DRAFT

FEDERALLY PROTECTED SPECIES ASSESSMENT FOR THE BAY AQUATIC BENEFICIAL USE SITES GALVESTON BAY, TEXAS

***Prepared for*:**

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT
2000 Fort Point Road
Galveston, Texas 77550

US Army Corps of Engineers

***Prepared by*:**

ANAMAR ENVIRONMENTAL CONSULTING, INC.
13146 NW 86th Drive, Suite I-200
Alachua, Florida 32615

April 2025

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Proposed Action & Project Area 1
1.2 Regulatory Framework 4
1.2.1 National Environmental Policy Act of 1969 4
1.2.2 Endangered Species Act of 1973 4
1.2.3 Bald & Golden Eagle Act 4
1.2.4 Migratory Bird Treaty Act of 1918 5
1.2.5 Marine Mammal Protection Act of 1972 5
2 FEDERALLY PROTECTED SPECIES OF INTEREST 6
2.1 Searches of Available Literature & Databases 8
2.2 Occurrence of Species & Their Critical Habitat 8
3 EFFECTS ANALYSIS OF PROPOSED ACTION 26
3.1 Effects to Monarch Butterfly 26
3.2 Effects to Sawfishes & the Giant Manta 26
3.3 Effects to the American Alligator & Alligator Snapping Turtle 26
3.4 Effects to Sea Turtles & Their Critical Habitat 26
3.5 Effects to Birds & Their Critical Habitat 28
3.6 Effects to Aquatic & Avian Mammals 29
4 AVOIDANCE & MINIMIZATION MEASURES 31
4.1 Monarch Butterfly 31
4.2 Sea Turtles 31
4.3 Birds 31
4.4 Manatees, Right Whales & Dolphins 33
5 Summary of Effects ..... **Error! Bookmark not defined.**
6 REFERENCES 36

LIST OF TABLES

Table 2-1. Summary of Federally Protected Species That May Occur In or Near Galveston Bay 6
Table 5-1. Summary of Effects to Federally Protected Species....34

LIST OF FIGURES

Figure 1-1 Conceptual Design of the Proposed Action: Bay Aquatic Beneficial Use Sites in Upper Galveston Bay 3
Figure 2-1. Known Occurrences of the Alligator Snapping Turtle (*Macrochelys temminckii*) in Water Basins that Surround Galveston Bay....11
Figure 2-2. Green Sea Turtle (*Chelonia mydas*) Proposed Critical Habitat in Texas Includes Galveston Bay 13
Figure 2-3. Loggerhead Sea Turtle (*Caretta caretta*) Critical Habitat 'LOGG-S-02' off the Texas Coast, from 10-m Contour to the U.S. Exclusive Economic Zone 14
Figure 2-4. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Distribution within Texas....16
Figure 2-5. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Breeding Status per County During 2011–2016 17
Figure 2-6. Examples of Habitats Typically Used by the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)....18
Figure 2-7. Critical Habitat for the Piping Plover (*Charadrius melodus*) Includes Bolivar Beach (TX-36) and Two Other Areas (TX-35 and TX-37) Adjacent to the Project Area 19
Figure 2-8. Critical Habitat for the Rufa Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of the Bolivar Peninsula (TX-1) Adjacent to the Project Area....21
Figure 2-9. Critical Habitat for the Rufa Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of Galveston Island (TX-2) Adjacent to the Project Area....22

ACRONYMS, ABBREVIATIONS & INITIALISMS

BABUS	Bay Aquatic Beneficial Use Sites
BU	beneficial use
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cy	cubic yards
DMMP	Dredged Material Management Plan
EA	Environmental Assessment
ECIP	Expansion Channel Improvements Project
EIS	Environmental Impact Statement
ESA	Endangered Species Act of 1973
FIFR	Final Integrated Feasibility Report
GCBR	Global Core Biodata Resource
HSC	Houston Ship Channel
iDigBio	integrated digitized biocollections
IGFA	International Game Fish Association
ISED	International Sawfish Encounter Database
MBTA	Migratory Bird Treaty Act
MLLW	mean lower low water
NEPA	National Environmental Policy Act of 1969
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NSED	National Sawfish Encounter Database
ODMDS	ocean dredged material disposal site
O&M	operations and maintenance
PA	placement area
TPWD	Texas Parks and Wildlife Department
UF	University of Florida
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The U.S. Army Corps of Engineers, Galveston District (USACE) has prepared an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA), Public Law 91–190, and regulations for implementing the procedural provisions of the NEPA, 40 Code of Federal Regulations (CRF) 1500–1508. The EA evaluates potential impacts associated with the Bay Aquatic Beneficial Use Sites (BABUS) project construction and operation. The EA serves to evaluate practicable alternative locations for the BABUS, assess effects anticipated from the proposed project, and recommends avoidance and minimization measures to avoid and minimize adverse effects resulting from the proposed action.

The existing Houston Ship Channel (HSC) spans 52 miles of federal navigation channels through three counties. This important series of federal navigation channels have been modified, starting at least as far back as 1905, to better accommodate vessel traffic. Several additional modifications to these channels have taken place since this time (USACE 2019). The latest modification project, titled the HSC Expansion Channel Improvements Project (ECIP), is the planned deepening, widening, and re-configuration of several portions of these channels. These proposed changes are planned to address existing inefficiencies in accommodating current and projected container and bulk freighter vessel size and fleet size. See the Final Integrated Feasibility Report (FIFR) and Environmental Impact Statement (EIS) for the HSC ECIP by USACE (2019) for more information. There are several placement areas (PAs) and beneficial use (BU) areas adjacent to the HSC for placement of some of the HSC dredged material. New work and maintenance-dredged (operations and maintenance [O&M]) material from several areas of the HSC is also planned to be disposed of at the Galveston Ocean Dredged Material Disposal Site (ODMDS). However, the planned improvements to the HSC will increase the volume of maintenance-dredged material from the HSC. Due to limited capacity of the PAs and BU areas for the increased volume of dredged material, there is a need for a new placement area for this material for the next 50 years of maintenance dredging (USACE 2019).

1.1 Proposed Action & Project Area

The proposed action is the construction of the BABUS for the placement of primarily O&M dredged material (Figure 1-1). Since the BABUS project is in the conceptual stage, the exact configuration of the BABUS, and position within the project footprint, has not yet been determined. The current design of the BABUS project has a footprint that does not exceed approximately 4,500 acres. The project area is in upper Galveston Bay, southeast of Atkinson Island (and its associated BU PAs), north of the Mid Bay Placement Area (Blue Water Atoll), and east of the HSC. Upper Galveston Bay is bordered by Chambers and Harris counties, Texas. The project area is submerged land in Chambers County owned by the State of Texas and managed by the Texas General Land Office. The project area is subtidal and has an average bottom elevation of -8 feet (-2.4 m) mean lower low water (MLLW) (USACE 2022). The area is transected by two recreational boating channels: Five Mile Cut Channel and North Boaters Cut. One or both channels may require dredging to a width and depth sufficient to accommodate bottom-dump scows and (or) hopper dredges for delivery of dredged material to the BABUS.

The project will consist of two types of PAs. The first type is an excavated BU PA created by excavating the bay bottom and using that material to construct confining dikes. These dikes would serve as the outer perimeter of the PA and may be reinforced with riprap or other similar materials as needed to prevent erosion. The current design has the crests of the confining dikes having a elevation between 4 and 8 feet (2.4 m) MLLW. The second type of PA will be marsh fill areas for beneficial use of dredged material. The interiors of the BABUS PAs would be filled gradually with material dredged from areas of the HSC north of Morgans Point (mile 26.2) (DMMP [Appendix R

of the FIFR-EIS by USACE 2019]). The placement of the material would occur over the projected 50-year period or until the estimated capacity of approximately 100 million cy is reached.

The beneficial use PA (shown in the center of the project area in Figure 2-1) is anticipated to be excavated to a depth of -70 feet (-21.3 m) MLLW, dependent on the results of further engineering and design work, to maximize dredged material capacity. Following initial excavation, the interior of this PA would temporarily be a deep basin accessible via North Boaters Cut or Five Mile Cut Channel. A gap in the exterior dike will be provided to allow passage of the scows/dredges. Upon completion of the construction of the exterior containment dike and bay bottom excavation to the maximum depth and extent practicable, the excavated area will be filled with dredged material using dump scows until the depth prevents scows from entering the area. After this point, the dike will be closed and the material will be placed using a pipeline dredge. The containment dikes have the potential to host a variety of aquatic and emergent habitats, including oyster reef. The types of habitats and their placement along these dikes will be decided based on further engineering and design work.

The marsh fill areas are anticipated to be filled with dredged material. The containment dikes around these areas will be constructed of bay bottom material excavated from within the dredged material PA. The outer slopes of these containment dikes are anticipated to provide habitat benefits, such as intertidal marsh and oyster reef, that are similar to those to be created on the dikes of the dredged material PA. The details for how the dikes are to be constructed, and the habitats they will support, are dependent on the results of further engineering and design efforts. The elevation of the interior of the marsh fill areas would be raised from the existing bay bottom elevation (averaging -8 feet [2.4 m] MLLW) to intertidal elevations of 0 to +3.5 feet (0–1.07 m) MLLW for the potential to create beneficial use intertidal marsh and bird island habitats. Once the interior of the marsh fill areas have reached the desired elevation, the dike will be cut at strategic locations to allow for tidal exchange of bay water in and out while continuing to provide erosion protection.

Once the excavated beneficial use PA and the marsh fill areas are filled to their desired elevations and the 100 million cy capacity is reached, it is anticipated that new marsh habitat and (or) upland habitats could be created on the upper surface of the BABUS. The habitats would be designed to accommodate various desirable wetland and aquatic species. The BABUS would also be expected to provide refuge for migratory birds along the northern Gulf coast during migrations, and to add to the productivity of bird islands along the Galveston Bay migratory corridor. Thus, the proposed action is intended to aid in the USACE's requirements and directives for increasing BU of dredged material to at least 70% of all dredged material by 2030 (USACE 2023).

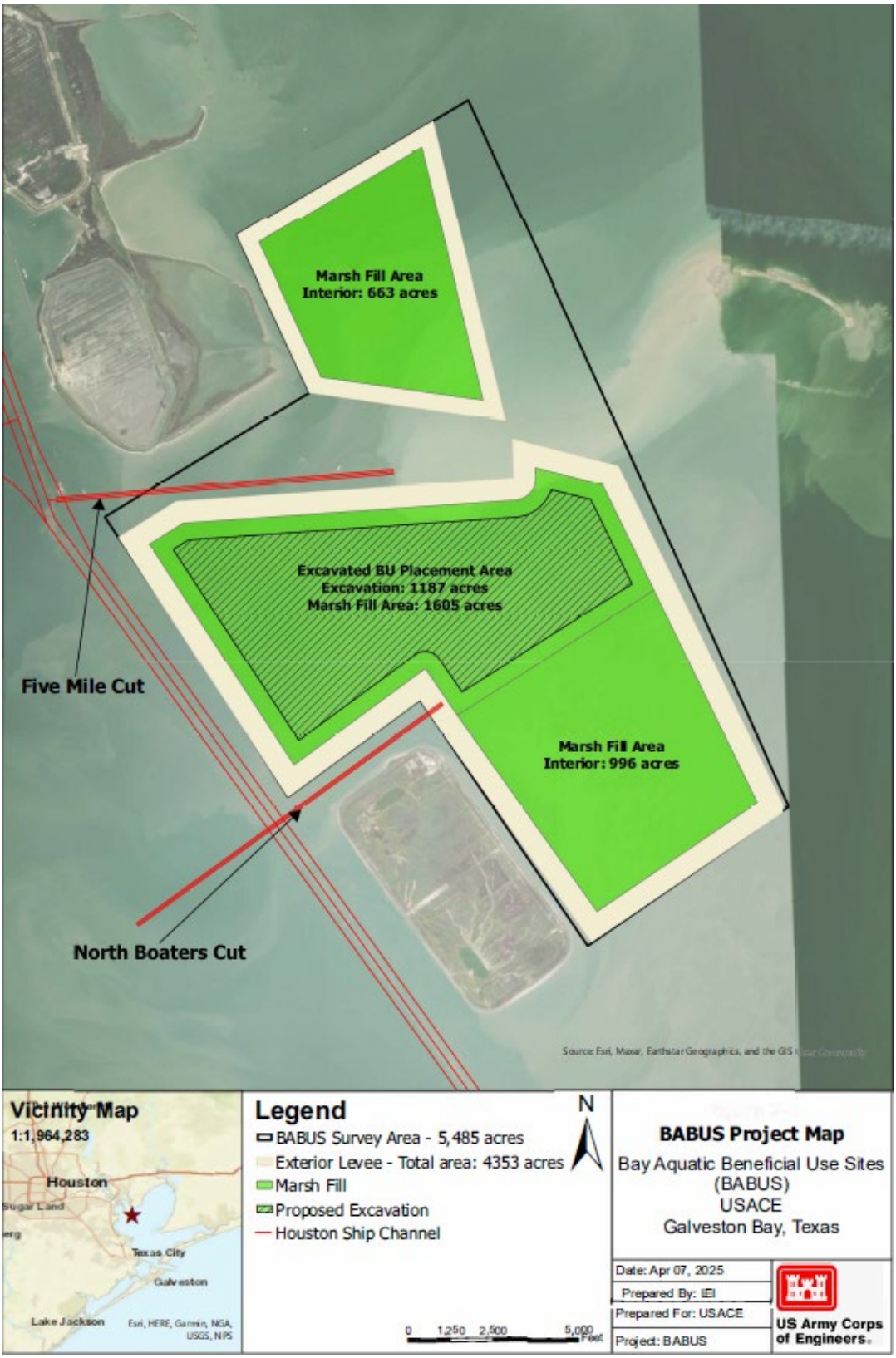

Figure 1-1 Conceptual Design of the Proposed Action: Bay Aquatic Beneficial Use Sites in Upper Galveston Bay

1.2 Regulatory Framework

1.2.1 National Environmental Policy Act of 1969

NEPA is an important part of the decision-making process for actions involving federal lands. The NEPA process mandates federal agencies prepare an EA or an EIS designed to explain possible effects of the proposed actions on the human environment, including alternative actions and no action, and to allow the public to comment. Significant impacts can result from cumulative actions and can affect unique or endangered resources. The EA or EIS is to be prepared as soon as an agency has a proposed goal (Council on Environmental Quality [CEQ] § 1508.23) during the proposal stage of the federal action. An EA is produced if the impacts of a given action are unknown (CEQ § 1507.3 and § 1508.9). The result of drafting an EA may be a Finding of No Significant Impacts (CEQ §1508.13) or a finding of significant impacts, which mandates the production of an EIS (CEQ § 1501.4 and § 1507.3). NEPA is procedural only and is designed to prevent uninformed decisions but does not force any particular action.

1.2.2 Endangered Species Act of 1973

The ESA was designed to protect imperiled species from extinction due to economic growth and development. ESA Section 7, Interagency Coordination, is of interest to this assessment of federally protected species. It regulates all federal agencies to protect endangered and threatened species and their designated critical habitat.

ESA Section 7(a)(2) states that agencies shall, in consultation with the secretary of the interior or the secretary of commerce (depending on the species in question), ensure that any action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat unless the agency was granted an exception for the action by the Endangered Species Committee (ESA § 7(h)).

A formal consultation with the secretary is conducted to obtain a written Biological Opinion and a summary of information on which the opinion is based showing how the agency action affects the species or its critical habitat (ESA § 7(b)(3)(a)). If the action is found to put the species in jeopardy or to adversely modify critical habitat, the secretary will suggest reasonable and prudent alternatives, which will not violate ESA § 7(a)(2), to be taken by the agency in implementing the action.

An informal consultation with the secretary is conducted if the agency has reason to believe that an endangered or threatened species or designated critical habitat may be present in the area affected by the project and that the implementation of the proposed action is likely to affect such species or habitat (ESA § 7(a)(3)). The results of a literature review on the federally protected species, including ESA-listed species, that may occur within the BABUS project area are incorporated into the ESA § 7 consultation as part of this assessment.

1.2.3 Bald & Golden Eagle Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) has been amended several times since its 1940 enaction (USFWS 2024). This act prohibits anyone from “taking” bald or golden eagles (*Haliaeetus leucocephalus* or *Aquila chrysaetos*) alive or dead, or possessing or selling any parts (including feathers), nest or eggs of these species, unless otherwise permitted by the USFWS. “Take” is defined here as to pursue, shoot, or attempt to shoot, poison, wound, kill, capture, collect, molest, or disturb either of these species (USFWS 2024).

