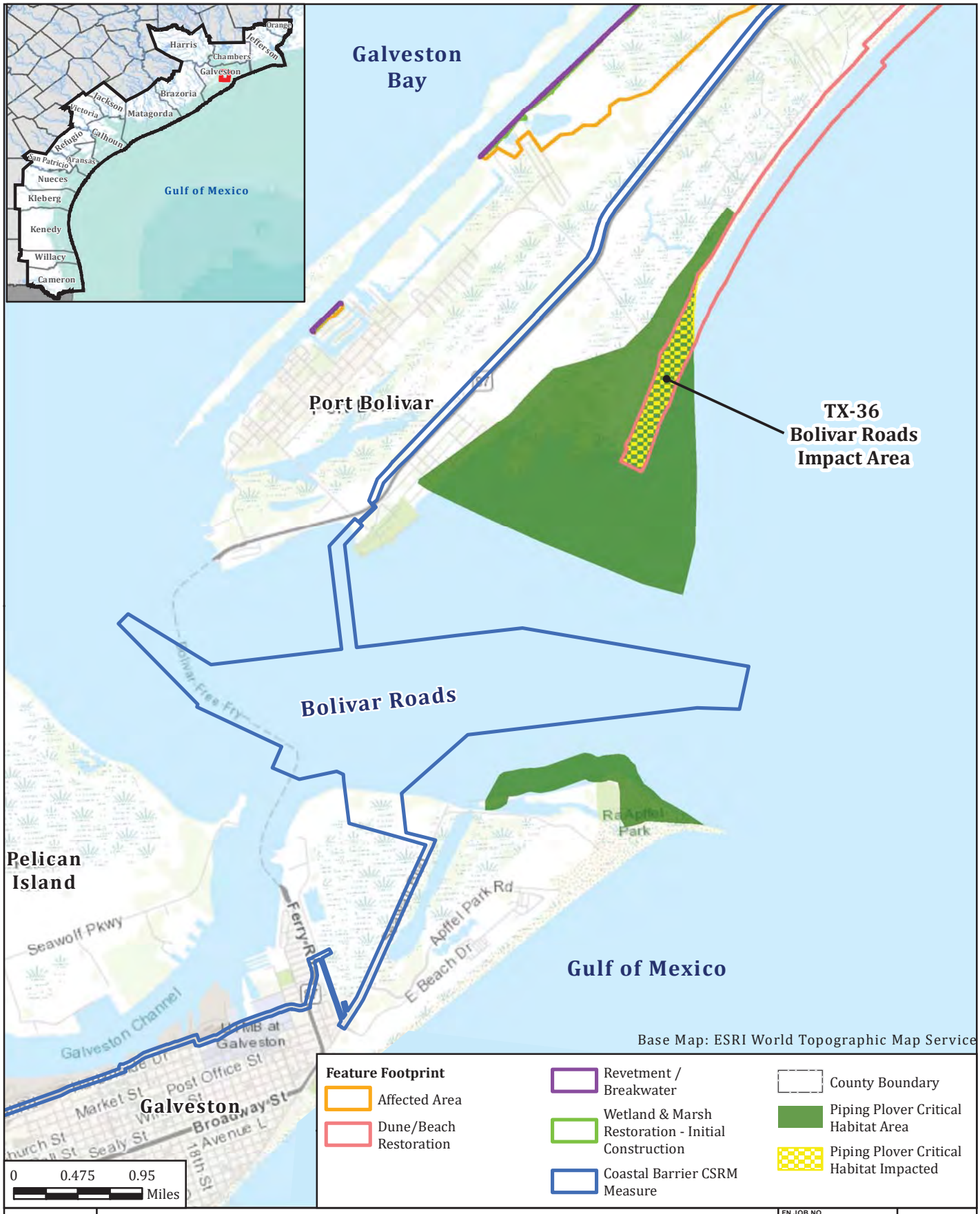
USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2a_Critical_Habitat.mxd
DATE	7/10/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2a
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



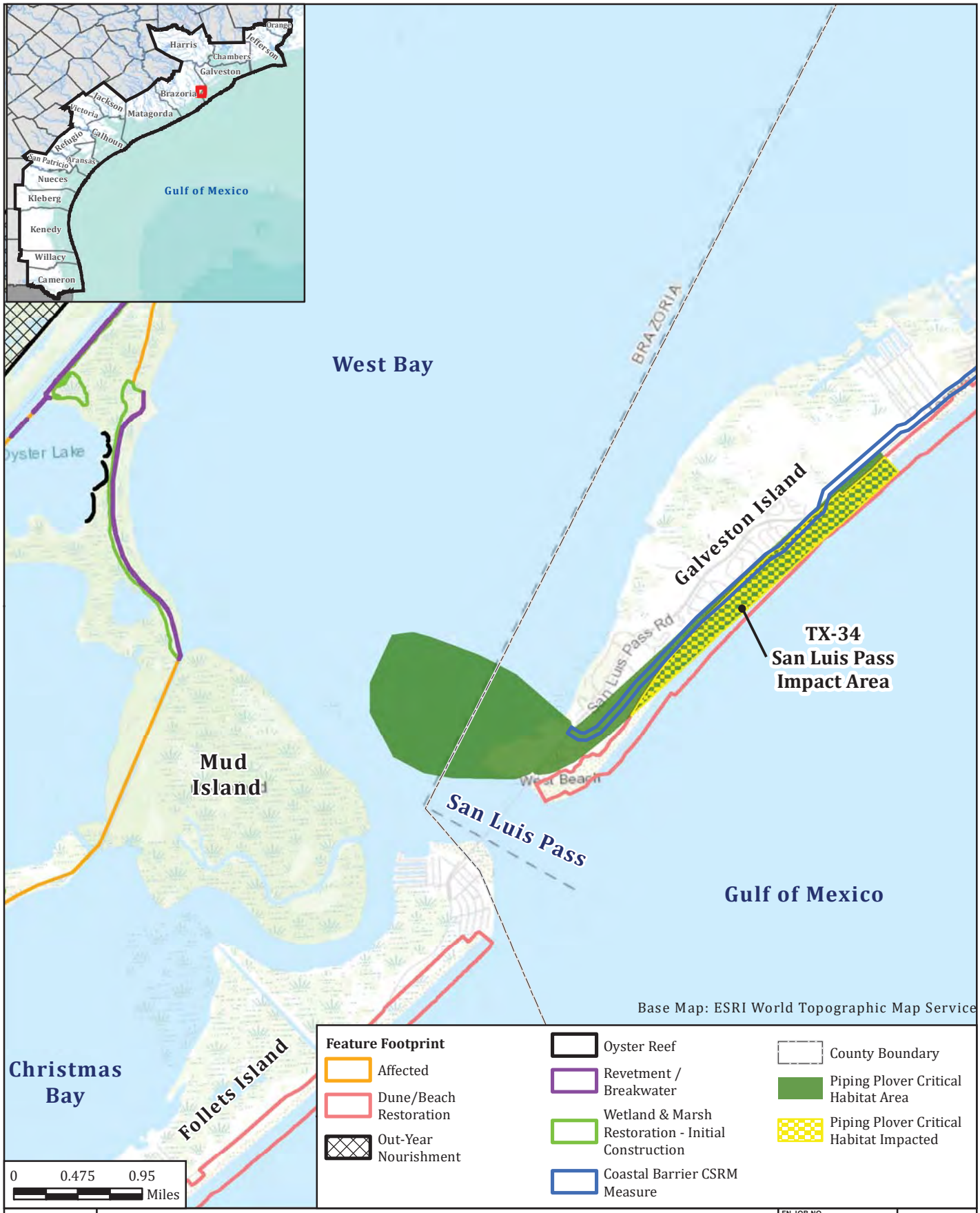
USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2b_Critical_Habitat.mxd
DATE	7/10/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2b
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



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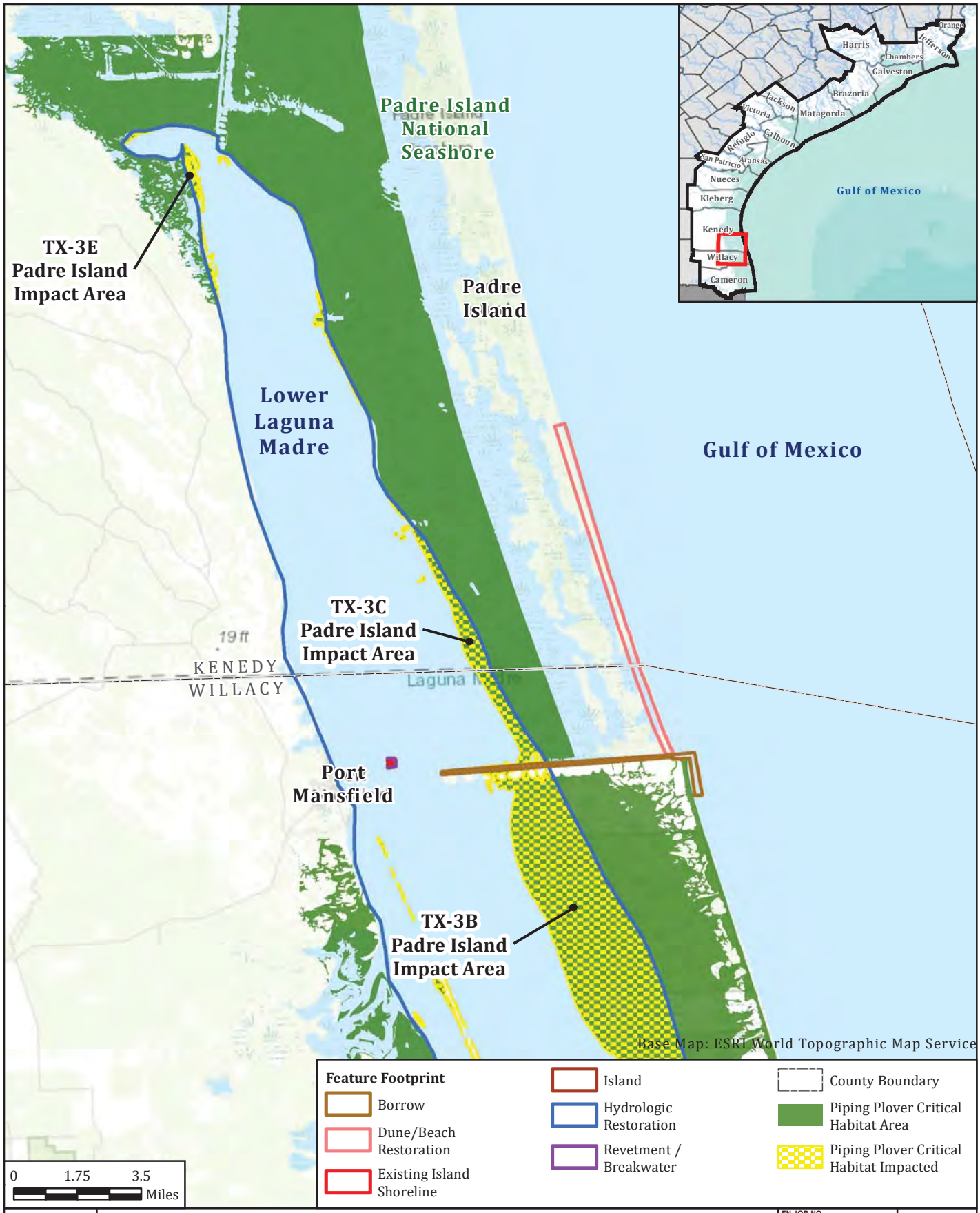
USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2c_Critical_Habitat.mxd
DATE	7/10/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2c
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