1.2.4 Migratory Bird Treaty Act of 1918

Most bird species native to the United States are protected from anthropogenic harm under the Migratory Bird Treaty Act of 1918 ([MBTA] 16 U.S.C. §§ 703–712). This protection is for all life stages (eggs through adult stages) and includes their nests. The statute makes it unlawful to pursue, hunt, take, capture, kill, or sell (whole or parts, live or dead) any of the over 800 species of birds covered under the act. Migratory birds, as listed in 50 CFR § 10.13, are those species that are ecologically and economically important to the United States and enable various recreational activities such as bird watching, behavioral studies, and photography. Only about 338 species of birds are Nearctic-Neotropical migrants of North America (Shackelford et al. 1999), therefore, the MBTA covers not just those species that are strictly migratory, but also covers many other bird species of ecological and economic importance.

Over 615 species of birds have been documented in Texas, more than any other state (Shackelford et al. 1999), and many of these species are covered under the MBTA. The Galveston area is within the central flyway and the Mississippi flyway—two of the four major migratory flyways of North America (Shackelford et al. 1999).

Executive Order 13186, published in 2001, asserts that the protection of migratory birds is the responsibility of federal agencies. Also, a memorandum of understanding between the Department of Defense and USFWS, signed in September 2014, states that the Department of Defense shall take steps to manage and mitigate potential impacts on migratory birds, such as identifying the species likely to occur in the proposed action and assessing the potential impacts to migratory species using best-available data. Although this memorandum of understanding expired five years after it was signed, it represents the latest agreement between these agencies concerning migratory birds until the newest administration can work on an updated agreement. A complete list of species covered under the MBTA can be found at https://www.govinfo.gov/content/pkg/FR-2023-07-31/pdf/2023-15551.pdf.

1.2.5 Marine Mammal Protection Act of 1972

The Marine Mammal Protection Act of 1972 (16 U.S.C. Chapter 13, §§ 1361–1362, 1371–1389, 1401–1407, 1411–1418, 1421–1421h, and 1423–1423h), and associated amendments and agreements, affords federal protections from anthropogenic actions to all species of marine mammals that occur within U.S. waters. This protection generally addresses incidental and purposeful ‘take’ (to hunt, harass, capture, or kill) (except with a permit) or attempts to take, and prohibits (except with a permit) the import and export of marine mammals and their parts or products (NOAA Fisheries 2024). This act is facilitated by National Oceanic and Atmospheric Administration (NOAA) Fisheries for cetaceans (toothed whales including dolphins/porpoises and baleen whales) and pinnipeds (seals and sea lions). USFWS facilitates Marine Mammal Protection Act protections for walrus, manatees, sea otters, and polar bears. Marine mammals in Alaska are co-managed with native Alaskan tribes. In addition, the Marine Mammal Commission provides science-based oversight of federal policies and actions that may affect marine mammals and the habitats these animals require (NOAA Fisheries 2024).

2 FEDERALLY PROTECTED SPECIES OF INTEREST

Federally protected species that may potentially occur within the project area include the insects, fishes, reptiles, birds, and mammals listed in Table 2-1 below. This section lists and discusses these 21 federally protected species as they relate to the proposed action. Federally protected species that lead pelagic open-water lifestyles, and terrestrial plant species, are omitted from consideration of possible effects of this estuarine-based proposed action area. Likewise, the Galveston area is unsuitable for ESA-listed corals and such corals have not been recorded there and are therefore omitted from consideration.

Table 2-1. Summary of Federally Protected Species That May Occur In or Near Galveston Bay

Common Name (Scientific Name)	Status	
	Federal	State (TPWD)
INSECTS		
Monarch butterfly (*Danaus plexippus*)	Candidate (USFWS) (88 FR 41560, 06/27/2023) (no critical habitat designated)	(not listed)
FISHES		
Giant manta (*Mobula birostris*)	Threatened (NOAA Fisheries) (83 FR 2916, 01/22/2018) (no critical habitat designated)	(not listed)
Smalltooth sawfish (*Pristis pectinata*)	Endangered (NOAA Fisheries) (68 FR 15674, 04/01/2003) Critical habitat is designated (74 FR 45363, 09/02/2009)	Endangered
REPTILES		
American alligator (*Alligator mississippiensis*)	Threatened (USFWS) (due to similarity of appearance)* (52 FR 21059, 06/04/1987) (no critical habitat designated)	(not listed)
Alligator snapping turtle (*Macrochelys temminckii*)	Proposed threatened under 4(d) rule of ESA (USFWS) (86 FR 62434, 11/09/2021)	Threatened
Green sea turtle (*Chelonia mydas*)	Threatened (co-managed) (43 FR 32800, 07/28/1978) Critical habitat is designated with more proposed (63 FR 46693, 09/02/1998 88 FR 46572, 07/19/2023)	Threatened
Hawksbill sea turtle (*Eretmochelys imbricata*)	Endangered (co-managed) (35 FR 8491, 06/02/1970) Critical habitat is designated (63 FR 46693, 09/02/1998)	Endangered
Kemp's ridley sea turtle (*Lepidochelys kempii*	Endangered (co-managed) (35 FR 18319, 12/02/1970) Critical habitat is proposed (43 FR 45905, 11/29/1978)	Endangered
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered (co-managed) (35 FR 18319, 12/02/1970)	Endangered

Common Name (Scientific Name)	Status	
	Federal	**State (TPWD)**
	Critical habitat is designated (77 FR 4170, 01/26/2012)	
Loggerhead sea turtle (*Caretta caretta*)	Threatened (co-managed) (43 FR 32800, 07/28/1978) Critical habitat is designated (79 FR 39856, 07/10/2014)	Endangered
BIRDS		
Bald eagle (*Haliaeetus leucocephalus*)	Protected under Bald and Golden Eagle Protection Act (USFWS) (no critical habitat designated)	(not listed)
Eastern black rail (*Laterallus jamaicensis jamaicensis*)	Threatened (USFWS) (85 FR 63764, 10/08/2020) (no critical habitat designated)	Threatened
Piping plover (*Charadrius melodus*)	Threatened (USFWS) (50 FR 50726, 12/11/1985) (Atlantic coast and northern Great Plains populations) Critical habitat is designated (74 FR 23476, 05/19/2009)	Threatened
Rufa red knot (*Calidris canutus rufa*)	Threatened (USFWS) (79 FR 73705, 12/11/2014) Critical habitat is proposed (88 FR 22530, 04/13/2023)	Threatened
Whooping crane (*Grus americana*)	Endangered (USFWS) (35 FR 8491, 06/02/1970) Critical habitat is designated (43 FR 36588, 08/17/1978)	Endangered
Wood stork (*Mycteria americana*)	Threatened, proposed to be de-listed (USFWS) (47 FR 58454, 02/28/1984) (no critical habitat designated)	Threatened
MAMMALS		
Bottlenose dolphin (*Tursiops truncatus*)	Protected under the Marine Mammal Protection Act (NOAA Fisheries)	(not listed)
North Atlantic right whale (*Eubalaena glacialis*)	Endangered (NOAA Fisheries) (73 FR 12024, 03/06/2008) Critical habitat is designated (80 FR 4838, 01/27/2016) also protected under the Marine Mammal Protection Act (NOAA Fisheries)	(not listed)
Tricolored bat (*Perimyotis subflavus*)	Proposed endangered (USFWS) (87 FR 56381, 09/14/2022) (no critical habitat designated)	(not listed)
West Indian manatee (Florida manatee) (*Trichechus manatus* [*T. m. latirostris*])	Threatened (USFWS) (82 FR 16668, 04/05/2017) Critical habitat is designated (42 FR 47840, 09/22/1977) Also protected under the Marine Mammal Protection Act (NOAA Fisheries)	Endangered

* SA = Species is listed due to the similarity of appearance with the federally threatened American crocodile, *Crocodylus acutus*.

Sources: National Marine Fisheries Service ([NMFS] 2018b), Seitz and Waters (2018, 2020), USFWS IPaC (https://ipac.ecosphere.fws.gov/) and ESA species (https://www.fws.gov/species) queries on 13 September 2023 and 21 Mar 2025, Texas Parks and Wildlife Department (TPWD) Species of Greatest Conservation Need (https://tpwd.texas.gov/landwater/land/tcap/sgcn.phtml) queries on 14 September 2023 and 21 Mar 2025. North Atlantic right whale occurrence in Texas waters based on Schmidly et al. (1972), Ward-Geiger et al. (2011), and Laist (2017).

2.1 Searches of Available Literature & Databases

Searches were conducted of the available literature, and in online databases, on 3–9 November 2023 and 21 March 2025 for occurrences within the Galveston Bay area for each of the species listed in Table 2-1. The following online databases were used, as appropriate, for each taxon of interest:

- Global Core Biodata Resource (GCBR) database (https://globalbiodata.org/what-we-do/global-core-biodata-resources/)
- The online vertebrate data aggregation web portal Vert Net (http://portal.vertnet.org/search) (includes Texas A&M collections data)
- The integrated digitized biocollections (iDigBio) online portal of vouchered specimens held in public university collections (https://www.idigbio.org/portal/search)
- The following University of Florida (UF) collections databases:
    - UF Lepidoptera Collection (http://specifyportal.flmnh.ufl.edu/leps/)
    - UF Ichthyology Collection (http://specifyportal.flmnh.ufl.edu/fishes/)
    - UF Herpetology Collection (http://specifyportal.flmnh.ufl.edu/herps/)
    - UF Ornithology Collection (http://specifyportal.flmnh.ufl.edu/birds/)
    - UF Mammalogy Collection (http://specifyportal.flmnh.ufl.edu/mammals/)
- The following amateur naturalist observation databases:
    - iNaturalist all-taxa observation database (https://www.inaturalist.org/observations)
    - HerpMapper reptile and amphibian observation database (https://www.herpmapper.org)
    - eBird bird observation database (https://ebird.org/explore)

2.2 Occurrence of Species & Their Critical Habitat

Results of the literature and database searches are summarized here, along with notes on critical habitat, if applicable.

Monarch Butterfly (*Danaus plexippus*)

The monarch butterfly is currently a candidate species for future federal protection under the ESA. No critical habitat has been designated as of this writing. This species occurs throughout North America, including Texas, along with areas of Central and South America. Some migrating populations fly through Texas on their way to and from overwintering sites in Mexico (Heppner 2005).

The literature search did not locate specific occurrences within the Galveston Bay area. The database search resulted in 204 records of monarch butterflies in the GCBR for the Galveston area from 2019 to present. A search of iNaturalist produced 221 observations of this species in the Galveston area from 2022 to present. Observations were for all land surrounding Galveston Bay. No records were found in the UF Lepidoptera Collection for the Galveston Bay area.

Giant Manta (*Mobula birostris*)

The giant manta is well known to inhabit the northern Gulf of Mexico (Walls 1975, Hoese and Moore 1977, Shipp 1986, McEachran and Fechhelm 1998). NMFS (2020) reported anecdotal records of giant manta captures during relocation-trawling efforts in the Gulf of Mexico but gave no further spatial or temporal information. In the northern Gulf, the species is most often observed over the Flower Garden Banks National Marine Sanctuary (McEachran and Fechhelm 1998) which is approximately 100 nmi (120 mi, 190 km) south of Galveston. There is at least one record of an individual captured in Corpus Christi Bay (Hoese and Moore 1977) but the species does not appear to commonly enter bays. Searches of the available literature, and online databases, did not produce specific occurrences or vouchered specimens or images of this species for the Galveston Bay area.

No critical habitat has been designated for this species (NMFS 2019).

Smalltooth Sawfish (*Pristis pectinata*)

Smalltooth sawfish occur in Texas waters today, although their current center of distribution in U.S. waters is southern Florida (Waters et al. 2014). Critical habitat has been designated for this species, but such habitat is limited to two areas in southern Florida (Charlotte Harbor estuary and the Ten Thousand Islands/Everglades units [NMFS 2009a, b]). The Texas coastline, including the project area, is far outside (north) of the designated critical habitat for this primarily tropical species. Nevertheless, Galveston Bay, including the project area, is contained within smalltooth sawfish recovery region B (NMFS 2009a, b). Of the 73+ individuals of this species having been documented in Texas waters and reported by Waters et al. (2014), most of these encounters occurred within this same recovery region.

The most recent record of smalltooth sawfish from the Sawfish Recovery Database at the Florida Fish and Wildlife Conservation Commission (formerly held at UF and named the International Sawfish Encounter Database [previously the National Sawfish Encounter Database]) in Galveston is from 1967.

American Alligator (*Alligator mississippiensis*)

The American alligator is federally threatened due to similarity of appearance to the American crocodile (*Crocodylus porosus*). Alligators range across the southeastern U.S. including eastern and southern Texas (Powell et al. 2016). Alligators occur in inland and coastal water bodies, including estuarine bays (Dundee et al. 1989). Chambers County is among the 'core counties', consisting of the prime historical habitat for this species in Texas, according to the TPWD (2019). No critical habitat is designated for this species.

A total of 426 sightings within Galveston Bay and surrounding areas of the City of Galveston, from 2022 to present, were recorded in iNaturalist and many of these sightings included photographic evidence. A total of 75 records were found in HerpMapper for Chambers, Galveston, and Harris counties, mostly from 2024 but as far back as 2015. Alligators were observed in and around Galveston Bay during most months of the year, but sightings peaked in April and May based on a search of these amateur naturalist sites.

Alligator Snapping Turtle (*Macrochelys temminckii*)

Although this species is not currently federally protected, the species is under review for possible inclusion as a threatened species under the 4(d) rule of ESA (USFWS 2021c). The alligator snapping turtle has been documented to occur in Chambers, Galveston, and Harris counties as recently as 2022 according to Gordon et al. (2023a, b). The species is well known to occur in the

Trinity River (Pritchard 1989), and more recently in Buffalo Bayou (Munscher et al. 2020, 2023) and in the San Jacinto River (Rosenbaum et al. 2023) (Figure 2-3), and all these water bodies flow into Galveston Bay. However, although this species is known to occur in estuaries at least occasionally, and occurs in certain waterways of Houston (e.g., Munscher et al. 2020), no records were found of occurrences within Galveston Bay. This species prefers aquatic habitats that have submerged structures (Sloan and Taylor 1987, Harrel et al. 1996, Howey and Dinkelacker 2009) and the relative lack of such structures within the project area may make this area unattractive to this species.

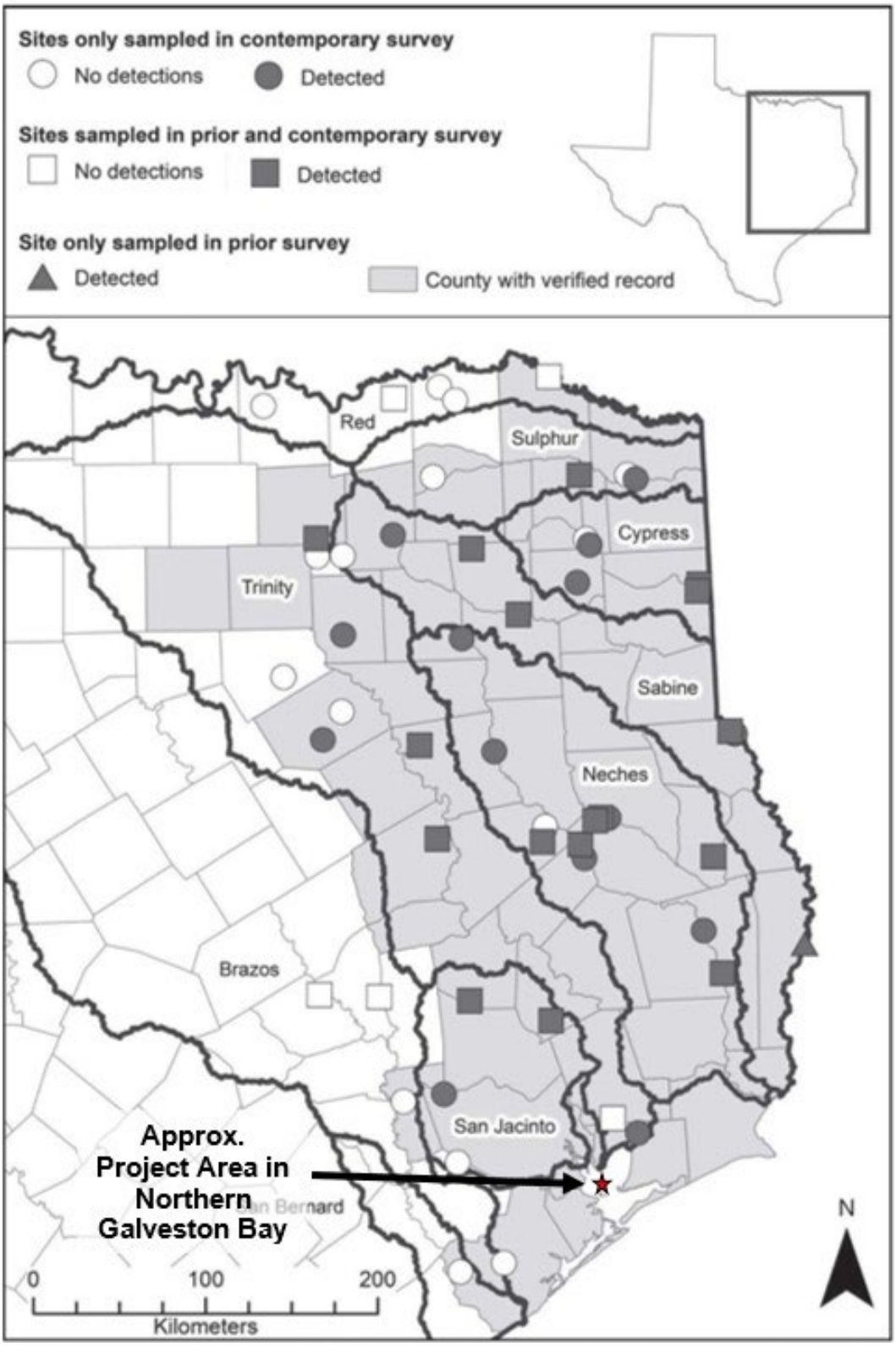

Figure 2-1. Known Occurrences of the Alligator Snapping Turtle (*Macrochelys temminckii*) in Water Basins that Surround Galveston Bay

Source: Modified from Figure 1 of Rosenbaum et al. (2023)

Sea Turtles (Cheloniidae & Dermochelyidae)

Five species of federally threatened or endangered sea turtles occur in coastal Texas waters (Girondot 2015, Witherington and Witherington 2015). Three species, Loggerhead, Green, and Kemps ridley, could potentially be found Galveston Bay waters. NMFS (2023a) stated that Galveston Bay supports a resident population of green turtles. NMFS also stated that the bay 'provides moderate conservation value because it supports moderate density benthic foraging/resting' (page 46584 in NMFS 2023b).

The database search resulted in 4 loggerhead sea turtle (*Caretta caretta*) observations, 17 green sea turtle (*Chelonia mydas*) observations, and 11 Kemp's ridley sea turtle (*Lepidochelys kempii*) observations in Galveston Bay or nearshore waters off Galveston Island. These records were primarily from 2023, but as far back as 2012, as reported to iNaturalist and HerpMapper. In addition, a Kemp's ridley nest was documented in 2022 within the Gulf-side dunes at Galveston Island State Park, with a reported 107 eggs within the clutch (TPWD 2022). No records were found for hawksbill sea turtle (*Eretmochelys imbricata*) or leatherback sea turtle (*Dermochelys coriacea*) within Galveston Bay or nearby waters.

Critical habitat has been designated for all five species. Critical habitat for the North Atlantic distinct population segment of green sea turtle was proposed in July 2023 for along the Texas coastline by NMFS (2023b). Proposed critical habitat unit 'TX01' includes the project area and throughout Galveston Bay along with Gulf waters along the continental slope (NMFS 2023a, b) (Figure 2-2). No other sea turtle critical habitat occurs in Galveston Bay (USFWS IPaC [https://ipac.ecosphere.fws.gov/]).

Loggerhead sea turtle designated critical habitat 'LOGG-S-02' occurs in Texas coastal and offshore waters from the 10-m contour out to the boundary of the U.S. exclusive economic zone (NMFS 2014) (Figure 2-3). Similar critical habitat is proposed by NMFS (2023a, b) for juvenile green turtles using sargassum habitat. The areas of critical habitat for both these species is dependent on the presence of floating pelagic macroalgae, *Sargassum fluitans* and *S. natans*, commonly referred to as simply sargassum. Such habitat does not exist in the Galveston Bay project area.

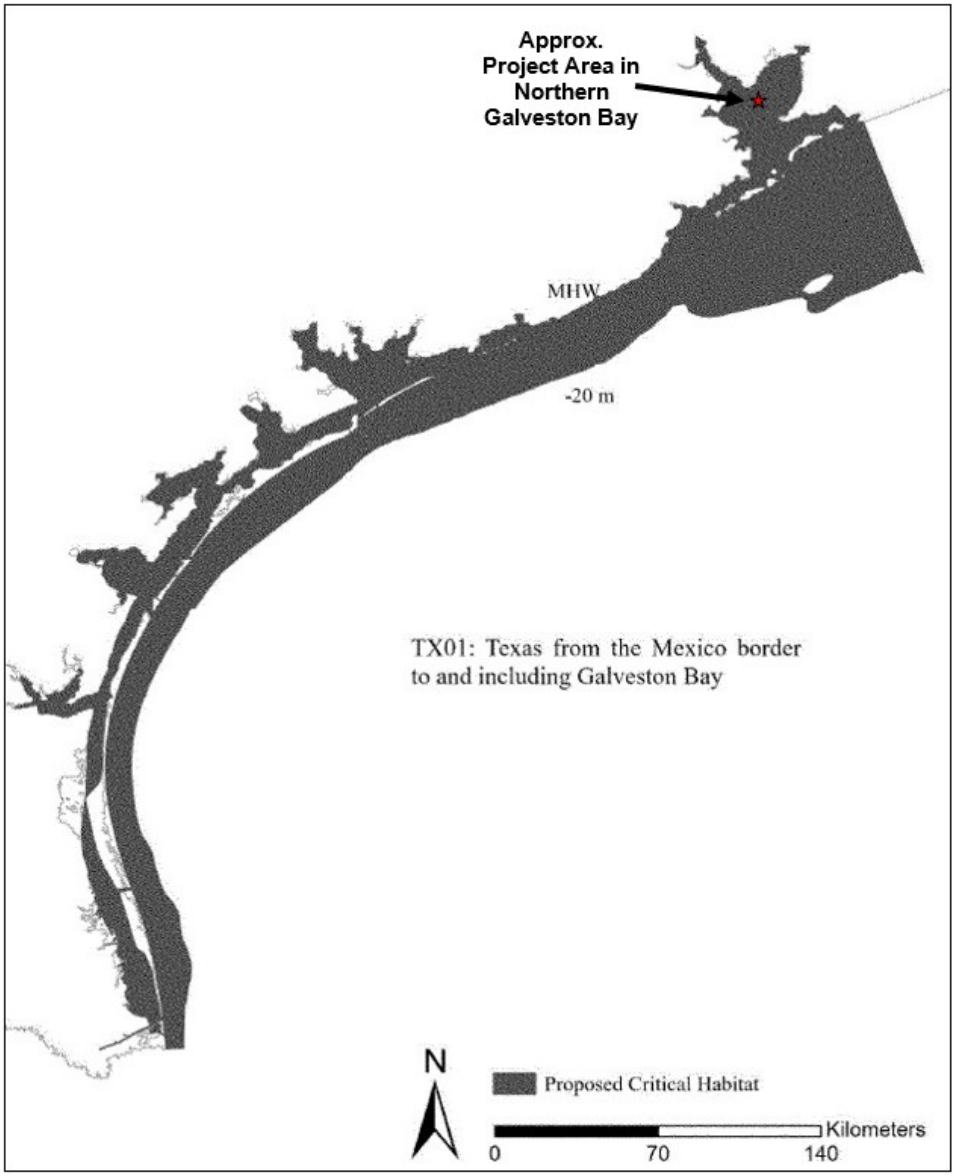

Figure 2-2. Green Sea Turtle (*Chelonia mydas*) Proposed Critical Habitat in Texas Includes Galveston Bay

Note: Proposed critical habitat includes nearshore and bays from the mean high water line out to the 20 m isobath.
Source: Modified from Figure 1c of NMFS (2023b)

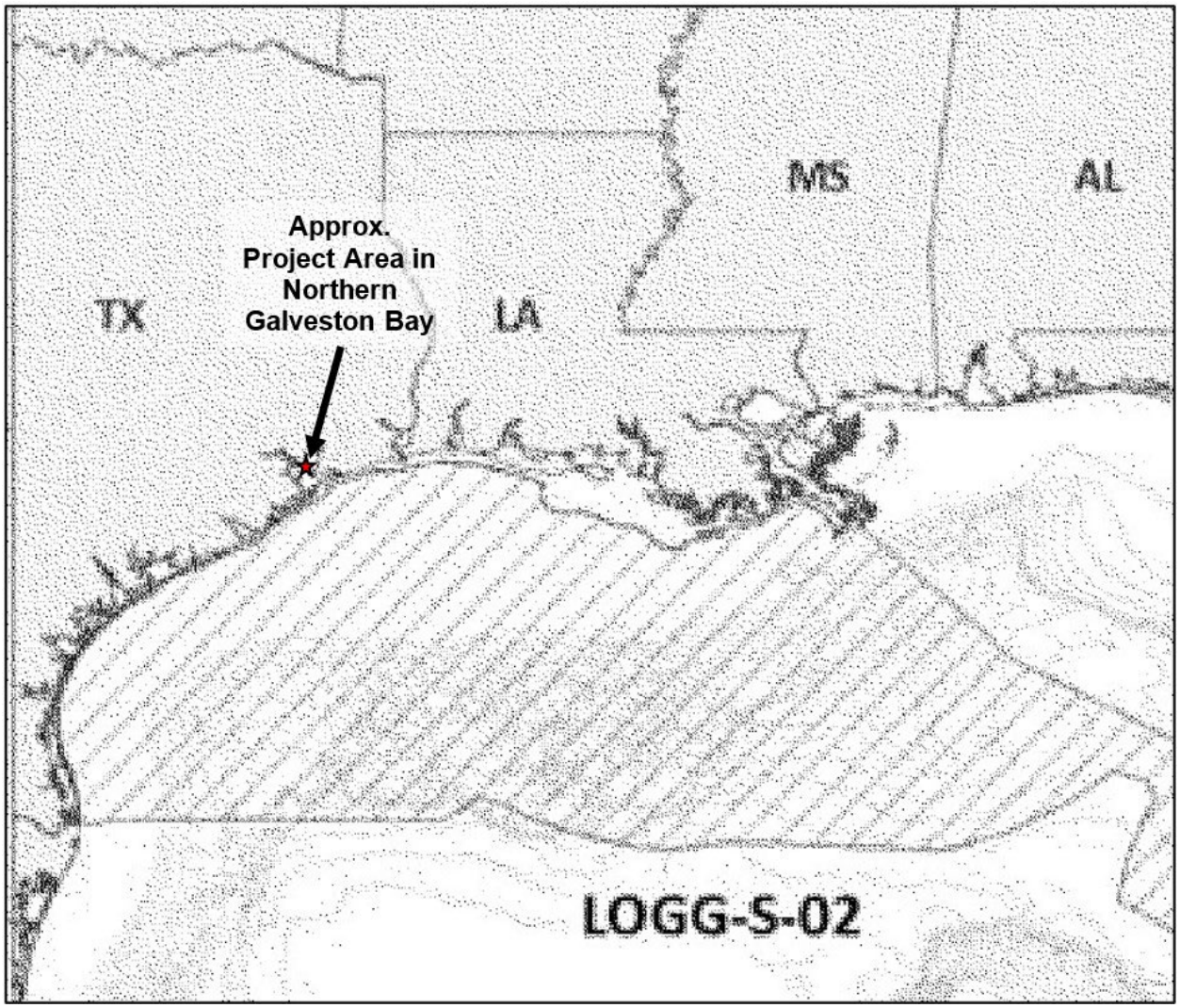

Figure 2-3. Loggerhead Sea Turtle (*Caretta caretta*) Critical Habitat 'LOGG-S-02' off the Texas Coast, from 10-m Contour to the U.S. Exclusive Economic Zone

Note: Critical habitat is shown as crosshatching in the map above. The critical habitat spans from the 10-m isobath and proceeding west and south to the outer boundary of the U.S. exclusive economic zone (ca. 200 nmi offshore).

Source: Modified from an unlabeled figure on page 39912 of NMFS (2014)

Bald Eagle (*Haliaeetus leucocephalus*)

Hundreds of observations of bald eagles were revealed along landforms on all sides of Galveston Bay, and surrounding areas, in the Avian Knowledge Network (aggregated from eBird primarily). An additional 20 observations of bald eagle in the Galveston Bay area were found by searching iNaturalist, and these were primarily from 2022 through 2024, with one record as far back as 2015.

Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)

Coastal habitats of Texas are used year-round by the federally threatened eastern black rail (Figure 2-4) and the species is thought to breed in the state (Oberholser 1974, USFWS 2019) (Figure 2-5). Evidence of breeding in Texas includes nests and (or) pairs of adults observed in May and June in Galveston County (Oberholser 1974). Texas is estimated to have 100–500 breeding pairs, although there is a high degree of uncertainty (USFWS 2019). Suitable coastal

habitats used by the eastern black rail include coastal prairie habitats having emergent grasses, rushes, or other herbaceous plant species (Figure 2-6) (USFWS 2019). Microhabitats preferred by this species include dense mats of dead grass blades in herbaceous coastal areas (Bent 1963), such as where fire has been suppressed (Pough 1951). Isopods appear to be the principal prey item according to Pough (1951).

This subspecies of black rail is considered by the USFWS to be a permanent resident within the Galveston Bay watershed, where it inhabits wet prairies and freshwater and saltwater marshes, although it is considered rare in these habitats (Wolfe and Drew 1990, USFWS 2019). Breeding occurs from mid-March through September in Texas, typically in large coastal marshes where they make their nests out of grasses (Maehr and Kale 2005, USFWS 2019). Current threats to the eastern black rail were identified by USFWS (2019) to include loss and degradation of wetland habitat resulting from land development, conversion of coastal prairie habitat to incompatible land use (e.g., cattle grazing, agriculture), incompatible or poorly timed land management techniques (e.g., grazing, prescribed fire, mechanical treatment), and stochastic events such as floods and hurricanes. Sea level rise is considered a future risk factor.

During the 2014 Texas breeding season, 57 individuals were detected during surveys (USFWS 2019). During the 2016 and 2017 breeding seasons, 239 individuals were detected during surveys (USFWS 2019). Black rail observations in eBird from 2014 to present numbered 603 in the Galveston area, including four photographs and 62 audio files of this species. Observations of black rail in the Galveston area occurred in every month of the year but were highest during March through August. Observations in iNaturalist numbered 13 from 11 observers during 2014 to present, with most records being from 2022 through 2024. No records were found for black rail in the Avian Knowledge Network database or UF Ornithology Collection database for Chambers, Galveston, or Harris counties. The project area lacks prairie or marsh habitat typically used for nesting by coastal populations of this subspecies. The black rail is unlikely to inhabit the project area although the number of observations in the area around the bay suggest that the species occurs in the region.

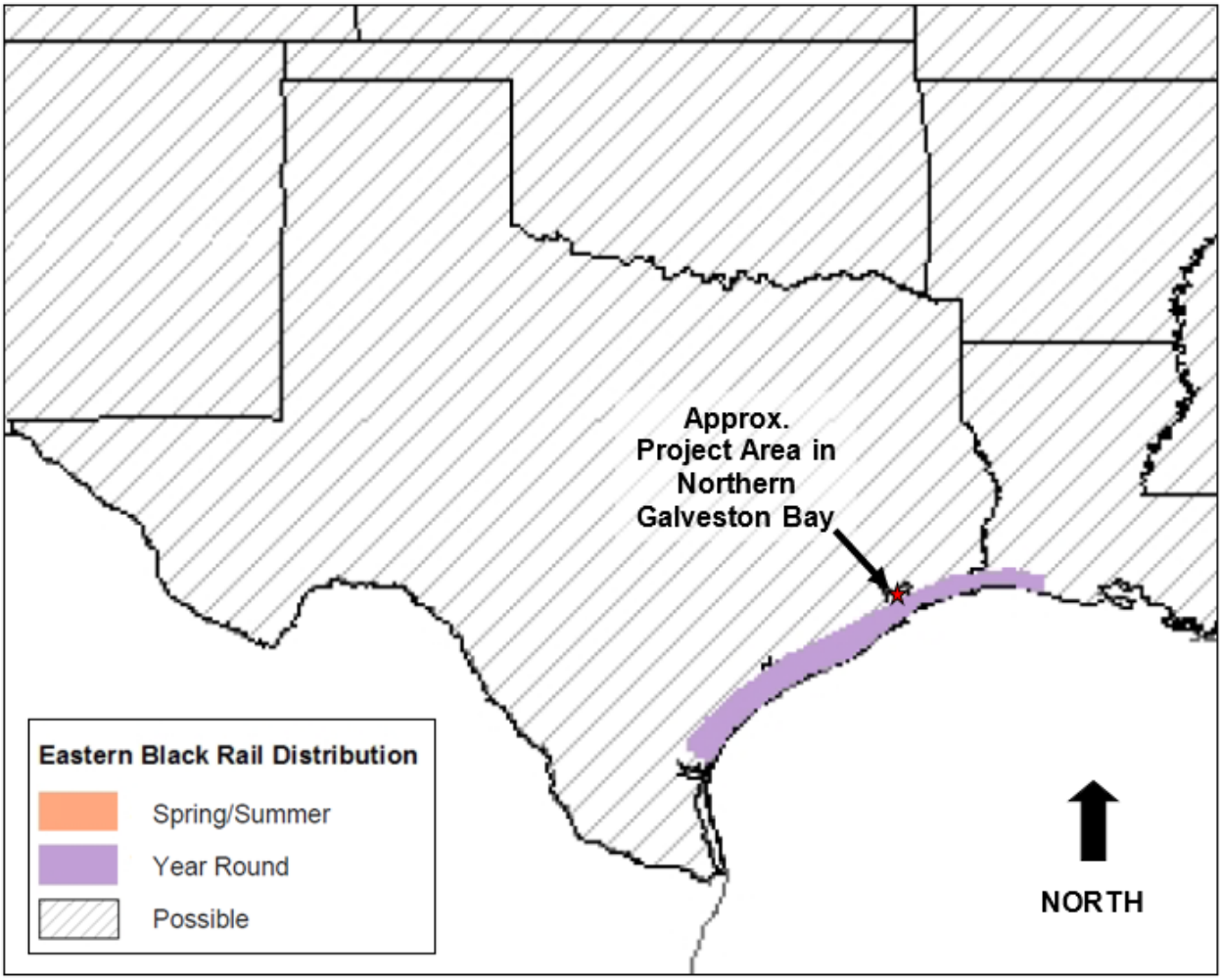

Figure 2-4. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Distribution within Texas

Notes: The species is known to occur year-round in the solid purple area, but occurrence is also possible anywhere within the gray hatched area. The approximate project location is shown with a red star.