N W E S

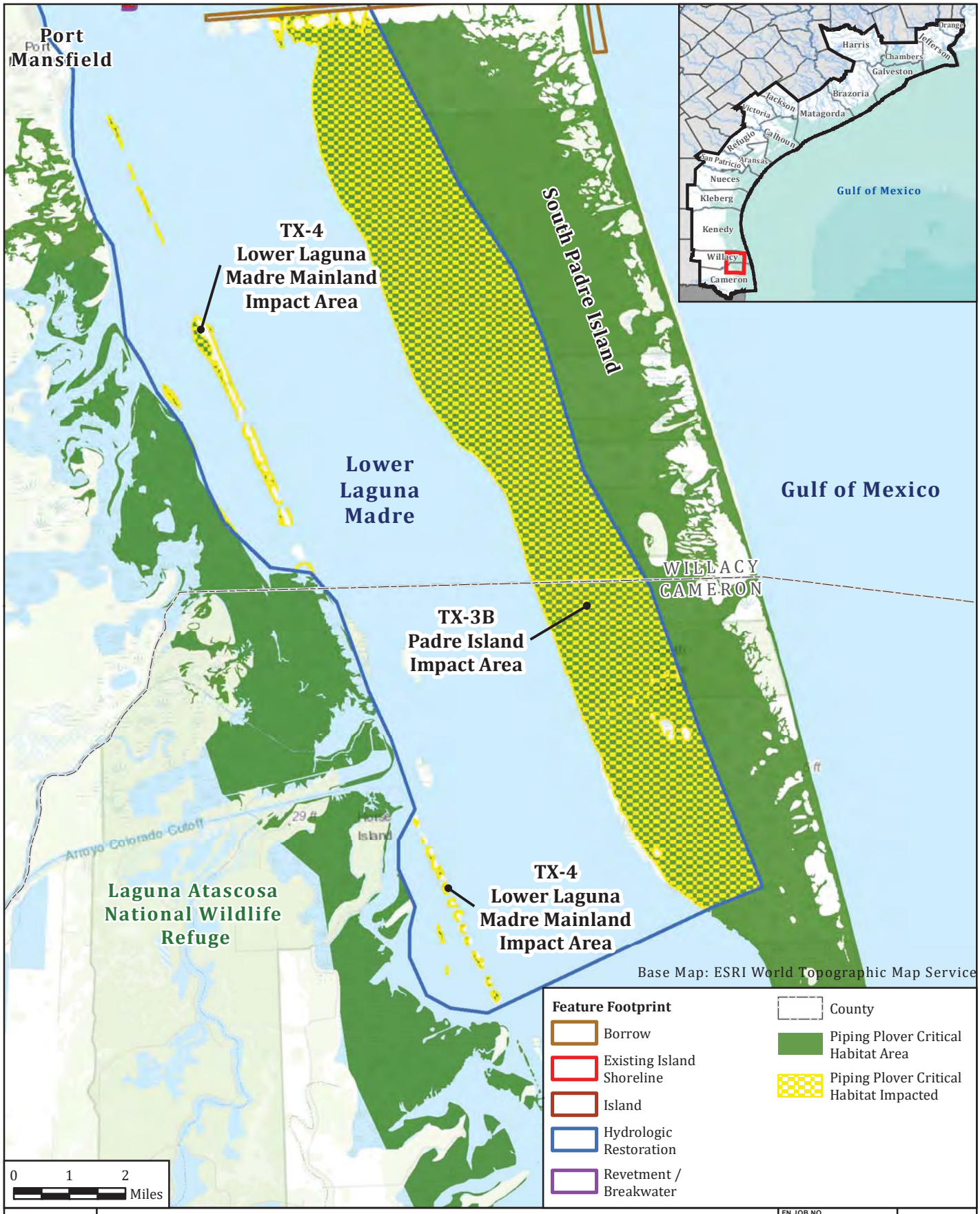
USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2d_Critical_Habitat.mxd
DATE	7/9/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2d
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet



USACE COASTAL TEXAS
PROTECTION AND RESTORATION STUDY

Federally Designated Critical Habitat
Piping Plover

FN JOB NO	TGL18185
FILE NAME	Figure2e_Critical_Habitat.mxd
DATE	7/9/2018
SCALE	
DESIGNED	KLC
DRAFTED	02588

2e
FIGURE

NAD 1983 StatePlane Texas Central FIPS 4203 Feet

mudflats and marshes, beach areas, and exposed oyster reefs. Placement of fill material and construction activity can potentially increase turbidity and disturb individuals. However, impacts are expected to be temporary and localized, and the measures are expected to provide a net benefit providing shoreline protection to vulnerable habitats, restoring degraded marshes and beaches, and increasing the total available habitat for the species.

2.8.2 Range and Distribution

Worldwide, there are six distinct subspecies of red knot, each with various morphological differences and distinct migration routes. The migratory route for the rufa red knot ranges from its breeding grounds in northern Canada to Tierra del Fuego on the tip of South America. Rufa red knots are found in Texas during the wintering period, arriving in late July and staying until December to February (USFWS, 2013b). The wintering population in Texas occurs near Bolivar Flats in Galveston County; their numbers from 1985 to 1996 were about 3,000, but recently have experienced declines from reduced resources and habitat availability (USFWS, 2007). More-current estimates for portions of the wintering region in Texas are about 2,000 individuals (USFWS, 2013b).

Delaware Bay is the largest and most important spring stopover site. It corresponds with the timing of horseshoe crab (*Limulus polyphemus*) spawning, which provides an important meal source before their migration to breeding ground in the Arctic. The population of horseshoe crabs in Delaware is also declining due to harvesting of eggs for bait and adults for biomedical research. With low prey resources and lower body masses, red knots could have difficulty completing their migration to the Arctic for nesting (USFWS, 2013b).

2.8.3 Presence Within the Project Areas

According to eBird (2018b) data, rufa red knots have been observed throughout the entire length of the Texas coast. It is likely populations of rufa red knots occur within the ER and CSRM project areas; therefore, the species would be affected by the Preferred Alternative. Populations of rufa red knots would be temporarily disturbed; however, the ER measures are expected to improve loafing, foraging, and wintering habitats along their range in Texas.

2.9 RED-CROWNED PARROT

The red-crowned parrot was listed as a candidate species on October 6, 2011 (76 *FR* 62016-62034, USFWS, 2011a) by the USFWS. The parrot is medium sized with bright green plumage, yellow-green cheeks, and bright red crown and lores (USFWS, 2011a). Red-crowned parrots are threatened by habitat loss and illegal trapping for the pet trade (American Bird Conservancy [ABC], 2018).

2.9.1 Habitat

Red-crowned parrots are naturally found in tropical lowlands in deciduous, thornscrub, and evergreen forests. They are associated with strangler fig (*Ficus continifolia*), coma (*Bumelia laetevirens*), ebony (*Pithecellobium flexicaule*), and ojite (*Brosimum alicatrum*) (USFWS, 2011a). Red-crowned parrots prefer nesting in colonies in tree cavities and artificial structures such as cell phone towers and roadway signage (ABC, 2018).

2.9.2 Range and Distribution

The red-crowned parrot is endemic to northeastern Mexico and south Texas along the LRGV. There are also several introduced populations found in urban areas in Puerto Rico, and in the United States in California, Texas, and Hawaii (ABC, 2018). There are estimated to be 5,000 individual red-crowned parrots in the world, including about 625 individuals in the LRGV of Texas (ABC, 2018; USFWS, 2011a).

2.9.3 Presence Within the Project Areas

Red-crowned parrots are found within the LRGV in south Texas. They are primarily found in urbanized areas in Brownsville, McAllen, and Harlingen (eBird, 2018c). There has been one sighting of an individual on South Padre Island near the project area, but the parrots are more concentrated in urbanized areas to the south; red-crowned parrots are not likely to occur within any CSRM or ER project areas.

2.10 WHOOPING CRANE

Whooping cranes are the tallest birds in North America and are known for their call, size, and white plumage. They were Federally listed as endangered on March 11, 1967 (32 *FR* 4001, USFWS, 1967). Threats to whooping cranes include habitat loss, powerline collision, illegal hunting, and human disturbances (Canadian Wildlife Service [CWS] and USFWS, 2007). Whooping cranes have responded positively to recovery efforts since their listing. The Aransas-Wood Buffalo population, which migrates between Canada's Wood Buffalo National Park and Aransas NWR, has increased from less than 50 individuals in 1941 to 431 individuals in 2017 (USFWS, 2017c).

2.10.1 Habitat

The wintering habitat in Texas within the Aransas NWR and adjacent areas on the Gulf coast is composed of salt flats, marshes, and grasslands. Typical vegetation of these habitats includes salt grass (*Distichlis spicata*), smooth cordgrass (*Spartina alterniflora*), Gulf cordgrass (*Spartina spartinae*), and sea ox-eye (*Borrichia frutescens*). The refuge also maintains oak savannahs, which contains live oak (*Quercus virginiana*), redbay (*Persea borbonia*), and bluestem (*Andropogon* sp.) as habitat. Whooping crane winter diet consists of Carolina wolfberry, blue crab (*Callinectes sapidus*), and clams (*Tagelus plebeius, Ensis minor, Rangia cuneate, Cyrtopleura costada, Phacoides pectinate, Macoma constricta*) (Allen, 1952;

Chavez-Ramirez, 1996). During the summer and migration period, they feed primarily on frogs, crayfish, insects, berries, and fish (USFWS, 2012). The USFWS designated Aransas NWR and adjacent lands including San Antonio Bay, Mesquite Bay, portions of Matagorda Island, and Espiritu Santo Bay as critical habitat (43 *FR* 20942, USFWS, 1978a).

2.10.2 Range and Distribution

Historically, the whooping crane was once thought to number 10,000 individuals with a historical range extending from central Mexico to the Arctic coast, and from Utah to New Jersey (CWS and USFWS, 2007). More recently, the population rebounded from an all-time low of 15 individuals in 1941 to 442 wild individuals in 2015 (USFWS, 2012, 2017c). There were several migration routes across the United States from the Central Plains to Louisiana, the Hudson Bay in Canada to the Atlantic coast, and a route alongside sandhill cranes (*Antigone canadensis*) through west Texas into Mexico (CWS and USFWS, 2007). Currently there are several populations of whooping cranes in Canada and the United States. There are nonmigratory populations in Louisiana and Florida and two migratory populations that winter in central Florida and Texas. The migratory Texas population breeds and nests in Wood Buffalo National Park in northern Alberta, Canada, during the summer and flies south to the Aransas NWR near Rockport, Texas, where they spend the winter (USFWS, 2012).

2.10.3 Presence Within the Project Areas

There are no planned ER or CSRM measures within the designated critical habitat area. It is unlikely that whooping cranes occur within the ER and CSRM project areas.

2.11 GREEN SEA TURTLE

The green sea turtle was Federally listed as threatened in 1978, except for Florida and the Pacific coast of Mexico (including the Gulf of California), where it is listed as endangered (43 *FR* 32800–32811, USFWS, 1978b). In 2015, the USFWS identified 11 distinct population segments worldwide (80 *FR* 51763–51764, USFWS, 2015a). The proposed distinct population segments rule would continue to list the North Atlantic population (which includes Texas) as threatened. Primary threats to worldwide populations of green sea turtle include harvesting of adult and eggs on nesting and feeding grounds, capture in fishing gear, and incidental take from dredging activities (NMFS, 2016a).

2.11.1 Habitat

Green sea turtles utilize shallow habitats such as lagoons, bays, inlets, coral reefs, shoals, estuaries, and other areas with an abundance of marine algae and seagrasses. Female green sea turtles prefer nesting on high energy beaches with deep sand. NPS biologists located 28 green sea turtle nests on the Padre Island National Seashore in 2017 (NPS, 2018a). Green sea turtles are omnivores and consume seagrass, algae, jellyfish, crustaceans, and mollusks (USFWS, 1991).

2.11.2 Range and Distribution

Green sea turtles are found worldwide in tropical and subtropical waters. The North Atlantic population includes species within the U.S. Virgin Islands, Puerto Rico, and the continental United States from Massachusetts to Texas. Many sea turtles nest on the east coast of Florida, while relatively small numbers nest in Georgia, North Carolina, and Texas (USFWS, 1991). The USFWS has not designated any critical habitat in Texas (USFWS, 2018).