Source: Modified from Figure 2-6 of USFWS (2019)

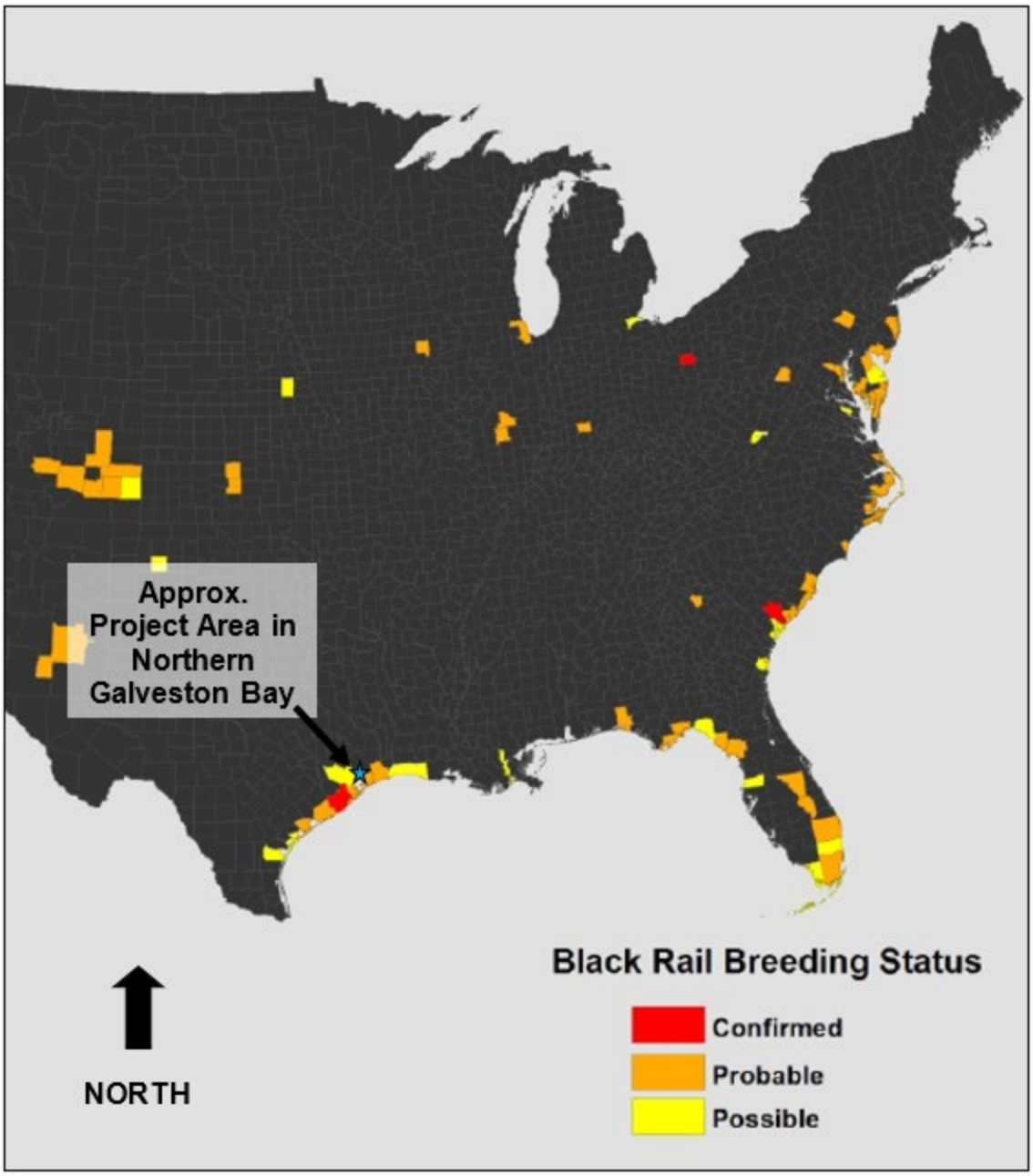

Figure 2-5. Eastern Black Rail (*Laterallus jamaicensis jamaicensis*) Breeding Status per County During 2011–2016

Notes: Confirmed = record of a nest with eggs or young observed; probable = record occurred during 15 May through 31 August; possible = record occurred during 1 April through 15 May. The approximate project location is shown with a blue star.

Source: Modified from Figure 2-7 of USFWS (2019)

Figure 2-6. Examples of Habitats Typically Used by the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)

Notes: Habitat photos were taken in South Carolina (A), Texas (B), Kansas (C), and Honduras (D). Photos taken by C. Hand (A), W. Woodrow (B), R. Laubhan (C), and R. Gallardo and A. Vallely (D).

Source: Modified from Figure 2-5 of USFWS (2019)

Piping Plover (*Charadrius melodus*)

The range of the federally threatened Atlantic Coast and northern Great Plains populations of piping plover includes Texas. Critical habitat has been designated for this species and includes 37 coastal areas of Texas, including the 395-acre Bolivar Flats area (critical habitat unit 'TX-36') and two smaller areas in Galveston County ('TX-35' and 'TX-37') (USFWS 2001). See Figure 2-7 for a map of the three critical habitat units adjacent to Galveston Bay. These and other coastal areas of Texas are used primarily as overwintering and stopover areas by migrating populations (Bent 1929, Hall 1960, National Geographic Society 1987). These habitat areas are primarily composed of tidal flats that are only infrequently inundated. The upland habitat areas of TX-35 through TX-37 are used for roosting by piping plover, while lower elevation areas of these habitat units are used for foraging (USFWS 2001). Threats to piping plover populations include habitat destruction, disturbance by people and pets (especially dogs), high levels of predation, and contaminants (USFWS 2001). Dredging-related threats to the species that were identified by USFWS (2001), including shoreline manipulation that results in habitat loss, disturbing the prey base for piping plover, and direct disturbance of individual birds (USFWS 2001).

The piping plover fall migration arrives in Texas as early as mid-August and the spring migration from Texas to northern climes start as early as late March (Bent 1929). Hundreds of observations

of piping plover for the Galveston area were uncovered from Avian Knowledge Network, eBird, and iNaturalist. The timing of these observations reflects the arrival of these birds in late summer to early fall and their departure in early spring. Searches of the UF Ornithology Collection database and other databases held no additional records for this area.

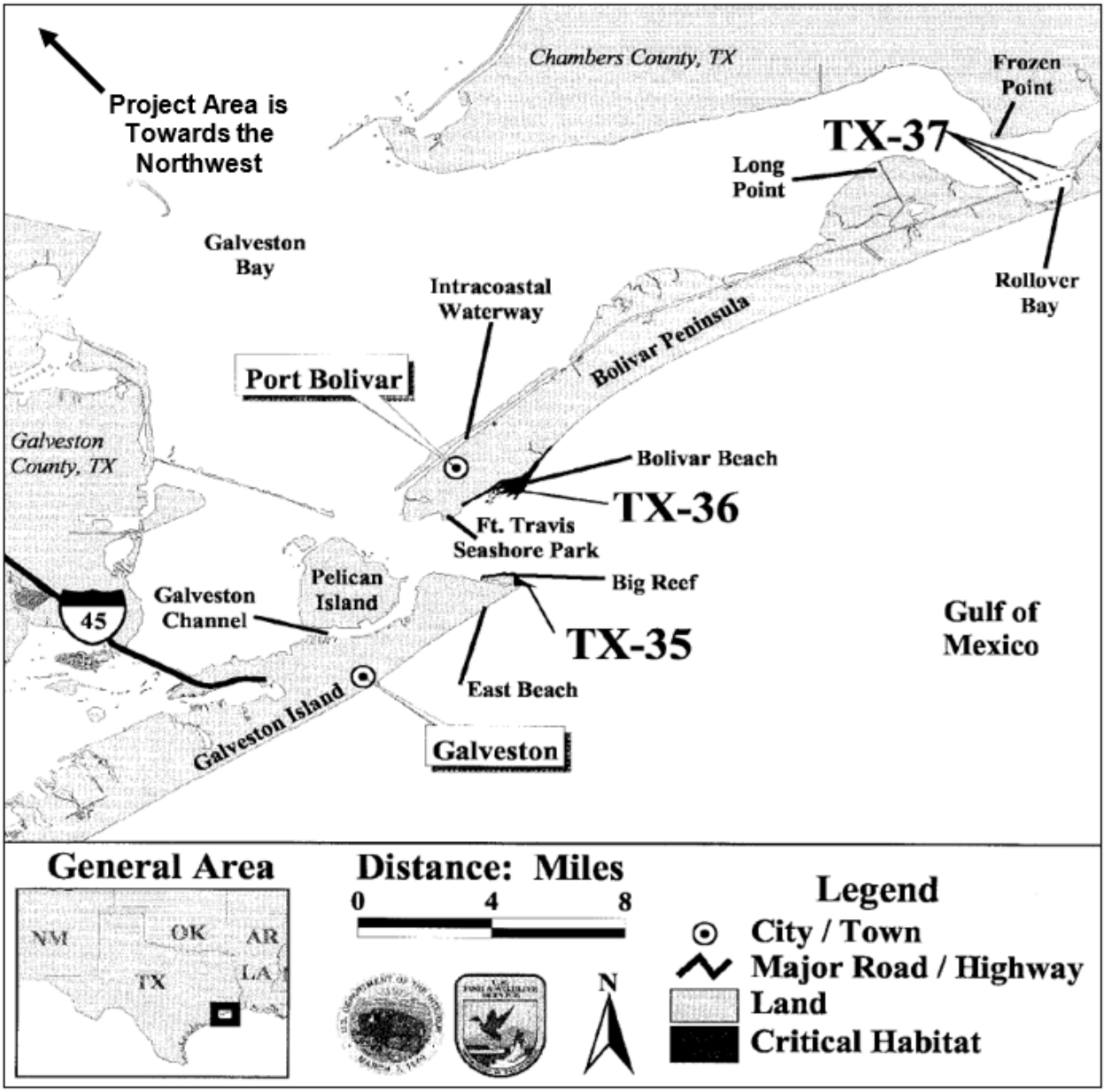

Figure 2-7. Critical Habitat for the Piping Plover (*Charadrius melodus*) Includes Bolivar Beach (TX-36) and Two Other Areas (TX-35 and TX-37) Adjacent to the Project Area

Source: Modified from a figure on page 36143 of USFWS (2001)

Rufa Red Knot (*Calidris canutus rufa*)

Texas is part of the winter (non-breeding) range of the red knot. The *rufa* red knot is one of six subspecies of red knot and is the only subspecies to be afforded federal protection as a threatened species. A total of 1,264 acres of habitat along 17 miles of Gulf shoreline of the Bolivar Peninsula, and Bolivar Flats, is included as proposed critical habitat TX-1 for the rufa red knot

(Figure 2-8) (USFWS 2021a). The western portion of this critical habitat overlaps with the critical habitat of the piping plover. Specific habitat types within TX-1 include subtidal mudflats and sandflats having seagrass, and sandy shoreline (beach) (USFWS 2021a). Oberhalser (1974) listed habitats used by red knots in Texas as sandy and shelly beaches and to a lesser extent, bays and lagoons. Threats identified within critical habitat unit TX-1 include disturbance from vehicle use, modification of habitat resulting from development, beach maintenance and beach nourishment activities, sea level rise, predation by raptors, and natural and anthropogenic disasters (e.g., oil spills, hurricanes) (USFWS 2021a). A total of 590 acres of habitat along the Gulf side of Galveston Island is included as proposed critical habitat TX-2 for this species (Figure 2-9). Specific habitat types within TX-2 are like those of TX-1, as are the threats within this critical habitat unit (USFWS 2021a). Both critical habitat units provide important foraging and roosting habitat for this species during the winter months (USFWS 2021a).

Bolivar Flats is among the most important areas of Texas for overwintering red knot (Niles et al. 2008). This area is managed by the Houston Audubon Society and is part of a peninsula that frames the southeastern edge of Galveston Bay. Although bird-counts for this species in Bolivar Flats have numbered around 3,000 individuals during 1985–1996, more recent counts in that area have recorded only a fraction of that number, with a count in January 2003 estimated at only 300 birds. Knots in Texas feed on bivalves, such as dwarf surf clam (*Mulinia lateralis*) and coquina (*Donax variabilis*) that they forage for in sandy and muddy intertidal zones (Niles et al. 2008). Habitats used by red knot at Bolivar Flats, and elsewhere in Texas, consist of sandy beach, tidal mudflat, and marsh. Such habitats are used during spring and fall migrations as well as while overwintering (Niles et al. 2008).

It is very difficult to discern between subspecies of red knot while in the field and at least two subspecies occur along the northern Gulf Coast. Observations in Texas of banded and marked individuals from areas known to have *rufa* subspecies suggest that the Texas red knot population includes the *rufa* subspecies. However, the Texas population may contain either or both *C. c. rufa* and *C. c. roselaari* subspecies (e.g., Niles et al. 2008).

Hundreds of observations of red knot were uncovered for the Galveston area (especially the Bolivar Flats area) from searching the Avian Knowledge Network, eBird, and iNaturalist. Searches of the UF Ornithology Collection database and other databases held no additional records for this area.

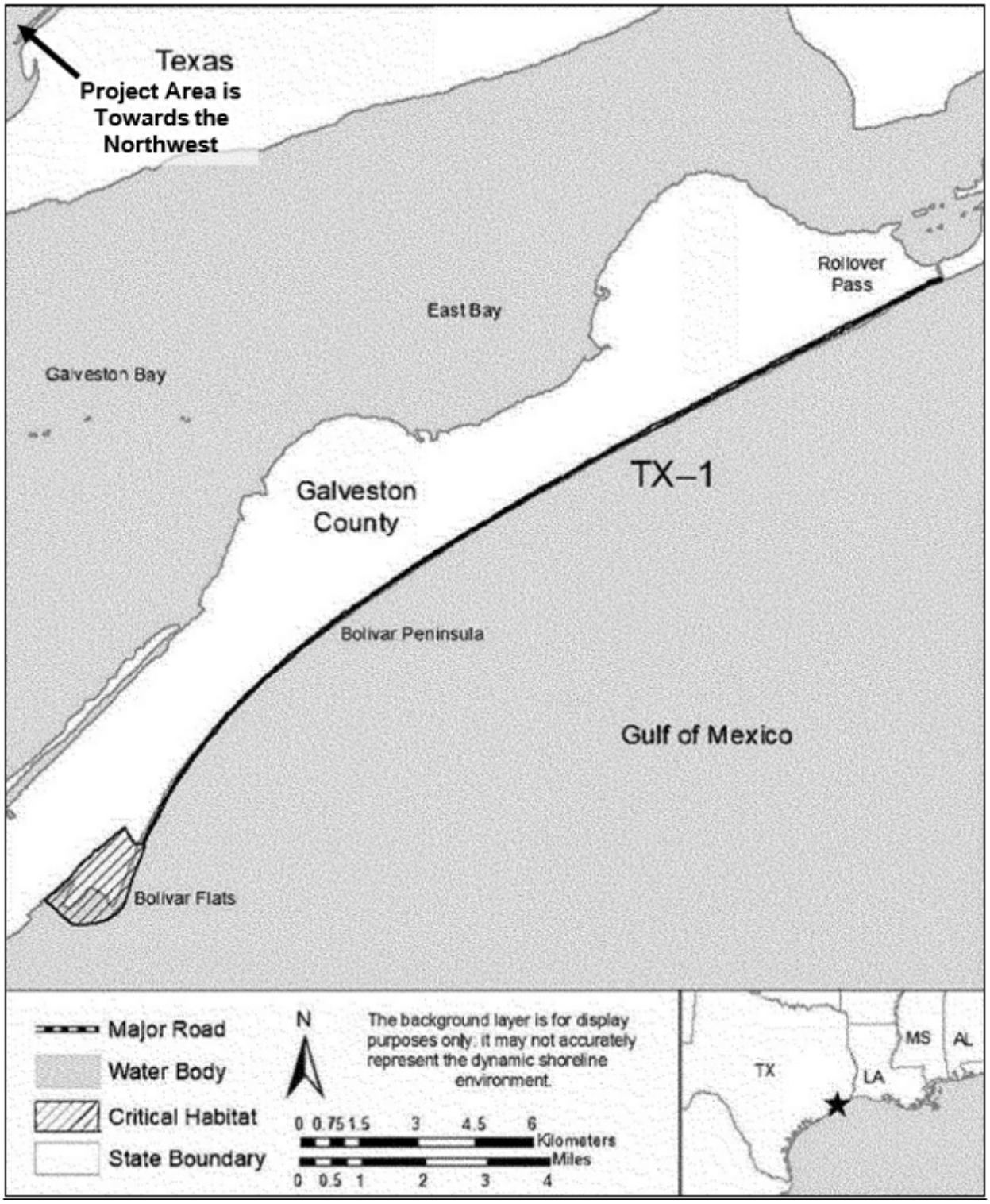

Figure 2-8. Proposed Critical Habitat for the Rufa Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of the Bolivar Peninsula (TX-1) Adjacent to the Project Area