2.11.3 Presence Within the Project Areas

Green sea turtles are found within the project area. The likelihood of encountering a green sea turtle within the ER and CSRM project areas would be rare. However, there is a possibility that sand mining for beach nourishment material, hopper dredging for the gate structure and channel maintenance, and overnight lighting from construction operations could have a temporary negative effect on the species. The turtles may benefit from having improved beach nesting habitat and increased SAV availability.

2.12 HAWKSBILL SEA TURTLE

The hawksbill sea turtle was Federally listed as endangered by the USFWS in 1970 (35 *FR* 8491–8498, USFWS, 1970a). The species is named after its distinctive sharp, curved beak and decorative shell. The primary global threat to the species is loss of coral reef habitat and communities, recreational use of nesting beaches, capture from fishing nets, and vessel strikes. Because of their unique sunburst carapace, individuals are harvested for their shells as well as for leather, oils, and other goods (NMFS, 2014).

2.12.1 Habitat

Hawksbill sea turtles occupy a variety of different habitats at different life stages. Post-hatchling sea turtles are commonly found in pelagic waters among *Sargassum* rafts in convergence zones. Juvenile and adult hawksbills are more commonly found in coastal waters, estuaries, and mangrove bays where the turtles feed primarily on sponges (USFWS, 1993). The USFWS designated critical habitat near Mona Island and Isla Monito in Puerto Rico; no critical habitat has been designated in Texas (USFWS, 2018).

2.12.2 Range and Distribution

Hawksbill sea turtle are circumtropical and found within the Indian, Pacific, and Atlantic oceans. Nesting locations are widely distributed, scattered, low in number, and poorly documented (USFWS, 1998). Along the continental United States, the hawksbill sea turtles can be regularly found in Florida and Texas (USFWS, 1993). Primary nesting areas in the United States are in Puerto Rico, the U.S. Virgin Islands, the southeast coast of Florida, and the Florida Keys. The first and only hawksbill sea turtle nest in Texas was discovered in 1998 on the Padre Island National Seashore (NPS, 2018b).

2.12.3 Presence Within the Project Areas

The likelihood of encountering a hawksbill sea turtle within the ER and CSRM project areas would be rare. Turtles may benefit from having improved beach nesting habitat and increased SAV availability.

2.13 KEMP'S RIDLEY SEA TURTLE

Kemp's ridley sea turtles were Federally listed as endangered in 1970 (35 *FR* 18319–18322, USFWS, 1970b). They are the smallest known species of sea turtle. Adults are usually 2 feet in length and weigh up to 100 pounds. Threats to the Kemp's ridley sea turtle include collection of eggs and adults for meat and other products, habitat loss, incidental take from shrimp trawlers and dredge hoppers, ship collision, and use of explosives to clear debris. Populations of nesting Kemp's ridley sea turtles in Texas have steadily increased due to nest protection and the use of Turtle Excluder Devices on fishing trawlers and dredging ships (USFWS, 2011b).

2.13.1 Habitat

Kemp's ridley sea turtles occupy a variety of habitat at different life stages. Post-hatch sea turtles occupy the oceanic zone, foraging around *Sargassum* rafts, and are passive migrants in the Gulf Loop Current. Juvenile and adult sea turtles are more commonly found in shallow coastal and estuarine waters feeding on crabs, bivalves, jellyfish, and other crustaceans (Campbell, 2003; USFWS, 2011b). The USFWS has not designated any critical habitat in Texas (USFWS, 2018).

2.13.2 Range and Distribution

Kemp's ridley sea turtles are found throughout the Gulf and western Atlantic from New England to eastern Mexico. They gather for nesting in large groups called an "arribada." Kemp's ridley sea turtle nest areas are primarily found on the beaches near Tamaulipas, Veracruz, and Campeche, Mexico (Campbell, 2003). In the United States, nesting in Texas occurs on the Padre Island National Seashore and occasionally in Florida, Alabama, Georgia, South Carolina, and North Carolina (USFWS, 2011b). In 2017, 353 Kemp's ridley sea turtle nests were recorded in Texas (NPS, 2018b).

2.13.3 Presence Within the Project Areas

The likelihood of encountering a Kemp's ridley sea turtle within the ER and CSRM project areas is possible throughout the Texas Gulf coast, including CSRM and ER measure project areas. Turtles may benefit from having improved beach nesting habitat and increased SAV availability.

2.14 LEATHERBACK SEA TURTLE

The leatherback sea turtle was Federally listed as endangered in 1970 (35 *FR* 8491–8498, USFWS, 1970b) by the USFWS and NMFS. They are the largest turtle species in the world, reaching up to 6 feet in length

and 650–1,200 pounds, and the only sea turtle without a bony shell. Major threats to the species include egg collection, fishing bycatch, and nesting habitat loss (NMFS, 2016b).

2.14.1 Habitat

Leatherback sea turtles are pelagic and spend most of their time in open oceans, but forage in coastal waters during nesting season. The turtles feed primarily on jellyfish and tunicates. In the Gulf, they commonly feed on cabbagehead (*Stomolophus* sp.) and moon jellyfish (*Aurelia* sp.). Due to their large body mass and insulating fat layer, leatherback sea turtles can be found in colder waters as far north as Newfoundland and the Pacific northwest and can dive as deep as 4,200 feet (NMFS, 2016b; NPS, 2015a). The USFWS has not designated critical habitat for the leatherback sea turtle in Texas (USFWS, 2018).

2.14.2 Range and Distribution

Leatherbacks have one of the largest migratory distributions of any reptile species. They are found in tropical and temperate waters in the Atlantic, Pacific, and Indian oceans. Leatherback turtles can be found in the Gulf, Puerto Rico, U.S. Virgin Islands, and along the Atlantic coast to Maine. In the United States, leatherbacks nest on Puerto Rico, the U.S. Virgin Islands, and southeast Florida (USFWS, 1992). Leatherback nesting in Texas is extremely rare. Leatherback sea turtle nests were recorded on Padre Island in the 1930s and 1940s. Most recently, a leatherback sea turtle nest was located at Padre Island National Seashore in 2008 (NPS, 2015a). No leatherback sea turtle nests have been located anywhere in Texas since then (NPS, 2018b).

2.14.3 Presence Within the Project Areas

The likelihood of encountering a leatherback sea turtle within the ER and CSRM project areas is rare. After construction, turtles may benefit from having improved beach nesting habitat and increased SAV availability.

2.15 LOGGERHEAD SEA TURTLE

In 2011, the NMFS and USFWS determined that loggerhead sea turtles were composed of nine distinct population segments. The Northwest Atlantic population segment, which includes Texas, was Federally listed as threatened (76 *FR* 58868–58952, USFWS, 2011c). The loggerhead sea turtles are known for their large head and powerful jaw, which they use to break coral and shellfish. Threats to loggerhead sea turtles include bycatch from shrimp trawling, incidental take from dredging activities, nesting habitat loss, direct harvest, and pollution (NMFS, 2008, 2017a).

2.15.1 Habitat

Female loggerhead sea turtles typically nest on high-energy, steeply sloped, coarse-grained subtropical beaches in the summer. Post-hatchlings are typically found associated with *Sargassum* rafts in convergence zones within the Gulf and North Atlantic. Juvenile and adult loggerhead sea turtles occupy the neritic zone where they feed primarily on mollusks and benthic crabs (USFWS, 2011c). In 2013, NMFS and USFWS finalized critical habitat for the loggerhead turtle. The proposed critical habitat is located along coastal areas in North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi (USFWS, 2103d). The USFWS has not designated critical habitat for loggerheads in Texas (USFWS, 2018).

2.15.2 Range and Distribution

Loggerhead turtles are circumglobal and inhabit temperate and tropical waters of the Atlantic, Pacific, and Indian oceans. In the Atlantic, they can be found as far north as Newfoundland and as far south as Argentina (NMFS, 2008; 2017a). A few loggerhead nests are found each year in Texas on Padre Island (NPS, 2015b). Nine loggerhead nests were discovered along the Padre Island National Seashore in 2017 (NPS, 2018a).

2.15.3 Presence Within the Project Areas

The likelihood of encountering a loggerhead sea turtle within the ER and CSRM project areas would be possible. Turtles may benefit from having improved beach nesting habitat and increased SAV availability.

2.16 GOLDEN ORB

Golden orbs were Federally listed as a candidate species in 2011, when a 12-month petition finding from USFWS found five Texas mussel species were warranted for listing. The golden orb was added to the candidate species list after USFWS found the listing was precluded by higher priority actions (76 *FR* 62166–62212, USFWS, 2011d). The golden orb are a small mussel species, usually less than 3.2 inches, with an oval to nearly round, smooth, and unsculptured shell, except for concentric growth rings (Howells, 2002). External shell coloration varies from yellow-orangish-tan, brown, occasionally dark brown, or black, with some specimens showing faint greenish rays. Internal shell color is white to bluish white, iridescent posteriorly, with tissues white to off-white (Howells, 2010).

2.16.1 Habitat

Golden orbs have been observed almost exclusively in flowing waters of moderately sized rivers and some smaller tributaries (Howells, 2014; Ford and Oliver, 2017). It has been found in only one impoundment, Lake Corpus Christi, on the lower Nueces River, on a wind-swept point with wave action that mimics riverine conditions (Howells, 2010). Based on recent observations, subadults and adults appear to occur most often in riffle and run mesohabitats in sand, gravel, and cobble substrates, including gravel-filled

cracks in bedrock (Howells, 2010; Tsakiris and Randklev, 2014). Golden orb do not appear to be tolerant of soft substrates, such as loose mud or silt, or unstable sand or scoured bottoms (Howells, 2002).

2.16.2 Range and Distribution

Golden orbs are endemic only to the Guadalupe-San Antonio and Nueces-Frio river basins of Central Texas (Howells, 2014). Historical and current data indicate the golden orb has declined throughout its range (USFWS, 2011d); however, since the 1990s, surveys have discovered live individuals or recently dead specimens in the following rivers or basins: San Antonio-Guadalupe River drainage, San Marcos River, and the Nueces River drainage (Randklev et al., 2017). Aside from the Guadalupe River, all other known populations occur in small fragmented geographical areas.

2.16.3 Presence Within the Project Areas

The golden orb range is limited to freshwater riverine habitats in the Guadalupe-San Antonio and Nueces-Frio river basins. The ER and CSRM project areas occur only in coastal environments with saline and brackish conditions and do not affect freshwater riverine habitats. It is highly unlikely that golden orb occurs within the ER and CSRM project area.

2.17 SMOOTH PIMPLEBACK

The smooth pimpleback was Federally listed as a candidate species in 2011. The smooth pimpleback was added to the candidate species list after the USFWS found the listing was precluded by higher priority actions (76 *FR* 62166–62212, USFWS, 2011d). The smooth pimpleback are nearly round mussel species with a thick, solid shell up to 2.7 inches in length. External shell coloration varies from yellowish brown and tan to occasionally dark brown or black. Internal nacre color is white with iridescent posterior (Howells, 2014).

2.17.1 Habitat

Habitat for smooth pimpleback includes mixed mud, sand, and fine gravels in moderate to large streams, rivers, and some reservoirs. Unlike other central Texas pimpleback species, the smooth pimpleback are tolerant of impoundments and have been found to inhabit some reservoirs in central Texas. Live mussels have been found in Lake LBJ and Lake Marble Falls, with dead shells found in Inks Lake (Howells, 2010).

2.17.2 Range and Distribution

Smooth pimpleback occurs only in the central and lower reaches of the Colorado and Brazos rivers and their tributaries (USFWS, 2011d). The species seem to be more abundant in the Brazos River and tributaries, and Colorado River population numbers appear low by comparison (Howells, 2010).

2.17.3 Presence Within the Project Areas

The smooth pimpleback range is limited to freshwater riverine habitat in the Colorado and Brazos river basins. The ER and CSRM project areas occur only in coastal environments with saline and brackish conditions and do not affect riverine habitats. It is highly unlikely that smooth pimpleback occurs within the ER and CSRM project area.

2.18 TEXAS FAWNSFOOT

The Texas fawnsfoot was Federally listed as a candidate species in 2011. The Texas fawnsfoot were added to the candidate species list after USFWS found the listing was precluded by higher priority actions (76 *FR* 62166–62212, USFWS, 2011d). The Texas fawnsfoot are a small mussel with an elongate shell that can reach up to 2.4 inches in length. The shell exterior is generally smooth but has coloration that varies from yellowish brown to green with a pattern of broken rays or irregular blotches. Internal nacre color is bluish white or white, and is iridescent posteriorly (Howells, 2010).

2.18.1 Habitat

Until 2008, when a living population of Texas fawnsfoot was found in the lower Brazos River, little was known of the mussel's preferred habitat. Subsequent discoveries of live mussels suggest that Texas fawnsfoot prefer large to moderate riverine environments with soft, sandy sediment and moderate water flow (Randklev et al., 2010). Conversely, the species seem to be intolerant of impoundments, as no individuals have been found in lakes, ponds, or reservoirs within its range (Howells, 2010). Based on recent field surveys, adults appear to occur most often in bank habitats and occasionally in backwater, riffle, and point bar habitats with low to moderate water velocities and fine or coarse sediments (Randklev et al., 2014).

2.18.2 Range and Distribution

Texas fawnsfoot are endemic only to the Colorado and Brazos river basins; however, few have been documented since the species was first described. Almost all individuals found were deposited on gravel bars after flood events (Randklev et al., 2010). Live Texas fawnsfoot were found in the lower Colorado River in 2009, and the only other occurrence within the basin is in the San Saba River, where a population likely persists in low densities (Randklev et al., 2017). In the Brazos system, the Texas fawnsfoot persist in the mainstem Brazos River, Clear Fork Brazos River, Navasota River, Deer Creek, and the Little River (Randklev et al., 2017; USFWS, 2011d).

2.18.3 Presence Within the Project Areas

The Texas fawnsfoot range is limited to freshwater riverine habitats in the Colorado and Brazos river basins. The ER and CSRM projects are in coastal environments with saline and brackish conditions, and do not

affect riverine habitats. It is highly unlikely that Texas fawnsfoot occurs within the ER and CSRM project area.

2.19 TEXAS PIMPLEBACK

The Texas pimpleback was Federally listed as a candidate species in 2011. The Texas pimpleback were added to the candidate species list after USFWS found the listing was precluded by higher priority actions (76 *FR* 62166–62212, USFWS, 2011d). The Texas pimpleback are a large pimpleback species that is between 2.4 to 3.5 inches in length. The shell of the species is thick, and generally smooth, but commonly has concentric rings that can be rough to the touch. External coloration ranges from yellowish tan to dark brown, with mottles or dark green rays on some individuals (76 *FR* 62166–62212, USFWS, 2011d). Internal nacre is white and iridescent posteriorly (Howells, 2014).

2.19.1 Habitat

Texas pimpleback typically occur in moderately sized rivers, usually in mud, sand, gravel, and cobble, and occasionally in gravel-filled bedrock cracks (Howells, 2014). The species has not been found in deep water and as such does not appear to be tolerant of deep, low-velocity waters associated with artificial impoundments (Howells, 2002).

2.19.2 Range and Distribution

Texas pimpleback are endemic to the Colorado and Guadalupe-San Antonio river basins; however, the species have declined rangewide, and only four streams are known to harbor persisting populations (Howells, 2002). The San Saba, Concho, Guadalupe, and San Marcos rivers are known to contain small populations, and recent data from central Texas has led to the discovery of live individuals or recently dead specimens in the Guadalupe and Colorado river drainages, despite previous suggestions that the Texas pimpleback had been extirpated from the remainder of its historical range (Randklev et al., 2017). The Texas pimpleback continue to persist within the Llano and San Saba rivers in the Colorado River drainage and the mainstem of the Guadalupe River, with low abundance in the Llano and San Saba, and moderate abundance in the Guadalupe (Randklev et al., 2017).

2.19.3 Presence Within the Project Areas

The Texas pimpleback range is limited to freshwater riverine habitats in the Colorado and Guadalupe-San Antonio river basins. The ER and CSRM projects are in coastal environments with saline and brackish conditions and do not affect riverine habitats. It is highly unlikely that Texas pimpleback occurs within the ER and CSRM project area.

2.20 SLENDER RUSH-PEA

The slender rush-pea were Federally listed as an endangered in 1985 (50 *FR* 45614–45618, USFWS, 1985c). Slender rush-pea are a small, perennial legume with compound leaves and delicate yellow-orange flowers (TPWD, 2016). Much of its historical range has been converted to croplands, and individuals must compete with non-native grasses such as the Kleberg and King Ranch bluestem. Additional threats to the plant include cattle grazing, fungal infections, and roadway construction (USFWS, 2008).

2.20.1 Habitat

Slender rush-pea are commonly found in patches of native short- and mid-grass prairie adjacent to permanent or intermittent creeks (USFWS, 2008). There is no Federally designated critical habitat for the slender rush-pea (USFWS, 2018).

2.20.2 Range and Distribution

The slender rush-pea are found in Kleberg and Nueces counties in coastal prairie habitat. The largest population can be found at the St. James cemetery in Bishop, Texas. There have been no other populations reported outside of the two counties (USFWS, 2008).

2.20.3 Presence Within the Project Areas

The slender rush-pea are found in a few well-documented locations within Kleberg and Nueces counties, farther inland from any of the ER or CSRM measures along the Texas Gulf coast. No potential habitat for the plant is anticipated to occur within CSRM and ER measure project areas.

2.21 SOUTH TEXAS AMBROSIA

The South Texas ambrosia was Federally listed as an endangered in 1994 (59 *FR* 43648–43652, USFWS, 1994). The South Texas ambrosia are a perennial herbaceous plant with gray-green leaves and yellow inflorescence flowers. The primary threat to the south Texas ambrosia is habitat loss, agricultural conversion of prairie, competition with non-native grasses, and urban development (USFWS, 2010b)

2.21.1 Habitat

The South Texas ambrosia are commonly found in lower elevations in well-drained, heavy soils in association with subtropical woodlands with coastal prairies and savannahs (USFWS, 2010b). Extant populations are found in sites with native grasses such as Texas grama (*Bouteloua rigidiseta*) and buffalograss (*Buchloe dactyloides*) and maintained with regular mowing and minimal tilling. There is no Federally designated critical habitat for the South Texas ambrosia (USFWS, 2018).

2.21.2 Range and Distribution

Historically, populations of the South Texas ambrosia have been found within Cameron, Jim Wells, Kleberg, and Nueces counties in South Texas, and the state of Tamaulipas in Mexico. More recently, there are six documented sites with the species in fragmented habitats within Kleberg and Nueces counties (USFWS, 2010b).

2.21.3 Presence Within the Project Areas

The South Texas ambrosia are presently located inland in Nueces and Kleberg counties, away from the coast. Outside of their known sites, the presence of other populations is unknown due to private property restrictions and lack of historical documentation. No potential habitat for the plant is anticipated to occur within CSRM and ER measure project areas.

2.22 TEXAS AYENIA

The Texas ayenia (*Ayenia limitaris*) or the "Tamaulipan kidneypetal" was Federally listed as endangered in 1994 (59 *FR* 43648–43652, USFWS, 1994). It is a spineless shrub of the subtropical thorn forests of south Texas and northern Mexico. The plant has alternate, heart-shaped leaves with fine hairs and toothed margins. Flower inflorescence arise from the leaf axil and contain 0.2-inch yellow-cream flowers. Flowers and seed capsules are observed from March to November following significant rainfall. The species is threatened by competition with non-native plant species, such as Guinea grass (*Megathyrsus maximus*), conversion of grassland savannas to dense shrublands, herbicide usage, and mineral resource development (USFWS, 2016b).

2.22.1 Habitat

The Texas ayenia may be found in open ground, within thickets, and partial shade on dry alluvial clay soils. They are commonly associated with Texas ebony (*Ebonopsis ebano*), tenaza (*Havardia pallens*), colima (*Zanthoxylum fagara*), brasil, crucillo (*Randia rhagocarpa*), and granjeno. It is possible that kidneypetal are adapted to fire-influenced savannahs (USFWS, 2016b). No critical habitat has been designated by the USFWS (2018).

2.22.2 Range and Distribution

Historically, the ayenia were found in Hidalgo and Cameron counties, Texas, to Múzquiz, Coahuila, and Durango, Mexico. Currently there are extant populations located at the Estero Llano Grande State Park, LRGV NWR, C.B. Wood Municipal Park, and on private properties near Rio Hondo. Extant populations in Mexico are located among various sites in Tamaulipas, Mexico. These populations are small (less than 100 individuals) and highly fragmented (USFWS, 2016b).

2.22.3 Presence Within the Project Areas

No potential habitat for the plant is anticipated to occur within CSRM and ER measure project areas.

2.23 TEXAS PRAIRIE DAWN-FLOWER

The Texas prairie dawn-flower were Federally designated as an endangered species in 1986 (51 *FR* 8681–8683, USFWS, 1986b). It was first discovered in 1889 and was considered extinct until it was rediscovered in 1981. The dawn-flower are a small, annual plant with yellow flower head, which blooms in early spring. The plant can grow up to 6 inches, and its leaves are spoon-shaped, alternate, and narrow. Threats to the population of Texas prairie dawn-flower include loss of native pimple mound structures, climate change, and competition with non-native grasses (USFWS, 1989, 2015b).

2.23.1 Habitat

Texas prairie dawn-flower are commonly found in fine sandy loam soils at the base of pimple mounds. They are often associated with shortspike windmillgrass (*Chloris subdolichostachys*), sicklegrass (*Parapholis incurva*), Gulf cordgrass (*Spartina spartinae*), bitterweed (*Helenium amarum*), and bearded flatsedge (*Cyperus aristatus*) (USFWS, 2015b). There is no Federally designated critical habitat for the Texas prairie dawn-flower.

2.23.2 Range and Distribution

According to the Texas Natural Diversity Database, there are 63 known occurrences of Texas prairie dawn-flower among 5 counties (Fort Bend, Gregg, Harris, Trinity, and Waller). Many historic sites were lost due to highway, residential, and commercial development. Once abundant sites, such as USACE Addicks and Barker Reservoir, have not been recently surveyed, but recent habitat quality is believed to have declined (USFWS, 2015b).

2.23.3 Presence within the Project Areas

Populations of the Texas prairie dawn-flower have been observed within Harris County; however, sites in Harris County are located away from Galveston Bay and potential ER and CSRM project areas. There is the potential of unknown sites located in areas with pimple mounds near Texas City or Brazoria NWR.

3.0 DIRECT, INDIRECT, AND CUMULATIVE EFFECTS FROM THE PROPOSED PROJECT

This section details the direct, indirect, and cumulative effects of the Preferred Alternative. Proposed project activity includes bulldozing and earth moving, dredging and fill placement, breakwater and revetment construction, construction of surge barrier gates, and maintenance. The effects of the Preferred Alternative on listed species and their habitat include noise, water quality, and habitat modification. Noise, turbidity, and water quality impacts would be short term and limited to the duration of dredging and construction activities. Conservation measures would be applied to minimize these effects.

3.1 NOISE

Sound waves can be used by fish, sea turtles, and marine mammals to interpret their surrounding environments, detect predators and prey, orient themselves during migration, attract mates, aggregate, engage in territorial behavior, and for acoustic communication (Peng et al., 2015). Excessive underwater noise could lead to communication impairment, disturbance, and potentially to predation, disease, starvation, and death. Behavioral changes could cause marine species to alter their movements and foraging patterns. Underwater noise may be reduced with the use of bubble curtains, “soft starts,” and the use of trained marine mammal observers (European Commission, 2013; Reyff, 2009).