Source: Modified from Figure 94 on page 37650 of USFWS (2021a)

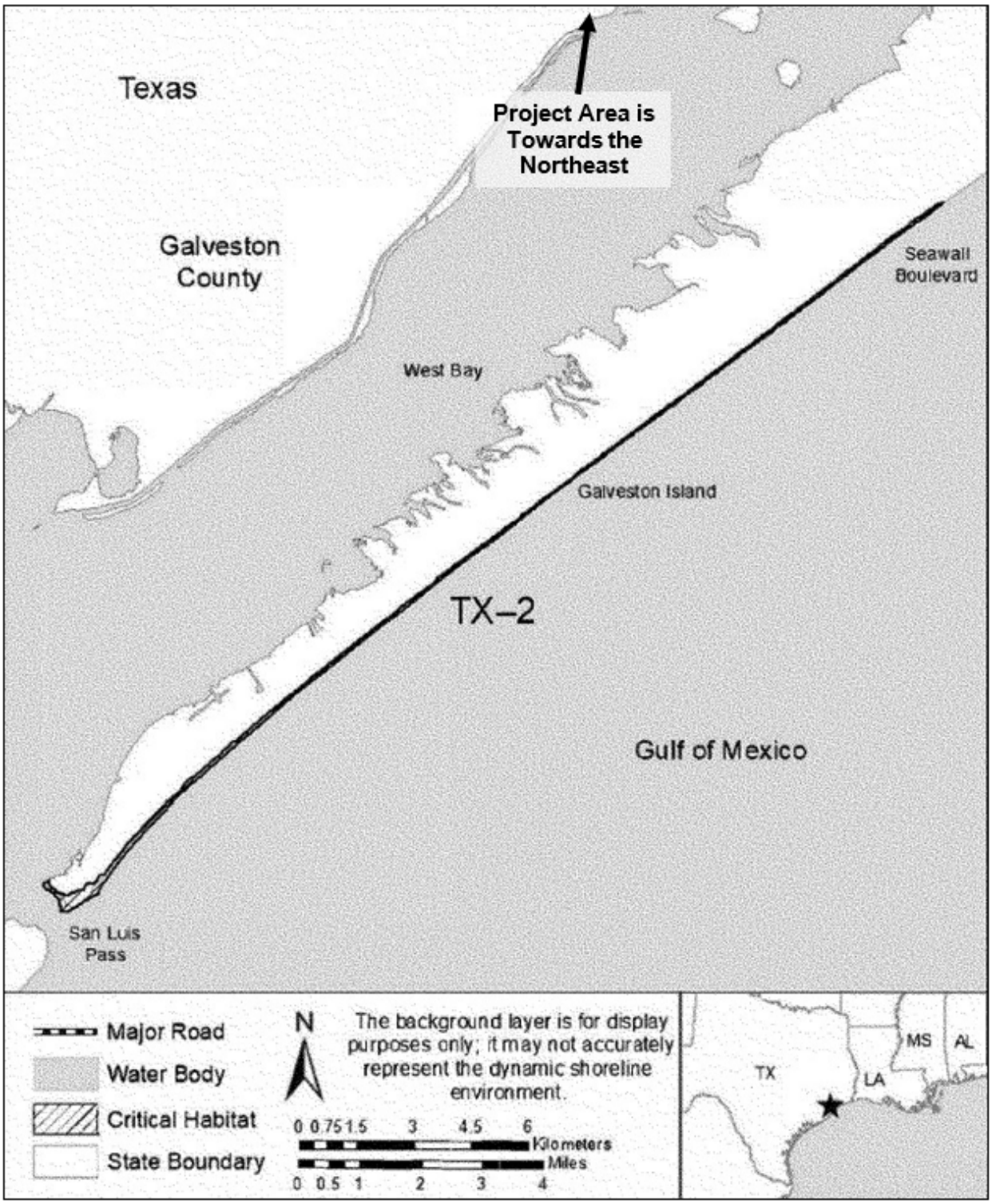

Figure 2-91. Critical Habitat for the Rufa Red Knot (*Calidris canutus rufa*) Includes the Gulf Side of Galveston Island (TX-2) Adjacent to the Project Area

Source: Modified from Figure 95 on page 37652 of USFWS (2021a)

Whooping Crane (*Grus americana*)

The federally endangered whooping crane includes Texas in its historic range (USFWS 2021b). Critical habitat has been designated in seven states including Texas. Critical habitat in Texas

consists of an area in Aransas, Calhoun, and Refugio counties and does not include any area around Galveston Bay (USFWS 1978). Aransas National Wildlife Refuge is included as part of the critical habitat. Texas is within the wintering area of migratory whooping crane. Nesting occurs at Aransas National Wildlife Refuge, where 50 nesting pairs were recorded in 2002, out of 185 whooping crane wintering in Texas (TPWD [no date]). Major threats to whooping cranes include pollution from industrial and agricultural chemicals and oil spills (Oberholser 1974).

Three observations of whooping crane were revealed in the Avian Knowledge Network west of Galveston Bay, near West Bay, and several observations east of Galveston Bay, north of Interstate 10. These records were first reported to eBird. No additional records of this species were found in iNaturalist or the UF Ornithology Collection database for the Galveston Bay area.

Wood Stork (*Mycteria americana*)

The southeastern U.S. distinct population segment of the wood stork was, until recently, afforded federal protection as a threatened species. The USFWS proposed on 15 Feb 2023 for the de-listing of this distinct population segment (the only population to have been protected under the ESA) (USFWS 2023). There is no critical habitat designated for this species (USFWS 2023).

Wood storks spend spring and summer in Texas, where they forage for prey in ponds and lakes having reduced water levels, where prey is concentrated and can be more easily captured by the stork's tactile-feeding methods. The species breeds in southeastern coastal states (Florida, Georgia, South Carolina, and North Carolina). Nesting has not been recorded in Texas in decades according to the Texas Breeding Bird Atlas (https://txtbba.tamu.edu/species-accounts/wood-stork/). Nesting records in Texas are from Chambers County (1930), Jefferson County (1960), and Harris County (date not recorded). Although Chambers and Harris counties border Galveston Bay, the fact that nesting hasn't been recorded in decades makes the project area unlikely to negatively impact wood stork nesting.

Hundreds of observations of wood stork in the Galveston area were uncovered from the Avian Knowledge Network, eBird, and iNaturalist online databases. Searches of the UF Ornithology Collection database and other databases held no additional records for this area.

Bottlenose Dolphin (*Tursiops truncatus*)

Bottlenose dolphin range throughout coastal areas of the northern Gulf of Mexico along with much of the eastern seaboard of the U.S., including Texas bays and estuaries (Schmidly 1981, Brown 1991, Wynne and Schwartz 1999). Davis and Schmidly (1994) noted that there is evidence that the numbers of bottlenose dolphins off Galveston are reduced during the winter months but did not suggest a possible cause of the seasonal movements. The population within Galveston Bay and surrounding bays is considered a distinct 'stock' or population from populations in surrounding areas according to Vollmer and Rosel (2013). Coastal populations and offshore populations rarely intermix (Davis and Schmidly 1994). The species is protected under the Marine Mammal Protection Act. Vollmer and Rosel (2013) conducted a thorough literature review that included potential threats to populations in the Gulf of Mexico. Anthropogenic threats identified included fisheries and research-related mortalities, entanglement, provisioning, habitat degradation, coastal development, and climate change. Davis and Schmidly (1994) listed threats to bottlenose dolphins in Texas as including oil and gas industry development, heavy boating traffic, and coastal pollution. Dredging-related activities were not identified as potential threats by any of these authors.

North Atlantic Right Whale (*Eubalaena glacialis*)

Although this federally endangered species is not well known to occur in the Gulf of Mexico (Laist 2017), the results of the literature review revealed records for this species off Texas and the Florida Gulf coast. Sightings in Gulf waters stretch at least as far back as the 19th century, when Clark (1887) reported that overwintering right whales at least occasionally were found in the Gulf of Mexico. Twentieth century records of right whales in the Gulf include a sighting on 10 March 1963 of two apparent adults off Sarasota, Florida, by Moore and Clark (1963). A carcass of a juvenile calf was found in Jan 1972 off Freeport, Texas and reported by Schmidly et al. (1972). The calf had reportedly been struck by a vessel.

More recently, in 2004, two cow-calf pairs were observed in the Gulf of Mexico. Photographic documentation allows researchers to identify individual North Atlantic right whales by the patterning of callosities on their skin, along with other identifying marks. A cow-calf pair was observed in Mar and Apr 2004 off northwestern Florida (Ward-Geiger et al. 2011). This pair of North Atlantic right whales were photographed off Panama City Beach, Florida, on 14 Mar 2004. The cow was identified as NARW 2360, a cow of unknown age that was first photo-documented in 1993 (Ward-Geiger et al. 2011). This was her first known calf. They were later photographed on 01 Apr 2004 in Pensacola Bay, Florida, and on 08 Apr 2004 between Pensacola and Panama City, Florida. The same pair had been observed on 30 Jan 2004 swimming off Miami, Florida, and later, off Cape Cod, Massachusetts, on 31 May 2004, indicating that they had successfully migrated to northern feeding grounds (Ward-Geiger et al. 2011).

A cow-calf pair was sighted on 16 Jan 2006 in Corpus Christi, Texas, and photographed by the Texas Marine Mammal Stranding Network (Ward-Geiger et al. 2011). The pair were found near the Port of Corpus Christi and the calf was observed to have wounds on its dorsal side. This is the farthest west that any North Atlantic right whale has been recorded. On 04 Feb 2006, the calf was photographed (including video) near the Aransas Pass Ship Channel and the photographs were later identified as NARW 2503's calf (Ward-Geiger et al. 2011). NARW 2503 is an 11-year-old cow and this was her first documented calf. The cow-calf pair were then photographed by NOAA Fisheries and the Florida Fish and Wildlife Conservation Commission on 27 Feb 2006 off Longboat Key, Florida. The dorsal wounds on the calf appeared to be healing (Ward-Geiger et al. 2011).

No records were found of North Atlantic right whales in or near Galveston Bay. However, given that a pair were observed farther west, off Corpus Christi, the Galveston area is apparently within the known range of wandering right whales. There is no designated critical habitat off Texas or elsewhere in the Gulf of Mexico (NMFS 2016b).

Tricolored Bat (*Perimyotis subflavus*)

The tricolored bat has been proposed for listing as an endangered under the ESA since 14 Sep 2022. The species has a wide distribution that includes eastern and coastal Texas. The species utilizes wide assortment of natural materials and man-made structures for roosting, including Spanish moss (*Tillandsia usneoides*), palm fronds, pine needles, roofs, bridges, roadside culverts, in caves, and (rarely) in buildings (Davis and Schmidly 1994, Marks and Marks 2006, USFWS 2022). Tricolored bats do not appear to use bat houses (Marks and Marks 2006). Roosting is done singly or in pairs; only rarely in larger groups (Marks and Marks 2006). Foraging is done in forested areas and over water and the species feeds on insects including ants, beetles, flies, moths, and leafhoppers (Davis and Schmidly 1994). In southern states such as Texas, the species may be active through the winter; however, the species hibernates in caves (either singly or in small groups) within its northern range (Davis and Schmidly 1994). Natural and anthropogenic threats to the tricolored bat include white-nose syndrome disease, caused by the

fungal pathogen *Pseudogymnoascus destructans*, mortality associated with wind turbines, habitat loss and disturbance, and (potentially) climate change (USFWS 2022). A search of available literature, and online databases, turned up a photo-documented observation, dated Oct 2023, of a tricolored bat roosting on a rock-walled building in Harris County, Texas.

West Indian Manatee (*Trichechus manatus* [Florida manatee *T. m. latirostris*])

The West Indian manatee is afforded federal protection as a threatened species under the ESA and well as under the Marine Mammal Protection Act. Manatee occur primarily in peninsular Florida and southeastern Georgia (Wynne and Schwartz 1999), but have been recorded as far west in the U.S. as Texas although the species is very rare in the state (O'Shea et al. 1995). Texas occurrences include records from the Bolivar Peninsular, Copano Bay, Cow Bayou, near Sabine Lake, San Hose Island, and the mouth of the Rio Grande River (Davis and Schmidly 1994, Schmidly and Bradley 2016). Critical habitat has been designated in several coastal and riverine areas of Florida (https://ecos.fws.gov/ecp/species/4469) but no such habitat has been designated in Texas. A search of the available literature, and online databases, did not reveal any records of manatee in Galveston Bay.

3 EFFECTS ANALYSIS OF PROPOSED ACTION

3.1 Effects to Monarch Butterfly

The monarch butterfly has not yet gained protection under the ESA and it lacks designated critical habitat. Over 200 observations of this species within the Galveston Bay area were found in online databases for the period 2019 to present. Members of this species likely fly across Galveston Bay while migrating to and from overwintering sites in Mexico, although there are multiple flyways used during migration. However, the project area does not offer habitat or resources important to the species' life history. Measures to avoid and minimize impacts to monarch butterflies are summarized in Subsection 4.1. For these reasons, the proposed action is expected to have **no effect** on the monarch butterfly.

3.2 Effects to Sawfishes & the Giant Manta

No records were found to indicate the recent or current presence of the federally protected giant manta or smalltooth sawfish in or near the project area. The giant manta lacks designated critical habitat while the smalltooth sawfish has critical habitat outside of Texas. These species would not be expected to occur in the project area. The giant manta occurs most often in open water, rather than in shallow bays, and is a highly migratory open-water pelagic species. The smalltooth sawfish has been recorded in Texas waters in recent years but is considered rare in the state. No recent records were found for encounters with this species within Galveston Bay.

Manta and sawfishes are large and highly mobile, and it is reasonable to assume they would be able to easily avoid slow-moving vessels and dredging equipment and would not be impacted by dredged material placement. The giant manta is most often found offshore and is not likely to spend time in any one area, given its highly migratory behavioral traits. For these reasons, the proposed action will have **no effect** on smalltooth sawfish or Giant Manta ray.

3.3 Effects to the American Alligator & Alligator Snapping Turtle

The American alligator is well managed in Texas by the TPWD (2019), including determining population trends, assessing alligator habitat, and establishing sustainable hunting for this species. Most life stages of alligators can swim strongly and are likely to be able to quickly move out of the project area to avoid equipment or burial by dredged material. The alligator is listed as threatened due to similarity of appearance to crocodiles. Crocodiles are not known to exist in Galveston Bay. Therefore the proposed action will have **no effect** to the American alligator.

No evidence was found of the occurrence of alligator snapping turtles in Galveston Bay, either past or present. The nearest population(s) of this species to the project area are in rivers upstream of Galveston Bay, and these upstream habitats would not be affected by the proposed action. **No effect** is expected to the alligator snapping turtle.

3.4 Effects to Sea Turtles & Their Critical Habitat

At least three species of sea turtles frequent Galveston Bay based on results of the literature and database search. Records indicate that green sea turtles, loggerheads, and Kemp's ridley sea turtles have been observed within the bay at least as recently as 2024. There is proposed critical habitat for the green turtle that includes the project area and throughout Galveston Bay and this habitat is likely to be formally designated soon.

Leatherbacks are unlikely to enter Galveston Bay, and Texas beaches are not important for leatherback nesting, although the species inhabits open Gulf waters (Girondot 2015, Shillinger

and Bailey 2015). **No effect** is predicted for leatherbacks as the project area is many miles from the nearest suitable habitat for this species.

Hawksbill sea turtles prefer clear offshore waters of mainland and island shelves and therefore are unlikely to occur in the project area. They are most common where coral reef formations are present. **No effect** is predicted for hawksbill sea turtles as the project area is many miles from the nearest near coastal or suitable coral reef habitat for this species.