On land, noise from construction activity can potentially disturb and affect Federally listed birds and mammals. Anthropogenic noise can cause auditory masking and changes in individual and social behaviors. Noise impact is expected to be temporary. Disturbed wildlife would be able to move to adjacent habitats and recolonize the project area once construction is completed. Noise impacts from the TSP are still being evaluated and information concerning noise impacts would be updated in a later phase.

3.2 ENTRAINMENT IN DREDGING EQUIPMENT

Hopper dredges, suction dragheads, and relocation trawlers are potential sources of mortality and injury to sea turtles and manatees. To reduce the potential for incidental take, the USACE would adhere to the proposed avoidance and minimalization measures provided by NMFS (2007). The avoidance, minimalization, and conservation measures that would be implemented include onboard observers, screening, sea turtle deflecting dragheads and pumps, dredge take reporting, Sea Turtle Stranding and Salvage Network (STSSN) notification, and relocation trawling (more detail in Section 4.9 below) (NMFS, 2007).

3.3 TURBIDITY AND RESUSPENDED SEDIMENTS

Dredging and construction activity on the water can affect water quality by increasing turbidity within the water column. Generally, the amount of suspended sediments would be highest next to dredging and

placement areas. The amount and extent of resuspension of sediments are a result of sediment properties, site conditions, obstructions, and operational considerations of the dredging equipment and operator.

Increased turbidity can affect fish, sea turtles, manatees, oysters and other filter feeders by interfering with foraging activities, gill tissue or respiratory damage, physical stress, and behavioral changes (Wilber and Clarke, 2001) (see Aquatic Communities Section 5.4.2 of Appendix C-1). Photosynthesis in seagrasses and SAVs may also be inhibited by turbidity and sediment deposition on leaves and chlorophyll (Newell and Koch, 2004). The level of impact would be limited to the amount of time the individual is exposed and the concentration of suspended sediments. Fish, sea turtles, and manatees are mobile and can relocate to adjacent undisturbed areas. Increases in turbidity would be temporary and would not extend far beyond the area of disturbance. Sediments on SAVs can be flushed with tides and waves. Appropriate Best Management Practices (e.g., silt curtains) could be used if turbidity levels are in excess. In the long term, the establishment of additional oyster reefs, breakwater structures, and expanded marsh habitat can potentially reduce the amount of turbidity within the water column (Newell and Koch, 2004).

3.4 DISSOLVED OXYGEN, SALINITY, AND WATER TEMPERATURE

Water quality in Galveston Bay and along the Texas Gulf coast is highly variable depending on the season, weather, and water depth. Construction activities associated with CSRM and ER measures are expected to cause temporary changes to the water quality. Completion of the Coastal Barrier CSRM System (Coastal Barrier Alternative) surge barrier gates could have an impact on the salinity and dissolved oxygen of Galveston Bay; temperature is not expected to be altered by the Preferred Alternative. Other ER measures are not expected to substantially impact water quality.

Hydraulic modeling indicates the Coastal Barrier, along with barriers at Clear Lake, Dickinson Bay, and Offatts Bayou, would increase retention time upstream of each barrier. Salinity upstream of the barriers at Clear Lake, Dickinson Bay, and Offatts Bayou may be lower on average than in the past because of this increased retention time. Increased retention may increase sediment deposition and development of low dissolved oxygen conditions upstream of the barriers. Hydrodynamic modeling from the USACE predicts a slight decrease of average salinity of about 2 parts per thousand (McAlpin et al., 2018). Most organisms occupying the coast can tolerate a wide range of salinities (Pattillo et al., 1997). Therefore, most species can tolerate the change in salinity from the construction of the coastal barrier.

Reduced mixing and water exchange combined with pollution and episodic storms are considered major contributors to low dissolved oxygen levels in estuaries (Howarth et al., 2011; Paerl, 2006). These conditions have occurred in Dickinson Bay and Dickinson Bayou in Galveston Bay (Quigg et al., 2009). Most fish die-offs in the Galveston Bay system have been attributed to low oxygen (Lowe et al., 1991; Thronson and Quigg, 2008). Completion of the Coastal Barrier CSRM System (Coastal Barrier Alternative) surge barrier gates may affect the magnitude and extent of mixing and exchange based on modeling,

particularly under specific scenarios. If low oxygen conditions or harmful algal blooms develop upstream of the barrier, they would be expected to impact some portion of the bay downstream as they move through the barrier. Water and sediment quality impacts may be minimal and possibly improve relative to recent conditions.

3.5 CUMULATIVE EFFECTS

Cumulative effects are the effect of future State, tribal, local, private activities, and Federal activities that are reasonably certain to occur within the project area of the Federal action subject to consultation (50 Code of Federal Regulations §402.02). The purpose of this cumulative effects summary is to aid the USFWS and NMFS in making a jeopardy/no jeopardy determination for a species, preparing Biological Opinions, and tracking the environmental conditions throughout the area. A comprehensive cumulative impact assessment is presented in Section 5.10 of the Environmental Supporting Documentation (Appendix C-1).

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4.0 EFFECTS ANALYSIS AND AVOIDANCE, MINIMIZATION, AND CONSERVATION MEASURES

In this document, the USACE presents their determination about each species potentially occurring within the ER and CSRM project area, using the language recommended by the USFWS:

- *No effect* – The proposed action will not affect a Federally listed species or critical habitat;
- *May affect, but 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; or
- *Likely to adversely affect* – effects to the listed species and/or critical habitat may occur as a direct result of the proposed action or its interrelated or interdependent actions, and the effects are not discountable, insignificant, or completely beneficial. Under this determination, an additional determination is made whether the action is likely to jeopardize the continued survival and eventual recovery of the species.

Following the effect determinations for the project on Federally listed species, the USFWS and NMFS will review the information and complete the Section 7 consultation process under the ESA.

4.1 GULF COAST JAGUARUNDI AND OCELOT

The Gulf Coast jaguarundi and ocelot are rare cats found in thornscrub forest of south Texas. The ER and CSRM measures are located along the coast away from their typical habitat. There is no Federally designated critical habitat for these cat species. Ocelots and jaguarundis are not found on South Padre Island. It would be rare to find ocelots or jaguarundis along the coastal barrier island or bays. Jaguarundis and ocelots are not expected to be impacted by the completed ER and CSRM features.

Effect Determination

The project will have no effect on the Gulf Coast jaguarundi. The project will have no effect on the ocelot.

4.2 WEST INDIAN MANATEE

West Indian manatees are rare migrants to the Texas Gulf coast. Single, isolated observations have been made in recent years along the upper and mid coast, but populations of the species remain rare in Texas. Manatees could be impacted by collision with ships, incidental take from the operation of dredge hoppers, decreased water quality, and habitat modification. Conservation measures to protect any manatees within the construction area would include the use of NMFS-approved observers on hopper dredges, reporting protocols to NMFS, and dredging operational changes (additional information can be found in the sea turtle effects Section 4.9 below).

After the completion of the Coastal Barrier CSRM System (Coastal Barrier Alternative), it is expected that the presence and operation of the surge barrier gates would negatively impact manatees. The gate system may alter movements of manatees between the bay and the Gulf. However, incidental take, if it does occur, would not jeopardize the continued existence or recovery of the species.

Effect Determination

The project may affect, but not likely to adversely affect West Indian manatees.

4.3 PIPING PLOVER

Dredging activity off- or nearshore would not directly impact piping plover. The greatest potential for impacts to piping plovers would be associated with placement of fill material for beach nourishment, dune restoration, or construction of levee and breakwater structure near potential habitat; however, these effects would be temporary and localized and long-term effects of ER measures are expected to be beneficial by creating and protecting potential habitat. Dredge material placement and construction on the beach could disturb and impact piping plover foraging, roosting, and loafing areas where they overwinter on the Texas coast. Wintering piping plovers have been observed using uplands for resting between placement areas. A preconstruction survey should be conducted to determine presence or absence of piping plovers. Noise from construction operations, placement of sediments on habitat, and earth moving would temporarily disturb individuals and bury some designated critical habitat. Birds would likely become acclimated to the noise level or relocate to undisturbed, adjacent habitat. According to eBird data (2018d), piping plovers have been observed throughout the Texas Gulf coast. This includes Federally designated critical habitat units TX-3 (B, C, E): Padre Island, TX-34: San Luis Pass, TX-36: Bolivar Flats, and TX-37: Rollover Pass where ER and CSRM measures are located.

Conservation measures include survey for presence or absence prior to construction, construction outside of piping plover wintering season, and avoidance.

Disturbance of piping plovers along the project area would not jeopardize the continued existence or the potential recovery of the species. After construction is completed, ER measures would result in a positive effect on piping plovers by increasing the extent of suitable habitat within designated critical habitat, shoreline protection of vulnerable tidal wetlands, and restoration of degraded beach/dune areas.

Effect Determination

The proposed project may affect, but not likely to adversely affect piping plover and their critical habitat.

4.4 RUFA RED KNOT

Red knots would not be directly impacted by open-water dredging. Red knots typically utilize large areas of wide exposed intertidal flats, beaches, and oyster reefs similarly used by piping plovers. Rufa red knots are anticipated to be directly impacted by disturbances from construction activity and noise, placement of sediment materials over existing habitat, and buried foraging resources. These effects are expected to be temporary and localized. There is no Federally designated critical habitat associated with rufa red knots in Texas. A survey should be performed prior to construction to determine the presence or absence of red knots near the project area.

The disturbance of rufa red knots along the project area would not jeopardize the continued existence or the potential of recovery for the species. After the completion of the ER measures, red knots are expected to benefit from the increased habitat and stabilized shoreline from beach nourishment, breakwaters, dune restoration, and additional foraging habitat from oyster reef creation.

Effect Determination

The proposed project may affect, but not likely to adversely affect red knot.

4.5 WHOOPING CRANE

There are no ER or CSRM measures located near Aransas NWR or on whooping crane critical habitat in Brazoria. Whooping cranes may occur in brackish bays, marshes, and salt flats along the mid Texas coast. A survey should be performed prior to construction activity to determine the presence or absence of whooping cranes within the project area. During construction of the ER measures, noise and habitat modification, such as earth moving from the construction of levees, may indirectly impact wintering whooping cranes. Changes in water quality from dredging and fill placement may also affect the foraging ability of whooping cranes in marshes and bays. Impacts from the measure are expected to be temporary.

After construction of the ER measure is completed, whooping cranes are expected to benefit from restored marshes and stabilized shorelines for additional or improved foraging and wintering habitat.

Effect Determination

The proposed project may affect, but not likely to adversely affect whooping cranes.

4.6 NORTHERN APLOMADO FALCON

There is no designated critical habitat for aplomado falcons along the Texas coastline. According to eBird data (2018a), aplomado falcons have been observed throughout the coast of Texas from Boca Chica State Park to Texas City Prairie Preserve. The construction of ER and CSRM measures along the Texas coastline

may indirectly impact aplomado falcons through construction noise and habitat modification. These effects are expected to be temporary, and conditions are expected to normalize after construction is complete. Post construction, falcons are expected to benefit from the stabilized shoreline and restored dunes for additional or improved habitat.

Effects Determination

The proposed project may affect, but not likely to adversely affect northern aplomado falcons.

4.7 ATTWATER'S PRAIRIE CHICKEN AND RED-CROWNED PARROT

There is no designated critical habitat for the Attwater's prairie chicken. The prairie chicken is found in coastal prairies. Currently they are only found within the Attwater Prairie Chicken NWR. The construction of ER and CSRM projects is not expected to impact Attwater's prairie chicken.

Effects Determination

The proposed project will have no effect on Attwater's prairie chicken or its habitat.

4.8 RED-CROWNED PARROT

There is no designated critical habitat for the red-crowned parrot. Red-crowned parrot populations have been found in urbanized locations in the LRGV in South Texas. The construction of ER and CSRM projects is not expected to impact red-crowned parrot habitat.