Loggerhead sea turtles are found in three distinct marine habitats: oceanic beaches, pelagic convergence zones, and benthic feeding grounds of shallow waters and bays (TPWD 2017). Although not frequently found in the Galveston area, it is possible for an individual loggerhead turtle to be located in Galveston Bay at any given time.

Green sea turtles are found in three distinct marine habitat types: high-energy oceanic beaches, convergence zones in pelagic habitat, and benthic feeding grounds in relatively shallow, protected waters such as those found in Galveston Bay (USFWS/NMFS 1991). Although no seagrass is present in the project area, green sea turtles could be present in the water column in search of adequate foraging habitat.

Kemp's ridley adults in their post-pelagic stages are commonly found feeding over bottoms and juveniles are frequently found feeding in bays, coastal lagoons, and river mouths and could be located in inland waters of Galveston Bay (TPWD 2017)

Dredging interactions are well known sources of mortality to sea turtles via entrainment (Dickerson et al. 1990, Dickerson 2011). Non-dredging-related vessels also present potential sources of injury or death to sea turtles due to impact with the hull, lower unit, and (or) propeller of the vessel. Pre-construction briefs will be given to construction/dredging crews to inform them of appropriate procedures should a sea turtle be observed. Guidance and recommendations from the USACE Waterways Experiment Station's *Alternative Dredging Equipment and Operational Methods to Minimize Sea Turtle Mortalities* (Dickerson et al. 1990) may be used to help avoid impacts to sea turtles during construction. All best management practices will be adhered to during construction and dredging activities to ensure avoidance of impacts to sea turtles.

Most sea turtles spend about 3% of their time at the surface of the water, breathing and basking (Witherington and Witherington 2015) and such surface time puts them at risk from collisions with vessels (Hazel and Gyuris 2006). Under the proposed action scenario, scows or hopper dredges would transit between the HSC, generally above Morgans Point (mile 26.2), and the BABUS to place dredged material there. Although the distance from the HSC to the proposed action area is relatively short, such activity may nonetheless lead to collisions between vessels and sea turtles. Vessels traveling at speeds below 15 knots (28 km/hour or 17 mi/hour) have lower chances of striking a sea turtle compared to those traveling at higher speeds (Witherington and Witherington 2015). Slower vessel speeds allow more time for a turtle to avoid collision. Hazel and Gyuris (2006) found that vessels traveling over 4 km/hour (2.5 mi/hour) are difficult for green sea turtles to avoid collision if they are at or near the water surface and are within the vessel's track during transit. However, sea turtles are highly mobile and alert and can often visually and audibly sense an approaching vessel and will dive or otherwise evade collision if given adequate time (Hazel and Gyuris 2006). Hopper dredges can move quickly while in transit, with maximum speeds of 17 knots unloaded and 16 knots loaded with dredged material (NMFS 2020). Thus, a hopper dredge, whether loaded or empty, transiting at top speed may easily collide with a sea turtle. This fact is made clearer when compared to the tow speeds of bottom otter trawls used to relocate sea turtles from active dredging areas. Such trawls are well known to capture sea turtles under standard trawl-towing speeds of from 1.5 to 3 knots (2.8–5.6 km/hour or 1.7–3.5 mi/hour) (NMFS 2020).

The dredge contractors would adopt avoidance and minimization measures to reduce the potential for collisions with sea turtles at the surface. These avoidance and minimization measures are discussed in Subsection 4.2.

Placement activities at the BABUS can potentially reduce food availability by burying and (or) altering the benthic habitat and creating temporary increases in turbidity. Turbidity and siltation can negatively affect seagrasses and macroalgae (which green turtles commonly feed on) by reducing the amount of sunlight that reaches photosynthetic cells or to smother beds of these species. However, sidescan surveys conducted in December 2023 and October 2024 throughout the project area found no evidence of any seagrass within the project area, so effects to seagrasses are expected to be very low.

The effect of increased turbidity on sea turtles, and their food sources, is expected to be minimal due to the short duration of the reduced water clarity. The effects of burial on benthic infauna could be persistent within the boundaries of the BABUS since placement operations repeatedly impact the same area, potentially making it difficult for benthic infauna to fully recover within the placement footprint or altering species composition. However, the proposed BABUS project area (≤4,500 acres) represents only a small portion of this type of benthic habitat available in the Galveston Bay complex, and only a relatively small portion of the BABUS project area would be impacted during any one placement event.

Kemp's ridley sea turtles feed on a wide variety of food items, and in general, larger epibenthic prey are more often consumed rather than strictly benthic prey (Witherington et al. 2006, Schmid and Barichivich 2006). Larger epibenthic organisms, such as crabs and snails, being adapted for digging in and out of soft sediment, may be able to dig out of and recover following dredged material placement. Overall, considering the information above, any effect on the availability of prey is considered to be negligible.

For the reasons stated above, significant effects on sea turtles are not expected due to construction or dredged material placement activities; therefore, the proposed action **may affect, but is not likely to adversely affect** green, loggerhead, and Kemp's ridley sea turtles or their critical habitat.

3.5 Effects to Birds & Their Critical Habitat

The habitat characterization and results of the literature and database searches indicate that some bird species probably utilize the project area at least occasionally and in low numbers. The low numbers of any one species of bird minimize the chances of disturbance to foraging or roosting birds during the construction and maintenance-dredged material placement phase of the proposed BABUS project. Also, no critical habitat occurs in or near the project area, although some critical habitat occurs in the nearby Bolivar Peninsula and in other areas of Galveston County. Measures designed to minimize and avoid disturbance to bird species are summarized in Subsection 4.3.

Piping plover and rufa red knots are known to utilize intertidal beaches, flats, dune systems, and upland flats. The project does not include the construction of any of these habitat features and therefore is not expected to attract these bird species following construction. Due to lack of available habitat at the project area, and distance of the project to any designated critical habitat areas, the project is anticipated to have **no effect** to piping plover and rufa red knot.

No effect to the wood stork or whooping crane is expected. The proposed action area is currently devoid of suitable habitat for wood storks or whooping cranes and this species would not be expected to utilize the project area for any reason.

No effect to the eastern black rail is expected. The proposed action area is currently devoid of suitable habitat for rails and this species would not be expected to utilize the project area for any reason.

However, it is possible that the rail may experience a net positive effect resulting from the proposed action. The constructed intertidal marsh habitat may possibly be used by the eastern black rail for nesting and foraging, as marsh habitat has declined in and around Galveston Bay in recent decades. Black rails may adopt and use the generated marsh habitat once it is established.

No effect is expected for the bald eagle. The proposed action area is suitable for foraging but is small relative to the size of the Galveston Bay complex as a whole. The proposed action is expected to have a net benefit to several fish species of the bay by providing marsh habitat where none currently exist. Marsh habitat is widely known to be used as nursery habitat for larger fishes and provides habitat for forage fishes on which a wide variety of species rely on. Thus, the proposed action may increase the prey base for eagles and other predators that include fish in their diet.

No effect is expected for the whooping crane. The project area is devoid of critical habitat, or other habitat, used by this species. Dredging activities are not listed among the known threats to the whooping crane.

3.6 Effects to Aquatic & Avian Mammals

Bottlenose Dolphin

The population of bottlenose dolphins inhabiting Galveston Bay, and surrounding bays, is considered distinct from populations of this species outside of this area according to Vollmer and Rosel (2013). Bottlenose dolphins are powerful and highly mobile swimmers and therefore are likely to be able to easily avoid the project area during construction and placement activities. No dredging-related effects were found during a literature search. A compilation of anthropogenic threats identified by Davis and Schmidly (1994) and Vollmer and Rosel (2013) did not note dredging actions or dredging equipment as potential hazards to individual dolphins or their populations. For these reasons, **no effect** is expected to the Galveston Bay population or the regional populations of bottlenose dolphin.

North Atlantic Right Whale

There are only about 400 individuals, and only about 100 remaining breeding females, of the North Atlantic right whale remaining on the planet (Bak 2020). An ESA workshop by USACE in February 2024 that included right whale experts indicated that the population was only approximately 360 individuals at that time (USACE 2024). The extremely low population size of this species, coupled with the species' *K*-selected life history traits (e.g., late maturity, long gestation period, small number of offspring) and the rate of decline of its remaining population, demands vigilance on the part of managers involved with dredging projects within the Atlantic basin. This is because the loss of as little as one reproductive-age female may have population-level effects.

Vessel collisions, along with entanglements in fishing gear, are the largest threats to North Atlantic right whales (Laist 2017, Hamilton-Barry 2019, Bak 2020). The recovery plan for this species considers vessel collisions the 'greatest known current cause of right whale mortality' (page IG-1

of NMFS 2004). A workshop conducted by USACE in February 2024 on dredging impacts to right whales along the U.S. east coast identified vessel collisions as the highest risk to this species from dredging (USACE 2024).

Unlike other baleen whales of the Atlantic basin, which generally spend their lives far offshore, this species spends most of its time in shallow continental shelf waters within a short distance from shore and is known to enter inshore waters such as bays (Laist 2017, Hamilton-Barry 2019, Bak 2020). Right whales are difficult to detect because they lack a dorsal fin and cow-calf pairs often spend time just below the surface (USACE 2024). Unlike along the east coast of the U.S., there are no known passive acoustic listening stations in the Gulf for right whales, and there are no aerial surveys for this species performed in the Gulf (USACE 2024). Any right whales that enter the Gulf are not tracked and may go completely undetected for long periods of time.

Although few records exist for this species in Texas waters, what few records exist for this area have included cows with calves. Thus, an abundance of caution is needed for dredging managers and NEPA practitioners in Texas to avoid collisions. See Subsection 4.4 for a discussion of the avoidance and minimization measures for marine mammals. However, the lack of critical habitat in the Gulf, coupled with the very rare known occurrences of this species off Texas, and no known occurrences of this species within Galveston Bay, when considered together indicates that **no effect** is expected for the North Atlantic right whale resulting from the proposed action. The proposed action reduces the number of transits of hopper dredges or scows to the Galveston ODMDS (in nearshore Gulf waters) over the next several decades and therefore this action reduces the change of vessel-strike for any right whales that may wander into Texas waters in the future.

Tricolored Bat

Although this bat appears to occur in the Galveston Bay area, the project area lacks roosting areas or hibernacula. Although the species may forage over-water in Galveston Bay, the project area amounts to only a small fraction of the over-water area within the bay complex. No critical habitat has been designated as of this writing. The proposed action does not appear to include a component that could potentially affect this species. Overall, **no effect** is expected for the tricolored bat.

West Indian Manatee

West Indian manatees are very rare in Texas due mainly to the cooler winter water temperatures there compared to Florida and southeastern Georgia, where this warm water species finds the water temperatures more favorable. No recent records were found during the literature and database searches. Texas lacks designated critical habitat for this species. Nonetheless, avoidance and minimization measures will be employed during the construction phase of the proposed action (see Subsection 4.4 for specified measures). For these reasons, and taking into account the key to effects determinations for the manatee in USACE (2013), the proposed action **may affect, but is not likely to adversely affect** the West Indian manatee.

4 AVOIDANCE & MINIMIZATION MEASURES

Stakeholder involvement through agency coordination during project development aided in the development of avoidance and minimization measures that would be implemented in the specific BABUS placement areas to protect federally protected species as discussed below.

4.1 Monarch Butterfly

Use of construction lighting at night shall be minimized, directed toward the construction activity area, and shielded from view outside of the project area to the maximum extent practicable. This will help reduce confusion to migrating monarch butterflies and prevent collisions with equipment due to excessive lighting. This considers the use of ultraviolet polarized light (among other cues) that monarchs use as a compass for navigating during migrations (Guerra et al. 2014).

4.2 Sea Turtles

USACE will comply with applicable windows and protective measures for protection of sea turtles as stated in the Gulf of Mexico Regional Biological Opinion by NOAA Fisheries (2003) through revision 2 of NMFS (2007) (or more recent revision). USACE will also comply with the construction conditions for protected species that are outlined in NOAA Fisheries (2021).

In general, to minimize the potential for collisions, vessels transporting dredged materials to the BABUS are expected to implement protective measures, where feasible, to avoid interactions with sea turtles, including maneuvering away from the animal or slowing the vessel. During transport of dredged material from the HSC to the BABUS cells and when returning to the HSC, vessels would use caution and proceed at a speed such that the vessel can safely take proper and effective action to avoid a potential collision with a sea turtle; this preventative action would significantly reduce the potential for a vessel strike with a sea turtle. Any known collision or sighting of an injured or dead sea turtle shall be reported immediately to the NOAA Fisheries Southeast Regional Office, Protected Resources Division, and the local authorized sea turtle stranding/rescue organization.

Despite these precautions, turtles may prove very difficult to spot from a moving vessel when they are resting below the water surface, during nighttime, and during periods of inclement weather. It is assumed, however, that a collision between a sea turtle and moving vessel is unlikely. Adult, subadult, and perhaps juvenile turtles are mobile enough to actively avoid dredge-related vessels in transit, especially when the vessels operate within predictable areas (federal navigation channels mainly) and at slow speeds.

4.3 Birds

There is a risk that birds may take up residence and be disturbed during the latter stages of construction of the BABUS cells. This is because constructed habitat may attract shorebirds and other types of birds. The following measures are planned with the intent to avoid or otherwise minimize impacts to birds to the extent possible:

- Project equipment and vehicles transiting between the dredging area and the BABUS will be minimized to the extent practicable, including but not limited to using designated routes and confining vehicle access to the immediate needs of the project.
- Use of construction lighting at night shall be minimized, directed toward the construction activity area, and shielded from view outside of the project area to the maximum extent practicable. This will help reduce confusion to night-flying or crepuscular bird species and prevent collisions with equipment due to excessive lighting.

- Construction crews should avoid working in important shorebird habitats when winter winds above 20 miles per hour co-occur with temperatures below 40 degrees Fahrenheit. These conditions can cause the birds to roost for energy conservation, often in available ruts. If placement is not able to be avoided during nesting season, all efforts will be made to avoid placement of material within emergent shell hash areas along the shoreline to the best extent practicable.
- Material will be placed from the back of the marsh area first, working towards the bay, to allow for birds and other species to seek refuge or vacate the area prior to dredged material placement within the open-water area.
- The following conservation measures would be implemented to avoid or minimize potential effects to eastern black rail:
    - Avoid marsh placement of dredged material from March 1 through September 30 (breeding, nesting, chick rearing, and molting season).
        - If this timing restriction cannot be achieved, then the following will take place: No material for marsh restoration will be placed in high marsh dominated by dense overhead cover that meets the target marsh elevation for black rail habitat.
    - A biological monitor should ensure a sufficiently slow pace of all equipment moving through potential habitat to allow birds to escape ahead of equipment.
    - A biological monitor will have authority to stop work immediately upon discovery of any eastern black rail (alive, injured, or dead). The Texas Coastal Ecological Services Field Office will be contacted immediately at 361-533-6765 upon discovery of a black rail.
    - Minimize traffic in temporary access routes, pipeline routes, or staging areas that occur within identified black rail habitat, and suitable eastern black rail habitat will not be completely removed in a single day. Pockets of eastern black rail habitat (refugia) approximately 10 by 20 feet will be left for 2 days and (or) a biological monitor will ensure dense herbaceous covered pathways are maintained into unaffected areas.
    - Placement of material will avoid covering existing consolidated vegetated marsh areas to the best extent practicable. This will help protect any black rails that may have taken up residence within the constructed marsh vegetation.
    - Temporary impacts from the hydraulic pipeline, or vehicles, used within vegetated wetland areas would be restored as closely as practicable to pre-project elevations utilizing dredged material following the removal of the temporary pipeline from the placement area.
- The following conservation measures would be implemented to minimize the potential for adverse effects to the whooping crane:
    - Seasonal timing restriction from November 1 through April 30 in which construction will be avoided to the extent possible.
    - If proposed actions cannot be avoided during this timeframe, then the following measures will be employed: tall structures, including buildings, construction equipment 15 feet high or higher, fences, and antennas in the area should be marked/flagged or laid down on the ground at night or when not in use to provide higher visibility and avoid/minimize potential whooping crane collisions.
    - Workers should be educated, with approved USFWS materials, to recognize whooping cranes, their habitat, and their federally endangered status.

- A biological monitor with authority to stop work immediately should be present from start to finish of the project in the event a whooping crane appears on the work site. If a whooping crane does appear near the site and is within 1,000 feet of the construction area, work should cease until it has moved beyond that distance or left the area.
- Report sightings of whooping cranes to the Texas Coastal Ecological Services Field Office in Corpus Christi at 361-533-6765.

4.4 Manatees, Right Whales & Dolphins

To minimize project impacts on the manatee, and other aquatic mammals, related to construction of the BABUS and of the transporting of dredged material to the BABUS, the USACE will comply with the terms and conditions of the Gulf of Mexico Regional Biological Opinion by NOAA Fisheries (2003) through revision 2 of NMFS (2007) (or more recent revision). As with sea turtle avoidance measures, the USACE will also comply with the construction conditions for protected species outlined in NOAA Fisheries (2021). In addition, the following conservation measures would be implemented to minimize the potential for adverse effects to manatees:

- Workers should be educated, with approved USFWS materials, to recognize manatees, and be instructed not to provide food or freshwater to manatees.
- If used, siltation barriers shall be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment.
- If a manatee is observed within 100 yards of an active work zone, all precautions will be implemented to ensure protection of the manatee. No equipment shall be operated within 50 feet of a manatee and activities will not resume until the manatee(s) has departed the project areas of its own volition.
- If a manatee is sighted nearby during construction or placement activities at the BABUS, the USFWS will be contacted at 361-533-6765 and the volunteer-based nonprofit organization Texas Marine Mammal Stranding Network at 1-800-962- 6625 (1-800-9MAMMAL).

If a North Atlantic right whale is spotted in the vicinity of Galveston, dredges, scows, and support vessels of 10 m (33 feet) or larger should limit their speed to 10 knots or less (≤13.2 mi/hour or ≤21.3 km/hour). This is what is recommended in ‘Right Whale Slow Zones’ and ‘Dynamic Management Areas’ along the U.S. east coast (USACE 2024).

5 SUMMARY OF EFFECTS

Table 5-1 below presents the summary of effects determined for the proposed BABUS project for all species with potential occurrence in or around Galveston Bay

.

Table 5-1. Summary of Effects to Federally Protected Species

Common Name (Scientific Names)	Federal Protection	Proposed Action: Effects Determination Under ESA Section 7	Summary of Effects
INSECTS			
Monarch butterfly (*Danaus plexippus*)	C	NE	No effects to terrestrial foraging or nesting habitats
FISHES			
Giant manta (*Mobula birostris*)	T	NE	Preferred habitat is pelagic open water, not likely to be in project area
Smalltooth sawfish (*Pristis pectinata*)	E	NE	Known habitat does not occur in project area
REPTILES			
American alligator (*Alligator mississippiensis*)	T*	NE	No presence of crocodiles in project area,
Alligator snapping turtle (*Macrochelys temminckii*)	P	NE	No effects to terrestrial foraging or nesting habitats
Green sea turtle (*Chelonia mydas*)	T	NLAA	Possibly occurs in project area, effects would be minimal as individuals are mobile and will avoid project area. No effect to nesting habitat.
Hawksbill sea turtle (*Eretmochelys imbricata*)	E	NE	Preferred habitat is shallow coastal open water and coral reef, not likely to be in project area. No effect to nesting habitat.
Kemp's ridley sea turtle (*Lepidochelys kempii*	E	NLAA	Possibly occurs in project area, effects would be minimal as individuals are mobile and will avoid project area. No effect to nesting habitat.
Leatherback sea turtle (*Dermochelys coriacea*)	E	NE	Preferred habitat is pelagic open water, not likely to be in project area. No effect to nesting habitat.
Loggerhead sea turtle (*Caretta caretta*)	T	NLAA	Possibly occurs in project area, effects would be minimal as individuals are mobile and will avoid project area. No effect to nesting habitat.
BIRDS			
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA	NE	No effects to terrestrial foraging or nesting habitats

Common Name (Scientific Names)	Federal Protection	Proposed Action: Effects Determination Under ESA Section 7	Summary of Effects
Eastern black rail (*Laterallus jamaicensis jamaicensis*)	T	NE	No effects to terrestrial foraging or nesting habitats
Piping plover (*Charadrius melodus*)	T	NE	No effects to terrestrial foraging or nesting habitats
Rufa red knot (*Calidris canutus rufa*)	T	NE	No effects to terrestrial foraging or nesting habitats
Whooping crane (*Grus americana*)	E	NE	No effects to terrestrial foraging or nesting habitats
Wood stork (*Mycteria americana*)	T	NE	Known habitat does not occur in project area
MAMMALS			
Bottlenose dolphin (*Tursiops truncatus*)	MMPA	NE	Possibly occurs in project area, effects would be minimal as individuals are mobile and will avoid project area
North Atlantic right whale (*Eubalaena glacialis*)	E	NE	Preferred habitat is pelagic open water, not likely to be in project area
Tricolored bat (*Perimyotis subflavus*)	P	NE	No effects to terrestrial foraging or nesting habitats
West Indian manatee (Florida manatee) (*Trichechus manatus* [*T. m. latirostris*])	T	NLAA	Possibly occurs in project area, effects would be minimal as individuals are mobile and will avoid project area

*Due to similarity of appearance to American crocodile

P- Proposed, E- Endangered, T- Threatened, C- Candidate, MMPA- Marine Mammal Protection Act, BGEPA – Bald and Golden Eagle Protection Act, NE- No Effect, NLAA- Not likely to adversely affect.

6 REFERENCES

Bak, C.V. 2020. *Threats to North Atlantic Right Whales and Killer Whales*. Nova Science Publishers, Inc., New York, NY.

Baughman, J.L. 1943. Notes on sawfish, *Pristis perotteti* Müller and Henle, not previously reported from the waters of the United States. *Copeia* 1943:43−48.

Bent, A.C. 1929. *Life Histories of North American Shore Birds. Willets, Plovers, Tattlers, Curlews, Oyster Catchers, and Others. Part 2*. Dover Publications, Inc., New York, NY.

Bent, A.C. 1963. *Life Histories of North American Marsh Birds*. Dover Publications, Inc., New York, NY.

Blair, H.B., N.D. Merchant, A.S. Friedlaender, D.N. Wiley, and S.E. Parks. 2016. Evidence for ship noise impacts on humpback whale foraging behaviour. *Biology Letters* 12(8).

Brown, L.N. 1991. *Sea Mammals: Atlantic, Gulf and Caribbean*. Windward Publishing, Inc., Miami, FL.

Clark, A.H. 1887. The whale-fishery. In: G.B. Goode (ed.), *The Fisheries and Fishery Industries of the United States*. Government Printing Office, Washington, D.C.

Cullen, D. 2023. What can a humpback whale hear? *Cosmos* published 17 Oct 2023 at https://cosmosmagazine.com/nature/marine-life/what-can-a-humpback-whale-hear/.

Davis, W.B. and D.J. Schmidly. 1994. *The Mammals of Texas*. Texas Parks & Wildlife Nongame and Urban Program, Austin, TX.

Dickerson, C., K.J. Reine, and D.G. Clarke. 2001. *Characterization of Underwater Sounds Produced by Bucket Dredging Operations*. DOER Technical Notes Collection (ERDC TN-DOER-E14), U.S. Army Engineer Research and Development Center, USACE, Vicksburg, MS.

Dickerson, D. 2011. *Methods to Minimize Dredging Impacts on Sea Turtles*. USACE Environmental Research and Development Center, Environmental Lab, Vicksburg, MS. Accessed online at https://dots.el.erdc.dren.mil/workshops/2011-05-24-dmams/20_19_Sea-Turtles-Dredging_Dickerson.pdf.

Dickerson, D., D.A. Nelson, and G. Banks. 1990. *Environmental Effects of Dredging Technical Notes. Alternative Dredging Equipment and Operational Methods to Minimize Sea Turtle Mortalities*. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. Accessed online at https://apps.dtic.mil/sti/tr/pdf/ADA292684.pdf.

Dundee, H.A., D.A. Rossman, and E.C. Beckham. 1989. *The Amphibians and Reptiles of Louisiana.* Louisiana State University Press, Baton Rouge, LA.

EPA. 1984. *Final Environmental Impact Statement for the Galveston, Texas Dredged Material Disposal Site Designation*. EPA Region 6, Dallas, TX.

EPA and USACE. 2016. *Galveston, Texas Ocean Dredged Material Disposal Site, Site Management & Monitoring Plan as Required by Section 102 of the Marine Protection, Research, and Sanctuaries Act*. EPA Region 6, Dallas, TX, and USACE Galveston District, Galveston, TX.

Forbush, E.H. and J.B. May. 1955. *A Natural History of American Birds of Eastern and Central North America*. Bramhall House, New York, NY.

Galveston Bay Report Card. 2024. *Galveston Bay Report Card. Wildlife Summary* [online resource]. Accessed online at https://www.galvbaygrade.org/wildlife/.

Girondot, M. 2015. Leatherback turtle populations in the Atlantic Ocean. Pp. 97–109. In: J.R. Spotila and P.S. Tomillo (eds.) *The Leatherback Turtle, Biology and Conservation*. Johns Hopkins University Press, Baltimore, MD.

Gordon, M, B. Giles, K. Garcia, J.W. Oakley, E. Munscher, J.J. Apodaca, A. Krohn, D.R. Bontrager, J. Kittle, M. Mokrech, T. Sankey, A. Tuggle, C. Franklin, V. Ricardez, C. Schalk, D. Saenz, D. Rosenbaum, C.J. Jones, J. Watson, T. Corbett, and G. Guillen. 2023a. *Baseline Study of Alligator Snapping Turtle (*Macrochelys temminckii*) Population Viability in Texas Watersheds, Final Report*. EIH Final Report No. EIH23-002, Prepared for the Texas Comptroller of Public Accounts (Contract 20-6997BG), Austin, TX.

Gordon, M, D.R. Bontrager, J.E. Watson, T. Corbett, C. Crawford, C.J. Franklin, B. Kirby, E. Munscher, V. Ricardez, and A. Tuggle. 2023b. Using local ecological knowledge to document distribution and temporal patterns of *Macrochelys temminckii* in Texas. *Southeastern Naturalist* 22(special issue 12):171–196.

Gower, J. and S. King. 2008. Satellite images show the movement of floating *Sargassum* in the Gulf of Mexico and Atlantic Ocean. *Nature Proceedings* (2008), https://doi.org/10.1038/npre.2008.1894.1

Guerra, P.A., R.J. Gegear, and S.M. Repport. 2014. A magnetic compass aids monarch butterfly migration. *Nature Communications* 5(4164). https://doi.org/10.1038/ncomms5164.

Hall, H.M. 1960. *A Gathering of Shore Birds.* The Devin-Adair Co., New York, NY.

Hamilton-Barry, J. 2019. *The North American Right Whale. Past, Present, and Future*. Nimbus Publishing, Ltd., Halifax, NS, Canada.

Harrel, J.B., C.M. Allen, and S.J. Hebert. 1996. Movements and habitat use of subadult alligator snapping turtles (*Macroclemys temminckii*) in Louisiana. *American Midland Naturalist* 135:60–67.

Hazel, J. and E. Gyuris. 2006. Vessel-related mortality of sea turtles in Queensland, Australia. *Wildlife Research* 33:149–154.

Hazel, J., I.R. Lawler, H. Marsh, and S. Robson. 2021. Vessel speed increases collision risk for the green turtle *Chelonia mydas*. *Endangered Species Research* 3:105–113.

Heppner, J.B. 2005. *The Monarch,* Danaus plexippus *(Linneaus) (Nymphalidae: Danainae).* Scientific Publishers, Inc., Gainesville, FL.

Hewlett, K.G. 1977. Saga of a sawfish. *Drum and Croaker, A Highly Irregular Journal for the Public Aquarist* 17(1):41–43.

Hoese, H.D. and R.H. Moore. 1977. *Fishes of the Gulf of Mexico. Texas, Louisiana, and Adjacent Waters*. Texas A&M University Press, College Station, TX.

Holt, M.M. 2008. *Sound Exposure and Southern Resident Killer Whales (*Orcinus orca*): A Review of Current Knowledge and Data Gaps*. NOAA Technical Memorandum NMFS-NWFSC-89, NMFS, Northwest Fisheries Science Center, Seattle, WA.

Houser, D.S., P.H. Kvadsheim, L. Kleivane, J. Mulsow, R.A. Olberg, C.A. Harms, J. Teilmann, and J.J. Finneran. 2024. Direct hearing measurements in a baleen whale suggest ultrasonic sensitivity. *Science* 386(6724). Accessed online at https://www.science.org/doi/10.1126/science.ado7580.

Howey, C.A.F., and S.A. Dinkelacker. 2009. Habitat selection of the alligator snapping turtle (*Macrochelys temminckii*) in Arkansas. *Journal of Herpetology* 43:589–596.

Iverson, J.B. 1992. *A Revised Checklist with Distribution Maps of the Turtles of the World*. Privately printed, Richmond, VA.

La Monte, F. 1958. *North American Game Fishes*. Doubleday & Company, Inc., Garden City, NY.

Laist, D.W. 2017. *North Atlantic Right Whales, from Hunted Leviathan to Conservation Icon*. Johns Hopkins University Press, Baltimore, MD.

Lester, LA., H.W. Avery, A.S. Harrison, and E.A. Standora. 2018. Interactions with motorboats. Pp. 221-230. In: W.M. Roosenburg and V.S. Kennedy (eds.) *Ecology and Conservation of the Diamond-backed Terrapin.* Johns Hopkins University Press, Baltimore, MD.

Lloyd Engineering, Inc. 2025. *Oyster Resources Survey Report, Houston Ship Channel Bay Aquatic Beneficial Use Sites, Galveston Bay, Texas*. Report prepared by Lloyd Engineering, Bellaire, TX; prepared for USACE Galveston District, Galveston, TX.

Love, M.S., A. Baldera, C. Yeung, and C. Robbins. 2013. *The Gulf of Mexico Ecosystem, a Coastal & Marine Atlas*. Ocean Conservancy, Gulf Restoration Center, New Orleans, LA. Accessed online at https://oceanconservancy.org/wp-content/uploads/2017/05/gulf-atlas.pdf.

Lutcavage, M.E., P. Plotkin, B. Witherington, and P.L. Lutz. 1997. Human impacts on sea turtle survival. Pp. 387–409. In: P.L. Lutz and J.A. Musick (eds). *The Biology of Sea Turtles, Vol I*. CRC Press, Boca Raton, FL.

Maehr, D.S. and H.W. Kale III. 2005. *Florida's Birds, a Field Guide and Reference*. Pineapple Press, Inc., Sarasota, FL.

Marks, C.S. and G.E. Marks. 2006. *Bats of Florida*. University Press of Florida, Gainesville, FL.

McEachran, J.D. and J.D. Fechhelm. 1998. *Fishes of the Gulf of Mexico. Volume I: Myxiniformes to Gasterosteiformes*. University of Texas Press, Austin, TX.

Mickle, M.F. and D.M. Higgs. 2022. Towards a new understanding of elasmobranchs. *Marine Biology* (2022)169:12.

Moore, J.C. and E. Clark. 1963. Discovery of right whales in the Gulf of Mexico. *Science* 141:269.

Munscher, E., J. Gray, A. Tuggle, D.B. Ligon, V. Gladkaya, C. Franklin, C. Drake, V. Ricardez, B.P. Butterfield, K. Norrid, and A. Walde. 2020. Discovery of an alligator snapping turtle (*Macrochelys temminckii*) population in metropolitan Houston, Harris County, Texas. *Urban Naturalist* 32:1–13.

Munscher, E., J.D. Riedle, A. Tuggle, J. Gray, D.B. Ligon, V. Gladkaya, C. Drake, R. Couvillon, J. Bolton, M. Morrison, B.P. Butterfield, and A.D. Walde. 2023. Demography of an urban population of alligator snapping turtles (*Macrochelys temminckii*) in Texas. *Southeastern Naturalist* 22(Special Issue 12):221–235.

National Geographic Society. 1987. *Field Guide to the Birds of North America*. National Geographic Society, Washington, D.C.

Niles, L.J., H.P. Sitters, A.D. Dey, P.W. Atkinson, A.J. Baker, K.A. Bennett, R. Carmona, K.E. Clark, N.A. Clark, C. Espoz, P.M. Gonzalez, B.A. Harrington, D.E. Hernández, K.S. Kalasz, R.G. Lathrop, R.N. Matus, C.D.T. Minton, R.I.G. Morrison, M.K. Peck, W. Pitts, R.A. Robinson, and I.L. Serrano. 2008. *Status of the Red Knot (*Calidris canutus rufa*) in the Western Hemisphere*. Studies in Avian Biology No. 36, Cooper Ornithological Society, Department of Biology, University of California, Riverside, CA.

NMFS. 2004. *Recovery Plan for the North Atlantic Right Whale (*Eubalaena glacialis*), Revision*. NMFS, Office of Protected Species, St. Petersburg, FL. Accessed online at https://repository.library.noaa.gov/view/noaa/3411.

NMFS. 2007. *Revision 2 to the National Marine Fisheries Service (NMFS) November 19, 2003, Gulf of Mexico Regional Biological Opinion (GRBO) to the U.S. Army Corps of Engineers (COE) on Hopper Dredging of Navigation Channels and Borrow Areas in the U.S. Gulf of Mexico.* NMFS Southeast Regional Office, St. Petersburg, FL. Accessed online at www.saj.usace.army.mil/Portals/44/docs/Planning/EnvironmentalBranch/EnviroCompliance/GRBO_2007rev2[508].pdf.