Effects Determination

The proposed project will have no effect on red-crowned parrot or its habitat.

4.9 SEA TURTLES

The responsibility for agency coordination on marine reptiles is divided between two Federal agencies: the NMFS for sea turtles in the water and the USFWS for nesting sea turtles. Juvenile and adult sea turtles may be present in the water within the CSRM and the ER measures project site during certain times of the year. There are five sea turtle species with the potential to be found in Texas Gulf waters: hawksbill sea turtle, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. Sea turtle nesting season in Texas extends from April to September (Palmer, 2017).

Dredging activities could result in impacts to the sea turtles, if they are present in the project area. These impacts are expected to be local and temporary. A hopper dredge will be utilized to dredge the bypass

channel for the Houston Ship Channel for construction of the Coastal Barrier CSRM System. Sand mining from offshore sources will use a hopper dredge to collect fill material for the construction of beach nourishment, dune restoration, and island restoration. Sea turtles can easily avoid pipeline dredges because of the slow movement of the dredge. Dredging for construction of the CSRM and ER features is expected to take up to 10 years. Between 1995 and 2017, the USACE Galveston District has recorded 113 incidental takes of sea turtles along the Texas Gulf coast including 51 green, 42 loggerhead, and 20 Kemp's ridley sea turtles (Operations and Dredging Endangered Species System, 2018). Other types of impacts to sea turtle from dredging activity include noise, increased water turbidity, and decreased dissolved oxygen around the sand-mining area and placement area. The increased work boat traffic that will occur from construction activity could potentially increase the likelihood of vessel collision, contaminant spills, debris and trash, which could potentially impact sea turtles. The potential for incidental take of sea turtles by hopper dredges would be minimized using draghead deflectors, sea turtle observers, screening, relocation trawling, and other conservation measures. The likelihood of adverse effects during construction will be greatly reduced through the implementation of avoidance, minimalization, and conservation measures. A summary of avoidance, minimization, and conservation measures to reduce incidental take of sea turtles during hopper dredging operations that will be implemented follows:

- *Observers*. The USACE would arrange for NMFS-approved protected species observer to be aboard hopper dredges to monitor the hopper bins, screening, and dragheads for sea turtles. Observer coverage should be sufficient for 100 percent monitoring (i.e., two observers) if hopper dredging is implemented between April 1 and November 30, and whenever water temperature is 51°F or greater. Observer coverage of hopper dredging of sand-mining area should be 50 percent.
- *Screening*. One hundred percent 4-x-4-inch inflow screening of dredged material is required. If conditions prevent 100 percent inflow, the USACE, observers, and draghead operators must consult with the USACE and notify NMFS before reducing or eliminating inflow screening and provide details regarding overflow screening. If necessary, screening may be modified to 6 x 6, 9 x 9, then 12 x 12 inch.
- S*ea Turtle Deflecting Draghead and Dredging Pumps*. A state-of-the-art rigid deflector draghead must be used on all hopper dredges in all Gulf channels and sand-mining sites at all times of the year. Dredging pumps should be disengaged by the dredge operator when the dragheads are not firmly on the bottom to prevent impingement or entrainment of sea turtles within the water column (especially important during clean-up phase when the draghead frequently comes off the bottom and can suck up turtles resting in the shallow depressions).
- *Dredge Take Reporting*. Observer reports of incidental take would be submitted by fax or email to the NMFS Regional Office by onboard protected species observer. Reports would contain information on location, start-up and completion dates, cubic yards of material dredged, problems encountered, incidental takes and sightings of protected species, mitigative actions taken, screening type, and daily water temperatures.
- *Dredge Lighting*. From May 1 to October 1, all lighting aboard hopper dredges and hopper barges operating within 3 nautical miles of sea turtle nesting beaches would be limited to minimal

lighting necessary to comply with U.S. Coast Guard and Occupational Safety and Health Administration requirements. Nonessential lighting would be minimized through reduction, shielding, lowering, and appropriate placement to minimize illumination of nesting beaches and reduce disorientation effects on female sea turtles and hatchlings.

- *STSSN Notification*. The USACE would notify the STSSN state representative of start-up and completion of hopper dredging and relocation trawling operations and ask to be notified of any turtle stranding within the project area. Dredge stranding information would be reported in the end-of-project summary report and end-of-year annual report.
- *Relocation Trawling*. The purpose of the trawling would be to capture sea turtles that may be in the dredge path and relocate them away from the action area. The handling of sea turtles during relocation trawling would be conducted by a NMFS-approved protected species observer. An end-of-project report would be generated upon completion and incorporated into the hopper dredging annual summary report.
- *Operations*. During periods when hopper dredges are operating and a protected species observer is not required, the USACE would (1) advise inspectors, operators, and vessel captains that take, harm, and harassment of sea turtles are prohibited; (2) instruct the hopper dredge captain to avoid any sea turtles during travel or activity and contact the USACE if sea turtles are observed within the vicinity; (3) notify the NMFS if sea turtles are observed in the dredging area to coordinate further take-avoidance precautions; and (4) notify the NMFS if a sea turtle or any other protected species is taken by the dredge.

During the 2017 nesting season, a total of 390 nests were found on Texas beaches: 353 Kemp's ridley, 9 loggerhead, and 28 green sea turtles. Most of the nests were found on Padre Island National Seashore. Kemp's ridley turtle nests have been found on the Bolivar Peninsula, Galveston Island, the Matagorda Peninsula, and Mustang Island. A leatherback sea turtle nest was discovered in 2008, and a hawksbill nest was discovered in 1998. Both were on the Padre Island National Seashore and remain the only documented nests of their kind on the Texas coast (NPS, 2018a). Female sea turtles show strong nesting site fidelity. Constructed beach profile should mimic the natural slope and sand composition (grain size, shell content, etc.) as the original beach to promote sea turtle nesting (Brock et al., 2007). Fill placement and earth-moving activities should be reserved to fall and winter months when sea turtle nesting will not occur. During beach levee construction or dune restoration, artificial beachfront lighting for construction purposes can discourage and disorient nesting females. Artificial lighting can also disorient hatchling sea turtles, leading them towards inland buildings and streets where they can become dehydrated, depredated, or injured. Reducing the amount of artificial lighting, using low-pressure sodium-vapor lighting, or tinting windows can prevent hatchling disorientation (Sea Turtle Conservancy, 2017).

The operation of surge barrier gates may potentially affect sea turtles and shorebirds within the area by changing the hydrology and salinity characteristics of the bay (see sections 5.3.3 and 5.3.4 of Appendix C-1). The gate structures may impede movement of manatees, dolphins, and sea turtles travelling between Galveston Bay and the Gulf (Department of Environmental Resources Management, 1995; NOAA

Fisheries, 2018). Once beach nourishment is completed, more nesting habitat and a stabilized shoreline would be available for nesting sea turtles and hatchlings. The net benefit from the ER measures would include increased nesting habitat availability, increased SAV, and foraging habitat.

Effect Determination

The likelihood of adverse effects, including incidental take, during construction of the CSRM and ER measures would be greatly reduced by full implementation of avoidance, minimization, and conservation measures outlined above. Leatherback and hawksbill sea turtles are less likely to be impacted since they are less likely to occur in the proposed project area. The effect determination, based on the information presented in this document and the DIFR-EIS, are presented in Table 2. Incidental take, if it occurs, would not jeopardize the continued existence or potential recovery of any of the sea turtle species.

Table 2
Sea Turtle Effect Determination Relative to the Preferred Alternative

Common Name	Scientific Name	Dredging Activity Determination	Placement of Dredged Material Determination
Green sea turtle	*Chelonia mydas*	Likely to adversely affect	Likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricate*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Kemp's ridley sea turtle	*Lepidochelys kempii*	Likely to adversely affect	Likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Loggerhead sea turtle	*Caretta caretta*	Likely to adversely affect	Likely to adversely affect

4.10 FRESHWATER MOLLUSKS

Golden orb, smooth pimpleback, Texas fawnsfoot, and Texas pimpleback are candidate species for Federal listing. The freshwater mussels are intolerant of saline waters and would not be found along the Gulf coast in brackish or saltwater. It is highly unlikely for the mollusks to be found along the project area.

After construction, the mussel species could potentially benefit from ER and CSRM measures. The levee barrier would prevent storm surge upstream in freshwater rivers. The surge barrier gates across Galveston Bay would act as a partial saltwater barrier and prevent saltwater intrusion upstream of the San Jacinto and Trinity River watershed.

Effect Determination

The proposed project will have no effect on the golden orb, smooth pimpleback, Texas fawnsfoot, or Texas pimpleback.

4.11 SLENDER RUSH-PEA, SOUTH TEXAS AMBROSIA, AND TEXAS AYENIA

There are no Federally designated critical habitats for the slender rush-pea, South Texas ambrosia, or the Texas ayenia. Populations of the plant species are well documented and exist farther inland, away from the project area. It is highly unlikely that the species would be affected directly or indirectly from construction activity or habitat modification from the ER or CSRM measures. A plant survey should be performed to determine the presence or absence of any rare species before construction of the ER and CSRM features.

Effect Determination

The proposed project will have no effect on the slender rush-pea, south Texas ambrosia, or the Texas ayenia or associated habitats.

4.12 TEXAS PRAIRIE DAWN-FLOWER

While populations of the Texas prairie dawn-flower have been documented along pimple mounds in Harris County, there is the potential of undiscovered sites on private or public property along the Galveston Bay area. Since there are pimple mounds and saline soils within the Harris County CSRM and ER measures, there is the potential to impact undocumented prairie dawn-flower sites. Conservation measures should include a presence/absence survey for the dawn-flower along suitable habitat prior to construction. The potential to impact Texas prairie dawn-flower is unlikely, but possible.

Effects Determination

The proposed project may affect but is not likely to adversely affect Texas prairie dawn-flower.

5.0 SUMMARY

Table 3 presents a summary of effects determination for the Federally threatened and endangered species covered in this BA.

Table 3
Effects Determinations Summary for the ER and CSRM Measures

Common Name	Scientific Name	ER Measures	CSRM Measures
MAMMALS			
Gulf Coast jaguarundi	*Herpailurus yagouaroundi cacomitli*	No Effect	No Effect
Ocelot	*Leopardus pardalis*	No Effect	No Effect
West Indian manatee	*Trichechus manatus*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
BIRDS			
Attwater's prairie chicken	*Tympanuchus cupido attwateri*	No Effect	No Effect
Interior least tern	*Sterna antillarum*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Northern aplomado falcon	*Falco femoralis septentrionalis*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Piping plover	*Charadrius melodus*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Red knot (rufa)	*Calidris canutus rufa*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Red-crowned parrot	*Amazona viridigenalis*	No Effect	No Effect
Whooping crane	*Grus americana*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
REPTILES			
Green sea turtle	*Chelonia mydas*	Likely to adversely affect	Likely to adversely affect
Hawksbill sea turtle	*Eretmochelys imbricata*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Kemp's Ridley sea turtle	*Lepidochelys kempii*	Likely to adversely affect	Likely to adversely affect
Leatherback sea turtle	*Dermochelys coriacea*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect
Loggerhead sea turtle	*Caretta caretta*	Likely to adversely affect	Likely to adversely affect
MOLLUSKS			
Golden orb	*Quadrula aurea*	No Effect	No Effect
Smooth pimpleback	*Quadrula houstonensis*	No Effect	No Effect
Texas fawnsfoot	*Truncilla macrodon*	No Effect	No Effect
Texas pimpleback	*Quadrula petrina*	No Effect	No Effect
PLANTS			
Slender rush-pea	*Hoffmannseggia tenella*	No Effect	No Effect
South Texas ambrosia	*Ambrosia cheiranthifolia*	No Effect	No Effect
Texas ayenia	*Ayenia limitaris*	No Effect	No Effect
Texas prairie dawn-flower	*Hymenoxys texana*	May affect, but not likely to adversely affect	May affect, but not likely to adversely affect

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Attachment 1

USFWS and NMFS Species Lists

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

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Project information

NAME

CSRM and ER measures

LOCATION

Texas

DESCRIPTION

as of 5-25-18

Local office

Texas Coastal Ecological Services Field Office

(281) 286-8282
(281) 488-5882

17629 El Camino Real #211
Houston, TX 77058

http://www.fws.gov/southwest/es/TexasCoastal/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. 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.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

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Gulf Coast Jaguarundi Herpailurus (=Felis) yagouaroundi cacomitli — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/3945

Ocelot Leopardus (=Felis) pardalis — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/4474

West Indian Manatee Trichechus manatus — Threatened
Marine mammal
There is **final** critical habitat for this species. Your location is outside the critical habitat.
https://ecos.fws.gov/ecp/species/4469

Birds

NAME	STATUS
Attwater's Greater Prairie-chicken Tympanuchus cupido attwateri No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7259	Endangered
Least Tern Sterna antillarum This species only needs to be considered if any of the following conditions apply: • Wind related projects within migratory route. • Wind Related Projects Within Migratory Route No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8505	Endangered
Northern Aplomado Falcon Falco femoralis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1923	Endangered
Piping Plover Charadrius melodus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot Calidris canutus rufa No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1864	Threatened
Red-crowned Parrot Amazona viridigenalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9022	Candidate

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Whooping Crane Grus americana There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/758	Endangered

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened
Hawksbill Sea Turtle Eretmochelys imbricata There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3656	Endangered
Kemp's Ridley Sea Turtle Lepidochelys kempii There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/5523	Endangered
Leatherback Sea Turtle Dermochelys coriacea There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1493	Endangered
Loggerhead Sea Turtle Caretta caretta There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1110	Threatened

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Clams

NAME	STATUS
Golden Orb Quadrula aurea No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9042	Candidate
Smooth Pimpleback Quadrula houstonensis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8967	Candidate
Texas Fawnsfoot Truncilla macrodon No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8965	Candidate

Texas Pimpleback Quadrula petrina No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8966	Candidate

Flowering Plants

NAME	STATUS
Slender Rush-pea Hoffmannseggia tenella No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5298	Endangered
South Texas Ambrosia Ambrosia cheiranthifolia No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3331	Endangered
Texas Ayenia Ayenia limitaris No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4942	Endangered
Texas Prairie Dawn-flower Hymenoxys texana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6471	Endangered

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Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Piping Plover Charadrius melodus https://ecos.fws.gov/ecp/species/6039#crithab	Final
Whooping Crane Grus americana https://ecos.fws.gov/ecp/species/758#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

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Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look

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carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

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Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are **not** shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. 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.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME
West Indian Manatee *Trichechus manatus* https://ecos.fws.gov/ecp/species/4469

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Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES

Anahuac National Wildlife Refuge 37,092.67 acres

(409) 267-3337
(409) 267-4314

MAILING ADDRESS
P.O. Box 278
Anahuac, TX 77514-0278

PHYSICAL ADDRESS
4017 Fm 563
Anahuac, TX 77514

https://www.fws.gov/refuges/profiles/index.cfm?id=21521

Aransas National Wildlife Refuge 193,212.27 acres

(361) 286-3559
(361) 286-3722

MAILING ADDRESS
1 Wildlife Circle
Austwell, TX 77950-0100

PHYSICAL ADDRESS
Farm Market Road 2040
Austwell, TX 77950

https://www.fws.gov/refuges/profiles/index.cfm?id=21532

Big Boggy National Wildlife Refuge 4,499.23 acres

(979) 964-3639
(979) 964-3210

6801 Cr 306
Brazoria, TX 77422-7896

https://www.fws.gov/refuges/profiles/index.cfm?id=21542

Brazoria National Wildlife Refuge 45,667.21 acres

(979) 922-1037
(979) 922-1539

24907 Fm 2004
Angleton, TX 77515

https://www.fws.gov/refuges/profiles/index.cfm?id=21543

NOT FOR CONSULTATION

Laguna Atascosa National Wildlife Refuge 106,104.21 acres

(956) 748-3607
(956) 748-3609

22817 Ocelot Road
Los Fresnos, TX 78566

https://www.fws.gov/refuges/profiles/index.cfm?id=21553

Lower Rio Grande Valley National Wildlife Refuge 86,376.95 acres

(956) 784-7500
(956) 787-8338

MAILING ADDRESS
3325 Green Jay Road
Alamo, TX 78516

PHYSICAL ADDRESS
7 Miles South Of Alamo, Tx On Fm907 And 1/4 Mile East On Highway 281
Alamo, TX 78516-9509

https://www.fws.gov/refuges/profiles/index.cfm?id=21552

Mcfaddin National Wildlife Refuge 2,608.9 acres

(409) 971-2909
(409) 971-2104

MAILING ADDRESS
P.O. Box 358
Sabine Pass, TX 77655-0358

PHYSICAL ADDRESS
7950 South Gulfway Drive
Sabine Pass, TX 77655

https://www.fws.gov/refuges/profiles/index.cfm?id=21525

San Bernard National Wildlife Refuge 62,873.32 acres

(979) 964-3639
(979) 964-3210

6801 Cr 306
Brazoria, TX 77422-7896

https://www.fws.gov/refuges/profiles/index.cfm?id=21541

NOT FOR CONSULTATION

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

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Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal,

state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Endangered and Threatened Marine Species under NMFS' Jurisdiction

Approximately 2,300 species are listed as endangered or threatened under the ESA. Of these species, about 675 are foreign species, found only in areas outside of the U.S. and our waters.

We have jurisdiction over **161 endangered and threatened marine species**, including **65 foreign species**. We work with **U.S. Fish and Wildlife Service (USFWS)** to manage ESA-listed species. Generally, we manage marine species, while USFWS manages land and freshwater species.

- **Marine Mammals**
- **Sea Turtles & Other Marine Reptiles**
- **Fish (Marine and Anadromous)**
- **Marine Invertebrates and Plants**

ESA Fact Sheet

» How does the ESA define "species"?

Marine Mammals (33 listed "species")

Manatees and sea otters are also listed under the ESA, but fall under the jurisdiction of the U.S. Fish and Wildlife Service.

(E = **"endangered"**; T = **"threatened"**; F = **"foreign"**; n/a = not applicable)

Species	Year Listed	Status	Critical Habitat*	Recovery Plan
Cetaceans				
dolphin, Chinese River / baiji (*Lipotes vexillifer*)	1989	E (F)	n/a	n/a
dolphin, Hector's (2 listed subspecies) (*Cephalorhynchus hectori*)				
◦ Maui (*Cephalorhynchus hectori maui*)	2017	E (F)	n/a	no
◦ South Island (*Cephalorhynchus hectori hectori*)	2017	T (F)	n/a	no
dolphin, Indus River (*Platanista minor*)	1991	E (F)	n/a	n/a
porpoise, Gulf of California harbor / vaquita (*Phocoena sinus*)	1985	E (F)	n/a	n/a
whale, beluga (1 listed DPS) (*Delphinapterus leucas*)				
◦ Cook Inlet	2008	E	**final**	**final**
whale, blue (*Balaenoptera musculus*)	1970	E	n/a	**final**
whale, bowhead (*Balaena mysticetus*)	1970	E	n/a	n/a*
whale, false killer (1 listed DPS) (*Pseudorca crassidens*)				
◦ Main Hawaiian Islands Insular	2012	E	no	**in process**
whale, fin (*Balaenoptera physalus*)	1970	E	n/a	**final**
whale, gray (1 listed DPS) (*Eschrichtius robustus*)				
◦ Western North Pacific	1970	E (F)	n/a	n/a
whale, humpback (5 DPSs) (*Megaptera novaeangliae*) *» original listing - 1970*				**final**+
◦ Arabian Sea	2016	E (F)	n/a	
◦ Cape Verde Islands/Northwest Africa	2016	E (F)	n/a	

◦ Central America	2016	E	no	
◦ Mexico	2016	T	no	
◦ Western North Pacific	2016	E	no	
whale, killer (1 listed DPS) (*Orcinus orca*)				
◦ Southern Resident	2005	E	**final**	**final**
whale, North Atlantic right (*Eubalaena glacialis*) *original listing as "northern right whale" -*	2008 1970	E E	**final**	**final**
whale, North Pacific right (*Eubalaena japonica*) *original listing as "northern right whale" -*	2008 1970	E E	**final**	**final**
whale, sei (*Balaenoptera borealis*)	1970	E	n/a	**final**
whale, Southern right (*Eubalaena australis*)	1970	E (F)	n/a	n/a
whale, sperm (*Physeter macrocephalus*)	1970	E	n/a	**final**
Pinnipeds				
sea lion, Steller (1 listed DPS) (*Eumetopias jubatus*)				
◦ Western *original listing -*	1997 1990	E T	**final**	**final**
seal, bearded (2 listed DPSs) *(Erignathus barbatus)*				
◦ Beringia	2012	T	no	no
◦ Okhotsk	2012	T (F)	n/a	no
seal, Guadalupe fur (*Arctocephalus townsendi*)	1985	T	n/a	n/a
seal, Hawaiian monk (*Neomonachus schauinslandi)*	1976	E	**final**	**final**
seal, ringed (4 listed subspecies) *(Phoca hispida)*				
◦ Baltic (*Phoca hispida botnica*)	2012	T (F)	n/a	no
◦ Ladoga (*Phoca hispida ladogensis*)	2012	E (F)	n/a	no
◦ Okhotsk (*Phoca hispida ochotensis*)	2012	T (F)	n/a	no
◦ **Saimaa** (*Phoca hispida saimensis*)	1993	E (F)	n/a	n/a
seal, Mediterranean monk (*Monachus monachus)*	1970	E (F)	n/a	n/a
seal, spotted (1 listed DPS) *(Phoca largha)*				
◦ Southern	2010	T (F)	n/a	n/a

+ Recovery plan written prior to the identification of DPSs

Sea Turtles & Other Marine Reptiles (26 listed "species")

(E = **"endangered"**; T = **"threatened"**; F = **"foreign"**; n/a = not applicable)

Species	Year Listed	Status	Critical Habitat*	Recovery Plan*
Sea Turtles				
turtle, green (11 listed DPSs) (*Chelonia mydas*) » *original listing - 1978*				
◦ Central North Pacific	2016	T	no	**final** +
◦ Central South Pacific	2016	E	no	**final** +
◦ Central West Pacific	2016	E	no	**final** +
◦ East Indian-West Pacific	2016	T(F)	n/a	no
◦ East Pacific	2016	T	no	**final** +
◦ Mediterranean	2016	E(F)	n/a	no
◦ North Atlantic	2016	T	**final**	**final** +
◦ North Indian	2016	T(F)	n/a	no
◦ South Atlantic	2016	T	no	**final** +
◦ Southwest Indian	2016	T(F)	n/a	no
◦ Southwest Pacific	2016	T(F)	n/a	no
turtle, hawksbill (*Eretmochelys imbricata*)	1970	E	**final**	**final**
turtle, Kemp's ridley (*Lepidochelys kempii*)	1970	E	n/a	**final**
turtle, leatherback (*Dermochelys coriacea*)	1970	E	**final**	**final**
turtle, loggerhead (9 listed DPSs) (*Caretta caretta*) » *original listing - 1978*			*no*	***final***
◦ Mediterranean Sea	2011	E (F)	n/a	n/a
◦ North Indian Ocean	2011	E (F)	n/a	n/a
◦ North Pacific Ocean	2011	E	**no**	**final**
◦ Northeast Atlantic Ocean	2011	E (F)	n/a	n/a
◦ Northwest Atlantic Ocean	2011	T	**final**	**final**
◦ South Atlantic Ocean	2011	T (F)	n/a	n/a
◦ South Pacific Ocean	2011	E (F)	n/a	n/a
◦ Southeast Indo-Pacific Ocean	2011	T (F)	n/a	n/a
◦ Southwest Indian Ocean	2011	T (F)	n/a	n/a
turtle, olive ridley (2 listed populations^) (*Lepidochelys olivacea*)				
◦ Mexico's Pacific coast breeding colonies	1978	E	n/a	**final**
◦ all other areas	1978	T	n/a	**final**
Other Marine Reptiles				
sea snake, dusky (*Aipysurus fuscus*)	2015	E (F)	n/a	no

^ These populations were listed before the 1978 ESA amendments that restricted population listings to "distinct population segments of vertebrate species."