NMFS. 2009a. Endangered and threatened species; critical habitat for the endangered distinct population segment of smalltooth sawfish. *Federal Register* 74(169):45353–45378.

NMFS. 2009b. *Recovery Plan for Smalltooth Sawfish (*Pristis pectinata*).* Prepared by the Smalltooth Sawfish Recovery Team for NMFS, Silver Spring, MD.

NMFS. 2014. Endangered and threatened species: critical habitat for the northwest Atlantic Ocean loggerhead sea turtle distinct population segment (DPS) and determination regarding critical habitat for the North Pacific Ocean loggerhead DPS. *Federal Register* 79(132):39856–39912. Accessed online at https://www.federalregister.gov/documents/2014/07/10/2014-15748/endangered-and-threatened-species-critical-habitat-for-the-northwest-atlantic-ocean-loggerhead-sea.

NMFS. 2016a. *Continued Operations of Maintenance Dredging and Beach Sand Placement Actions under the 2007 Gulf of Mexico Regional Biological Opinion (GRBO) (I/SER/2015/17543)*. Memorandum from R.E. Crabtree of NMFS to A.B. Lee, 04 Mar 2016 of USACE South Atlantic Division. [not found; cited in Appendix K of the EIS for the HSC ECIP by USACE 2019].

NMFS. 2016b. Endangered and Threatened species; critical habitat for endangered North Atlantic right whale. *Federal Register* 81(17):4838–4874. Accessed online at https://www.govinfo.gov/content/pkg/FR-2016-01-27/pdf/2016-01633.pdf.

NMFS. 2018a. *2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts*. NOAA Technical Memorandum NMFS-OPR-59, Office of Protected Resources, NMFS, Office of Protected Resources, Silver Spring, MD. Accessed online at: https://tethys.pnnl.gov/sites/default/files/publications/NMFS-2018-Revision.pdf.

NMFS. 2018b. Endangered and threatened wildlife and plants: final rule to list the giant manta ray as threatened under the Endangered Species Act. *Federal Register* 83(14):2916–2931. Accessed online at https://www.federalregister.gov/documents/2018/01/22/2018-01031/endangered-and-threatened-wildlife-and-plants-final-rule-to-list-the-giant-manta-ray-as-threatened.

NMFS. 2019. Endangered and threatened species; determination on the designation of critical habitat for giant manta ray. *Federal Register* 84(234):66652–66664. Accessed online at https://www.govinfo.gov/content/pkg/FR-2019-12-05/pdf/2019-26265.pdf.

NMFS. 2020. *Endangered Species Act – Section 7 Consultation Biological Opinion. South Atlantic Regional Biological Opinion for Dredging and Material Placement Activities in the Southeast United States (2020 SARBO)*. NMFS, Southeast Regional Office, St. Petersburg, FL. Accessed online at https://media.fisheries.noaa.gov/dam-migration/sarbo_acoustic_revision_6-2020-opinion_final.pdf.

NMFS. 2023a. *Draft Biological Report for the Designation of Marine Critical Habitat for Six Distinct Population Segments of the Green Turtle,* Chelonia mydas. Report by NMFS, NOAA, Silver Spring, MD. Accessed online at https://www.fisheries.noaa.gov/s3/2023-07/DraftGreenTurtleCH-BiologicalReport-June2023.pdf.

NMFS. 2023b. Endangered and threatened wildlife and plants; proposed rule to designate marine critical habitat for six distinct population segments of green sea turtles. *Federal Register* 88(137):46572–46671. Accessed online at https://www.govinfo.gov/content/pkg/FR-2023-07-19/pdf/2023-14109.pdf.

NOAA Fisheries. 2003. *Endangered Species Act – Section 7 Consultation, Dredging of Gulf of Mexico Navigation Channels and Sand Mining ("Borrow") Areas using Hopper Dredges by COE Galveston, New Orleans, Mobile, and Jacksonville Districts (Consultation Number F/SER/2000/01287).* NOAA Fisheries Southeast Regional Office, St. Petersburg, FL. Accessed online at www.saj.usace.army.mil/Portals/44/docs/Planning/EnvironmentalBranch/EnviroCompliance/GRBO_2003[508].pdf.

NOAA Fisheries. 2021. *Protected Species Construction Conditions, NOAA Fisheries Southeast Regional Office*. NOAA Fisheries, Southeast Regional Office, Protected Resources Division, St. Petersburg, FL. Accessed online at https://media.fisheries.noaa.gov/2021-06/Protected_Species_Construction_Conditions_1.pdf.

NOAA Fisheries. 2022. Acropora*: Elkhorn and Staghorn Coral Critical Habitat Map and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/acropora-elkhorn-and-staghorn-coral-critical-habitat-map-and-gis-data.

NOAA Fisheries. 2023a. *Boulder Star Coral Critical Habitat Maps and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/boulder-star-coral-critical-habitat-maps-and-gis-data.

NOAA Fisheries. 2023b. *Lobed Star Coral Critical Habitat Maps and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/lobed-star-coral-critical-habitat-maps-and-gis-data.

NOAA Fisheries. 2023c. *Mountainous Star Coral Critical Habitat Maps and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/mountainous-star-coral-critical-habitat-maps-and-gis-data.

NOAA Fisheries. 2023d. *Pillar Coral Critical Habitat Maps and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/pillar-coral-critical-habitat-maps-and-gis-data.

NOAA Fisheries. 2023e. *Rough Cactus Coral Critical Habitat Maps and GIS Data*. Website accessed at https://www.fisheries.noaa.gov/resource/map/rough-cactus-coral-critical-habitat-maps-and-gis-data.

NOAA Fisheries. 2024. *Laws & Policies: Marine Mammal Protection Act*. Website accessed at https://www.fisheries.noaa.gov/topic/laws-policies/marine-mammal-protection-act.

Oberholser, H.C. 1974. *The Bird Life of Texas* [two volumes]. University of Texas Press, Austin, TX.

O'Shea, T.J., B.B. Ackerman, and H.F. Percival. 1995. *Population Biology of the Florida Manatee*. Information and Technology Report I, U.S. Department of the Interior, National Biological Service, Washington, D.C.

Pough, R.H. 1951. *Audubon Water Bird Guide. Water, Game and Large Land Birds; Eastern and Central North America from Southern Texas to Central Greenland*. Doubleday & Company, Inc., Garden City, NY.

Powell, R., R. Conant, and J.T. Collins. 2016. *Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America*. Houghton Mifflin Harcourt Publishing Co., New York, NY.

Pritchard, P.C.H. 1989. *The Alligator Snapping Turtle, Biology and Conservation*. Milwaukee Public Museum, Milwaukee, WI.

Reine, K.J., D. Clarke, C. Dickerson, and G. Wikel. 2014. *Characterization of Underwater Sounds Produced by Trailing Suction Hopper Dredges during Sand Mining and Pump-out Operations*. Document ERDC/EL TR 14-3 and BOEM 2014-055, U.S. Department of the Interior, Bureau of Ocean Energy Management and USACE, Herndon, VA. Accessed online at https://espis.boem.gov/final%20reports/5380.pdf.

Rolland, R.M., S.E. Parks, K.E. Hunt, M. Castellote, P.J. Corkeron, D.P. Nwacek, S.K. Wasser, and S.D. Kraus. 2012. Evidence that ship noise increases stress in right whales. *Proceedings of the Royal Society B: Biological Sciences* 279(1737):2363–2368.

Rosenbaum, D., D.C. Rudolph, D. Saenz, L.A. Fitzgerald, R.E. Nelson, C.S. Collins, T.J. Hibbitts, R.W. Maxey, P. Crump, and C.M. Schalk. 2023. Distribution and demography of the alligator snapping turtle (*Macrochelys temminckii*) in Texas: a 20-year perspective. *Southeastern Naturalist* 22(Special Issue 12):197–220.

Ross, D. 1976. *Mechanics of Underwater Noise*. Pergamon Press, New York.

Schmid, J.R. and W.J. Barichivich. 2006. *Lepidochelys kempii* – Kemp's ridley. Pp. 128–141. In: P.A. Meylan (ed), *Biology and Conservation of Florida Turtles*. Chelonian Research Monographs No. 3.

Schmidly, D.J. 1981. *Marine Mammals of the Southeastern United States Coast and the Gulf of Mexico*. FWS/OBS-80/41, Coastal Ecosystems Project, Office of Biological Services, USFWS, U.S. Department of the Interior, Washington, D.C.

Schmidly, D.J., C.O. Martin, and G.F. Collins. 1972. First occurrence of a black right whale (*Balaena glacialis*) along the Texas coast. *Southwestern Naturalist* 17(2):214–215.

Schmidly, D.J. and R.D. Bradley. 2016. *The Mammals of Texas*. University of Texas Press, Austin, TX.

Seitz, J.C. and G.R. Poulakis. 2006. Anthropogenic effects on the smalltooth sawfish (*Pristis pectinata*) in the United States. Marine Pollution Bulletin 52:1533–1540.

Shackelford, C.E., E.R. Rozenburg, W.C. Hunter, and M.W. Lockwood. 1999. *Migration and the Migratory Birds of Texas: Who They are and Where They are Going*. Publication PWD BK W7000-511, Texas Parks and Wildlife, Austin, TX.

Shillinger, G.L. and H. Bailey. 2015. Movements and behavior of adult and juvenile leatherback turtles. Pp. 162–172. In: J.R. Spotila and P.S. Tomillo (eds.) *The Leatherback Turtle, Biology and Conservation.* Johns Hopkins University Press, Baltimore, MD.

Shipp, R.L. 1986. *Dr. Bob Shipp's Guide to Fishes of the Gulf of Mexico*. Dauphin Island Sea Laboratory, Dauphin Island, AL.

Sloan, K.N., and D. Taylor. 1987. Habitats and movements of adult alligator snapping turtles in northeast Louisiana. *Proceedings of the Southeastern Association of Fish and Wildlife Agencies* 41:343–348.

Thorson, T.B. 1982. Life history implications of a tagging study of the largetooth sawfish, *Pristis perotteti*, in the Lake Nicaragua-Rio San Juan system. *Environmental Biology of Fishes* 7:207–228.

TPWD. No date. *Whooping Crane*. Online resource at https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0013_whooping_crane.pdf.

TPWD. 2017. Loggerhead Sea Turtle. http://www.tpwd.state.tx.us/huntwild/wild/species/logghead. (Accessed April 9, 2025).

TPWD. 2019. *Alligators in Texas; Rules, Regulations, and General Information*. TPWD, Austin, TX. Accessed online at https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_1011.pdf.

TPWD. 2022. *Kemp's Ridley Sea Turtle Nest Found at Galveston Island State Park for the First Time in a Decade*. TPWD, Austin, TX. Accessed online at https://tpwd.texas.gov/newsmedia/releases/?req=20220519a.

USACE. 2013. *The Corps of Engineers, Jacksonville District, and the State of Florida Effect Determination Key for the Manatee in Florida*. USACE, Jacksonville District, Jacksonville, FL. Accessed online at https://www.saj.usace.army.mil/Portals/44/docs/regulatory/sourcebook/endangered_species/Manatee/2013_FINAL_ManateeKey.pdf.

USACE. 2019. *Houston Ship Channel Expansion Channel Improvement Project, Harris, Chambers, and Galveston Counties, Texas. Final Integrated Feasibility Report – Environmental Impact Statement*. USACE Galveston District, Galveston, TX. Accessed online at https://www.swg.usace.army.mil/Projects/Houston-Ship-Channel-Improvement-Project/Houston-Ship-Channel-Project-Documents/.

USACE. 2022. *Final Value Engineering Study Report for Houston Ship Channel (HSC) Bay Aquatic Beneficial Use Site (BABUS), Galveston Bay, TX.* Prepared by Strategic Value Solutions, Inc., Lee's Summit, MO; submitted to USACE Galveston District, Galveston, TX.

USACE. 2024. *Virtual Breakout Workshop Summary: Regional Dredging NEPA Meetings*. USACE, South Atlantic Division, Charleston, SC. Virtual meeting held 14–22 Feb 2024

USFWS. 1967. Native fish and wildlife, endangered species. *Federal Register* 32(48):4001.

USFWS. 1978. Chapter I—U.S. Fish and Wildlife Service, Department of the Interior, Part 17—endangered and threatened wildlife and plants, determination of critical habitat for the whooping crane. *Federal Register* 43(94):20938–20945.

USFWS. 2001. Endangered and threatened wildlife and plants; final determination of critical habitat for wintering piping plovers. *Federal Register* 66(132):36038–36143.

USFWS. 2019. *Species Status Assessment Report for the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*)*. USFWS, Southeast Region, Atlanta, GA. Accessed online at https://ecos.fws.gov/ServCat/DownloadFile/186791.

USFWS. 2021a. Endangered and threatened wildlife and plants; designation of critical habitat for rufa red knot (*Calidris canutus rufa*). *Federal Register* 86(133):37410–37668.

USFWS. 2021b. Endangered and threatened wildlife and plants; initiation of 5-year status reviews of 23 species in the southwest. *Federal Register* 86(85):23976–23978.

USFWS. 2021d. Endangered and threatened wildlife and plants; threatened species status with Section 4(d) rule for alligator snapping turtle. *Federal Register* 86(214):62434–62463.

USFWS. 2022. Endangered and threatened wildlife and plants; endangered species status for tricolored bat. *Federal Register* 87(177):56381–56393.

USFWS. 2023. Endangered and threatened wildlife and plants; removal of the southeast U.S. distinct population segment of the wood stork from the list of endangered and threatened wildlife. *Federal Register* 88(31):9830–9850.

USFWS. 2024. *Bald and Golden Eagle Protection Act*. Accessed online at https://www.fws.gov/law/bald-and-golden-eagle-protection-act.

USFWS and NMFS. 1991. Recovery Plan for U.S. Population of Atlantic Green Turtle. National Marine Fisheries Service, Washington, D.C.

USFWS and NMFS. 1998. *Endangered Species Consultation Handbook*. Procedures for Conducting Section 7 Consultations and Conferences. USFWS, Washington, D.C., and NMFS, Silver Spring, MD.

U.S. Navy. 2017. *Criteria and Thresholds for U.S. Navy Acoustic and Explosive Effects Analysis (Phase III)*. Accessed online at https://www.goaeis.com/portals/goaeis/files/eis/draft_seis_2020/supporting_technical/Criteria_and_Thresholds_for_U.S._Navy_Acoustic_and_Explosive_Effects_Analysis_June2017.pdf

Vollmer, N.L. and P.E. Rosel. 2013. A review of common bottlenose dolphins (*Tursiops truncatus truncatus*) in the northern Gulf of Mexico: population biology, potential threats, and management. *Southeastern Naturalist* 12(monograph 6):1–43.

Walls, J.G. 1975. *Fishes of the Northern Gulf of Mexico*. T.F.H. Publications, Inc., Neptune City, NJ.

Ward-Geiger, L.I., A.R. Knowlton, A.F. Amos, T.D. Pitchford, B. Mase-Guthrie, and B.J. Zoodsma. 2011. Recent sightings of the North Atlantic right whale in the Gulf of Mexico. *Gulf of Mexico Science* 29(1):74–78.

Waters, J.D., R. Coelho, J. Fernandez-Carvalho, A.A. Timmers, T. Wiley, J.C. Seitz, M.T. McDavitt, G.H. Burgess, and G.R. Poulakis. 2014. Use of encounter data to model spatio-temporal distribution patterns of endangered smalltooth sawfish, *Pristis pectinata*, in the western Atlantic. *Aquatic Conservation: Marine and Freshwater Ecosystems* 24:760–776.

Welsh, R.C. and B.E. Witherington. 2023. Spatial mapping of vulnerability hotspots: information for mitigating vessel-strike risks to sea turtles. *Global Ecology and Conservation* 2023(46):e02592.

Witherington, B., R. Herren, and M. Bresette. 2006. *Caretta caretta* – loggerhead sea turtle. Pp. 74–89. In: P.A. Meylan (ed), *Biology and Conservation of Florida Turtles*. Chelonian Research Monographs No. 3.

Witherington, B. and D. Witherington. 2015. *Our Sea Turtles, a Practical Guide for the Atlantic and Gulf, from Canada to Mexico*. Pineapple Press, Inc., Palm Beach, FL.

Wolfe, S.H. and R.D. Drew (eds.). 1990. *An Ecological Characterization of the Tampa Bay Watershed*. USFWS Biological Report 90(20), Fish and Wildlife Service Research and Development, National Wetlands Research Center, Washington, D.C.

Wynne, K. and M. Schwartz. 1999. *Guide to Marine Mammals & Turtles of the U.S. Atlantic & Gulf of Mexico.* Rhode Island Sea Grant, University of Rhode Island, Narragansett, RI.

Yakich, D.M, A.K. Wooley, L.B. Heath, and G.R. Poulakis. 2024. Effects of marine debris and human interactions on the smalltooth sawfish (*Pristis pectinata*). *Marine Pollution Bulletin* 206:116606.