+ Recovery plan written prior to the identification of DPSs

Fish (Marine & Anadromous) (74 listed "species")

(E = **"endangered"**; T = **"threatened"**; F = **"foreign"**; XN = **"nonessential experimental population"**; n/a = not applicable)

Species	Year Listed	Status	Critical Habitat*	Recovery Plan
angelshark, Argentine (*Squatina argentina*)	2017	E(F)	n/a	no

angelshark, common (*Squatina squatina*)	2016	E(F)	n/a	no
angelshark, sawback (*Squatina aculeata*)	2016	E(F)	n/a	no
angelshark, smoothback (*Squatina oculata*)	2016	E(F)	n/a	no
angelshark, spiny (*Squatina guggenheim*)	2017	E(F)	n/a	no
bocaccio (1 listed DPS) (*Sebastes paucispinis*)				
◦ Puget Sound/ Georgia Basin	2010	E	**final**	no
cardinalfish, Banggai (*Pteropogon kauderni)*	2016	T(F)	n/a	no
coelacanth, African (1 listed DPS) (*Latimeria chalumnae)*				
◦ Tanzanian	2016	T(F)	n/a	no
eulachon (1 listed DPS) (*Thaleichthys pacificus*)				
◦ Southern DPS	2010	T	**final**	**final**
grouper, gulf (*Mycteroperca jordani*)	2016	E	**no**	no
grouper, island (*Mycteroperca fusca)*	2016	T(F)	n/a	no
grouper, Nassau (*Epinephelus striatus*)	2016	T	no	no
guitarfish, blackchin (*Rhinobatos cemiculus)*	2017	T(F)	n/a	no
guitarfish, Brazilian (*Rhinobatos horkelii*)	2017	E(F)	n/a	no
guitarfish, common (*Rhinobatos, rhinobatos*)	2017	T(F)	n/a	no
ray, giant manta (*Manta birostris*)	2018	T	n/a	no
rockfish, yelloweye (1 listed DPS) (*Sebastes ruberrimus*)				
◦ Puget Sound/ Georgia Basin	2010	T	**final**	no
salmon, Atlantic (1 listed DPS) (*Salmo salar*)				
◦ Gulf of Maine *original listing -*	2009 (expanded) 2000	E	**final**	**draft**
salmon, Chinook (9 listed ESUs & 2 XNs) (*Oncorhynchus tshawytscha*)				
◦ California coastal	1999**	T	**final**	**draft**
◦ Central Valley spring-run	1999**	T	**final**	**final**
◦ Central Valley spring-run in the San Joaquin River, CA	2013	XN	n/a	-
◦ Lower Columbia River	1999**	T	**final**	**final**
◦ Puget Sound	1999**	T	**final**	**final**
◦ Sacramento River winter-run	1994**	E	**final**	**final**
◦ Snake River fall-run	1992**	T	**final**	**draft**
◦ Snake River spring/ summer-run	1992**	T	**final**	**in process**
◦ Upper Columbia River spring-run	1999**	E	**final**	**final**
◦ Upper Columbia River spring-run in the Okanogan River subbasin, WA	2014	XN	n/a	-

◦ Upper Willamette River	1999**	T	final	final
salmon, chum (2 listed ESUs) (*Oncorhynchus keta*)				
◦ Columbia River	1999**	T	final	final
◦ Hood Canal summer-run	1999**	T	final	final
salmon, coho (4 listed ESUs) (*Oncorhynchus kisutch*)				
◦ Central California coast	2005** 1996**	E T	final	final
original listing -				
◦ Lower Columbia River	2005**	T	final	final
◦ Oregon coast	2008	T	final	draft
◦ Southern Oregon & Northern California coasts (SONCC)	1997**	T	final	final
salmon, sockeye (2 listed ESUs) (*Oncorhynchus nerka*)				
◦ Ozette Lake	1999**	T	final	final
◦ Snake River	1991**	E	final	final
sawfish, dwarf *(Pristis clavata)*	2014	E (F)	n/a	no
sawfish, green *(Pristis zijsron)*	2014	E (F)	n/a	no
sawfish, largetooth *(Pristis pristis)* (formerly *P. perotteti, P. pristis*, and *P. microdon*)	2014	E	no	no
sawfish, narrow *(Anoxypristis cuspidata)*	2014	E (F)	n/a	no
sawfish, smalltooth (2 listed DPSs) (*Pristis pectinata*)				
◦ U.S. portion of range	2003	E	final	final
◦ Non-U.S. portion of range	2014	E (F)	n/a	no
shark, daggernose (*Isogomphodon oxyrhynchus*)	2017	E(F)	n/a	no
shark, oceanic whitetip (*Carcharhinus longimanus*)	2018	T	no	no
shark, narrownose smoothhound (*Mustelus schmitti*)	2017	T(F)	n/a	no
shark, scalloped hammerhead (4 listed DPSs) *(Sphyrna lewini)*				
◦ Central & Southwest Atlantic	2014	T	no	no
◦ Eastern Atlantic	2014	E (F)	n/a	no
◦ Eastern Pacific	2014	E	no	no
◦ Indo-West Pacific	2014	T	no	no
shark, striped smoothhound (*Mustelus fasciatus*)	2017	E(F)	n/a	no
steelhead (11 listed DPSs & 1 XN) *(Oncorhynchus mykiss)*				
◦ California Central Valley	1998**	T	final	final
◦ Central California coast	1997**	T	final	draft
◦ Lower Columbia River	1998**	T	final	final
◦ Middle Columbia River	1999**	T	final	final
◦ Middle Columbia River	2013	XN	n/a	
◦ Northern California	2000**	T	final	draft
◦ Puget Sound	2007	T	final	no
◦ Snake River Basin	1997**	T	final	in process
◦ South-Central California coast	1997**	T	final	final

◦ Southern California	1997**	E	final	final
◦ Upper Columbia River *original listing -* *change in status -* *court reinstated status -*	2009+ 1997** 2006** 2007+	T E T E	final	final
+ reinstated to endangered status per U.S. District Court decision in June 2007;**reclassified to threatened** [pdf] per U.S. District Court order in June 2009				
◦ Upper Willamette River	1999**	T	final	final
sturgeon, Adriatic *(Acipenser naccarii)*	2014	E (F)	n/a	no
sturgeon, Atlantic (Atlantic subspecies; 5 listed DPSs) *(Acipenser oxyrinchus oxyrinchus)*				
◦ Carolina	2012	E	final	no
◦ Chesapeake Bay	2012	E	final	no
◦ Gulf of Maine	2012	T	final	no
◦ New York Bight	2012	E	final	no
◦ South Atlantic	2012	E	final	no
sturgeon, Atlantic (Gulf subspecies) (*Acipenser oxyrinchus desotoi*)	1991	T	final	final
sturgeon, Chinese *(Acipenser sinensis)*	2014	E (F)	n/a	no
sturgeon, European *(Acipenser sturio)*	2014	E (F)	n/a	no
sturgeon, green (1 listed DPS) *(Acipenser medirostris)*				
◦ Southern DPS	2006	T	final	in process
sturgeon, Kaluga *(Huso dauricus)*	2014	E (F)	n/a	no
sturgeon, Sakhalin *(Acipenser mikadoi)*	2014	E (F)	n/a	no
sturgeon, shortnose (*Acipenser brevirostrum*)	1967	E	n/a	final
totoaba (*Totoaba macdonaldi*)	1979	E (F)	n/a	n/a

**All Pacific salmonid listings were revisited in 2005, 2006, and 2016. Only the salmonids whose status changed as a result of the review will show the revised date; for all others, only the original listing date is shown. For more information on the listing history, please click on the link for each ESU/DPS.

Marine Invertebrates (27 listed "species")

(E = **"endangered"**; T = **"threatened"**; F = **"foreign"**; n/a = not applicable)

Species	Year Listed	Status	Critical Habitat*	Recovery Plan
Abalone				
abalone, black *(Haliotis cracherodii)*	2009	E	final	no
abalone, white (*Haliotis sorenseni*)	2001	E	**not prudent** [pdf]	final
Corals				
coral, [no common name] (*Acropora globiceps*)	2014	T	no	no
coral, [no common name] (*Acropora jacquelineae*)	2014	T	no	no
coral, [no common name] (*Acropora lokani*)	2014	T (F)	n/a	no
coral, [no common name] (*Acropora pharaonis*)	2014	T (F)	n/a	no

coral, [no common name] (*Acropora retusa*)	2014	T	no	no
coral, [no common name] (*Acropora rudis*)	2014	T (F)	n/a	no
coral, [no common name] (*Acropora speciosa*)	2014	T	no	no
coral, [no common name] (*Acropora tenella*)	2014	T (F)	n/a	no
coral, [no common name] (*Acropora spinosa*)	2014	T (F)	n/a	no
coral, [no common name] (*Cantharellus noumeae*)	2015	E (F)	n/a	no
coral, [no common name] (*Euphyllia paradivisa*)	2014	T	no	no
coral, [no common name] (*Isopora crateriformis*)	2014	T	no	no
coral, [no common name] (*Montipora australiensis*)	2014	T (F)	n/a	no
coral, [no common name] (*Pavona diffluens*)	2014	T (F)	no	no
coral, [no common name] (*Porites napopora*)	2014	T (F)	n/a	no
coral, [no common name] (*Seriatopora aculeata*)	2014	T	no	no
coral, [no common name] (*Siderastrea glynni*)	2015	E (F)	n/a	no
coral, [no common name] (*Tubastraea floreana*)	2015	E (F)	n/a	no
coral, boulder star (*Orbicella franksi*)	2014	T	no	no
coral, elkhorn *(Acropora palmata)*	2006	T	**final**	**final**
coral, lobed star (*Orbicella annularis*)	2014	T	no	no
coral, mountainous star (*Orbicella faveolata*)	2014	T	no	no
coral, pillar (*Dendrogyra cylindrus*)	2014	T	no	no
coral, rough cactus (*Mycetophyllia ferox*)	2014	T	no	no
coral, staghorn *(Acropora cervicornis)*	2006	T	**final**	**final**

Marine Plants (1 listed "species")

(E = **"endangered"**; T = **"threatened"**; F = **"foreign"**; n/a = not applicable)

Species	Year Listed	Status	Critical Habitat*	Recovery Plan*
Johnson's seagrass (*Halophila johnsonii*)	1999	T	**final**	**final**

*** NOTE:** Critical habitat cannot be designated in foreign waters; critical habitat is also not required for species listed prior to the 1978 ESA amendments that added critical habitat provisions. Recovery plans for sea turtles are developed and implemented by NMFS and USFWS; the plans have been written separately for turtles in the Atlantic and Pacific oceans (and East Pacific for the green turtle) rather than for each listed species. Bowhead whales are exempt from recovery planning.

Endangered and Threatened Species Under NMFS' Jurisdiction:

- **All Endangered and Threatened Species under NMFS Jurisdiction**
  - » **Marine Mammals**
  - » **Sea Turtles & Other Marine Reptiles**
  - » **Fish (Marine & Anadromous)**
  - » **Marine Invertebrates & Plants**

Additional Species:

- **Species Petitioned for Listing under the ESA** (awaiting 90-day findings)
- **Candidates for ESA Listing**
- **Species Proposed for ESA Listing**
- **Species with "Not Warranted" 12-month findings** (we reviewed the status, but determined that listing was not warranted)
- **Delisted Species and Species Under Review or Proposed for Delisting**

Updated: January 29, 2018